



Kyndryl Resiliency Orchestration

A Recovery Automation Library

Version 8.4.12.0



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Revision History

We have updated documentation to reflect changes in terminologies from **whitelist** to **allowlist** , and **Master/Slave** to **Primary/St, andby**. You will encounter continued references to these former terminologies while we work to implement these deeper changes to code, API, , and CLI commands.

Document Version	Revision Date	Sections Updated	Page No.	Supported Product Version
8.1	Jun 2020	Cyber Resiliency RALs	3	8.1, and above
		zSystem RALs	19	
		Kyndryl RBR RALs	40	
		OpenShift RALs	41	
		RHV RALs	42	
8.1.1	Sep 2020	executeZoscomm, and	215	8.1.1, and above
		VMware SRM RALs	419	
		Openshift	42	
		AIX	44	
8.1.2	Dec 2020	ActifioCDM(16)	39	8.1.2, and above
		OpenShift (15 new)	512	
		Hyper-V RALs (16)	531	
8.1.3	Mar 2021	BlockReplicator-V2 – TDMFRecover	509	8.1.3
		AixWithTDMF (2)	545	
8.2.0	Jun 2021	Portworx	548	8.0.x
		Kyndryl CSM DS8K	105	
		Kyndryl CSM_GetLogEvents	241	
		VMware Guest OS Customization RAL	462	
		VMware vC Guest OS Customization V1	475	
		Check Role to be Primary	594	
		Check Role to be Secondary	595	
		CheckReplicationInSync	595	



		AzureSQLSwitchOver	596	
		AzureSQLFailOver	507	
		Veeam	614	
		CloudEndure	620	
		VMware RP	625	
8.2.1	Sep 2021	HuaweiOceanStor	610	8.2.x
8.2.3	Sep 2021	MSSQL Always ON Choose DR Availability Replica	412	8.2.x
8.2.6	Dec 2021	HMCDRInitializeResponseDRL RAL details added	22.19	8.2.x
		Commvault RAL	58	
		EMCUnity	59	
		Nutamix RALs	57	
		VMware Vcenter	38	
8.2.9	Mar 2022	GetInstanceStatus, GetDetachVolumeStatus	46.16,17	
8.2.9	Feb 2022	HuaweiReplicationPRLUNReadOnly	56.7	
		HuaweiReplicationDRLUNReadWrite	56.8	
		CloneReplicatedOSDisksv2	49.26	
		CloneReplicatedDataDisksv2	49.27	
		GetClonedDiskTask	49.28	
		HuaweiLUNMapping	56.9	
		VerifyDeleteInstantMount	61.1	
		VeritasNetbackup_DeleteInstantVM	61.2	
		VeritasNetbackup_GetBackupData	61.3	
		VeritasNetbackupInstantMount	61.4	
		VeritasNetbackupVerifyInstantMount	61.5	
8.2.9	Mar 2022	HuaweiReplicationLUNReadOnly	618	8.2.x
		HuaweiReplicationLUNReadWrite	619	
		VerifyFullA recovery	644	
		ExecuteRESTAPI	626	
			639	



		<ul style="list-style-type: none"> • VerifyDeleteInstantMount_V3 • FullA recoveryWithoutNetworkCard <p>Workflow > Custom > Powershell updates</p>	590	
8.3.1	Jul 2022	<p>Updated the following RALs with Dry Run</p> <ul style="list-style-type: none"> • VMwareSRMCleanup • VMwareSRMCleanupPGstateValidate • VMwareSRMversionCheck • VMwareSRMSwitchbackRPstateValidate • VMwareSRMSwitchback • VMwareSRMReprotectPGstateValidate • VMwareSRMRPvmstateDR • VMwareSRMDrReprotect • VMwareSRMstatePrimary • VMwareSRMstateDR • VMwareSRMRPstatePrimary • VMwareSRMSwitchoverRPstateValidate • VMwareSRMSwitchbackPGstateValidate • VMwareSRMSwitchover • VMwareSRMRPstateDR • VMwareSRMPGdrState 	562	8.3.x



		<ul style="list-style-type: none"> • VMwareSRMReprotectRPstateValidate • VMwareSRMVRAcomp • VMwareSRMPRvrastatus • VMwareSRMDRvrastatus • VMwareSRMPGPrimaryState • VMwareSRMSwitchoverPGstateValidate 		
8.3.2	Aug 2022	<ul style="list-style-type: none"> • VMwareSRMCheckReplicationStatus.htm • VMwareSRMCleanupRPstateValidate.htm • VMwareSRMFallback.htm • VMwareSRMFallbackPGstateValidate.htm • VMwareSRMFallbackRPstateValidate.htm • VMwareSRMinputValidation.htm • VMwareSRMprimaryReprotect.htm • VMwareSRMReprotectPGstatePRvalidate.htm • VMwareSRMReprotectRPstatePRvalidate.htm • VMwareSRMTest.htm • VMwareSRMTestPGstateValidate.htm • VMwareSRMTestRPstateValidate.htm • Vmware_Execute_Guest_OS_Comm_and.htm 	588	8.3.x
8.3.3	Sep 2022	<p>Updated the following RAL with the Dry Run feature</p> <ul style="list-style-type: none"> • VMwareSRMReprotect 	579	8.3.x



		<ul style="list-style-type: none"> • HanaCheckMode • HanaRegisterSR • HanaGetStatus • HanaStop • HanaVerifySync • ReplicationSyncStatus • Takeover 		
8.3.3	Sep 2022	<ul style="list-style-type: none"> • DeleteDetachedDisks • Azure_GetVMDetails • Azure_DetachVMDisks • Azure_VerifyVMDeletion • VerifyFullRecory_V2 • Azure_GetAssetIdFromAsset Name • Azure_GetA recoveryPointDetails • Azure_FullVMA recovery • Azure_GetSloIdFromProtectionPolicyName • Azure_GetSelectionIdFromAssetName • Azure_TriggerManualBackup • PreA recoveryCheck • VerifyJobCompletion 	737-738,827-830	8.3.x
8.3.4	Oct 2022	AzuregetDestinationConfigId	830	8.3.x
8.3.5	Nov 2022	<ul style="list-style-type: none"> • Dtc Reco • Dtc Reco Delete 	673	8.3.x
		<ul style="list-style-type: none"> • ExecuteRESTAPI • isRDF 	798 138	



8.3.6	Dec 22	Change_Port_Groups_Mapping_for_Virtual_Machine - RO-51263	535	8.3.x
8.3.6	Dec 22	Non-mandatory fields in the table are updated with 'NA' value for ExecuteRestAPI RAL - RO-37873	800	8.3.x
8.3.7	Jan 2023	<ul style="list-style-type: none"> • Veeam_PhysicalToVMDK.htm • Veeam_PhysicalToVMDKForSelectedSnapshot.htm 	746	8.3.x
8.3.10.0	Apr 2023	VMware Execute Guest OS Command	476	8.3.x
8.3.11.0	May 2023	VmwareChangePortgroupsMapping	762	8.3.x
8.4.3.0	September 2023	<ul style="list-style-type: none"> • Select Snapshots in Auto mode.tcl • Skip RG-level Workflow.tcl • Map RDM.tcl 	110-111	8.4.x



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A recovery Automation Library (RAL)

The Kyndryl Resiliency Orchestration RAL provides actions that can be inserted into any workflow. The library is packaged with the product. The actions implement specific automatic tasks with defined input and output parameters.

- All Kyndryl workflows use these RAL actions to implement their business continuity operations.
- RAL provides complete use of RAL actions to end-users and supports personnel to introduce new workflows or modify the extended existing workflows (BCOs, BPIs, policies, and DR drills).
- RAL actions can be exported/ imported to/ from XML files.
- Workflow execution will capture the output of the action, including any output parameters returned by the actions.
- If there are multiple primary or DR servers in a group, then the user should select the exact component server where the script/command will be executed.

RAL Categories

1 Actifio

For all the Actifio and Tripwire RALs, the timeout value has to be changed based on the current load on Actifio, and Tripwire. The default timeout value is 1800 seconds.

1.1 ActifioFailover

The Actifio Failover RAL will failover VM to the DR site. There are The following two types of failover:

- Ready Volume
- Ready VM

1.1.1 Ready Volume: The Ready Volume is a type of failover.

CASE 1: Failover to existing VM

Input: TARGET HOST – Host in which the application should failover.

Output: Success

CASE 2: Failover to new VM

Input: The following are inputs for this action.



The input name	Description
TARGET HOST	New VM name
ESXHOST	ESX host in which the new VM should be created
MGMTSERVER	Vcenter host in which ESX is available
DATASTORE	Datastore in the ESX(optional)

Output: If the action is successful, the following message is displayed:

```
Failover job Job_XXXX successful. Source VMName: Source VMName, Host: target host name, Management Server: Management server name, ESX Host: Esx host name, datastore: data store name, type: readyvolume
```

If the action is a failure, the following message is displayed:

```
Failover job Job_XXXX failed with message: errorMessage
```

1.1.2 Ready VM: The Ready VM is a type of failover to the existing ready VM.

Input: None

Output: If the action is successful, the following message is displayed:

```
Failover job Job_XXXX successful. Source VMName: Source VMName, Vcenterhostname: Management server name, ESX Host: ESX host name, type: readyvm. DR VM dr-SourceVmName is ready for use.
```

If the action is a failure, the following message is displayed:

```
Failover job Job_XXXX failed with message: errorMessage
```

1.2 ActifioTestFailover

Creates the test failover setup by mounting the snapshot images on the existing VM or creates a new VM , and mounts the images.

1.2.1 Ready Volume

CASE 1: Failover test to existing host

Input: TARGETHOST – Host in which the application should failover.

Output: If the action is successful, the following message is displayed:

```
Test Failover job Job_XXXX successful. Source VMName: Source VMName, Test Failover host: target host name, type: readyvolume
```



If the action is a failure, the following message is displayed:

```
Test Failover job Job_XXXX failed with message: errorMessage
```

CASE 2: Failover test to new VM

Input: The following are inputs for this action.

The inputName	Description
TARGET HOST	New VM name
ESXHOST	ESX host in which the new VM should be created
MGMTSERVER	Vcenter host in which ESX is available
DATSTORE	Datastore in the ESX(optional)

Output: If the action is successful, the following message is displayed:

```
Test Failover job Job_XXXX successful. Source VMName: Source VMName, Host: target host name, Management Server: Management server name, ESX Host: Esx host name, datastore: data store name, type: readyvolume
```

If the action is a failure, the following message is displayed:

```
Test Failover job Job_XXXX failed with message: errorMessage
```

1.2.2 Ready VM

Failover test by creating a new VM.

Input: TARGETHOST – New failover VM name.

Output: If the action is successful, the following message is displayed:

```
Failover job Job_XXXX successful. Source VMName: Source VMName, Test Failover VM: target host, Vcenterhostname: Management server name, ESX Host: ESX host name, type: readyvm.
```

If the action is a failure, the following message is displayed:

```
Failover job Job_XXXX failed with message: errorMessage
```

1.3 ActifioDeleteTestFailover

The Actifio Delete Test Failover RAL deletes the test failover setup. In the case of an existing VM, it unmounts the image. In the case of a new VM, it deletes the VM.



1.3.1 Ready Volume

CASE 1: Clean up Failover test of existing host

CASE 2: Clean up Failover test of new VM

1.3.2 Ready VM

Clean up Failover test of existing host

Input: TESTFAILOVERIMAGE - Image which is obtained from ActifioTestFailover.tcl

Output: If the action is successful, the following message is displayed:

```
Delete Test Failover job $jobname successful. Deleted image $testfailoverimage
```

If the action is a failure, The following message is displayed:

```
DeleteTestFailover failed with Actifio errorMessage
```

1.4 ActifioFailback

Description - Changes made at the DR site can be replicated back (failback) to your production environment at the local Actifio appliance

Input: None

Output: If the action is successful, the following message is displayed:

```
Fallback job Job_XXXX successful
```

If the action is a failure, the following message is displayed:

```
Fallback job Job_XXXX failed with message: errorMessage
```

1.5 ActifioRestore

The Actifio Restore RAL restores the primary VM after the fallback step.

Input: None

Output: If the action is successful, the following message is displayed:

```
Restore job Job_XXXX successful
```

If the action is a failure, the following message is displayed:

```
Restore job Job_XXXX failed with message: errorMessage
```




1.6 ActifioSyncback

The Actifio Sync back RAL will sync the changes from DR-VM to PR-VM before the fallback operation.

Input: None

Output: If the action is successful, the following message is displayed:

```
Syncback job Job_XXXX successful
```

If the action is a failure, the following message is displayed:

```
Syncback job Job_XXXX failed with message: errorMessage
```

1.7 ActifioSourceSideValidation

The Actifio Source Side Validation RAL validates the sourcesky Actifio appliance for the given VM.

Input: None

Output: There is no output if the action is successful.

If the action is a failure, this RAL displays the appropriate error message on UI.

1.8 ActifioTargetSideValidation

The Actifio Target Side Validation RAL validates the sourcesky Actifio appliance for the given VM.

Input: None

Output: There is no output if the action is successful.

If the action is a failure, this RAL displays the appropriate error message on UI.

1.9 ActifioMount

The Actifio Mount RAL mounts the snapshot images to the existing VM or New VM.

CASE 1: Mount VM disks to the existing host

Input: TARGETHOST – Host in which the application should failover.

Output: If the action is successful, the following message is displayed:

```
Mount job Job_XXXX successful. Source VMName: Source VMName, mounting to existing host: target host
```

If the action is a failure, the following message is displayed:

```
Mount job Job_XXXX failed with message: errorMessage
```



CASE 2: Mount VM disks to new VM

Input: The following are inputs for this action.

The inputName	Description
NEWVMNAME	New VM name
ESXHOST	ESX host in which the new VM should be created
MGMTSERVER	Vcenter host in which ESX is available
DATASTORE	Datastore in the ESX(optional)
IMAGENAME	Name of the image (optional, if not provided, the script will pick the last successful snapshot image)

Output: If the action is successful, the following message is displayed:

```
Mount job Job_XXXX successful. Source VMName: Source VMName, mount to new VM: NEWVMNAME, ESX: ESXHOST, Management server: MGMTSERVER
```

If the action is a failure, the following message is displayed:

Mount job Job_XXXX failed with message: errorMessage

1.10 ActifioClone

The Actifio Clone RAL clones a new VM , and mounts VM disks to the new VM.

Input: The following are inputs for this action.

The inputName	Description
NEWVMNAME	New VM name
ESXHOST	ESX host in which the new VM should be created
MGMTSERVER	Vcenter host in which ESX is available
DATASTORE	Datastore in the ESX (optional)
IMAGENAME	Name of the image (optional, if not provided, the script will pick the last successful snapshot image)

Output: If the action is successful, the following message is displayed:



```
Clone job Job_XXXX successful. Source VMName: Source VMName, clone as new VM:
NEWVMNAME, ESX: ESXHOST, Management server: MGMTSERVER
```

If the action is a failure, the following message is displayed:

```
Clone job Job_XXXX failed with message: errorMessage
```

1.11 ActifioUnmount

The Actifio Unmount RAL unmounts the snapshot images from the existing VM or new VM. In the case of a new VM, it deletes the VM along with the existing VM. This RAL should be used after mounting the images using ActifioMount RAL.

CASE 1: UnMount VM disks to the existing host

CASE 2: UnMount VM disks to new VM

Input: IMAGENAME – Image that needs to be unmounted

Output: If the action is successful, the following message is displayed:

```
Unmount job Job_XXXX successful on image Image_XXXX
```

If the action is a failure, the following message is displayed:

```
Unmount job Job_XXXX failed with message: errorMessage
```

1.12 ActifioReplicate

This RAL starts the new backup job for the VM, and waits till it completes.

Input: None

Output: If the action is successful, the following message is displayed:

```
Replication job JOB_XXXX successful.
```

If the action is a failure, the following message is displayed:

```
Replication job Job_XXXX failed with message: Actifio errorMessage.
```

1.13 ActifioVerifyMountApp

Verifies if the protected DB App image is already mounted on the Target Oracle host.

Required inputs:

Get the required details from the protection scheme, and Group object

1. APP ID
2. Actifio Node ID
3. Actifio Credential



4. Actifio Appliance IP

5. Target Oracle host Component Name as hostname discovered in Target Actifio where mounted App snapshot has to be verified.

KEYNAME: TARGET HOST

Output:

Success:

<HostName>: currently no App Images are mounted

Error:

1. If the Target host Component Name is incorrect which is expected to be the same as Actifio protected hostname.

 Error message: Actifio does not have any hostname <Target_hostname>

2. If the app image is already mounted:

Error message: App Images: <SNAPSHOT_IMAGE_ID> is found as mounted on the host, kindly check Target Actifio App , and cleanup.

1.14 ActifioMountApp

CASE 1: Mount to existing host

The inputparameters:

TARGETHOST – The host on which the Actifio application image is being mounted.

Required inputs:

Get the required details from the protection scheme , and Group object

1. APP ID

2. Actifio Node ID

3. Actifio Credential

4. Actifio Appliance IP

5. Target Oracle host Component Name where mounted App snapshot must be verified. Define the Target Oracle host component Name with KEY_NAME as "TARGET HOST" OR the target host component name would be considered from the Group discovered component at CR SITE.

6. Actifio Mounted Image_name KEY_NAME "UNMOUNTIMAGENAME"

Output:

Success:

 MOUNTED_IMAGE: <Actifio IMAGE_NAME> for JOBNAME: Job_XXXX

Failure:



Mount job failed with message: errorMessage

Note:

1. If RAL execution leads to timeout , and "Awaiting input".

e.g. MSG: Unable to get a response in the Configured time

Please refer to the below guidelines.

Update RAL TIMEOUT once workflow execution is completed.

2. if RAL action is failed, RAL goes to "Awaiting Input". Please check , and fix the error.

Please quit the workflow , and restart the workflow operation.

Guidelines:

Please check the backend target Actifio sky appliance for the selected APP Mount job status.

If it's in progress, kindly wait for the mounting job to be completed.

Once it's succeeded, verify the Actifio mount point at the target Oracle host , and update KEY_NAME "UNMOUNTIMAGENAME" at run time execution for the Image.

Actifio Mount point from Linux or AIX: /act/mnt/Job_28071890_mountpoint_1553676997528

Found jobname: Job_28071890

Imagename = Image_28071890

Update KEY_VALUE during run time execution as

KEY_NAME:

UNMOUNTIMAGENAME

KEY_VALUE:

Image_28071890

1.15 ActifioOracleAppwareMount

Performs Oracle Appware Mount operation on existing target Oracle host.

Required inputs:

Get the required details from the protection scheme , and Group object

1. APP ID
2. Actifio Node ID
3. Actifio Credential
4. Actifio Appliance IP
5. Target Oracle host Component Name where mounted App snapshot has to be verified.



Define the Target Oracle host component Name with KEY_NAME as "TARGET HOST" OR the target host component name would be considered from the Group discovered component at CR SITE.

6. Oracle Home Directory
7. Oracle tnsAdministrator's directory path
8. Oracle <sid_name>
9. Oracle service_account username

Output:

Success:

APP_NAME: JOB_NAME – Mount job is started

Sets KEY_VALUE for MOUNT_JOBNAME

i.e. KEY_NAME: MOUNT_JOBNAME

KEY_VALUE: JOB_NAME e.g. Job_28071890

Failure:

APP_NAME: MOUNT_JOB not found

1.16 ActifioGetJobStatus

Get Actifio job session status with JOB_NAME

Required Input:

1. Actifio Credential
2. Actifio Appliance IP
3. Actifio Job name
 - a. Required KEY_NAME: MOUNT_JOBNAME

KEY_VALUE: JOB_VALUE

Output:

Success:

JOB_NAME: Running job queue status is completed.

Failure:

Get job failed with CMD_OUT (error description)

1.17 ActifioGetImageName



Get Actifio Mount job status via JOB_NAME. If the mounting job is a success, it gets the KEY_VALUE for Image_Name.

Required Input:

1. Actifio Credential
2. Actifio Appliance IP
3. Actifio Job name
- a. Required KEY_NAME: MOUNT_JOBNAME

KEY_VALUE: JOB_VALUE

Output:

Success:

Image mounted successfully: IMAGE_NAME

Sets KEY_NAME: UNMOUNTIMAGENAME

KEY_VALUE: Image_<JOB_XXXX> e.g. Job_28071890

Image_28071890

Failure:

- a. GetJobHistoryDetails failed with ERROR_MSG if it fails to get Job status.
- b. Mount job JOB_NAME failed with message ERROR_MSG if the Actifio job is not succeeded.

1.18 ActifioGetAppMountpointDetail

Get App mount point details for the mounted Actifio SNAPSHOT

Required inputs:

Get the required details from the protection scheme , and Group object

4. APP ID
5. Actifio Node ID
6. Actifio Credential
7. Actifio Appliance IP
8. Oracle <sid_name>
9. Mounted Actifio_Image Name

KEY_NAME: UNMOUNTIMAGENAME

Output:

Success:

Actifio mounted the snapshot with MOUNTPOINT"



Failure:

Actifio snapshot MOUNTPOINT not found for target Oracle Host.

1.19 ActifioValidateApp

Validate the App Name defined in the Target Protection scheme.

Required inputs:

Get the required details from the protection scheme , and Group object

1. APP ID
2. Source Cluster ID
3. Actifio Credential
4. Actifio Appliance IP

Output:

Success:

Application AppName found.

Failure:

Application AppName Not found.

1.20 ActifioImportImages

This RAL will check for the backup job after completion is imported on Actifio at the CR site.

The inputparameters:

IMPORTIMAGES = true/false

JOBNAME = Actifio job name

VAULTPOOLID =Kyndryl COS vault id.

Output:

Success: Import Image on CR <image name>.

Failure: Import Image <image name> failed.

1.21 ActifioMountWin



CASE 1: Mount to existing host

The inputparameters:

TARGETHOST – The host onto which the applicant needs to be mounted.

Output:

Success:

Mount job Job_XXXX successful. Source VMName: Source VMName, mounting to existing host: target host

Failure:

Mount job Job_XXXX failed with message: errorMessage

CASE 2: Mount to new VM

The inputparameters:

NEWVMNAME – New VM name

ESXHOST – ESX host on which the new VM should be created

MGMTSERVER – Vcenter host on which ESX is available

DATSTORE – Datastore on the ESX(optional)

IMAGENAME – Name of the image(optional, if not provided, the script will pick the last successful snapshot image)

Output:

Success:

Mount job Job_XXXX successful. Source VMName: Source VMName, mount to new VM: NEWVMNAME, ESX: ESXHOST, Management server: MGMTSERVER

Failure:

Mount job Job_XXXX failed with message: errorMessage

1.22 ActifioListVaultJobs

List the running/queued vault jobs. To enable KyndrylCOS access for implementing Airgap, it checks if any jobs are in the queue for Kyndryl COS access or already running.

The inputparameters: Vaultpool names



VAULTLIST – list of Actifio vault pool names with ',' separated.

Output:

Success:

A number of vault jobs are running or in the queue.

Example: Vaultpool1=5,VaultPool2=0;

Failure:

Actifio jobs are not waiting for KyndrylCOS access, , and do not enable network port.

1.23 ActifioVaultJobsCompleted

Checks if there are any vault jobs which is running or in the queued state before disabling KyndrylCOS access for implementing Airgap. If there are jobs that are running or in the queue it waits for some time to complete them.

The inputparameters: Vaultpool names

VAULTLIST – list of Actifio vault pool names with ',' separated.

Output:

Success:

Vault jobs are completed. Disable KyndrylCOS access.

Failure:

Actifio jobs are running , and waiting to complete.

1.24 ActifioMountJobQueueStatus

Description - Validate Actifio Mount job queue status on Target Host.

Required Input:

Get the required details from the protection scheme , and Dataset Group object

1. Actifio Credential
2. Actifio Appliance IP
3. APP ID
4. Target host (Target oracle host as discovered in oracle DB dataset)

Output:

Success:

The Mount job queue session is not active.



Failure:

Image JOB Queue is in <STATUS> state for host <TARGET HOST>



2 ActifioCDM

2.1 Actifio_GetClusterDetails

Description – This Actifio RAL gets the cluster details.

Inputs	The inputKey Values	Output Key Values
None	None	CLUSTER_ID DEFAULT_DISK_POOL

2.2 Actifio_CRDataLag

Description – This Actifio RAL gets the CR DataLag values for gathering consistent timestamps

Inputs	The inputKey Values	Output Key Values
Primary App Id, Primary Cluster Id, , and CR Vault Pool Name	PR_APP_ID PR_CLUSTER_ID CR_VAULT_POOL_NAME	DEDUPCONSISTENCYDATE VAULTCONSISTENCYDATE

2.3 Actifio_PRRDataLag

Description - This Actifio RAL gets the PR DataLag value , and calculates the total data lag

Inputs	The inputKey Values	Output Key Values
Primary App Id, Primary Cluster Id, CR Vault Pool Name, Deduplication consistency date, , and Vault consistency date	PR_APP_ID PR_CLUSTER_ID CR_VAULT_POOL_NAME DEDUPCONSISTENCYDATE VAULTCONSISTENCYDATE	TOTALDATALAG

2.4 Actifio_CRReplicationStatus

Description - This Actifio RAL gets the CR Replication Status.



Inputs	The inputKey Values	Output Key Values
Primary App Id, Primary Cluster Id, CR Vault Pool Name, , and total datalag	PR_APP_ID PR_CLUSTER_ID CR_VAULT_POOL_NAME TOTALDATALAG	REPLICATION_DETAILS_DATALAG REPLICATION_DETAILS_DATALAG_UNIT REPLICATION_DETAILS_EXIT_STATUS REPLICATION_DETAILS_OUTPUT REPLICATION_DETAILS_OUTPUT_TYPE REPLICATION_STATUS

2.5 Actifio_CRReplicationInfo

Description – This Actifio RAL gets the CR Replication Info.

Inputs	The inputKey Values	Output Key Values
Primary App Id, Primary Cluster Id, , and CR Vault Pool Name	PR_APP_ID PR_CLUSTER_ID CR_VAULT_POOL_NAME	BACKUP_DETAILS_OUTPUT

2.6 Actifio_CRPRTimestamp

Description - This Actifio RAL gets the PR Time Stamp.

Inputs	The inputKey Values	Output Key Values
Primary App Id, Primary Cluster Id, , and CR Vault Pool Name	PR_APP_ID PR_CLUSTER_ID CR_VAULT_POOL_NAME	PR_TIMESTAMP TIMESTAMP_FORMAT TCL_OUTPUT

2.7 Actifio_MountImageOnExistingHost

Description – The Actifio Mount Image RAL mounts the snapshot image to a mount point on the existing host discovered on the Actifio appliance.



Inputs	The inputKey Values	Output Key Values
The image that needs to be mounted, the image mount point, , and the existing target host name	IMAGE_NAME CR_TARGET_HOST IMAGE_MOUNT_POINT	IMAGE_TO_UNMOUNT

2.8 Actifio_UnmountImage

Description - The Actifio Umount Image RAL unmounts the snapshot images from the host. This RAL should be used only after mounting the images using ActifioMount RAL.

Inputs	The inputKey Values	Output
The image that needs to be unmounted	IMAGE_TO_UNMOUNT	<p>If the action is successful, the following message is displayed:</p> <p>Unmount job Job_XXXX successful on image Image_xxxx</p> <p>If the action is a failure, the following message is displayed:</p> <p>Unmount job Job_XXXX failed with message: errorMessage</p>

2.9 Actifio_MountImageOnNewVM

Description - The Actifio Mount Image RAL mounts the snapshot image to a mount point on a new VM.



Inputs	The inputKey Values	Output
The image that needs to be mounted, , and new VM details	IMAGE_NAME NEW_VM_NAME ESX_HOST DATASTORE MGMT_SERVER IS_PHYSICAL_RDM	IMAGE_TO_UNMOUNT

2.10 Actifio_GetHostNameFromIPAddress

Description – This Actifio RAL gets the host name from a given IP address

Inputs	The inputKey Values	Output
Host IP address	HOST_IP_ADDRESS	HOST_NAME

2.11 Actifio_GetLatestSnapshot

Description – This Actifio RAL gets the latest snapshot image name of the application.

Inputs	The inputKey Values	Output
PR App Id (The production application ID on Actifio)	PR_APP_ID	IMAGE_NAME

2.12 Actifio_GetBackupImageDetails

Description – This Actifio RAL gets the backup image details for a given image name.

Inputs	The inputKey Values	Output
Image name	IMAGE_NAME	IMAGE_APP_TYPE IMAGE_APP_ID IMAGE_HOST_NAME

2.13 Actifio_ListPhysicalServers



Description – This Actifio RAL gets the details of a host by a unique name.

Inputs	The inputKey Values	Output
Unique name of the host	UNIQUE_NAME	IMAGE_NAME UNIQUE_NAME SOURCE_CLUSTER_ID FRIENDLY_PATH HOSTNAME OS TYPE TARGET_HOSTID

2.14 Actifio_ListApplication

Description – This Actifio RAL lists the applications on a host

Inputs	The inputKey Values	Output
Host Id	HOST_ID	SOURCE_CLUSTER_ID APP_NAME APP_ID

2.15 Actifio_GetAppDetails

Description – This Actifio RAL gets the details of the application on a target host

Inputs	The inputKey Values	Output
Target Host Id	TARGET_HOST_ID	APP_NAME APP_ID

2.16 Actifio_ImportVaultBackup

Description – This Actifio RAL imports the

Inputs	The inputKey Values	Output
The application ID, the production side Actifio node ID (the cluster ID), the vault pool name configured on the CR side Actifio	PR_APP_ID PR_CLUSTER_ID CR_VAULT_POOL_NAME	None



3 AWS

3.1 Create Route Table

3.1.1 Description

This action will add a routing entry to a route table , and associate the same to one or more subnets.

3.1.2 Inputs

The inputName	The inputType	The inputKey Name	Optional/ M, andatory
Management Service Name	Choose from the List of Management Service Name	AWS_MANAGEMENT_SERVICE	M, andatory
AWS Region	Choose the AWS Region	AWS_REGION	M, andatory
VPC ID	Choose the VPC available in the selected region	AWS_VPC_ID	M, andatory
Route Table Name	Enter the Route Table Name	AWS_ROUTE_TABLE_NAME	M, andatory
Subnet ID	Choose Multiple Subnet ID	AWS_SUBNET_ID	M, andatory
Re-associate subnet	Check this to associate with a subnet	N/A	Optional

3.1.3 Output

Output Name	Output Key Name	Description
AWS Route Table Id	AWS_ROUTE_TABLE_ID	Route table ID

Note:

- Kyndryl Resiliency Orchestration supports only EC2-VPC type of instance.



3.2 Attach Amazon Volume

3.2.1 Description

This action attaches an AWS volume.

3.2.2 Inputs

The inputName	The inputType	The inputKey Name	Optional/ M, andatory	Description
AWS management service	String	AWS_MANAGEMENT_SERVICE	M, andatory	Select the management service from the drop-down list.
AWS Region	String	AWS_REGION	M, andatory	Choose the AWS Region
AWS volume id	String	AWS_VOLUME_ID	M, andatory	Select the volume id from the drop-down list.
AWS instance id	String	AWS_INSTANCE_ID	M, andatory	Provide the AWS instance id.
AWS instance name	String	AWS_INSTANCE_NAME	Optional	Provide the AWS instance name.
AWS device	String	AWS_DEVICE	M, andatory	Provide the AWS device.

Note

Select the checkbox to list all the instance names/ids.

Select any list item, then the instance name , and instance id are auto-populated.

- To auto-populate, the instance name , and instance id, select the checkbox to list all the instance names/ids.
- To attach multiple volumes, the user must configure the following keys with comma-separated values: AWS_VOLUME_ID , and AWS_DEVICE.
- The valid value for key AWS_AUTO_SCAN_DEVICE_NAME is yes.



3.3 AmazonS3BucketCleanup

3.3.1 Description

This action cleans files or folders from a specified S3 bucket.

3.3.2 Inputs

The inputName	The inputType	The inputKey Name	Optional/ M, andatory	Description
Management Service Name	Integer	AWS_MANAGEMENT_SERVICE	M, andatory	Select the Management service from the drop-down list.
Bucket Name	String	AWS_BUCKET_NAME	M, andatory	Select the Bucket name from the drop-down list.
File/Folder Path	String	AWS_S3_PATH	M, andatory	Provide the file or folder path.

Note

The file/Folder path should not contain the bucket name. Eg: x/y.txt where x is the folder name , and y is the file name.

3.4 Attach Security Group

3.4.1 Description

This action will attach the security group to an AWS EC2 instance.

3.4.2 Inputs

The inputName	The inputType	The inputKey Name	Optional/ M, andatory
Management Service Name	Choose from the List of Management Service Name	AWS_MANAGEMENT_SERVICE	M, andatory



The inputName	The inputType	The inputKey Name	Optional/ M, andatory
Region	Choose the AWS Region	AWS_REGION	M, andatory
VPC	Choose the VPC available in the selected region	AWS_VPC_ID	M, andatory
Instance	Choose the Instance which depends on VPC	AWS_INSTANCE_ID	M, andatory
Security Groups	Choose Multiple Security Groups available for the selected VPC	AWS_SECURITY_GROUP_ID	M, andatory

Note

Kyndryl Resiliency Orchestration supports only the EC2-VPC type of instance.

3.5 Attach Elastic IP

3.5.1 Description

This action will attach the Elastic IP to an AWS instance.

3.5.2 Inputs

The inputName	The inputType	The inputKey Name	Optional/ M, andatory
Management Service Name	Choose from the List of Management Service Name	AWS_MANAGEMENT_SERVICE	M, andatory



The inputName	The inputType	The inputKey Name	Optional/ M, andatory
Region	Choose the AWS Region	AWS_REGION	M, andatory
VPC	Choose the VPC available in the selected region	AWS_VPC_ID	M, andatory
Elastic IP	Choose Elastic IP	AWS_ELASTIC_IP	M, andatory
Instance	Choose the Instance depending on VPC	AWS_INSTANCE_ID	M, andatory
Re-associate address	Select Checkbox (Allow an Elastic IP address that's already associated to be re-associated)	AWS_CIDR_BLOCK	Optional

3.5.3 Outputs

Output Name	Output Key Name	Description
AWS Association Id	AWS_ASSOCIATION_ID	Association Id of elastic IP

Notes

Kyndryl Resiliency Orchestration supports only the EC2-VPC type of instance.

3.6 AWS Instance Status Checks RAL

3.6.1 Input:

Management Service Name Region Name , and Instance ID for which Instance status checks can be monitored.

3.6.2 DryRUN:

Check if the management Service , and Instance exist or not.

3.6.3 Result:

Monitoring until the Instance status checks (System reachability , and Instance reachability) are verified successfully.



NOTE

- kv AWS_MANAGEMENT_SERVICE as Management Service Name.
- kv AWS_REGION as Region Name
- kv AWS_INSTANCE_ID as Instance ID.

3.7 AWS Instance Terminate RAL

3.7.1 Input:

Management Service Name Region Name , and Instance ID which can be terminated.

3.7.2 DryRun:

Check if the management Service , and Instance exist or not.

3.7.3 Result:

Terminate the Instance.

- NOTE kv AWS_MANAGEMENT_SERVICE as Management Service Name.
- kv AWS_REGION as Region Name.
- kv AWS_INSTANCE_ID as Instance ID.

3.8 Create Amazon Instance

3.8.1 Description

This action creates an instance in AWS.

3.8.2 Inputs

The inputName	The inputType	The inputKey Name	Optional/ M, andatory	Description
AWS image id	String	AWS_IMAGE_ID	M, andatory	Provide the AWS image id.
AWS instance name	String	AWS_INSTANCE_NAME	Optional	Provide the AWS instance name.
AWS IP address	String	AWS_IMAGE_IP	Optional	Provide the IP address.



The inputName	The inputType	The inputKey Name	Optional/M, andatory	Description
AWS management service	String	AWS_MANAGEMENT_SERVICE	M, andatory	Select the management service from the drop-down list.
AWS security group id	String	AWS_SECURITY_GROUP_ID	M, andatory	Select the security group id from the drop-down list.
AWS subnet id	String	AWS_SUBNET_ID	M, andatory	Select the subnet id from the drop-down list.
AWS key name	String	AWS_KEY_NAME	M, andatory	Select the key name from the drop-down list.
AWS instance type	String	AWS_INSTANCE_TYPE	M, andatory	Select the instance type from the drop-down list.
region	String	AWS_REGION	M, andatory	Choose the AWS Region

Note:

- Select the **Show Saved Images** check box for listing the saved AWS images in Kyndryl Resiliency Orchestration.
- If **Show Saved Images** is **selected**, the instance name, image id ad IP address fields are automatically populated.

3.8.3 Outputs

Output Name	Output Key Name	Description
AWS instance id	AWS_INSTANCE_ID	AWS Instance Id

Note

If this action fails, the output key does not have any value.

3.8.4 Prechecks



- All the inputkeys , and values are checked.
- Credential check.

3.9 Create Amazon Volume

3.9.1 Description

This action creates a volume in the AWS.

3.9.2 Inputs

The inputName	The inputType	The inputKey Name	Optional/ M, andatory	Description
AWS management service	String	AWS_MANAGEMENT_SERVICE	M, andatory	Select the management service from the drop-down list.
Region	String	AWS_REGION	M, andatory	Choose the AWS Region
AWS availability zone	String	AWS_AVAILIBILITY_ZONE	M, andatory	Provide the AWS availability zone.
AWS volume size	Integer	AWS_VOLUME_SIZE	Optional(If snapshot id is configured then it will be optional, otherwise m, andatory)	Provide the AWS volume size.
AWS volume type	String	AWS_VOLUME_TYPE	M, andatory	Select the dataset from the drop-down list.



The inputName	The inputType	The inputKey Name	Optional/ M, andatory	Description
AWS provisioned volume iops	Integer	AWS_PROVISIONED_VOLUME_IOPS	M, andatory	Provide the AWS provisioned volume iops.
AWS snapshot id	String	AWS_SNAPSHOT_ID	Optional (if the volume size is configured)	Select the snapshot id from the drop-down list.
Encryption	String	AWS_ENCRYPT_VOLUME	Optional	Select checkbox

Note

Select the check box to disable the snapshot if you want to create a volume with the given size.

- To create multiple volumes, the user needs to configure either the Snapshot id or volume size with comma-separated values.
- **keys:** AWS_VOLUME_SIZE , and AWS_VOLUME_TYPE (valid volume types are io1, st, andard, , and gp2).
- The user should specify the value to 0(for volume type other than io1) for key AWS_PROVISIONED_VOLUME_IOPS.
- The valid value for key AWS_ENCRYPT_VOLUME is yes/no.

3.9.3 Outputs

Output Name	Output Key Name	Description
AWS volume id	AWS_VOLUME_ID	AWS Volume Id

Note

If this action fails, the output key does not have any value.

If you are creating volume from a snapshot , and do not specify a volume size, the default is the snapshot size.

3.9.4 Prechecks



- All the inputkeys , and values are checked.
- Credential check.

3.10 Create Amazon Snapshot

3.10.1 Description

This action creates a Snapshot in the AWS.

3.10.2 Inputs

The inputName	The inputType	The inputKey Name	Optional/ M, andatory
Snapshot Name	Enter snapshot name	AWS_SNAPSHOT_NAME	Optional
Management service Name	Choose from the List of Management Service Name	AWS_MANAGEMENT_SERVICE	M, andatory
Region	Choose the AWS Region	AWS_REGION	M, andatory
AWS volume id	Select the Volume id from the drop-down list	AWS_VOLUME_ID	M, andatory

3.10.3 Outputs

Output Name	Output Key Name	Description
AWS snapshot id	AWS_SNAPSHOT_ID	AWS Snapshot id

Note

If this action fails, the output key does not have any value.

3.10.4 Prechecks

- All the inputkeys , and values are checked.
- Credential check.

3.11 Create an Internet Gateway



3.11.1 Description

This action will create an Internet Gateway , and attach the same to VPC.

3.11.2 Inputs

The inputName	The inputType	The inputKey Name	Optional/ M, andatory	Description
Management Service Name	String	AWS_MANAGEMENT_SERVICE	M, andatory	Choose from the List of Management Service Name
Region	String	AWS_REGION	M, andatory	Choose the AWS Region
VPC	String	AWS_VPC_ID	M, andatory	Choose the VPC available in the selected region
Name	String	AWS_INTERNET_GATEWAY_NAME	M, andatory	Internet Gateway Name

3.11.3 Output

AWS_GATEWAY_ID

3.12 Create Image RAL

3.12.1 Description

This action will create an Internet Gateway , and attach the same to VPC.

3.12.2 Input

Management Service Name, Region name, Instance ID, Image name

3.12.3 DryRUN



Check the management Service , and instance exists or not.

3.12.4 Result

Creates image for the existing instance id.

NOTE

- The inputKV kv AWS_MANAGEMENT_SERVICE as Management Service Name kv AWS_REGION as Region Name kv AWS_INSTANCE_ID as Instance ID kv AWS_IMAGE_NAME as the Instance ID
- Output KV AWS_IMAGE_ID

3.13 Create Subnet RAL

3.13.1 Description

This action will create a Subnet in AWS.

3.13.2 Inputs

The inputName	The inputType	The inputKey Name	Optional/ M, andatory
Management Service Name	Choose from the List of Management Service Name	AWS_MANAGEMENT_SERVICE	M, andatory
Subnet Name	AWS Subnet name	AWS_SUBNET_NAME	M, andatory
Region	Choose the AWS Region	AWS_REGION	M, andatory
VPC ID	Choose the VPC available in the selected region (As we support Non EC2-Classic instance)	AWS_VPC_ID	M, andatory
Availability Zone	The Availability Zone for the subnet. Default: Amazon EC2 selects one for you (recommended).	AWS_AVAILABILITY_ZONE	Optional
CIDR Block	The network range for the subnet is in CIDR notation. For	AWS_CIDR_BLOCK	M, andatory



The inputName	The inputType	The inputKey Name	Optional/ M, andatory
	example, 10.0.0.0/24.		
Map Public Ip On Launch	Select checkbox (Specify true to indicates that instances launched into the specified subnet should be assigned public IP address)	AWS_MAP_PUBLIC_IP_ON_LAUNCH	Optional

3.13.3 Outputs

Output Name	Output Key Name	Description
AWS Subnet Id	AWS_SUBNET_ID	The ID of the subnet created

3.14 Create Security Group

3.14.1 Description

This action will create a security group in AWS.

3.14.2 Inputs

The inputName	The inputType	The inputKey Name	Optional/ M, andatory
Management Service Name	Choose from the List of Management Service Name	AWS_MANAGEMENT_SERVICE	M, andatory
Region	Choose the AWS Region	AWS_REGION	M, andatory
VPC ID	Choose the VPS available in the selected region (As we support Non EC2-Classic instance)	AWS_VPC_ID	M, andatory



The inputName	The inputType	The inputKey Name	Optional/ M, andatory
Security Group Name	Provide the Security Group name	AWS_SECURITY_GROUP_NAME	M, andatory
Ingress Rules	Provide the Ingress Rules (protocol:startPort:endPort:IPCider, protocol:startPort:endPort:IPCider)	AWS_SECURITY_GROUP_INGRES S_RULES	Optional
Egress Rules	Provide the Egress Rules (protocol:startPort:endPort:IPCider, protocol:startPort:endPort:IPCider)	AWS_SECURITY_GROUP_EGRES S_RULES	Optional
Description	Describe the security group	AWS_SECURITY_GROUP_DESC	M, andatory

3.14.3 Outputs

Output Name	Output Key Name	Description
AWS security group id	AWS_SECURITY_GROUP_ID	The ID of the Security Group created
AWS security group name	AWS_SECURITY_GROUP_NAME	The Name of the Security Group created

3.15 Create Amazon S3 Bucket

3.15.1 Description: This action will create an S3 Bucket in Specified Region.

3.15.2 Inputs

The inputName	The inputType	The inputKey Name	Optional/ M, andatory
Management Service Name	Choose from the List of Management Service Name	AWS_MANAGEMENT_SERVICE	M, andatory



The inputName	The inputType	The inputKey Name	Optional/ M, andatory
Bucket Name	Bucket Name	AWS_BUCKET_NAME	M, andatory
Region	Choose from the List of Regions	AWS_REGION	M, andatory

3.15.3 Outputs

Output Name	Output Key Name	Description
AWS bucket name	AWS_BUCKET_NAME	Bucket Name

3.16 Delete Amazon Volume

3.16.1 Description

This action deletes the volume in AWS.

3.16.2 Inputs

The inputName	The inputType	The inputKey Name	Optional/ M, andatory	Description
AWS volume id	String	AWS_VOLUME_ID	M, andatory	Select the volume id from the drop-down list.
AWS management service	String	AWS_MANAGEMENT_SERVICE	M, andatory	Select the management service from the drop-down list.
region	String	AWS_REGION	M, andatory	Choose the AWS Region



3.16.3 Prechecks

- All the inputkeys , and values are checked.
- Credential check.

3.17 Detach Amazon Volume

3.17.1 Description

This action detaches an AWS volume.

3.17.2 Inputs

The inputName	The inputType	The inputKey Name	Optional/ M, andatory	Description
Management service name	String	AWS_MANAGEMENT_SERVICE	M, andatory	Select the management service from the drop-down list.
AWS Region	String	AWS_REGION	M, andatory	Select the region from the drop-down list.
AWS Volume ID	String	AWS_VOLUME_ID	M, andatory	Select the volume id from the drop-down list.
Force Detach Volume	Boolean	AWS_FORCE_DETACH_VOLUME	Optional	The check box, if enabled, forces the volume to be detached.

3.17.3 Prechecks

- All the inputkeys , and values are checked.
- Credential check.

3.18 Delete Amazon Snapshot

3.18.1 Description

This action deletes the Snapshot in the AWS.



3.18.2 Inputs

The inputName	The inputType	The inputKey Name	Optional/ M, andatory	Description
Management service name	String	AWS_MANAGEMENT_SERVICE	M, andatory	Select the management service from the drop-down list.
AWS Region	String	AWS_REGION	M, andatory	Select the region from the drop-down list
AWS snapshot id	String	AWS_SNAPSHOT_ID	M, andatory	Select the snapshot id from the drop-down list.

3.18.3 Prechecks

- All the inputkeys , and values are checked.
- Credential check.

3.19 DeregisterInstancesFromAmazonElasticLoadBalancer

3.19.1 Description

This action deregisters instances from Amazon elastic load balancer.

3.19.2 Inputs

The inputName	The inputType	The inputKey Name	Optional/ M, andatory	Description
Management Service Name	String	AWS_MANAGEMENT_SERVICE	M, andatory	Select the management service from the drop-down list.
region	String	AWS_REGION	M, andatory	Select the region from



				the drop-down list.
AWS Load Balancer Name	String	AWS_LOAD_BALANCER_NAME	M, mandatory	Enter the Load balancer name.
AWS Instance ID	String	AWS_INSTANCE_ID	M, mandatory	Enter the AWS Instance Id.

3.19.3 Pre-checks

- All the inputkeys , and values are checked.
- Credential check.

3.20 RegisterInstancesWithAmazonElasticLoadBalancer

3.20.1 Description

This action registers instances with the Amazon elastic load balancer.

3.20.2 Inputs

The inputName	The inputType	The inputKey Name	Optional/ M, mandatory	Description
Management Service Name	String	AWS_MANAGEMENT_SERVICE	M, mandatory	Select the management service from the drop-down list.
region	String	AWS_REGION	M, mandatory	Select the region from



				the drop-down list.
AWS Load Balancer Name	String	AWS_LOAD_BALANCER_NAME	M, mandatory	Enter the Load balancer name.
AWS Instance ID	String	AWS_INSTANCE_ID	M, mandatory	Enter the AWS Instance Id.

3.20.3 Pre-checks

- All the inputkeys , and values are checked.
- Credential check

3.21 DeleteAmazonElasticLoadBalancer

3.21.1 Description

This action deletes the Amazon elastic load balancer.

3.21.2 Inputs

The inputName	The inputType	The inputKey Name	Optional/ M, mandatory	Description
Management Service Name	String	AWS_MANAGEMENT_SERVICE	M, mandatory	Select the management service from the drop-down list.



Region	String	AWS_REGION	M, mandatory	Select the region from the drop-down list.
Load Balancer Name	String	AWS_LOAD_BALANCER_NAME	M, mandatory	Enter the Load balancer name to be deleted.

3.21.3 Pre-checks

- All the inputkeys , and values are checked.
- Credential check.

3.22 Import EC2 RAL

3.22.1 Description

This action will import the instance to the AWS instances.

3.22.2 Inputs

The inputName	The inputType	The inputKey Name	Optional/ M, mandatory
Management Service Name	Choose from the List of Management Service Name	AWS_MANAGEMENT_SERVICE	M, mandatory
Region	Choose the AWS Region	AWS_REGION	M, mandatory
Availability Zone	Choose the AWS Availability Zone	AWS_AVAILABILITY_ZONE	M, mandatory



The inputName	The inputType	The inputKey Name	Optional/ M, andatory
Instance Type	Choose the available instance type	AWS_INSTANCE_TYPE	M, andatory
Instance Name	Provide instance name	AWS_INSTANCE_NAME	Optional
Architecture	Choose the available architecture	AWS_INSTANCE_ARCHITECTURE	M, andatory
Platform	Choose the available platform	AWS_PLATFORM	Optional
Subnet Id	Choose the available subnet or create new	AWS_SUBNET_ID	M, andatory
Private IP	Provide a Private IP Address within n subnet	AWS_PRIVATE_IP_ADDRESS	Optional
Replication appliance	Choose the replication appliances where the CBT is running. Only OVA replication appliances can be listed	AWS_REPLICATION_APPLIANCE	M, andatory
File format	Choose the file format. As of now, only RAW is supported	AWS_FILE_FORMAT	M, andatory
RAW File Path	Provide Absolute RAW file path location	AWS_RAWFILE_PATH	M, andatory
Bucket Name	Choose Amazon S3 Bucket Name	AWS_BUCKET_NAME	M, andatory



3.22.3 Outputs

Output Name	Output Key Name	Description
AWS instance Id	AWS_INSTANCE_ID	Created instance id
aws S3 path	AWS_S3_PATH	Uploaded RAW file to S3 bucket path

Note

AWS EC2 CLI has to be installed , and configured in the Resiliency Orchestration Appliance (Do not set the access key , and secret key as static).

3.23 Import EBS Volume RAL

3.23.1 Description

This action will import the volume to the AWS instances.

3.23.2 Inputs

The inputName	The inputType	The inputKey Name	Optional/ M, andatory
Management Service Name	Choose from the List of Management Service Name	AWS_MANAGEMENT_SERVICE	M, andatory
Region	Choose the AWS Region	AWS_REGION	M, andatory
Availability Zone	Choose the AWS availability zone	AWS_AVAILABILITY_ZONE	
Replication appliance	Choose the replication appliances where the CBT is running. Only OVA replication appliances can be listed	AWS_REPLICATION_APPLIANCE	M, andatory
RAW File Path	Provide Absolute RAW file path location	RAW_FILE_PATH	M, andatory



The inputName	The inputType	The inputKey Name	Optional/ M, andatory
File format	Choose the file format. As of now, only RAW is supported	AWS_FILE_FORMAT	M, andatory
Bucket Name	Choose Amazon S3 Bucket Name	AWS_BUCKET_NAME	M, andatory
Volume Size	Provide the size of the volume to be created (In GBs)	AWS_VOLUME_SIZE	M, andatory
Description	Describe the volume	AWS_VOLUME_DESC	Optional

3.23.3 Outputs

Output Name	Output Key Name	Description
EBS Volume Id	<i>EBS_VOLUME_ID</i>	The ID of the EBS volume created

Note

AWS EC2 CLI has to be installed , and configured in the Resiliency Orchestration Appliance (Do not set the access key , and secret key as static).

3.24 Start AWS Instance

3.24.1 Description

This action starts the instances in AWS.

3.24.2 Inputs

The inputName	The inputType	The inputKey Name	Optional/ M, andatory	Description
Management Service Name	String	AWS_MANAGEMENT_SERVICE	M, andatory	Choose from the List of Management Service Names.



The inputName	The inputType	The inputKey Name	Optional/ M, andatory	Description
Region	String	AWS_REGION	M, andatory	Choose the AWS Region.
Instance	String	AWS_INSTANCE_ID	M, andatory	Choose the instance available in the selected region.

3.25 Stop Amazon Instance

3.25.1 Description

This action stops the instance in AWS.

3.25.2 Inputs

The inputName	The inputType	The inputKey Name	Optional/ M, andatory	Description
Management Service Name	String	AWS_MANAGEMENT_SERVICE	M, andatory	Choose from the List of Management Service Names.
Region	String	AWS_REGION	M, andatory	Choose the AWS Region.
Instance	String	AWS_INSTANCE_ID	M, andatory	Choose the instance available in the selected region.

3.26 S3 Bucket CleanUp

3.26.1 Description

This action will clean the file/folder from Amazon S3 Bucket.

3.26.2 Inputs



The inputName	The inputType	The inputKey Name	Optional/ M, andatory
Management Service Name	Choose from the List of Management Service Name	AWS_MANAGEMENT_SERVICE	M, andatory
Bucket Name	Choose from the List of Bucket Name	AWS_BUCKET_NAME	M, andatory
File/Folder Path	File/Folder path in S3 Bucket	AWS_S3_PATH	M, andatory

Notes

The file/Folder path should not contain the bucket name. Example: x/y.txt where x is the folder name , and y is the file name.



4 Cyber Resiliency

4.1 Actifio CR

4.1.1 ActifioSourceSideValidation

Description: This RAL validates the sourcesky Actifio appliance for the given VM.

Input: None

Output: If successful, ActifioSourceSide Validation is successful. Otherwise, in case of failure, it throws appropriate failure ErrorMessage on UI.

4.1.2 ActifioTargetSideValidation

Description: This RAL validates the sourcesky Actifio appliance for the given VM.

Input: None

Output: If successful, ActifioTargetSide Validation is successful. Otherwise, in case of failure, it throws appropriate failure ErrorMessage on UI.

4.1.3 ActifioMount

Description: This RAL mounts the selected snapshot on the given ESXi host.

- **CASE 1:** Mount VM disks to the existing host

Input: TARGETHOST – Host in which the application failed over.

Output: If successful, mount job Job_XXXX is successful.

Source VMName: Source VMName, mounting to existing host: targethost.

In case of failure, mount job Job_XXXX fails with errorMessage.

- **CASE 2:** Mount VM disks to new VM

Inputs: The following are inputs:

- NEWVMNAME – New VM name
- ESXHOST – ESX host on which the new VM should be created
- MGMTSERVER – Vcenter host on which ESX is available
- DATASTORE – Datastore on the ESX(optional)
- IMAGENAME – Name of the image(optional, if not provided, the script will pick the last successful snapshot image)

Output: If successful, mount job Job_XXXX is successful.

Source VMName: Source VMName, mount to new VM: NEWVMNAME, ESX: ESXHOST, , and Management server – MGMTSERVER

In case of failure, mount job Job_XXXX fails with errorMessage.



4.1.4 ActifioUmount

Description: Unmounts the selected Actifio image from the ESXi host.

- CASE 1: UnMount VM disks to the existing host
- CASE 2: UnMount VM disks to new VM

Input: UNMOUNTIMAGENAME – Image that needs to be unmounted

Output: If successful, unmount job, for example, Job_XXXX is successful on the image, for example, Image_xxxx.

In case of failure, the unmount job, for example, Job_XXXX fails with errorMessage.

4.1.5 ActifioImportImages

Description: Imports the image from the vault pool, and checks if the specified image or image corresponding to a particular job is present on the extended cyber DR site.

Input: IMAGENAME– Image, which needs to be verified when imported on the Cyber DR site.

Output: If successful, the import image, for example, Image_xxxx is successful. In case of failure, the import image, for example, Image_xxxx is timeout.

4.1.6 ActifioReplicate

Description: Creates a new backup job for the VM on the primary site Actifio, and returns the job name.

Input: None

Output: If successful, the replication job is successful. Otherwise, the replication The job fails with the error message.

4.2 Import Windows Registry

Description: This RAL displays all the server names, which are available in Cyber Resiliency. It allows the user to select the required registry file, which is available in .reg format, and import it to the Windows Registry.

Inputs: The following is a list of inputs that are required to perform this action.



The inputName	The inputType	The inputKey Name	Optional/ M, andatory	Description
Server Name	Select Option	Agent Node	M, andatory	Enter the Agent Node/ DR.
Registry key Location	Windows Registry Key Location	Registry Key Location	M, andatory	Location to which Windows Registry Key will be copied

4.3 Export Windows Registry

Description: This RAL displays all Server Names available in Cyber Resiliency. From the select options, the user can select the registry file in .reg format , and export it to the Windows Registry.

Inputs: The following is a list of inputs that are required to perform this action.

The inputName	The inputType	The inputKey Name	Optional/ M, andatory	Description
Server Name	Select Option	Agent Node	M, andatory	Agent Node/ DR.
Registry key Name	Windows Registry Key Name	Registry Key Name	M, andatory	Name of the Windows Registry Key to be copied
Registry Key File Name	Enter the Registry Key File Name	Registry Key File Name	M, andatory	File to which the Registry key is to be exported
Registry Key Save Path	Enter the path where the registry keys will be exported to	Registry Key Save Path	M, andatory	Location to which Windows Registry Key will be copied

4.4 Delete Windows Registry RAL

Description: This RAL displays all the server names, which are available in Cyber Resiliency. It allows the user to select the registry key location , and then remove it.

Inputs: The following is a list of inputs that are required to perform this action.



The inputName	The inputType	The inputKey Name	Optional/ M, andatory	Description
Server Name	Select List	Server Name	M, andatory	Select Agent Name from the drop-down List
Registry Key Location	String	Registry Key Location	M, andatory	Need Registry Key Location

Outputs: The following is the output of this action.

Output	Output File Name	Description
Success/Failure		Deletes the registry key from the Agent Node

4.5 Import DVS

Description: The user can select JSON file, management server, , and Distributed Virtual Switch, , and Import the configuration into the selected switch.

Inputs: The following is a list of inputs that are required to perform this action.

The inputName	The inputType	Optional/ M, andatory	Description
Venter Management Service	Select List	M, andatory	Select the Management Service from the drop-down list.
Datacenter Name	Select List	M, andatory	Select the data center name from the drop-down list.



The inputName	The inputType	Optional/ M, andatory	Description
DVS Name	Select List	M, andatory	Select the DVS name from the drop-down list.
File path	String	M, andatory	DVS File path

Outputs: The following is the output of this action.

Output Result	Output File Name	Description
Success/Failure	File Name	Result

4.6 Export DVS

Description: This RAL exports the DVS configuration file to a JSON file. RAL also takes management services , and allows users to choose Datacenter. Users can provide Configure DVS name , and provide the location to export the File. The file format is JSON.

Inputs: The following is a list of inputs that are required to perform this action.

The inputName	The inputType	Optional/ M, andatory	Description
Venter Management Service	Select List	M, andatory	Select the Management Service from the drop-down list.
Datacenter Name	Select List	M, andatory	Select the data center name from the drop-down list.



DVS Name	Select List	M, andatory	DVS File Name
File path	String	M, andatory	DVS File path
File Name	String	M, andatory	DVS File name

Outputs: The following is the output of this action.

Output Result	Output File Name	Description
Success/Failure	File Name	Result

4.7 Diff Files

Description: Comprehensive RAL is used to compare text files for Windows, Linux, , and DVS configurations.

The useris prompted to provide the Server Name, the File to compare, , and the Difference file save path.

Once the RAL is executed, the result of the comparison is saved in the result path.

Inputs: The following is a list of inputs that are required to perform this action.

The inputName	The inputType	Optional/ M, andatory	Description
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Server Name	Select List	M, andatory	Select Server Name from the drop-down List
File to compare	String	M, andatory	File Name
File to compare	String	M, andatory	File Name
Difference Result Output Save path	String	M, andatory	Directory Path of Difference result
Difference Result File Name	String	M, andatory	File Name

Outputs: The following is the output of this action.

Output	Output File Name	Description
Success/Failure	File Name	Difference Result

4.8 BackupDS8KAction

Description: This RAL exports all the connections on the DS8000 Storage device to the specified file directory.

The users is prompted to provide the Server Name , and the folder name where the copy of the configuration file should be saved.

Input: The following is the list of inputs that are required to perform this action.

The inputName	The inputKey Name	The inputType	Optional / M, andatory	Description
Server Name	List of server names	List	M, andatory	Select the server name from the drop-down list. The user can transfer the corresponding configuration file from the DS8K switch to the server.



File Directory Name	Folder Name	String	M, mandatory	Enter the folder name. The folder name where you need to copy the configuration file.
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Output: Connection files exported to the file directory specified.

Success message: Backup of DS8000 Connection (s) successful.

Failure message: Failed.

4.9 RestoreDS8KAction

Description: This RAL imports a specified connection onto the DS8000 Storage device.

The user is prompted to provide the Server Name, and the folder name where the copy of the configuration file should be saved.

Input: The following is the list of inputs that are required to perform this action.

The inputName	The inputKey Name	The inputType	Optional / M, mandatory	Description
Server Name	List of server names	List	M, mandatory	Select the server name from the drop-down list. The user can transfer the corresponding configuration file from the DS8K switch to the server.
File Directory Name	Folder Name	String	M, mandatory	Enter the folder name. The folder name where you need to copy the configuration file.

Output: Specified connection file will be imported on DS8000 storage device.

Success message: DS8000 connection (s) restored successfully.

Failure message: Failed.





5 Cyber Anomaly Detection

5.1 Actifio Get VM UUID

Description - This RAL will get the Unique Identifier of the VM (UUID).

Inputs	The inputKey Values	Output
Name of the host/VM being protected (information is taken from the Group created)	vm_name	VM_UUID

5.2 Register Scanner VM

Description - Registers the Scanner VM with the Anomaly detection tool API.

Inputs	The inputKey Values	Output
The set of scanner VMs provided in the config file	sallyconfig.properties file - property sally_scanner_vm_list	SCANNER_VM_LIST

5.3 Select Scanner VM

Description – This RAL will generate a random unique Job ID. Based on the Job ID, it will select a Scanner VM based on the consistent hashing algorithm.

Inputs	The inputKey Values	Output
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List of scanner VMs: the list configured in \$EAMROOT/installconfig/sallyConfig.properties	SCANNER_VM_LIST	Job ID (JOB_ID), Scanner VM Name (SCANNER_ID)
--	-----------------	---

5.4 Actifio Mount Anomaly Detection

Description – This RAL will mount the snapshot , and create a mount point on the VM.

Inputs	The inputKey Values	Output
Snapshot image name, Scanner VM name, Protected VM UUID	PANSVR_SNAPSHOT_ID, SCANNER_ID, VM_UUID	TEMP_MOUNT_POINT

5.5 Set Scanner Component

Description - This RAL makes sure the next RAL i.e. **Unmount Temporary Mount Directory** executes on the Scanner VM.

Inputs	The inputKey Values	Output
Scanner VM	SCANNER_ID	CUSTOM_ACTION_COMPONENT_NAME

5.6 Unmount Temporary Mount Point

Description - This will be executed on the selected scanner VM. This RAL will unmount the temporary mount directory created during the ActifioMount RAL as that mount directory is not recognized/readable by the Anomaly detection tool.

Inputs	The inputKey Values
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The temporary mount point created by the Actifio Mount RAL	TEMP_MOUNT_POINT
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5.7 Create a folder with VM UUID

Description - This RAL will create folders , and mount devices on Scanner VM so that the Anomaly detection tool can scan the mount points. The Scanner VM is now ready to be scanned.

5.8 Anomaly Scan Request

Description - This RAL will submit the request to scan for anomalies.

Inputs	The inputKey Values
Job ID, VM UUID, Scanner ID (Scanner VM name)	JOB_ID, VM_UUID, SCANNER_ID

5.9 Anomaly Scan Result

Description – This RAL gets the scan job details , and waits for it to complete. Polls until the jobs get completed. The output of this RAL is the decision.

Inputs	The inputKey Values	Output
Job ID	JOB_ID	DECISION=Clean DECISION=Not Clean

5.10 Raise Events for Scan Results

Description – This RAL will raise events based on the scan results.



If the Decision is “Clean” – Raises as Info event, else if the Decision is “Not Clean” (Anomalous) – Raises Critical event.

If the snapshot is clean , and an Info event is raised, the user is given the option to select a policy – Accept or Reject.

If the user chooses the Accept Policy, it means the user is accepting the Anomaly detection tool’s decision that the Snapshot is clean. If the user chooses the Reject Policy, it means the user is rejecting the Anomaly detection tool’s decision , and that the Snapshot is anomalous.

If the snapshot is anomalous , and a critical event is raised, the user is given the option to select a policy – Accept or Reject.

If the user chooses the Accept Policy, it means the user is accepting the Anomaly detection tool’s decision that the Snapshot is anomalous. If users choose the Reject Policy, it means the user is rejecting the Anomaly detection tool’s decision, , and the Snapshot will be marked as clean/verified.

Inputs	The inputKey Values	Output
Decision	DECISION	Info Event, Critical Event

5.11 Set Snapshot Status

Description – Sets the snapshot status based on the anomaly scan result.

Inputs	The inputKey Values	Output
Decision	DECISION	PANSVR_SNAPSHOT_STATUS = 1 OBSERVATION – The snapshot is clean. Hence marking it as verified. PANSVR_SNAPSHOT_STATUS = 3 OBSERVATION – The snapshot is anomalous. Hence marking it as Verification failed.



		PANSVR_SNAPSHOT_STATUS = 0 OBSERVATION – The snapshot is not verified. Hence marking it as Yet to be verified.
--	--	---

5.12 Snapshot Health Status Update

Description: This RAL saves the verification status for the snapshot.

Inputs: The following is the list of inputs that are required to perform this action.

The inputName	The inputKey Name	The inputType	Optional / Mandatory	Description
Protection Scheme Name	PANSVR_SERVICE	String	Mandatory	Select the protection scheme name configured for the group from the drop-down list.
Snapshot ID	PANSVR_SNAPSHOT_ID	String	Mandatory	Select the snapshot from the drop-down list.
Snapshot Status	PANSVR_SNAPSHOT_STATUS	String / Integer	Mandatory	Select the verification status. Otherwise, enter an integer value as the inputkey. Note: The inputtype is a string if the user is configuring the RAL from the RAL editor. Otherwise, the inputtype is an integer for configuring the RAL using key value pair.



Protection Scheme Type	PANSVR_SERVICE_TYPE	String	Optional	Enter the type of protection scheme as STATIC / DYNAMIC. Note: If PRANSVR_SERVICE is used to provide the protection scheme, this field is mandatory.
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5.13 Delete folder with VM UUID

Description – This RAL will unmount , and delete the mount folder on the Scanner VM.

Inputs	The inputKey Values
Protected VM UUID	VM_UUID

5.14 Actifio Umount

Description - The Actifio Umount RAL unmounts the snapshot images from the VM.

This RAL should be used only after mounting the images using ActifioMount RAL.

Inputs	The inputKey Values	Output
The image that needs to be unmounted	IMAGENAME	If the action is successful, the following message is displayed: Unmount job Job_XXXX successful on image Image_XXXX



		<p>If the action is a failure, the following message is displayed:</p> <p>Unmount job Job_XXXX failed with message: errorMessage</p>
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5.15 Anomaly Scan Result

Description – This RAL gets the scan job details , and waits for it to complete. Polls until the jobs get completed. The output of this RAL is the decision.

Inputs	The inputKey Values	Output
Job ID	JOB_ID	DECISION=Clean DECISION=Not Clean

5.16 Anomaly Scan Request

Description - This RAL will submit the request to scan for anomalies.

Inputs	The inputKey Values
Job ID, VM UUID, Scanner ID (Scanner VM name)	JOB_ID, VM_UUID, SCANNER_ID

5.17 Get Scanner VM List By OS Type

Description - This RAL will get the scanner VM list filtered by scan OS type

Inputs	Output
\$EAMSROOT/installconfig/IBMROADConfig.properties, DR_OS_TYPE	SCANNER_VM_LIST

5.18 A recovery RAL

Description - This RAL recovers the data from a selected Safeguarded Copy Session PIT to an SCB A recovery LUN.



Inputs	Output
SESSION_NAME:- KyndrylCSM Session Name IMAGE_NAME :- Snapshot Name	The RAL recovers the data successfully.



6 Kyndryl CSM DS8K

6.1 KyndrylCSM A recovery

Description - This RAL recovers the data from a selected Safeguarded Copy Session PIT to an SCB A recovery LUN.

Inputs	Output
SESSION_NAME:- KyndrylCSM Session Name IMAGE_NAME :- Snapshot Name	The RAL recovers the data successfully.

6.2 KyndrylCSM Get Backup Data

Description - This RAL fetches all the recoverable backup images from the KyndrylCSMDS8K server.

Inputs	Output
SESSION_NAME	List of recoverable images from KyndrylCSMDS8K server.

6.3 KyndrylCSM Background Copy Status

Description - This RAL checks if the initiate background copy job is complete or in progress.

Inputs	Output
SESSION_NAME	If successful: Returns the status of the initiated background copy job. If failure: Fails to return the status of the initiate background copy job.



6.4 KyndryICSM Initiate Background Copy

Description - This RAL will trigger the InitiateBackgroundCopy job for the recoverable image to copy LUN data to the DR vcenter.

Inputs	Output
SESSION_NAME , IMAGE_NAME	If successful: InitiateBackgroundCopy job is triggered successfully. If failure: Fails to trigger InitiateBackgroundCopy job successfully.

6.5 KyndryICSM DS8k A recovery

Description - This RAL recovers the data from a selected Safeguarded Copy Session PIT to an SCB A recovery LUN.

Inputs	Output
SESSION_NAME:- KyndryICSM Session Name IMAGE_NAME :- Snapshot Name	The RAL recovers the data successfully.

6.6 KyndryICSM DS8K Get Backup Data

Description - This RAL fetches all the recoverable backup images from the KyndryICSMDS8K server.

Inputs	Output
SESSION_NAME	List of recoverable images from KyndryICSMDS8K server.

6.7 KyndryICSM Get Backup Datalag

Description - This RAL fetches all the recoverable datalag images from the KyndryICSMDS8K server.



Inputs	Output
SESSION_NAME	List of recoverable datalag images from KyndrylCSMDS8K server.

6.8 IBMCSM_GetLogEventsMulti

Description - This RAL gets the log events.

Inputs	Output
SESSION_NAME	RECOVERY_EVENT_FOUND RECOVERY_EVENT_TIMESTAMP RECOVERY_EVENT_IMAGE

6.9 IBMCSMDS8K_RecoveryMulti

Inputs	Output
SESSION_NAME IMAGE_NAME	

6.10 IBMCSMDS8K_GetBackupData_V2

Description - This RAL gets backup data.

Inputs	Output
SESSION_NAME	BACKUP_DETAILS_OUTPUT PR_TIMESTAMP TIMESTAMP_FORMAT OUTPUT_TIMESTAMP_FORMAT



6.11 Select Snapshots in Auto mode.tcl

Description - This tcl script helps to automatically select the latest unverified snapshots for scanning and do some validations like snapshots should not be more than x minutes apart.

Inputs	Output
<p>N_MINUTES_APART - Acceptable threshold, for example, 2 would mean 2 snapshots can be at maximum 2 minutes apart</p> <p>SESSION_NAME - List of CSM session names</p> <p>SELECTION_MODE - Can be AUTO or MANUAL. In AUTO mode latest snapshot will be selected. In MANUAL user can control over the choice of snapshots.</p>	<p>IMAGE_NAME - Holds selected snapshots enclosed within square brackets []</p> <p>PANSVR_SNAPSHOT_ID - Holds selected snapshots</p>

6.12 Skip RG-level Workflow.tcl

Description - This tcl script helps to Skip RG workflows under fork group

Inputs	Output
<p>RGS_TO_SCAN – List the RG names to scan. If in case all are required to be scanned, just key in “all”</p>	<p>Skips RG level workflow under fork group</p>

6.13 Map RDM.tcl

Description - This tcl script helps to map raw disk to VM and update Key Values (KV) with UUID and mapped raw disks VMDK path.

Inputs	Output
<p>PANVC_VM_NAME – VM name</p> <p>DR_VM_NAME – DR VM name used only to generate raw disks VMDK path</p> <p>PANVC_HOSTNAME - Host</p>	<p>PANVC_VMDK_UUID_LIST – Append UUID of RDM disk</p> <p>PANVC_VMDK_PATH – Append RDMs VMDK path</p>



PANVC_DC_NAME – Datacluster name	PANVC_RDM_VMDK_PATH – List of VMDK
PANVC_LUN_PATHID – LUN Path ID to be mapped	paths for all RDMS
PANVC_VMDK_UUID_LIST – Existing UUID list	
PANVC_VMDK_PATH – Existing VMDK paths	



7 DB2

7.1 Activate Database

7.1.1 Description:

This action activates the database.

7.1.2 Inputs

UI Input	The inputKey Name	Description
Dataset Name	P, ANDB2_DATASET_NAME	Select the dataset from the drop-down list.

7.1.3 Outputs

None

7.1.4 Prechecks

- Credential , and role.
- Permission to create a file in tmp.
- Memory availability in tmp.
- The status of the selected dataset is Inactive.
- The agent is active.

7.2 Deactivate Database

7.2.1 Description:

This action deactivates the database.

7.2.2 Inputs:

UI Input	The inputKey Name	Description
Dataset Name	P, ANDB2_DATASET_NAME	Select the dataset from the drop-down list.

7.2.3 Outputs:

None



7.2.4 Prechecks

- Credential , and role.
- Permission to create a file in tmp.
- Memory availability in tmp.
- The status of the selected dataset is Active.
- The agent is active.

7.3 Execute SQL with Connection

7.3.1 Description:

This action executes the SQL by connecting to the database. This is mainly used for the primary database using a database connection.

7.3.2 Inputs:

UI Input	The inputKey Name	Description
Dataset Name	P, ANDB2_DATASET_NAME	Select the dataset from the drop-down list.
SQL to be executed	P, ANDB2_CONN_SQL	Enter the SQL comm, and to execute.

7.3.3 Outputs:

The action fails, if the database is not in the said state.

Output Name	Output Key Name	Description
The output of the SQL	P, ANDB2_CONN_SQL_RESULT	The output of the SQL that is being executed.

7.3.4 Prechecks

- Credential , and role.
- Permission to create a file in tmp.
- Memory availability in tmp.
- The agent is active.



7.4 Execute SQL Without Connection

7.4.1 Description:

This action executes the SQL without connecting to the database. This is mainly used for ADMIN SQL for the st, andby database.

7.4.2 Inputs:

UI Input	The inputKey Name	Description
Dataset Name	P, ANDB2_DATASET_NAME	Select the dataset from the drop-down list.
SQL to be executed	P, ANDB2_NOCONN_SQL	Enter the SQL comm, and to execute.

7.4.3 Outputs:

Output Name	Output Key Name	Description
The output of the SQL	P, ANDB2_NOCONN_SQL_RESULT	The output of the SQL that is being executed.

7.4.4 Prechecks

- Credential , and role.
- Permission to create the file in tmp.
- Memory availability in tmp.
- The agent is active.

7.5 Takeover

7.5.1 Description:

Switches the role of the database.

7.5.2 Inputs:

UI Input	The inputKey Name	Description
Dataset Name	P, ANDB2_DATASET_NAME	Select the dataset from the drop-down list.



UI Input	The inputKey Name	Description
By force	P, ANDB2_FORCE	Force the takeover.

7.5.3 Outputs:

None

7.5.4 Prechecks

- Credential , and role.
- Permission to create the file in tmp.
- Memory availability in tmp.
- The status of the selected dataset is on St, andby.
- The agent is active.

7.6 Verify Database State

7.6.1 Description:

This action verifies whether the database is ACTIVE, INACTIVE, or UNKNOWN.

7.6.2 Inputs:

UI Input	The inputKey Name	Description
Dataset Name	P, ANDB2_DATASET_NAME	Select the dataset from the drop-down list.
Expected State	P, ANDB2_DATASET_STATE	The Expected stateof the database can be ACTIVE, INACTIVE, or UNKNOWN.

7.6.3 Outputs:

The action fails, if the database is not in the said state.

Output Name	Output Key Name	Description
Dataset State	P, ANDB2_CURRENT_DATASET_STATE	The current state of the database (ACTIVE/INACTIVE/UNKNOWN)



7.6.4 Prechecks

- Credential , and role.
- Permission to create the file in tmp.
- Memory availability in tmp.
- The agent is active.

7.7 DB2VerifyInstanceState

7.7.1 Description:

Verifies the state of the DB2 instance.

7.7.2 Inputs:

UI Input	The inputKey Name	Description
Dataset Name	P, ANDB2_DATASET_NAME	Select the dataset from the drop-down list.

7.7.3 Outputs:

The provides the DB2 instance state.

7.7.4 Prechecks

- Credential , and role.
- The agent is active.

7.8 DB2InstanceStateOperation

7.8.1 Description:

Performs the Start/ Stop/ Restart , and Forcestop on the DB2 instance.

7.8.2 Inputs:

UI Input	The inputKey Name	Description
Dataset Name	P, ANDB2_DATASET_NAME	Select the dataset from the drop-down list.
Select DB2 Instance Operation	P, ANDB2_DATASET_INSTANCE_STATE	Select Start/ Stop/ Restart , and Forcestop from the drop-down list.



7.8.3 Outputs:

The DB2 instance state will be changed.

7.8.4 Prechecks

- Credential , and role.
- The agent is active.
- The database is Active.
- Must have sufficient privileges.



8 EMC BCV

8.1 establishBCV

This action re-establishes BCV devices to its RDF devices. If this is done successfully, all the changes done on the RDF devices start getting updated on the BCV devices.

Once the resync request is initiated, this action gets completed without waiting for the completion of resynchronization. 'getBCVStatus' or 'verifyBCVStatus' action should be used to check if the pair has arrived at a particular state. This action provides an option to select 'full establish'. If the user has selected "Full" mode, then the full establishment will be performed.

This operation can also be forced by selecting 'forceful'. When the 'force' option is used, SYMCLI attempts to force the operation even though one or more devices in the device group may not be in the normal, expected BCV state or mode for the operation.

When this action is executed as a part of the workflow, the SYMCLI 'symmir establish' comm, and is invoked on the pair represented by the selected protection scheme, along with the appropriate options selected by the user.

Inputs:

UI Input	Description	The inputKey Name	Key Values	Input Optional/ M, andatory
Protection Scheme Name	Select the protection scheme name configured for the group from the drop-down list. Note: If the group is attached with more than one pair of protection subsystems then do not select "Current Production Service" or "Current DR Service". Instead, select	EMC_ESTABLISH_BCV_OPER_ON	-	M, andatory



UI Input	Description	The inputKey Name	Key Values	Input Optional/ M, andatory
	the actual protection subsystem to configure the operation.			
Mode	Select the mode of operation.	EMC_ESTABLISH_BCV_MODE	FULL	Optional

Outputs: There are no output keys for this action.

Execution Log:

SYMCLI Comm, and: symmir -g <devGrpName> establish <-full> bcv Id <-force> -noprompt

Result: Execution <success/failed>

SYMCLI Output: <CLI Output>

Prechecks

- Configuration – Action is configured with the inputof Key Values or Advance Properties.
- Agent connectivity.
- Authentication (Password check for agentless).

8.2 splitBCV

This action stops the replication of the BCV devices. When successful, the updates of the RDF devices do not go to the BCV devices. This does not delete the pair, hence, it can be resynced later. The action returns as success when the splitting of BCV is successful.

When the action is executed as a part of the workflow, the comm, and SYMCLI 'symmir split' is invoked on the pair represented by the selected protection scheme.

Inputs:



UI Input	Description	The inputKey Name	Key Values	Input Optional/ M, andatory
Protection Scheme Name	Select the protection scheme name configured for the group from the drop-down list. Note: If the group is attached with more than one pair of protection subsystems then do not select "Current Production Service" or "Current DR Service". Instead, select the actual protection subsystem to configure the operation.	EMC_SPLIT_BCV_OPER_ON	-	M, andatory

Outputs:

There are no output keys for this action.

Execution Log:

SYMCLI Comm, and: symmir -g <devGrpName> split bcv ld -consistent <-force> -noprompt

Result: Execution <success/failed>

SYMCLI Output: <CLI Output>

Prechecks

- Configuration – Action is configured with the input of Key Values or Advance Properties.
- Agent connectivity.
- Authentication (Password check for agentless).



8.3 getBCVStatus

This action reports the BCV device(s) status (EMC specific device status that indicates the current state of replication).

Inputs:

UI Input	Description	The inputKey Name	Key Values	Input Optional/M,andatory
Protection Scheme Name	<p>Select the protection scheme name configured for the group from the drop-down list.</p> <p>Note:</p> <p>If the group is attached with more than one pair of protection subsystems then do not select "Current Production Service" or "Current DR Service". Instead, select the actual protection subsystem to configure the operation.</p>	EMC_STATUS_BCV_OPER_ON	-	M,andatory

Outputs:

EMC_STATUS_BCV_DEV_STATE indicates BCV status. Possible values are status values are

- Sync In Progress
- Synchronized
- Split



- Never Established
- Restore In Progress
- Restored
- Split In Progress
- Split No Increment
- Split Before Sync
- Split Before Restore

Execution Log:

- *getBCVStatus* will have the following output format:
 - If BCV contains no devices, then the output format will be:
No BCV devices found for device group <dgName>
 - The outkey *EMC_STATUS_BCV_DEV_STATE* will be empty
 - If BCV contains at least one device, then the output format will be:
Pair stateof BCV devices of device group <dgName>:
 - The out key *EMC_STATUS_BCV_DEV_STATE* will have a pairstate of each logical device in the following format:
 - *<LogicalDevName1> - <PairState>*
 - *<LogicalDevName2> - <PairState>*

Prechecks

- Configuration – Action is configured with the input of Key Values or Advance Properties.
- Agent connectivity.
- Authentication (Password check for agentless).

8.4 verifyBCVStatus

This action is used to verify the status of BCV devices. When this action is executed, it checks for the current status of each BCV device, , and this action is considered successif all device statematch what the userhas asked for.

Inputs:



UI Input	Description	The inputKey Name	Key Values	Input Optional/ M, andatory
Protection Scheme Name	<p>Select the protection scheme name configured for the group from the drop-down list.</p> <p>Note:</p> <p>If the group is attached with more than one pair of protection subsystems then do not select "Current Production Service" or "Current DR Service". Instead, select the actual protection subsystem to configure the operation.</p>	EMC_VERIFY_STATUS_BCV_OPERATOR_ON	-	M, andatory
BCV State	Select the BCV Status of the operation	EMC_VERIFY_STATUS_BCV_DEVELOPMENT_STATE	<p>One of the following should be provided/selected</p> <ul style="list-style-type: none"> • Sync In Progress • Synchronized • Split • Never Established • Restore In Progress 	M, andatory



UI Input	Description	The inputKey Name	Key Values	Input Optional/ M, andatory
			<ul style="list-style-type: none"> • Restored • Split In Progress • Split No Increment • Split Before Sync • Split Before Restore 	

Outputs: There are no output keys for this action.

Execution Log

verifyBCVStatus will have the following output format.

- If BCV contains no devices, then the output format will be:
No BCV devices found for device group <dgName>
- If all the devices are in the same pairstate then the output format will be:
All BCV devices of device group <dgName> are in <configuredPairState> pair state
- If all the devices are not in the same pairstate then the output format will be:
 - *The following BCV devices of device group <dgName> are not in <configuredPairState> pair state:*
 - *<LogicalDevName1> - <PairState>*
 - *<LogicalDevName1> - <PairState>*

Prechecks

- Configuration – Action is configured with the input of Key Values or Advance Properties.
- Agent connectivity.
- Authentication (Password check for agentless).



8.5 isBCV

This action checks whether the protection service name represented is a BCV protection service. This action is considered successful if a match occurs with what the user has asked for. This is an action considered failed to fail if it is of a different type.

Inputs:

UI Input	Description	The inputKey Name	Key Values	Input Optional/M, mandatory
Protection Scheme Name	Select the protection scheme name configured for the group from the drop-down list. Note: If the group is attached with more than one pair of protection subsystems then do not select "Current Production Service" or "Current DR Service". Instead, select the actual protection subsystem to configure the operation.	EMC_IS_BCV_OPER_ON	-	M, mandatory

Outputs:

There are no output keys for this action.

Execution Log

<Protection scheme> is <R1/R2/BCV>

Prechecks

- Configuration – Action is configured with the input of Key Values or Advance Properties.



- Agent connectivity.
- Authentication (Password check for agentless).

8.6 syncWaitBCV

This action will Wait until all the BCV devices are in a Synchronized state.

The action provides an option to specify the timeout value. It is specified in minutes. If no timeout value is specified, then the action completes immediately. Otherwise, the action waits till the timeout value or status becomes Synchronized, whichever happens, earlier.

When the action is executed as a part of the workflow, the 'symmir verify' comm, and is invoked on the device group represented by the selected protection scheme, along with the options chosen by the user. The action is considered successif all BCV device status becomes Synchronized, failed otherwise.

Inputs:

UI Input	Description	The inputKey Name	Key Values	Input Optional/ M, andatory
Protection Scheme Name	Select the protection scheme name configured for the group from the drop-down list. Note: If the group is attached with more than one pair of protection subsystems then do not select "Current Production Service" or "Current DR Service". Instead, select the actual protection subsystem to	EMC_SYNCWAIT_BCV_OPER_ON	-	M, andatory



UI Input	Description	The inputKey Name	Key Values	Input Optional/ M, andatory
	configure the operation.			
BCV State	Zero will verify once, any other positive integer will verify every 30 seconds	EMC_SYNCWAIT_BCV_TIMEOUT	0 or more (by default it is 0).	Optional

Outputs: There are no output keys for this action.

Prechecks

- Configuration – Action is configured with the input of Key Values or Advance Properties.
- Agent connectivity.
- Authentication (Password check for agentless).



9 EMC Clone

9.1 Recreate Clone

Description:

This action creates an internal copy session with the devices in the device group , and one or more target devices associated with the group. While the operation is in progress, the state of the device pair is 'CreateInProgress'. When the operation completes, the state of the device pair changes to 'Created'.

Inputs:

The inputName	The inputType	The inputKey Name	Optional/M,andatory
Operation on	Choose from the list of protection schemes configured for the group	EMC_RECREATE_CLONE_OPER_ON (Production Protection Scheme or DR Protection Scheme or service name), EMC_RECREATE_CLONE_OPER_ON_TYPE (DYNAMIC or STATIC)	M,andatory
rdf option	Acts on the remote Symmetrix array	EMC_RECREATE_CLONE_RDF	Optional
tgt option	Uses TGT devices as clone targets. When used with the -rdf option, the operation will use RTGT devices	EMC_RECREATE_CLONE_TGT	Optional

Outputs: There are no output keys for this action.

Execution Log: SYMCLI Comm, and: symclone -g <devGrpName>recreate-precoppy <-force><-tgt><-rdf>-noprompt

Result: Execution <success/failed>



SYMCLI Output: <CLI Output>

Prechecks

- Configuration – Action is configured with the input of Key Values or Advance Properties.
- Agent connectivity.
- Authentication (Password check for agentless).

9.2 Activate Clone

Description:

Activates an internal copy session with the devices in the device or composite group , and one or more target devices associated with the group.

While the operation is in progress, the state of the device pair is either CopyInProgress or CopyOnAccess. When the operation completes, the state changes to Copied.

Inputs:

The inputName	The inputType	The inputKey Name	Optional/M, andatory
Operation on	Choose from the list of protection schemes configured for the group	EMC_RECREATE_CLONE_OPER_ON (Production Protection Scheme or DR Protection Scheme or service name), EMC_RECREATE_CLONE_OPER_ON_TYPE(DYNAMIC or STATIC)	M, andatory
rdf option	Acts on the remote Symmetrix array.	EMC_RECREATE_CLONE_RDF	Optional
tgt option	Uses TGT devices as clone targets. When used with the -rdf option, the operation will use RTGT devices.	EMC_RECREATE_CLONE_TGT	Optional



The inputName	The inputType	The inputKey Name	Optional/M, andatory
consistent option	Consistently activates the source , and target pairs.	EMC_ACTIVATE_CLONE_CONSISTENT	Optional

Outputs:

There are no output keys for this action.

Execution Log:

SYMCLI Comm, and: symclone -g <devGrpName>activate<-force><-consistent><-tgt><-rdf>-noprompt

Result: Execution <success/failed>

SYMCLI Output: <CLI Output>

9.2.1 Prechecks

- Configuration – Action is configured with the inputof Key Values or Advance Properties.
- Agent connectivity.
- Authentication (Password check for agentless).

9.3 SyncWait Clone

Description:

Verifies whether clone device pairs in a group are in the Copied state.

Inputs:



The inputName	The inputType	The inputKey Name	Optional/M, andatory
Operation on	Choose from the list of protection schemes configured for the group	EMC_RECREATE_CLONE_OPER_ON (Production Protection Scheme or DR Protection Scheme or service name), EMC_RECREATE_CLONE_OPER_ON_TYPE(DYNAMIC or STATIC)	M, andatory
Operation timeout (in minutes)	zero will be verified once, any other positive integer will be verified every 30 seconds.	EMC_SYNCWAIT_CLONE_TIMEOUT (0 or more. Default is 0)	Optional

Outputs:

There are no output keys for this action.

Execution Log:

SYMCLI Comm, and: symclone -g <devGrpName> -i <interval> -c <count> -verify -copied

Result: Execution <success/failed>

SYMCLI Output: <CLI Output>

Prechecks

- Configuration – Action is configured with the inputof Key Values or Advance Properties.
- Agent connectivity.
- Authentication (Password check for agentless).

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10 EMC SRDF

10.1 establishRDF

This action re-establishes a split RDF , and then restarts the 'update copy operations' to the R2 volume. If this is done successfully, all the changes done on the Primary start getting updated on the Secondary volume. Once the resync request is initiated, this action gets completed without waiting for the completion of resynchronization. 'getRDFStatus' or 'verifyRDFStatus' action should be used to check if the pair has arrived at a particular state.

This action provides an option to select 'full establish'. If the user has selected "Full" mode, then a full establishment will be performed.

This operation can also be forced by selecting 'forceful'. When the force' option is used, SYMCLI attempts to force the operation even though one or more devices in the device group may not be in the normal, expected RDF state or mode for the operation.

When this action is executed as a part of the workflow, the SYMCLI 'symrdf establish' comm, and is invoked on the pair represented by the selected protection scheme, along with the appropriate options selected by the user.

Inputs:

UI Input	Description	The inputKey Name	Key Values	Input Optional/ Mandatory
Protection Scheme Name	Select the protection scheme name configured for the group from the drop-down list. Note: If the group is attached with more than one pair of protection subsystems then do not select "Current Production Service" or	EMC_ESTABLISH_RDF_OPER_ON EMC_ESTABLISH_RDF_OPER_ON_TYPE	Protection Scheme or DR Scheme or service name DYNAMIC or STATIC	Mandatory



UI Input	Description	The inputKey Name	Key Values	Input Optional/M,andatory
	"Current DR Service". Instead, select the actual protection subsystem to configure the operation.			
Mode	Select the mode of operation.	EMC_ESTABLISH_RDF_MODE	FULL	Optional
Forceful	Click the checkbox if the operation has to be forced.	EMC_ESTABLISH_RDF_FORCE	True or False. (It is False by default).	Optional

Outputs: There are no output keys for this action.

Execution Log:

SYMCLI Comm, and: symrdf -g <devGrpName> establish <-full> <-force> -noprompt

Result: Execution <success/failed>

SYMCLI Output: <CLI Output>

Prechecks

- Configuration – Action is configured with the input of Key Values or Advance Properties.
- Agent connectivity.
- Authentication (Password check for agentless).

10.2 suspendRDF

This action suspends the replication of a replicating pair. When the action is successful, the updates of the Primary volume do not go to the Secondary volume. This action does not delete the pair,



hence, it can be resynced later. When the pair is suspended successfully, the action returns as 'success'.

This action provides an option 'suspend immediate'. If the user has selected "Immediate" mode, the action causes a split to drop the RDF/A session immediately.

Note:

This option is used for RDF/A-capable devices only.

The operation can also be forced by selecting the "forceful". When the force option is used, SYMCLI attempts to force the operation even though one or more devices in the device group may not be in the normal, expected RDF state or mode for the operation.

When the action is executed as a part of the workflow, SYMCLI 'symrdf suspend' comm, and is invoked on the pair represented by the selected protection scheme, along with the appropriate options chosen by the user.

Inputs:

UI Input	Description	The inputKey Name	Key Values	Input Optional/ M, andatory
Protection Scheme Name	Select the protection scheme name configured for the group from the drop-down list. Note: If the group is attached with more than one pair of protection subsystems then do not select "Current Production Service" or "Current DR Service". Instead, select the	EMC_SUSPEND_RDF_OPER_ON EMC_SUSPEND_RDF_OPER_ON_TYPE	Production Protection Scheme or DR Protection Scheme or service name. DYNAMIC or STATIC	M, andatory



UI Input	Description	The inputKey Name	Key Values	Input Optional/M,andatory
	actual protection subsystem to configure the operation.			
Mode	Select the mode of operation.	EMC_SUSPEND_RDF_MODE	IMMEDIATE	Optional
Forceful	Click the checkbox if the operation has to be forced.	EMC_SUSPEND_RDF_FORCE	True or False. (It is False by default).	Optional

Outputs:

There are no output keys for this action.

Execution Log:

SYMCLI Comm, and: symrdf -g <devGrpName> suspend <-immediate> <-force> -noprompt

Result: Execution <success/failed>

SYMCLI Output: <CLI Output>

Prechecks

- Configuration – Action is configured with the input of Key Values or Advance Properties.
- Agent connectivity.
- Authentication (Password check for agentless).

10.3 resumeRDF

This action resumes a suspended RDF , and then restarts the update copy operations to the R2 volume. If successful, all the changes are done on the Primary , and start getting updated on the Secondary volume. The action completes after initiating the resync request , and does not wait for



the resynchronization to complete. 'getRDFStatus' or 'verifyRDFStatus' action should be used to check if the pair has arrived at a particular state.

When the action is executed as a part of the workflow, SYMCLI 'symrdf resume' comm, and is invoked on the pair represented by the selected protection scheme, along with the appropriate options if any chosen by the user.

Inputs:

UI Input	Description	The inputKey Name	Key Values	Input Optional/M, andatory
Protection Scheme Name	Select the protection scheme name configured for the group from the drop-down list. Note: If the group is attached with more than one pair of protection subsystems then do not select "Current Production Service" or "Current DR Service". Instead, select the actual protection subsystem to configure the operation.	EMC_RESUME_RDF_OPER_ON EMC_RESUME_RDF_OPER_ON_TYPE	Production Protection Scheme or DR Protection Scheme or service name. DYNAMIC or STATIC	M, andatory
Forceful	Click the checkbox if the operation has to be forced.	EMC_RESUME_RDF_FORCE	True or False. (It is False by default).	Optional

Outputs:



There are no output keys for this action.

Execution Log:

SYMCLI Comm, and: symrdf -g <devGrpName> resume <-force> -noprompt

Result: Execution <success/failed>

SYMCLI Output: <CLI Output>

Prechecks

- Configuration – Action is configured with the input of Key Values or Advance Properties.
- Agent connectivity.
- Authentication (Password check for agentless).

10.4 splitRDF

This action stops the replication of a replicating pair. When successful, the updates of the Primary volume do not go to the Secondary volume. This does not delete the pair, hence, it can be resynced later. The action returns as success, when the splitting of the pair is successful.

The action provides an option to choose a split immediately. If the user has selected "Immediate" mode, causes a split to drop the RDF/A session immediately.

Note:

This option is used for RDF/A-capable devices only.

The operation can also be forced by selecting the "forceful". When the force option is used, SYMCLI attempts to force the operation even though one or more devices in the device group may not be in the normal, expected RDF state or mode for the operation.

When the action is executed as a part of the workflow, SYMCLI 'symrdf split' comm, and is invoked on the pair represented by the selected protection scheme, along with the appropriate options selected by the user.

Inputs:



UI Input	Description	The inputKey Name	Key Values	Input Optional/ M,andatory
Protection Scheme Name	Select the protection scheme name configured for the group from the drop-down list. Note: If the group is attached with more than one pair of protection subsystems then do not select "Current Production Service" or "Current DR Service". Instead, select the actual protection subsystem to configure the operation.	EMC_SPLIT_RDF_OPER_ON EMC_SPLIT_RDF_OPER_ON_TYPE	Production Protection Scheme or DR Protection Scheme or service name DYNAMIC or STATIC	M,andatory
Mode	Select the mode of operation.	EMC_SPLIT_RDF_MODE	Immediate	Optional
Forceful	Click the checkbox if the operation has to be forced.	EMC_SPLIT_RDF_FORCE	True or False. (It is False by default).	Optional

Outputs: There are no output keys for this action.



Execution Log:

SYMCLI Comm, and:	symrdf -g <devGrpName> split <-immediate> <-force> -noprompt
Result:	Execution <success/failed>
SYMCLI Output:	<CLI Output>

Prechecks

- Configuration – Action is configured with the input of Key Values or Advance Properties.
- Agent connectivity.
- Authentication (Password check for Agentless).

10.5 getRDFStatus

This action reports the RDF pair status (EMC specific pair status that indicates the current state of replication).

When the action is executed as a part of the workflow, 'symdmg show' comm, and is invoked on the device group represented by the selected protection scheme. The success or failure of the action is determined by the output of the comm, and.

Inputs:

UI Input	Description	The inputKey Name	Key Values	Input Optional/ M, andatory
Protection Scheme Name	Select the protection scheme name configured for the group from the drop-down list. Note:	EMC_STATUS_RDF_OPER_ON EMC_STATUS_RDF_OPER_ON_TYPE	Production Protection Scheme or DR Protection Scheme or service name	M, andatory



UI Input	Description	The inputKey Name	Key Values	Input Optional/ M, andatory
	If the group is attached with more than one pair of protection subsystems then do not select "Current Production Service" or "Current DR Service". Instead, select the actual protection subsystem to configure the operation.		DYNAMIC or STATIC	

Outputs:

EMC_DETAILS_RDF_PAIR_STATE indicates pair status. possible values are status values are

- Sync In Progress
- Synchronized
- Consistent
- Split
- Failed Over
- R1 Updated
- R1 Update in Progress
- Suspended
- Partitioned
- Mixed
- Invalid
- TransIdle

Execution Log:



SYMCLI Comm, and: symrdg show <devGrpName>

Result: Execution <success/failed>

SYMCLI Output: <CLI Output>

Note:

Since the CLI output can be huge, only the required information will be captured.

Prechecks

- Configuration – Action is configured with the input of Key Values or Advance Properties.
- Agent connectivity.
- Authentication (Password check for agentless).

10.6 verifyRDFStatus

This action is used to verify the status of the RDF pair. When this action is executed, it checks for the current status of the pair, and if a match occurs with what the user has asked for then, this action is considered a success.

When the action is executed as a part of the workflow, The comm, and 'symrdg show' is invoked on the device group represented by the selected protection scheme. The success or failure of the action is determined by the output of the comm, and.

Inputs:

UI Input	Description	The inputKey Name	Key Values	Input Optional/ M, andatory
Protection Scheme Name	Select the protection scheme name configured for the group from the drop-down list. Note: If the group is attached with more than one pair of protection subsystems then do not select	EMC_VERIFY_STATUS_RDF_OPERATION EMC_VERIFY_STATUS_RDF_OPERATION_TYPE	Production Protection Scheme or DR Protection Scheme or service name. DYNAMIC or STATIC	M, andatory



UI Input	Description	The inputKey Name	Key Values	Input Optional/ M, andatory
	"Current Production Service" or "Current DR Service". Instead, select the actual protection subsystem to configure the operation.			
Status	Select the status of the RDF replication pair to verify	EMC_VERIFY_STATUS_RDF_PAIR_STATE	One of the following should be provided/selected <ul style="list-style-type: none"> • Sync In Progress • Synchronized • Consistent • Split • Failed Over • R1 Updated • R1 Update In Progress • Suspended • Partitioned • Mixed • Invalid 	M, andatory



UI Input	Description	The inputKey Name	Key Values	Input Optional/M, andatory
			<ul style="list-style-type: none"> Transldle 	

Outputs:

There are no output keys for this action.

Execution Log:

SYMCLI Comm, and: symrdg show <devGrpName>

Result: Execution <success/failed>

SYMCLI Output: <CLI Output>

Note:

Since the CLI output can be huge, only the required information will be captured.

Prechecks

- Configuration – Action is configured with the input of Key Values or Advance Properties.
- Agent connectivity.
- Authentication (Password check for agentless).

10.7 isRDF

This action checks whether the protection service name is supported. The following DG are supported:

- R1
- R2
- RDF21
- ANY
- REGULAR

If a match occurs with what the user has asked for then, this action is considered successful else it is considered a failure if there is a mismatch.



Inputs:

UI Input	Description	The inputKey Name	Key Values	Input Optional/ M, andatory
Protection Scheme Name	Select the protection scheme name configured for the group from the drop-down list. Note: If the group is attached with more than one pair of protection subsystems then do not select "Current Production Service" or "Current DR Service". Instead, select the actual protection subsystem to configure the operation.	EMC_IS_RDF_OPER_ON EMC_IS_RDF_OPER_ON_TYPE	Production Protection Scheme or DR Protection Scheme or service name DYNAMIC or STATIC	M, mandatory
RDF Type	Select the mode of operation.	EMC_IS_RDF_SRDF_TYPE	<ul style="list-style-type: none"> • R1 • R2 • RDF21 • ANY • REGULAR 	M, mandatory

Description:

This action can be used to check if the protection scheme is RDF.

Outputs:



There are no output keys for this action.

Execution Log:

<Protection scheme> is <R1/R2>

Prechecks

- Configuration – Action is configured with the input of Key Values or Advance Properties.
- Agent connectivity.
- Authentication (Password check for agentless).

10.8 failoverRDF

This action executes the EMC 'symrdf' comm, and which switches data processing from the source (R1) to the target (R2) side.

When the action is executed as a part of the workflow, the comm, and 'symrdf failover' is invoked on the device group represented by the selected protection scheme along with the appropriate options if any chosen by the user. The success or failure of the action is determined by the output of the comm, and.

Inputs:

UI Input	Description	The inputKey Name	Key Values	Input Optional/ M, andatory
Protection Scheme Name	Select the protection scheme name configured for the group from the drop-down list. Note: If the group is attached with more than one pair of protection subsystems then do not	EMC_FAILOVER_RDF_OPER_ON EMC_FAILOVER_RDF_OPER_ON_TYPE	Production Protection Scheme or DR Protection Scheme or service name DYNAMIC or STATIC	M, andatory



UI Input	Description	The inputKey Name	Key Values	Input Optional/ M, andatory
	select "Current Production Service" or "Current DR Service". Instead, select the actual protection subsystem to configure the operation.			
Mode	Select the mode of operation.	EMC_FAILOVER_RDF_MODE	IMMEDIATE	M, andatory
Forceful	Click the checkbox if the operation has to be forced.	EMC_FAILOVER_RDF_FORCE	True or False. (It is False by default).	Optional

Outputs:

There are no output keys for this action.

Execution Log:

SYMCLI Comm, and: symrdf -g <devGrpName> failover <-immediate> <-force> -noprompt

Result: Execution <success/failed>

SYMCLI Output: <CLI Output>

10.8.1 Prechecks

- Configuration – Action is configured with the input of Key Values or Advance Properties.
- Agent connectivity.
- Authentication (Password check for agentless).



10.9 failBackRDF

This action executes the EMC 'symrdf' comm, and which switches data processing back to the source (R1) side.

When this action is executed as a part of the workflow, the comm, and 'symrdf failback' is invoked on the device group represented by the selected protection scheme along with the appropriate options if any chosen by the user. The success or failure of the action is determined by the output of the comm, and.

Inputs:

UI Input	Description	The inputKey Name	Key Values	Input Optional/ Mandatory
Protection Scheme Name	Select the protection scheme name configured for the group from the drop-down list. Note: If the group is attached with more than one pair of protection subsystems then do not select "Current Production Service" or "Current DR Service". Instead, select the actual protection subsystem to configure the operation.	EMC_FAILBACK_RDF_OPER_ON	Production Protection Scheme or DR Protection Scheme or service name.	Mandatory
Forceful	Click the checkbox if the operation has to be forced.	EMC_FAILBACK_RDF_FORCE	True or False. (It is False by default.)	Optional



Execution Log:

SYMCLI Comm, and: symrdf -g <devGrpName> failback <-force> -noprompt

Result: Execution <success/failed>

SYMCLI Output: <CLI Output>

10.9.1 Prechecks

- Configuration – Action is configured with the input of Key Values or Advance Properties.
- Agent connectivity.
- Authentication (Password check for agentless).

10.10 swapRDF

This action Swaps the RDF personality of the designated RDF devices. Source R1 device(s) become target R2 device(s), and target R2 device(s) become source R1 device(s).

The Primary volume becomes the Secondary volume, and vice versa. If it is successful, all the changes are done on the Secondary, and start getting updated on the Primary volume after re-establishing. The action completes after reversing the role. It does re-establish or wait for resynchronization to complete. The 'establishRDF' action should be used to re-establish the pair after the swap.

When this action is executed as a part of the workflow, The comm, and 'symrdf swap' is invoked on the device group represented by the selected protection scheme, along with the options chosen by the user. The success or failure of the action is determined by the success or failure of the comm, and.

Inputs:

UI Input	Description	The inputKey Name	Key Values	Input Optional/M, andatory
Protection Scheme Name	Select the protection scheme name configured for the group from the drop-down list.	EMC_SWAP_RDF_OPER_ON EMC_SWAP_RDF_OPER_ON_TYPE	Production Protection Scheme or DR Protection Scheme or service name	M, andatory



UI Input	Description	The inputKey Name	Key Values	Input Optional/M,andatory
	<p>Note:</p> <p>If the group is attached with more than one pair of protection subsystems then do not select "Current Production Service" or "Current DR Service". Instead, select the actual protection subsystem to configure the operation.</p>		DYNAMIC or STATIC	
Forceful	Click the checkbox if the operation has to be forced.	EMC_SWAP_RDF_FORCE	True or False. (It is False by default).	Optional

Outputs:

There are no output keys for this action.

Execution Log:

SYMCLI Comm, and: symrdf -g <devGrpName> swap <-force> -noprompt

Result: Execution <success/failed>

SYMCLI Output: <CLI Output>

10.10.1 Prechecks

- Configuration – Action is configured with the input of Key Values or Advance Properties.
- Agent connectivity.
- Authentication (Password check for agentless).



10.11 R1update

This action starts to update the source (R1) side after a failover, while the target (R2) side may still be operational to its local host(s). The action completes after the invalid tracks count has reached the configured value by the user. If the user has configured zero, then this action will complete after all invalid tracks on R2 are updated to R1.

When the action is executed as a part of the workflow, the comm, and 'symrdf update' is invoked on the device group represented by the selected protection scheme, along with the options chosen by the user. The success or failure of the action is determined by the success or failure of the comm, and.

Inputs:

UI Input	Description	The inputKey Name	Key Values	Input Optional/M, andatory
Protection Scheme Name	Select the protection scheme name configured for the group from the drop-down list. Note: If the group is attached with more than one pair of protection subsystems then do not select "Current Production Service" or "Current DR Service".	EMC_R1UPDATE_RDF_OPER_ON	Production Protection Scheme or DR Protection Scheme or service name	M, andatory



	Instead, select the actual protection subsystem to configure the operation.			
Forceful	Click the checkbox if the operation has to be forced.	EMC_R1UPDATE_RDF_FORCE	True or False. (It is False by default).	Optional
Update Until	Update until invalid tracks are less than or equal to the configured value	EMC_R1UPDATE_UNTIL_INVALIDTRACKS_RDF	0 OR MORE (By default it is 0)	Optional

Outputs:

There are no output keys for this action.

Execution Log:

SYMCLI Comm, and: symrdf -g <devGrpName> update <invalidTracksCnt> <-force> -noprompt

Result: Execution <success/failed>

SYMCLI Output: <CLI Output>

10.11.1 Prechecks

- Configuration – Action is configured with the input of Key Values or Advance Properties.
- Agent connectivity.
- Authentication (Password check for agentless).

10.12 syncWaitRDF

This action will Wait until the target (R2) is Synchronized/Consistent with the source (R1).

The action provides an option to specify the timeout value. It is specified in minutes. If no timeout value is specified, then the action completes immediately. Otherwise, the action waits till the timeout value, or status becomes synchronized/consistent, whichever happens, earlier.



When the action is executed as a part of the workflow, the comm, and 'symrdf verify' is invoked on the device group represented by the selected protection scheme, along with the options chosen by the user. The action is considered successful if the status becomes Synchronized/Consistent, failed otherwise.

Inputs:

UI Input	Description	The inputKey Name	Key Values	Input Optional/ M, andatory
Protection Scheme Name	Select the protection scheme name configured for the group from the drop-down list. Note: If the group is attached with more than one pair of protection subsystems then do not select "Current Production Service" or "Current DR Service". Instead, select the actual protection subsystem to configure the operation.	EMC_SYNCWAIT_RDF_OPER_ON EMC_SYNCWAIT_RDF_OPER_ON_TYPE	Production Protection Scheme or DR Protection Scheme or service name DYNAMIC or STATIC	M, mandatory
Operation timeout (in minutes)	zero will verify once, any other positive integer will verify every 30 seconds.	EMC_SYNCWAIT_RDF_TIMEOUT	0 or more (It is 0 by default).	Optional

Outputs:



There are no output keys for this action.

10.12.1 Prechecks

- Configuration – Action is configured with the input of Key Values or Advance Properties.
- Agent connectivity.
- Authentication (Password check for agentless).



11 File

11.1 Check Disk Free Space

11.1.1 Description:

This action checks whether there is enough free space in a given Volume/Drive.

11.1.2 Inputs:

UI Input	The inputKey Name	Description
Component Name	Not Applicable	Select a component name from the drop-down list. This field is m, andatory
Vol/Drive Name	PANFO_IS_DISKFREE_VOL	Enter the volume or drive name. This field is m, andatory.
Required Free Space (MB)	PANFO_IS_DISKFREE_SIZE	Enter the value for the required free space in MB. This field is m, andatory.

11.1.3 Outputs:

Check Disk Free Space action does not return any value.

11.1.4 Error Codes:

Error Code	Description
PAN-CGEN-0002	Invalid component name.

11.1.5 Prechecks

- Login credentials.
- Availability of free disk space in the server.
- Locate Volume/Drive.

11.2 Check File Existence

11.2.1 Description:

This action checks whether a given file or directory exists or not.



11.2.2 Inputs:

UI Input	The inputKey Name	Description
Component Name	Not Applicable	Select a component name from the drop-down list. This field is mandatory.
File/Directory Name	PANFO_IS_FILEPATH_EXIST	Enter the file or directory name. This field is mandatory.

11.2.3 Outputs:

Check File Existence action does not return any value.

11.2.4 Error Codes:

Error Code	Description
PAN-CGEN-0002	Invalid component name.

11.2.5 Prechecks

- Login credentials.
- Locate folder , and file.

11.3 Check File Permission

Description:

This action checks whether a given file or directory has permissions for a particular user. On the Windows platform, permissions are not checked against 'username'. In this case, permissions are checked against the user with which Kyndryl Resiliency Orchestration Windows Agent is running.

Inputs:

UI Input	The inputKey Name	Description
Component Name	Not Applicable	Select a component name from the drop-down list. This field is mandatory.
Permission to check	PANFO_FILEPATH_PERMISSION	Select the type of permission from the drop-down list.



UI Input	The inputKey Name	Description
		The options are: READ, WRITE, , and DELETE. This field is m, andatory.
Username	PANFO_CHECK_PERMISSION_USER	Enter the username for which you want to check the file permission. This field is m, andatory.
File/Directory Name	PANFO_CHECK_PERMISSION_FILEPATH	Enter the file or directory name. This field is m, andatory.

Outputs:

Check File Permission action does not return any value.

Error Codes:

Error Code	Description
PAN-CGEN-0002	Invalid component name.

Limitations:

Not supported when the target server is Windows , and managed remotely [Agentless model].

Prechecks

- Login credentials.
- The userpermission.
- Locate folder , and file.

11.4 Copy File

Description:

This action copies the file(s) from one path to another path.

Inputs:

UI Input	The inputKey Name	Description
Component Name	Not Applicable	Select a component name from the drop-down list.



UI Input	The inputKey Name	Description
		This field is mandatory.
Source File Name with Path	PANFO_COPYFILE_SRC	Enter the file name , and path from where you want to copy the file. This field is mandatory.
Destination File Name with Path	PANFO_COPYFILE_DEST	Enter the file name , and path to where you want to copy the file. This field is mandatory.

Outputs:

Copy File action does not return any value.

Error Codes:

Error Code	Description
PAN-CGEN-0002	Invalid component name.

11.4.1 Prechecks

- Login credentials.
- Source path.
- Destination path.
- File or folder permission for a copy.
- Availability of disk space in the destination folder.

11.5 Delete Directory

Description:

This action deletes the given directory. This assumes that the user has the privilege to delete the given directory , and the directory is empty if recursive is not set.

Inputs:



UI Input	The inputKey Name	Description
Component Name	Not Applicable	Select a component name from the drop-down list. This field is mandatory.
Directory Name to delete	PANFO_DELETE_DIR	Enter the directory name that you want to delete. This field is mandatory.
Recursive	PANFO_DELETE_DIR_RECURSIVE	Select this check box, if you want to delete all the files within the directory, and its sub-folders. This KV is deprecated, and can be configured only using GUI mode.

Outputs:

Delete Directory action does not return any value.

Error Codes:

Error Code	Description
PAN-CGEN-0002	Invalid component name.

Prechecks

- Login credentials.
- The userpermission to delete the directory, and recursive or not.
- Permission for the root The user to delete the directory.

11.6 Delete File

Delete File - Deletes the specified file.

Description:

This action deletes the given file. This assumes that the user has the privilege to delete the given file. File delete action deletes a file if the underlying system allows it to delete for the user (Generally



Administrator user), , and the OS agent is running. On windows, some of the advanced permission settings like 'delete deny', are affected only when the user tries to delete from explorer. However, it is allowed to delete from cmd.exe. In such a case, the File delete action will delete the file.

Inputs:

UI Input	The inputKey Name	Description
Component Name	Not Applicable	Select a component name from the drop-down list. This field is mandatory
File Name to delete	PANFO_DELETE_FILE	Enter the file name that you want to delete. This field is mandatory.

Outputs:

Delete File action does not return any value.

Error Codes:

Error Code	Description
PAN-CGEN-0002	Invalid component name.

Note:

This action deletes files in the sub-directory also.

11.6.1 Prechecks

- Login credentials.
- Locate file.
- The user permission to delete the file in the directory or sub-directory.

11.7 Delete File List

Description:

This action deletes the list of files specified as comma separated.



Inputs:

UI Input	The inputKey Name	Description
Component Name	Not Applicable	Select a component name from the drop-down list. This field is mandatory
File Name to delete	PANFO_DELETE_FILELIST	Enter the file name that you want to delete. Click Add . To remove the file(s) from the list, select the file , and click Remove . This field is mandatory

Outputs:

Delete File List action does not return any value.

Error Codes:

Error Code	Description
PAN-CGEN-0002	Invalid component name.

Note:

This action deletes files in the sub-directory also.

Prechecks

- Login credentials.
- Locate file.
- The userpermission to delete the file in the directory or sub-directory.

11.8 Delete Files

Description:

This action deletes files whose name matches the given pattern. This assumes that the user has the privilege to delete the files in the directory.

Inputs:



UI Input	The inputKey Name	Description
Component Name	Not Applicable	Select a component name from the drop-down list. This field is m, andatory
Directory Name	PANFO_DELETEFILES_DIR	Enter the directory name from where you want to delete the files. This field is m, andatory.
File Name Pattern	PANFO_DELETEFILES_PATTERN	Enter the file name pattern to match the files to be deleted. You can use wild cards like * , and ?. This field is m, andatory.

Outputs:

Delete Files action does not return any value.

Error Codes:

Error Code	Description
PAN-CGEN-0002	Invalid component name.

Note:

This action deletes files in the sub-directory also.

Prechecks

- Login credentials.
- Locate files.
- The userpermission to delete files in a directory or sub-directory.

11.9 Delete Large Files

Description:

This action deletes files that are larger than a specified size in the given directory. This assumes that the userhas the privilege to delete the files in the directory.

Inputs:



UI Input	The inputKey Name	Description
Component Name	Not Applicable	Select a component name from the drop-down list. This field is mandatory.
Directory Name	PANFO_DELETEFILE_LARGER_DIR	Enter the directory name from where you want to delete the larger files. This field is mandatory.
File Size (MB)	PANFO_DELETEFILE_LARGER_SIZE	Enter the file size in MB. This field is mandatory.

Note:

This action deletes files in the sub-directory also.

Outputs:

The delete Larger Files action does not return any value.

Error Codes:

Error Code	Description
PAN-CGEN-0002	Invalid component name.

Note:

This action deletes files in the sub-directory also.

Prechecks

- Login credentials.
- Locate file.
- The userpermission to delete large files in the directory or sub-directory.

11.10 Delete Old Files



Delete Old Files - Deletes files that are older than the specified period.

Description:

This action deletes files that are older than the specified period in the given directory. This assumes that the user has the privilege to delete the files in the directory.

Inputs:

UI Input	The inputKey Name	Description
Component Name	Not Applicable	Select a component name from the drop-down list. This field is mandatory.
Directory Name	PANFO_DELETE_FILE_OLDER_DIR	Enter the directory name from where you want to delete the files older than the specified period. This field is mandatory.
Files Older Than	PANFO_DELETE_FILE_OLDER_TIME	Enter the time in hours. This field is mandatory.

Outputs:

The delete Old Files action does not return any value.

Error Codes:

Error Code	Description
PAN-CGEN-0002	Invalid component name.

Note:

This action deletes files in the sub-directory also.

Prechecks

- Login credentials.
- Locate the old files.



- The userpermission to delete old files in the directory or sub-directory.

11.11 Get File Checksum

Description:

This action gets the CRC32 checksum. The file name should be a regular file.

Inputs:

UI Input	The inputKey Name	Description
Component Name	Not Applicable	Select a component name from the drop-down list. This field is m, andatory
File Name	PANFO_CHECKSUM_FILENAME	Enter the file name for which you want to get the file checksum. This field is m, andatory.

Outputs:

Output Name	Output Key Name	Description
Checksum of the specified filename	PANFO_FILENAME_CHECKSUM	Check the specified file name.

Error Codes:

Error Code	Description
PAN-CGEN-0002	Invalid component name.

Limitations:

Not supported when the server is managed remotely [Agentless model].

Prechecks



- Login credentials.
- Locate folder , and file.

11.12 Get File Size

Description:

This action gets the file size in bytes. The file name should be a regular file.

Inputs:

UI Input	The inputKey Name	Description
Component Name	Not Applicable	Select a component name from the drop-down list. This field is m, andatory
File Name	PANFO_FILESIZE_FILENAME	Enter the file name for which you want to get the file size. This field is m, andatory.

Outputs:

Output Name	Output Key Name	Description
Size of file	PANFO_FILE_SIZE	Checks the size of the specified file name.

Error Codes:

Error Code	Description
PAN-CGEN-0002	Invalid component name.

Prechecks

- Login credentials.
- Locate the file within the prescribed folder on a selected machine.

11.13 Get File Time

Description:



This action gets the timestamp of the file. The file name should be a regular file.

Inputs:

UI Input	The inputKey Name	Description
Component Name	Not Applicable	Select a component name from the drop-down list. This field is m, andatory.
File Name	PANFO_TIMESTAMP_FILENAME	Enter the file name for which you want to get the timestamp. This field is m, andatory.

Outputs:

Output Name	Output Key Name	Description
Timestamp of file	PANFO_FILE_TIMESTAMP	Gets the timestamp of the file.

Error Codes:

Error Code	Description
PAN-CGEN-0002	Invalid component name.

Prechecks

- Login credentials.
- Locate the file within the prescribed folder on a selected machine.

11.14 Replace in a File

Description:

This action checks whether a specified pattern exists in the given file , and if found replaces it with the replace text.

Inputs:



UI Input	The inputKey Name	Description
Component Name	Not Applicable	Select a component name from the drop-down list. This field is mandatory.
File name	PANFO_REPLACE_FILE_TEXT_DIR	Enter the file name , and path for which you want to replace the text. This field is mandatory.
Pattern to search	PANFO_REPLACE_FILE_TEXT_PATTERN	Enter the text that you want to search in the specified file. This field is mandatory.
Replacement Text	PANFO_REPLACE_FILE_TEXT	Enter the text that you to replace with the existing specified text. This field is mandatory.

Outputs:

Replace in a File action does not return any value.

Error Codes:

Error Code	Description
PAN-CGEN-0002	Invalid component name.

Limitations:

Not supported when the server is managed remotely [Agentless model].

11.14.1 Prechecks

- Login credentials.
- The userpermission to access the folder , and edit the file.
- Locate the file in the directory or sub-directory.

11.15 Search in a File

Description:

This action checks whether a specified pattern exists in the given file or not.



Inputs:

UI Input	The inputKey Name	Description
Component Name	Not Applicable	Select a component name from the drop-down list. This field is m, andatory
File name	PANFO_IS_FILE_CONTAIN_PATTERN_FILENAME	Enter the file name that you want to search. This field is m, andatory.
Pattern to search	PANFO_IS_FILE_CONTAIN_PATTERN	Enter the pattern that you want to search in the specified component. This field is m, andatory

Outputs: Search in a File action does not return any value.

Error Codes:

Error Code	Description
PAN-CGEN-0002	Invalid component name.

Limitations: Not supported when the server is managed remotely [Agentless model].

11.15.1 Prechecks

- Login credentials.
- Locate the file in the directory or sub-directory.



12 Hitachi TrueCopy

12.1 Resync TrueCopy

Description:

This action re-establishes a split pair , and then restarts the update copy operations to the Secondary volume. If successful, all the changes are done on the Primary , and start getting updated on the Secondary volume. The action completes after initiating the resync request , and does not wait for the resynchronization to complete. The 'Check Status' or 'Verify Status' action should be used to check if the pair has arrived at a particular state.

When the action is run as a part of the workflow, CCI 'pairresync' comm, and is invoked on the pair represented by the selected protection scheme, along with the options chosen by the user. If all the pairs of groups are successfully resynced, the action returns as a success. In all other cases, it returns as a failure. The success or failure of the action depends on the success or failure of the 'pairresync' comm, and. Refer to the **Outputs , and Errors** table below for details.

CCI comm, and: pairresync -g <name>.

Input:

UI Input	The inputKey Name	Description
Protection Scheme Name	RESYNC_TC_OPER_ON, RESYNC_TC_OPER_ON_TYPE	Select the protection scheme name configured for the group from the drop-down list. Note: If the group is attached with more than one pair of protection subsystems then do not select "Current Production Service" or "Current DR Service". Instead, select the actual protection subsystem to configure the operation.

Outputs , and Errors:

The RESYNC_TC_RC key is set with an exit status of 'pairresync' comm, and.

The following are the possible values:

- A return code '0' indicates success.
- All other values indicates failure.



RESYNC_TC_RC value	Description
0	This value indicates that all the pairs in the group are successfully resynced.
NonZero	This value indicates some failure in the resync of group.
236	This value indicates an unmatched volume status within the group.
229	This value indicates an inconsistent status in group.
222	This value indicates an invalid volume status.
228	This value indicates an invalid pair status

12.1.1 Prechecks

- Configuration – Action is configured with the input of Key Values or Advance Properties.
- Agent connectivity.
- Authentication (Password check for agentless).
- HORCM services are running or not.
(This pre-check also supports that the agent is running , and the access credentials are correct).

12.2 Split TrueCopy

Description:

This action stops the replication of a replicating pair. When successful, the updates of the Primary volume do not go to the Secondary volume. This does not delete the pair, hence, it can be resynced later. The action returns as success, when the splitting of the pair is successful.

The action provides an option to choose SVOL access: READ or READWRITE. If the user has selected READWRITE, then the Secondary volume will be in READWRITE mode after the successful split.

When the action is run as a part of the workflow, CCI 'pairsplit' comm, and is invoked on the pair represented by the selected protection scheme, along with the options chosen by the user. The success or failure of the action is determined by the success or failure of the 'pairsplit' comm, and. Refer to the **Outputs , and Errors** table below for details.



CCI comm, and:

- If the user has selected the default value for SVOL Access: pairsplit -g <name>.
- If read: pairsplit -g <name> -r.
- If The user has selected readwrite: pairsplit -g <name> -rw.

Inputs:

UI Input	The inputKey Name	Description
Protection Scheme Name	SPLIT_TC_OPER_ON, SPLIT_TC_OPER_ON_TYPE	Select the protection scheme name configured for the group from the drop-down list. Note: If the group is attached with more than one pair of protection subsystems then do not select "Current Production Service" or "Current DR Service". Instead, select the actual protection subsystem to configure the operation.
SVOL Access	SPLIT_TC_SVOL_ACCESS	Select an appropriate option from the drop-down list. The options are: <ul style="list-style-type: none"> ▪ READ ▪ READWRITE

Outputs , and Errors:

The SPLIT_TC_RC key is set with an exit status of the 'pairsplit' comm, and.

The following are the possible values:

- A return code '0' indicates success.
- All other values indicates failure.

SPLIT_TC_RC value	Description
0	This value indicates that all the pairs in the group are successfully suspended.
NonZero	This value indicates some failure in the splitting of the group.



SPLIT_TC_RC value	Description
236	This value indicates an unmatched volume status within the group.
229	This value indicates an inconsistent status in the group.
222	This value indicates an invalid volume status.
235	This value indicates a Pair Volume combination error.
228	This value indicates an invalid pair status
234	This value indicates a Pair suspended at WAIT state.

12.2.1 Prechecks

- Configuration – Action is configured with the input of Key Values or Advance Properties.
- Agent connectivity.
- Authentication (Password check for agentless).
- HORCM services are running or not.
(This pre-check also supports that the agent is running , and the access credentials are correct).

12.3 Get Status

Description:

This action reports the volume status (whether paired or not , and if paired, whether it is SVol or PVol) , and pair status (Hitachi specific pair status that indicates the current state of replication).

When the action is run as a part of the workflow, CCI 'pairvolchk' comm, and is invoked on the volume represented by the selected protection scheme, along with the options chosen by the user. The success or failure of the action is determined by the success or failure of 'pairvolchk' comm, and. Refer to the **Outputs , and Errors** table below for details.

CCI comm, and: pairvolchk -g <name>.

Input:



UI Input	The inputKey Name	Description
Protection Scheme Name	GET_TC_STATUS_OPER_ON, GET_TC_STATUS_OPER_ON_TYPE	Select the protection scheme name configured for the group from the drop-down list. Note: If the group is attached with more than one pair of protection subsystem then do not select "Current Production Service" or "Current DR Service". Instead, select the actual protection subsystem to configure the operation.

Outputs , and Errors:

The GET_TC_STATUS_RC key is set with an exit status of 'pairvolchk' comm, and.

The following are possible values:

- GET_TC_STATUS_VOL_STATUS indicates volume status. The possible values are PVOL/SVOL/SMPL.
- GET_TC_STATUS_PAIR_STATUS indicates the pair status. The possible values are status values for pairs, such as PAIR/COPY/PSUS, etc.
- The return code 0-127 indicates the success of the action. All other values indicates failure.

GET_TC_STATUS_RC value	Description
0-127	These values indicates specific exit codes that represent the state of volume , and pair. (e.g. 22: PVOL_COPY). Refer to Hitachi CCI documentation for details.
236	This value indicates an unmatched volume status within the group.
235	This value indicates a Pair Volume combination error.

12.3.1 Prechecks

- Configuration – Action is configured with the inputof Key Values or Advance Properties.
- Agent connectivity.
- Authentication (Password check for agentless).



- HORCM services are running or not. (This pre-check also supports that the agent is running , and the access credentials are correct).

12.4 Verify Status

Description:

This action is used to verify the status of a pair. When run it checks for the current status of a pair , and returns success if a match occurs with what the userhas asked for.

The action provides an option to specify the timeout value. It is specified in Seconds. If no timeout value is specified, then the action completes immediately. Otherwise, the action waits till the timeout value or status becomes the expected value, whichever happens, earlier. The action provides an option to choose one of the possible states.

When the action is run as a part of the workflow, CCI 'pairevwait' comm, and is invoked on the pair represented by the selected protection scheme, along with the options chosen by the user. The success or failure of the action is determined by the success or failure of the 'pairevwait' comm, and. Refer to the **Outputs , and Errors** table below for details.

CCI Comm, and:

- (if timeout option is not specified) pairevwait -g <name> -s <state> -nowait.
- (if timeout option is specified) pairevwait -g <name> -s <state> -t <timeout value>.

Inputs:

UI Input	The inputKey Name	Description
Protection Scheme Name	VERIFY_TC_STATUS_OPER_ON, VERIFY_TC_STATUS_OPER_ON_TYPE	Select the protection scheme name configured for the group from the drop-down list. Note: If the group is attached with more than one pair of protection subsystem then do not select "Current Production Service" or "Current DR Service". Instead, select the actual protection subsystem to configure the operation.



Timeout (in Seconds) Range:0-1999999	VERIFY_TC_STATUS_TO	Enter a numeric value in seconds.
Replication Group State	VERIFY_TC_STATUS_STATE	Select the replication group state from the list of various states.

Outputs , and Errors:

The VERIFY_TC_STATUS_RC key is set with an exit status of 'pairevwait' comm, and.

The following are the possible values:

- A return code '0' indicates that the action is successful.
- All other values indicates failure.

VERIFY_TC_STATUS_RC value	Description
0	This value indicates that the current status of the pair matches with the userspecified status.
Other than 0-127	This value indicates a failure to get the current status or the current status does not match with the userspecified value.
236	This value indicates an unmatched volume status within the group.
229	This value indicates an inconsistent status in group.
222	This value indicates an invalid volume status.
235	This value indicates a Pair Volume combination error.
234	This value indicates a Pair suspended at WAIT state.
233	This value indicates a timeout waiting for specified status.
232	This value indicates a timeout waiting for specified status on the local host.

12.4.1 Prechecks



- Configuration – Action is configured with the input of Key Values or Advance Properties.
- Agent connectivity.
- Authentication (Password check for agentless).
- HORCM services are running or not.
(This pre-check also supports that the agent is running , and the access credentials are correct).

12.5 Takeover

Description:

This action executes the Hitachi 'horctakeover' comm, and. The horctakeover is a scripted comm, and for executing several Hitachi TrueCopy operations. The takeover comm, and checks the specified volumes or groups attributes (paircurchk), decides the takeover function based on the attributes, executes the chosen takeover function, , and returns the result. The four Hitachi TrueCopy takeover functions designed for HA software operation are takeover-switch, swap-takeover, PVOL-takeover, , and SVOL-takeover.

The action provides an option to choose: "SVOL Takeover": If Selected, it executes SVOL-takeover. The target volume of the local host must be an S-VOL.

A group can be specified as the target of the TrueCopy takeover comm, and. If SVOL-takeover is specified for a group, the data consistency check is executed for all volumes in the group, , and all the inconsistent volumes are found in the execution log file , and displayed (same as paircurchk comm, and). The takeover comm, and allows swapping of the Primary , and Secondary volumes so that if the Primary or the Secondary volume is switched due to a server error or package transfer, duplex operations can be continued using the reversed volumes. When control is h, anded over to the current node, swapping the volumes again eliminates the need to copy them. The takeover comm, and also allows the Secondary volume to be separated for disaster a recovery operations.

The takeover comm, and, when activated by a control script, checks for the combination of attributes of the local , and remote volumes , and determines the proper takeover action. Various take-over functions that can be executed are Nop-takeover, Swap-takeover, SVOL-takeover, PVOL-SMPL-takeover, PVOL-PSUE-takeover, , and SVOL-SSUS-takeover. If the comm, and fails, the error message , and the error code are returned. If the comm, and succeeds, the return code , and the message tells which takeover sub function is executed. To get the details about the horctakeover sub-functions , and what state causes which function to initiate, please refer to the applicable Comm, and Control Reference guide.

Note:



Hitachi horctakeover comm, and many times returns currency error even if the volumes are consistent. In such cases, takeover action returns to failure. The user is expected to verify the volumes before proceeding to the next action. For more details, please refer to the CCI guide (paircuchk).

CCI comm, and:

- If SVOL takeover option is not selected: horctakeover -g <name>.
- If SVOL takeover option is selected: horctakeover -g <name> -S.

Inputs:

UI Input	The inputKey Name	Description
Protection Scheme Name	TAKEOVER_TC_OPER_ON, TAKEOVER_TC_OPER_ON_TYPE	Select the protection scheme name configured for the group from the drop-down list. Note: If the group is attached with more than one pair of protection subsystem then do not select "Current Production Service" or "Current DR Service". Instead, select the actual protection subsystem to configure the operation.
Volume Option	TAKEOVER_TC_VOL_OPTIONS	Select SVOL takeover from the drop-down list.
Timeout (in Seconds)	TAKEOVER_TC_TO	Enter a value in the numeric field. This is applicable for the syncreplication type.

Outputs , and Errors:

The TAKEOVER_TC_RC key is set with an exit status of 'horctakeover' comm, and.

The following are the possible values:

- Values 0-5 indicates the success of the action.



- All other values indicates failure of action.

TAKEOVER_TC_RC value	Description
0	This value indicates a Nop-takeover (no operation).
1	This value indicates that a Swap-takeover was successfully executed.
2	This value indicates that a SVOL-takeover was successfully executed.
3	This value indicates that a PVOL-SMPL-takeover was successfully executed.
4	This value indicates the following: <ul style="list-style-type: none"> ▪ PVOL-PSUE-takeover was successfully executed. ▪ SVOL-SSUS-takeover was successfully executed. (This value depends on the microcode level.)
5	This value indicates that a SVOL-SSUS-takeover was successfully executed. (This value depends on the microcode level.)
236	This value indicates an unmatched volume status within the group.
229	This value indicates an inconsistent status in group.
235	This value indicates a Pair Volume combination error.
225	This value indicates a S-Vol currency error.
224	This value indicates a Local Volume currency error.
223	This value indicates a Local , and Remote Volume currency error.
233	This value indicates a timeout waiting for specified status.

12.5.1 Prechecks



- Configuration – Action is configured with the input of Key Values or Advance Properties.
- Agent connectivity.
- Authentication (Password check for agentless).
- HORCM services are running or not.
(This pre-check also supports that the agent is running , and the access credentials are correct).

12.6 Delete TrueCopy

Description:

This action deletes the replication relationship between the Primary volume , and the Secondary volume. The user cannot resync the delta changes between the Primary , and the Secondary volume, once it is deleted.

The action provides an option to choose "Force": If selected, it brings the Secondary volume into the simplex mode forcibly. It is issued by the secondary host, if the host possessing the Primary volume is down or has failed.

When the action is run as a part of the workflow, CCI 'pairsplit -S' comm, and is invoked on the pair represented by the selected protection scheme, along with the options chosen by the user. The success or failure of the action is determined by the success or failure of the 'pairsplit' comm, and. Refer to the **Outputs , and Errors** table below for details.

CCI Comm, and:

- if force option is not selected: pair split -g <name> -S.
- if force option is selected: pair split -g <name> -S -R.

Inputs:

UI Input	The inputKey Name	Description
Protection Scheme Name	DELETE_TC_OPER_ON, DELETE_TC_OPER_ON_TYPE	Select the protection scheme name configured for the group from the drop-down list. Note:



		If the group is attached with more than one pair of protection subsystem then do not select "Current Production Service" or "Current DR Service". Instead, select the actual protection subsystem to configure the operation.
Force	DELETE_TC_FORCE	Select True or False from the drop-down list.

Outputs , and Errors:

The DELETE_TC_RC key is set with an exit status of the 'pairsplit' comm, and.

The following are the possible values:

- A return code '0' indicates success.
- All other values indicates failure.

DELETE_TC_RC value	Description
0	This value indicates that the replication group is successfully deleted.
NonZero	This value indicates some failure in the splitting of group.
236	This value indicates an unmatched volume status within the group.
229	This value indicates an inconsistent status in group.
222	This value indicates an invalid volume status.
235	This value indicates a Pair Volume combination error.
228	This value indicates an invalid pair status
234	This value indicates a Pair suspended at WAIT state.

12.6.1 Prechecks

- Configuration – Action is configured with the input of Key Values or Advance Properties.



- Agent connectivity.
- Authentication (Password check for agentless).
- HORCM services are running or not.
(This pre-check also supports that the agent is running , and the access credentials are correct).

12.7 Create TrueCopy

Description:

This action creates the replication relationship between the Primary volume , and the Secondary volume. The action returns after the initial copy are initiated between the Primary , and the Secondary Volumes. The usershould verify the Replica status to check the desired status. The replication properties, such as type of replication (sync/async) or fence level (Data/status, etc) would be the same as per the setting present while discovering the protection scheme or default values.

The action provides an option to choose the direction of replication: forward (Selected protection scheme as Primary) or reverse (selected protection scheme as Secondary).

The action provides an option to choose fence level: possible values can be status, data, , and never. Please refer to the Hitachi TrueCopy The userguide for details on the fence level.

When the action is run as a part of a workflow, CCI 'paircreate' comm, and is invoked on the pair represented by the selected protection scheme, along with the options present while the discovery of the object. The success or failure of the action is determined by the success or failure of 'paircreate' comm, and. Refer to the **Outputs , and Errors** table below for details.

CCI Comm, and: paircreate -g <name> -f <fence> -vl (if The userhas selected FORWARD option) or -vr (if The userhas selected REVERSE option).

Inputs:

UI Input	The inputKey Name	Description
Protection Scheme Name	CREATE_TC_OPER_ON, CREATE_TC_OPER_ON_TYPE	Select the protection scheme name configured for the group from the drop-down list. Note: If the group is attached with more than one pair of protection subsystem then do not select "Current Production Service" or "Current DR Service". Instead, select



		the actual protection subsystem to configure the operation.
Replication Direction	CREATE_TC_REPL_DIRECTION	Select Forward or Reverse from the drop-down list.
Fence Level	CREATE_TC_FENCE	Select the appropriate fence level from the following: <ul style="list-style-type: none"> ▪ Data ▪ Status ▪ Never

Outputs , and Errors:

The CREATE_TC_RC key is set with an exit status of 'paircreate' comm, and.

The following are the possible values:

- A return code '0' indicates success.
- All other values indicates failure.

CREATE_TC_RC value	Description
0	This value indicates that the replication group is successfully created.
NonZero	This value indicates some failure in the creation of the replication group.
236	This value indicates an unmatched volume status within the group.
229	This value indicates an inconsistent status in group.
222	This value indicates an invalid volume status.
228	This value indicates an invalid pair status
212	This value indicates a Pair suspended at WAIT state.

12.7.1 Prechecks



- Configuration – Action is configured with the input of Key Values or Advance Properties.
- Agent connectivity.
- Authentication (Password check for agentless).
- HORCM services are running or not.
(This pre-check also supports that the agent is running , and the access credentials are correct).

12.8 Role Switch

Description:

This action re-establishes a split pair in the reverse direction. The Primary volume becomes the Secondary volume , and vice versa. If it is successful, all the changes done on the Secondary starts getting updated on the Primary volume. The action completes after reversing the role , and initiating the reverse resync request. It does not wait for resynchronization to complete. The 'Check Status' or 'Verify Status' action should be used to check if the pair has arrived at a particular state.

When the action is run as a part of the workflow, CCI 'pairresync -swapp or -swaps' comm, and is invoked on the pair represented by the selected protection scheme, along with the options chosen by the user. The success or failure of the action is determined by the success or failure of 'pairresync' comm, and. Refer to the **Outputs , and Errors** table below for details.

CCI Comm, and: pairvolchk -g <name> , and pairresync -g <name> -swapp.

Input:

UI Input	The inputKey Name	Description
Protection Scheme Name	ROLE_SWITCH_TC_OPER_ON, ROLE_SWITCH_TC_OPER_ON_TYPE	Select the protection scheme name configured for the group from the drop-down list. Note: If the group is attached with more than one pair of protection subsystems then do not select "Current Production Service" or "Current DR Service". Instead, select the actual protection subsystem to configure the operation.

Outputs , and Errors:

The ROLE_SWITCH_TC_RC key is set with an exit status of 'pairresync' comm, and.



The following are the possible values:

- A return code '0' indicates success.
- All other values indicates failure.

ROLE_SWITCH_TC_RC value	Description
0	This value indicates that the role of all the pairs in the group is successfully reversed.
NonZero	This value indicates some failure in the resync of a group.
236	This value indicates an unmatched volume status within the group.
229	This value indicates an inconsistent status in a group.
222	This value indicates an invalid volume status.
228	This value indicates an invalid pair status

12.8.1 Prechecks

- Configuration – Action is configured with the input of Key Values or Advance Properties.
- Agent connectivity.
- Authentication (Password check for agentless).
- HORCM services are running or not.
(This pre-check also supports that the agent is running , and the access credentials are correct).

12.9 Check Consistency

Description:

This action checks for the consistency of the Secondary volume. The action calls the Hitachi CCI 'paircurchk' comm, and, which checks for the currency of the Hitachi TrueCopy Secondary volume(s), by evaluating the data consistency based on pair status , and fence level. The action fails if the Secondary volume is not consistent. Please refer to the Hitachi CCI reference manual to know about the data consistency for each possible state of a Hitachi TrueCopy volume.

When the action is run as a part of the workflow, CCI 'paircurchk' comm, and is invoked on the pair represented by the selected protection scheme, along with the options chosen by the user. The



action returns success if the data volumes are consistent. In all other cases, it fails. Refer to the **Outputs , and Errors** table below for details.

Note

Hitachi paircurchk comm, and many times returns currency error even if the volumes are consistent. In such cases, consistency check action returns failure. For more details, please refer to the CCI guide (paircuchk).

CCI Comm, and: paircurchk -g <name>.

Inputs:

UI Input	The inputKey Name	Description
Protection Scheme Name	CHECK_CONSISTENCY_TC_OPER_ON, CHECK_CONSISTENCY_TC_OPER_ON_TYPE	Select the protection scheme name configured for the group from the drop-down list. Note: If the group is attached with more than one pair of protection subsystems then do not select "Current Production Service" or "Current DR Service". Instead, select the actual protection subsystem to configure the operation.

Outputs , and Errors:

The CHECK_CONSISTENCY_TC_RC key is set with an exit status of the 'paircurchk' comm, and.

The following are possible values:

- A return code '0' indicates Secondary volumes are consistent.
- All other value indicates failure or warnings.

CHECK_CONSISTENCY_TC_RCvalue	Description



0	This value indicates that the data is consistent.
225	This value indicates a S-Vol currency error.

12.9.1 Prechecks

- Configuration – Action is configured with the input of Key Values or Advance Properties.
- Agent connectivity.
- Authentication (Password check for agentless).
- HORCM services are running or not.
(This pre-check also supports that the agent is running , and the access credentials are correct).

12.10 Is TrueCopy

Description:

This action checks whether the protection service name represented is a TrueCopy protection service. The action fails if it is of a different type.

Action will have the following Private configuration.

- The user gets a drop-down list with names of all the protection schemes attached to the group. Users need to select one of the protection schemes.

Inputs:

UI Input	The inputKey Name	Description
Protection Scheme Name	IS_TC_OPER_ON , IS_TC_OPER_ON_TYPE (DYNAMIC or STATIC)	It should always be configured as static , and then the production scheme name has to be given. Note: Does not support Dynamic operation.

Outputs , and Errors:

None

12.10.1 Prechecks



- Configuration – Action is configured with the input of Key Values or Advance Properties.
- Agent connectivity.
- Authentication (Password check for agentless).
- HORCM services are running or not.
(This pre-check also supports that the agent is running , and the access credentials are correct).



13 Hitachi Universal Replicator

13.1 Resync UR

Description:

This action re-establishes a split pair , and then restarts the update copy operations to the Secondary volume. If it is successful, all the changes are done on the Primary , and start getting updated on the Secondary volume. The action completes after initiating the resync request , and does not wait for the resynchronization to complete. The 'Check Status' or 'Verify Status' action should be used to check if the pair has arrived at a particular state.

When the action is run as a part of the workflow, CCI 'pairresync' comm, and is invoked on the pair represented by the selected protection scheme, along with the options chosen by the user. If all the pairs of groups are successfully resynced, the action returns as a success. In all other cases, it returns as a failure. The success or failure of the action depends on the success or failure of 'pairresync' comm, and. Refer to the **Outputs , and Errors** table below for details.

CCI comm, and: pairresync -g <name>.

Input:

UI Input	The inputKey Name	Description
Protection Scheme Name	RESYNC_UR_OPER_ON, RESYNC_UR_OPER_ON_TYPE	Select the protection scheme name configured for the group from the drop-down list. Note: If the group is attached with more than one pair of protection subsystems then do not select "Current Production Service" or "Current DR Service". Instead, select the actual protection subsystem to configure the operation.

Outputs , and Errors:

The RESYNC_UR_RC key is set with an exit status of 'pairresync' comm, and.

The following are the possible values:

- A return code '0' indicates success.
- All other values indicates failure.



RESYNC_UR_RC value	Description
0	This value indicates that all the pairs in the group are successfully resynced.
NonZero	This value indicates some failure in the resync of the group.
236	This value indicates an unmatched volume status within the group.
229	This value indicates an inconsistent status in the group.
222	This value indicates an invalid volume status.
228	This value indicates an invalid pair status

13.1.1 Prechecks

- Configuration – Action is configured with the input of Key Values or Advance Properties.
- Agent connectivity.
- Authentication (Password check for agentless).

13.2 Split UR

Description:

This action stops the replication of a replicating pair. When successful, the updates of the Primary volume do not go to the Secondary volume. This does not delete the pair, hence, it can be resynced later. The action returns success when the splitting of the pair is successful.

The action provides an option to choose SVOL access: READ or READWRITE. If the user has selected READWRITE, then the Secondary volume will be in READWRITE mode after the successful split.

When the action is run as a part of the workflow, CCI 'pairsplit' comm, and is invoked on the pair represented by the selected protection scheme, along with the options chosen by the user. The success or failure of the action is determined by the success or failure of the 'pairsplit' comm, and. Refer to the **Outputs , and Errors** table below for details.

CCI comm, and:



- If the user has selected the default value for SVOL Access: pairsplit -g <name>.
- If read: pairsplit -g <name> -r.
- If the user has selected readwrite: pairsplit -g <name> -rw.

Inputs:

UI Input	The inputKey Name	Description
Protection Scheme Name	SPLIT_UR_OPER_ON, SPLIT_UR_OPER_ON_TYPE	Select the protection scheme name configured for the group from the drop-down list. Note: If the group is attached with more than one pair of protection subsystems then do not select "Current Production Service" or "Current DR Service". Instead, select the actual protection subsystem to configure the operation.
SVOL Access	SPLIT_UR_SVOL_ACCESS	Select an appropriate option from the drop-down list. The options are: <ul style="list-style-type: none"> ▪ READ ▪ READWRITE

Outputs , and Errors:

The SPLIT_UR_RC key is set with an exit status of the 'pairsplit' comm, and.

The following are the possible values:

- A return code '0' indicates success.
- All other values indicates failure.

SPLIT_UR_RC value	Description
0	This value indicates that all the pairs in the group are successfully suspended.
NonZero	This value indicates some failure in the splitting of group.
236	This value indicates an unmatched volume status within the group.



SPLIT_UR_RC value	Description
229	This value indicates an inconsistent status in the group.
222	This value indicates an invalid volume status.
235	This value indicates a Pair Volume combination error.
228	This value indicates an invalid pair status
234	This value indicates a Pair suspended at WAIT state.

13.2.1 Prechecks

- Configuration – Action is configured with the input of Key Values or Advance Properties.
- Agent connectivity.
- Authentication (Password check for agentless).

13.3 Get Status

Description:

This action reports the volume status (whether paired or not paired , and if paired, whether it is SVol or PVol) , and pair status (HP XP specific pair status that indicates the current state of replication).

When the action is run as a part of the workflow, CCI 'pairvolchk' comm, and is invoked on the volume represented by the selected protection scheme, along with the options chosen by the user. The success or failure of the action is determined by the success or failure of the 'pairvolchk' comm, and. Refer to the **Outputs , and Errors** table below for details.

CCI comm, and: pairvolchk -g <name>.

Input:

UI Input	The inputKey Name	Description
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Protection Scheme Name	GET_UR_STATUS_OPER_ON, GET_UR_STATUS_OPER_ON_TYPE	Select the protection scheme name configured for the group from the drop-down list. Note: If the group is attached with more than one pair of protection subsystems then do not select "Current Production Service" or "Current DR Service". Instead, select the actual protection subsystem to configure the operation.
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Outputs , and Errors:

The GET_UR_STATUS_RC key is set with an exit status of 'pairvolchk' comm, and.

The following are possible values:

- GET_UR_STATUS_VOL_STATUS indicates volume status. Possible values are PVOL/SVOL/SMPL.
- GET_UR_STATUS_PAIR_STATUS indicates pair status. possible values are status values for pairs like PAIR/COPY/PSUS etc.
- Return code 0-127 indicates the success of the action. All other value indicates failure.

GET_UR_STATUS_RC value	Description
0-127	These values indicates specific exit codes that represent the state of volume , and pair. (e.g. 22: PVOL_COPY). Refer to HP XP CCI documentation for details.
236	This value indicates an unmatched volume status within the group.
235	This value indicates a Pair Volume combination error.

13.3.1 Prechecks

- Configuration – Action is configured with the input of Key Values or Advance Properties.
- Agent connectivity.
- Authentication (Password check for agentless).



13.4 Verify Status

Description:

This action is used to verify the status of a pair. When run it checks the current status of a pair , and returns success, if it matches what the userhas asked for. If the userhas specified an optional timeout value, then the action periodically checks the status till either the status of the pair becomes the expected value, or the timeout expires. The action is successful if the status of the pair is what the userhas asked for. In all other cases, the action fails.

The action provides an option to specify the timeout value. It is specified in Seconds. If no timeout value is specified, then the action completes immediately. Otherwise, the action waits till the timeout value or status becomes the expected value, whichever happens, earlier. The action provides an option to choose one of the possible states.

When the action is run as a part of the workflow, CCI 'pairevwait' comm, and is invoked on the pair represented by the selected protection scheme, along with the options chosen by the user. The success or failure of the action is determined by the success or failure of the 'pairrevwait' comm, and. Refer to the **Outputs , and Errors** table below for details.

CCI Comm, and:

- (if timeout option is not specified) pairevwait -g <name> -s <state> -nowait.
- (if timeout option is specified) pairevwait -g <name> -s <state> -t <timeout value>.

Inputs:

UI Input	The inputKey Name	Description
Protection Scheme Name	VERIFY_UR_STATUS_OPER_ON, VERIFY_UR_STATUS_OPER_ON_TYPE	Select the protection scheme name configured for the group from the drop-down list. Note: If the group is attached with more than one pair of protection subsystems then do not select "Current Production Service" or "Current DR Service". Instead, select the actual protection subsystem to configure the operation.



Timeout (in Seconds) Range:0-1999999	VERIFY_UR_STATUS_TO	Enter a numeric value in seconds.
Replication Group State	VERIFY_UR_STATUS_STATE	Select the replication group state from the list of various states.

Outputs , and Errors:

The VERIFY_UR_STATUS_RC key is set with an exit status of 'pairevwait' comm, and.

The following are the possible values:

- A return code '0' indicates that the action is successful.
- All other values indicates failure.

VERIFY_UR_STATUS_RC value	Description
0	This value indicates that the current status of the pair matches with the userspecified status.
Other than 0-127	This value indicates a failure to get the current status or the current status does not match with the userspecified value.
236	This value indicates an unmatched volume status within the group.
229	This value indicates an inconsistent status in the group.
222	This value indicates an invalid volume status.
235	This value indicates a Pair Volume combination error.
234	This value indicates a Pair suspended at WAIT state.
233	This value indicates a timeout waiting for specified status.
232	This value indicates a timeout waiting for the specified status on the local host.



13.4.1 Prechecks

- Configuration – Action is configured with the input of Key Values or Advance Properties.
- Agent connectivity.
- Authentication (Password check for agentless).

13.5 Takeover

Description:

This action executes the Hitachi 'horctakeover' comm, and. The horctakeover is a scripted comm, and for executing several Hitachi TrueCopy operations. The takeover comm, and checks the specified volumes or groups attributes (paircurchk), decides the takeover function based on the attributes, executes the chosen takeover function, , and returns the result. The four Hitachi TrueCopy takeover functions designed for HA software operation are takeover-switch, swap-takeover, PVOL-takeover, , and SVOL-takeover.

The action provides an option to choose: "SVOL Takeover": If Selected, it executes SVOL-takeover. The target volume of the local host must be an S-VOL.

A group can be specified as the target of the TrueCopy takeover comm, and. If SVOL-takeover is specified for a group, the data consistency check is executed for all volumes in the group, , and all the inconsistent volumes are found in the execution log file , and displayed (same as paircurchk comm, and). The takeover comm, and allows swapping of the Primary , and Secondary volumes so that if the Primary or the Secondary volume is switched due to a server error or package transfer, duplex operations can be continued using the reversed volumes. When control is h, anded over to the current node, swapping the volumes again eliminates the need to copy them. The takeover comm, and also allows the Secondary volume to be separated for disaster a recovery operations.

The takeover comm, and, when activated by a control script, checks the combination of attributes of the local , and remote volumes , and determines the proper takeover action. Various take over functions that can be executed is Nop-takeover, Swap-takeover, SVOL-takeover, PVOL-SMPL-takeover, PVOL-PSUE-takeover, , and SVOL-SSUS-takeover. If the comm, and fails, the error message , and the error code are returned. If the comm, and succeeds, the return code , and the message tells which takeover sub-function is executed. To get details about the horctakeover sub-functions , and what state causes which function to initiate, please refer to the applicable Comm, and Control Reference guide.

Note

Hitachi horctakeover comm, and many times returns currency error even if the volumes are consistent. In such cases, takeover action returns to failure. The user is expected to verify the



volumes before proceeding to the next action. For more details, please refer to the CCI guide (paircuchk).

CCI comm, and:

- If SVOL takeover option is not selected: horctakeover -g <name> -t timeout.
- If SVOL takeover option is selected: horctakeover -g <name> -t timeout -S.

Inputs:

UI Input	The inputKey Name	Description
Protection Scheme Name	TAKEOVER_UR_OPER_ON, TAKEOVER_UR_OPER_ON_TYPE	Select the protection scheme name configured for the group from the drop-down list. Note: If the group is attached with more than one pair of protection subsystems then do not select "Current Production Service" or "Current DR Service". Instead, select the actual protection subsystem to configure the operation.
Volume Option	TAKEOVER_UR_VOL_OPTIONS	Select SVOL takeover from the drop-down list.
Timeout (in Seconds)	TAKEOVER_UR_TO	Enter a value in the numeric field.

Outputs , and Errors:

The REPL_TAKEOVER_RC key is set with an exit status of 'horctakeover' comm, and.

The following are the possible values:

- Values 0-5 indicates the success of the action.
- All other values indicates failure of action.

REPL_TAKEOVER_RC value	Description
0	This value indicates a Nop-takeover (no operation).
1	This value indicates that a Swap-takeover was successfully executed.



REPL_TAKEOVER_RC value	Description
2	This value indicates that a SVOL-takeover was successfully executed.
3	This value indicates that a PVOL-SMPL-takeover was successfully executed.
4	This value indicates the following: <ul style="list-style-type: none"> ▪ PVOL-PSUE-takeover was successfully executed. ▪ SVOL-SSUS-takeover was successfully executed. (This value depends on the microcode level.)
5	This value indicates that a SVOL-SSUS-takeover was successfully executed. (This value depends on the microcode level.)
236	This value indicates an unmatched volume status within the group.
229	This value indicates an inconsistent status in group.
235	This value indicates a Pair Volume combination error.
225	This value indicates a S-Vol currency error.
224	This value indicates a Local Volume currency error.
223	This value indicates a Local , and Remote Volume currency error.
233	This value indicates a timeout waiting for specified status.

13.5.1 Prechecks

- Configuration – Action is configured with the input of Key Values or Advance Properties.
- Agent connectivity.
- Authentication (Password check for agentless).

13.6 Role Switch



Description:

This action re-establishes a split pair in the reverse direction. The Primary volume becomes the Secondary volume , and vice versa. If it is successful, all the changes are done on the Secondary , and start getting updated on the Primary volume. The action completes after reversing the role , and initiating the reverse resync request. It does not wait for resynchronization to complete. The 'Check Status' or 'Verify Status' action should be used to check if the pair has arrived at a particular state.

When the action is run as a part of the workflow, the CCI 'pairresync -swapp or -swaps' comm, and is invoked on the pair represented by the selected protection scheme, along with the options chosen by the user. The success or failure of the action is determined by the success or failure of 'pairresync' comm, and. Refer to **Outputs , and Errors** table below for details.

CCI Comm, and: pairvolchk -g <name> , and pairresync -g <name> -swapp.

Input:

UI Input	The inputKey Name	Description
Protection Scheme Name	ROLE_SWITCH_UR_OPER_ON, ROLE_SWITCH_UR_OPER_ON_TYPE	Select the protection scheme name configured for the group from the drop-down list. Note: If the group is attached with more than one pair of protection subsystem then do not select "Current Production Service" or "Current DR Service". Instead, select the actual protection subsystem to configure the operation.

Outputs , and Errors:

The ROLE_SWITCH_UR_RC key is set with an exit status of 'pairresync' comm, and.

The following are the possible values:

- A return code '0' indicates success.
- All other values indicates failure.

ROLE_SWITCH_UR_RC value	Description



0	This value indicates that the role of all the pairs in the group is successfully reversed.
NonZero	This value indicates some failure in the resync of the group.
236	This value indicates an unmatched volume status within the group.
229	This value indicates an inconsistent status in the group.
222	This value indicates an invalid volume status.
228	This value indicates an invalid pair status

13.6.1 Prechecks

- Configuration – Action is configured with the input of Key Values or Advance Properties.
- Agent connectivity.
- Authentication (Password check for agentless).

13.7 Sync Wait

Description:

This action is used to make sure that all the changes on the Primary are updated on the Secondary volume. The action takes a timeout parameter, that indicates the duration for which the action waits for completion on synchronization. It should be issued after the application completes its write function , and is shutdown or quiesced.

The action provides an option to specify the timeout value for which the action waits for all the pending transfers to complete. Unit is 100 ms.

When the action is run as a part of the workflow, CCI 'pairsyncwait' comm, and is invoked on the pair represented by the selected protection scheme, along with the options chosen by the user. The action is successful if synchronization is complete for the device group. For all other cases, it fails. Refer to **Outputs , and Errors** table below for details.

CCI Comm, and: pairsyncwait -g <name> -t <timeout>.

Inputs:



UI Input	The inputKey Name	Description
Protection Scheme Name	SYNC_WAIT_UR_OPER_ON, SYNC_WAIT_UR_OPER_ON_TYPE	Select the protection scheme name configured for the group from the drop-down list. Note: If the group is attached with more than one pair of protection subsystem then do not select "Current Production Service" or "Current DR Service". Instead, select the actual protection subsystem to configure the operation.
Timeout (in 100ms)	SYNC_WAIT_UR_TO	Enter an appropriate numeral value.

Outputs , and Errors:

The SYNC_WAIT_RC key is set with an exit status of the 'pairsyncwait' comm, and.

The following are the possible values:

- A return code '0' indicates synchronization is done.
- All other values indicates failure.

SYNC_WAIT_UR_RC value	Description
0	This value indicates that the synchronization is complete.
1	This value indicates the status of the timeout.
2	This value indicates that the Status is broken (Synchronization process is rejected.)
3	This value indicates that the status is CHANGED (Q-marker is invalid due to resynchronize).
222	This value indicates an invalid volume status.

13.7.1 Prechecks

- Configuration – Action is configured with the inputof Key Values or Advance Properties.



- Agent connectivity.
- Authentication (Password check for agentless).

13.8 Check Consistency

Description:

This action checks the consistency of the Secondary volume. The action calls the Hitachi CCI 'paircurchk' comm, and which checks the currency of the Hitachi TrueCopy Secondary volume(s) by evaluating the data consistency based on pair status , and fence level. The action fails if the Secondary volume is not consistent. Please refer to the Hitachi CCI reference manual to know about the data consistency for each possible state of a Hitachi TrueCopy volume.

When the action is run as a part of the workflow, the CCI 'paircurchk' comm, and is invoked on the pair represented by the selected protection scheme, along with the options chosen by the user. The action returns success if the data volumes are consistent. In all other cases, it fails. Refer to **Outputs** , **and Errors** table below for details.

Note

Hitachi paircurchk comm, and many times returns currency error even if the volumes are consistent. In such cases, consistency check action returns failure. For more details, please refer to CCI guide (paircuchk).

CCI Comm, and: paircurchk -g <name>.

Inputs:

UI Input	The inputKey Name	Description
Protection Scheme Name	CHECK_CONSISTENCY_UR_OPER_ON, CHECK_CONSISTENCY_UR_OPER_ON_TYPE	Select the protection scheme name configured for the group from the drop-down list. Note: If the group is attached with more than one pair of protection subsystem then do not select "Current Production Service" or "Current DR Service". Instead, select the actual protection



		subsystem to configure the operation.
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Outputs , and Errors:

The CHECK_CONSISTENCY_UR_RC key is set with an exit status of the paircurchk comm, and.

The following are possible values:

- A return code '0' indicates Secondary volumes are consistent.
- All other value indicates failure or warnings.

CHECK_CONSISTENCY_UR_RCvalue	Description
0	This value indicates that the data is consistent.
225	This value indicates an S-Vol currency error.

13.8.1 Prechecks

- Configuration – Action is configured with the input of Key Values or Advance Properties.
- Agent connectivity.
- Authentication (Password check for agentless).

13.9 Is Universal Replicator

Description:

This action checks whether the protection service name represented is a UR protection service. The action fails if it is of a different type.

Inputs:

UI Input	The inputKey Name	Description



Protection Scheme Name	IS_UR_OPER_ON , IS_UR_OPER_ON_TYPE (DYNAMIC or STATIC)	It should always be configured as static , and then the production scheme name has to be given. Note: Does not support Dynamic operation.
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Outputs , and Errors:

None

13.9.1 Prechecks

- Configuration – Action is configured with the input of Key Values or Advance Properties.
- Agent connectivity.
- Authentication (Password check for agentless).



14 Hitachi Shadow Image

14.1 Resync ShadowImage

Description:

This action re-establishes a split pair , and then restarts the update copy operations to the Secondary volume. If it is successful, all the changes done on the Primary starts getting updated on the Secondary volume. The action completes after initiating the resync request , and does not wait for resynchronization to complete. The 'Check Status' or 'Verify Status' action should be used to check if the pair has arrived at a particular state.

The action provides an option to choose: "resync mode" - quick or normal. If the mode is normal, pairresync will be performed as Non quick mode, regardless of the setting of \$HORCC_RSYN environment variable , and/or the mode (87) via SVP (Remote console). if mode = quick, pairresync will be performed as Quick Resync, regardless of the setting of \$HORCC_RSYN environment variable , and/or the mode (87) via SVP (Remote console). If this option will not be specified, then performing pairresync is dependent on \$HORCC_RSYN environment variable , and or the mode setting through the SVP (Remote console) whether the operation of BC is executed by Quick or not. This option is ignored for older versions of cci where -fq option is not supported.

When the action is run as a part of the workflow, CCI 'pairresync' comm, and is invoked on the pair represented by the selected protection scheme, along with the options chosen by the user. If all the pairs of groups are successfully resynced, the action returns as a success. In all other cases, it returns as a failure. Success or failure of the action depends on the success or failure of 'pairresync' comm, and. Refer to **Outputs , and Errors** table below for details.

CCI comm, and: pairresync -g <name> -fq <normal or quick>.

Note:

-fq option is ignored for an older version of cci where it is not supported.

Inputs:

UI Input	The inputKey Name	Description
Shadow Image Name	RESYNC_SI_OPER_ON, RESYNC_SI_OPER_ON_TYPE	Select the shadow image name from the drop-down list.
Resync Mode	RESYNC_SI_MODE	Select an appropriate option from the drop-down list. The options are: <ul style="list-style-type: none"> ▪ NORMAL



		▪ QUICK
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Outputs , and Errors:

The RESYNC_SI_RC key is set with an exit status of 'pairresync' comm, and.

The following are the possible values:

- A return code '0' indicates success.
- All other values indicates failure.

RESYNC_SI_RC value	Description
0	This value indicates that all the pairs in the group are successfully resynced.
NonZero	This value indicates some failure in the resync of group.
236	This value indicates an unmatched volume status within the group.
229	This value indicates an inconsistent status in group.
222	This value indicates an invalid volume status.
228	This value indicates an invalid pair status

14.1.1 Prechecks

- Configuration – Action is configured with the inputof Key Values or Advance Properties.
- Agent connectivity.
- Authentication (Password check for agentless).

14.2 Split ShadowImage

Description:

This action stops the replication of a replicating pair. When successful, the updates of the Primary volume do not go to the Secondary volume. This does not delete the pair, hence, it can be resynced later. The action returns success when splitting of the pair is successful.



When the action is run as a part of the workflow, CCI 'pairsplit' comm, and is invoked on the pair represented by the selected protection scheme, along with the options chosen by the user. The success or failure of the action is determined by the success or failure of 'pairsplit' comm, and. Refer to the **Outputs , and Errors** table below for details.

CCI comm, and: pairresync -g <name> -fq <normal or quick>.

Note:

-fq option is ignored for an older version of cci where it is not supported.

Inputs:

UI Input	The inputKey Name	Description
Shadow Image Name	SPLIT_SI_OPER_ON, SPLIT_SI_OPER_ON_TYPE	Select the shadow image name from the drop-down list.
Split Mode	SPLIT_SI_MODE	Select an appropriate option from the drop-down list. The options are: <ul style="list-style-type: none"> ▪ NORMAL ▪ QUICK

Outputs , and Errors:

The SPLIT_SI_RC key is set with an exit status of 'pairsplit' comm, and.

The following are the possible values:

- A return code '0' indicates success.
- All other values indicates failure.

SPLIT_SI_RC value	Description
0	This value indicates that all the pairs in the group are successfully suspended.
NonZero	This value indicates some failure in the splitting of group.
236	This value indicates an unmatched volume status within the group.
229	This value indicates an inconsistent status in group.



SPLIT_SI_RC value	Description
222	This value indicates an invalid volume status.
235	This value indicates a Pair Volume combination error.
228	This value indicates an invalid pair status
234	This value indicates a Pair suspended at WAIT state.

14.2.1 Prechecks

- Configuration – Action is configured with the input of Key Values or Advance Properties.
- Agent connectivity.
- Authentication (Password check for agentless).

14.3 Get Status

Description:

This action reports the volume status (whether paired or not paired, , and if paired, whether it is SVol or PVol) , and pair status (Hitachi specific pair status that indicates the current state of replication).

When the action is run as a part of workflow, CCI 'pairvolchk' comm, and is invoked on the volume represented by the selected protection scheme, along with the options chosen by the user. Success or failure of the action is determined by the success or failure of 'pairvolchk' comm, and. Refer to **Outputs , and Errors** table below for details.

CCI comm, and: pairvolchk -g <name>.

Input:

UI Input	The inputKey Name	Description
Shadow Image Name	GET_SI_STATUS_OPER_ON, GET_SI_STATUS_OPER_ON_TYPE	Select the shadow image name from the drop-down list.

Outputs , and Errors:

The GET_SI_STATUS_RC key is set with an exit status of 'pairvolchk' comm, and.

The following are possible values:



- GET_SI_STATUS_VOL_STATUS indicates volume status. Possible values are PVOL/SVOL/SMPL.
- GET_SI_STATUS_PAIR_STATUS indicates pair status. Possible values are status value for pair like PAIR/COPY/PSUS etc.
- Return code 0-127 indicates success of action. All other value indicates failure.

GET_SI_STATUS_RC value	Description
0-127	These values indicates specific exit codes that represent the state of volume , and pair. (e.g. 22: PVOL_COPY). Refer to Hitachi CCI documentation for details.
236	This value indicates an unmatched volume status within the group.
235	This value indicates a Pair Volume combination error.

14.3.1 Prechecks

- Configuration – Action is configured with the input of Key Values or Advance Properties.
- Agent connectivity.
- Authentication (Password check for agentless).

14.4 Verify Status

Description:

This action is used to verify the status of a pair. When run it checks the current status of a pair , and returns a success, if it matches what the user has asked for. If the user has specified an optional timeout value, then the action periodically checks the status till either the status of the pair becomes the expected value or the timeout expires. The action is successful if the status of pair is what The user has asked for. In all other cases, the action fails.

The action provides an option to specify the timeout value. It is specified in Seconds. If no timeout value is specified, then the action completes immediately. Otherwise, the action waits till timeout value or status becomes expected value, whichever happens earlier. The action provides an option to choose one of the possible states.

When the action is run as a part of the workflow, CCI 'pairevwait' comm, and is invoked on the pair represented by the selected protection scheme, along with the options chosen by the user. Success or failure of the action is determined by the success or failure of 'pairevwait' comm, and. Refer to **Outputs , and Errors** table below for details.



CCI Comm, and:

- (if timeout option is not specified) `pairevwait -g <name> -s <state> -nowait`.
- (if timeout option is specified) `pairevwait -g <name> -s <state> -t <timeout value>`.

Inputs:

UI Input	The inputKey Name	Description
Shadow Image Name	VERIFY_SI_STATUS_OPER_ON, VERIFY_SI_STATUS_OPER_ON_TYPE	Select the shadow image name from the drop-down list.
Timeout (in Seconds) Range:0-1999999	VERIFY_SI_STATUS_TO	Enter a numeric value in seconds.
Replication Group State	VERIFY_SI_STATUS_STATE	Select the replication group state from the list of various states.

Outputs , and Errors:

The VERIFY_SI_STATUS_RC key is set with an exit status of 'pairevwait' comm, and.

The following are the possible values:

- A return code '0' indicates that the action is successful.
- All other values indicates failure.

VERIFY_SI_STATUS_RC value	Description
0	This value indicates that the current status of pair matches with the userspecified status.
Other than 0-127	This value indicates a failure to get the current status or current status does not match with the userspecified value.
236	This value indicates an unmatched volume status within the group.
229	This value indicates an inconsistent status in group.
222	This value indicates an invalid volume status.



VERIFY_SI_STATUS_RC value	Description
235	This value indicates a Pair Volume combination error.
234	This value indicates a Pair suspended at WAIT state.
233	This value indicates a timeout waiting for specified status.
232	This value indicates a timeout waiting for specified status on the local host.

14.4.1 Prechecks

- Configuration – Action is configured with the input of Key Values or Advance Properties.
- Agent connectivity.
- Authentication (Password check for agentless).

14.5 Delete ShadowImage

Description:

This action deletes the replication relationship between the Primary volume , and the Secondary volume. The user cannot resync the delta changes between the Primary , and the Secondary volume once it is deleted.

When the action is run as a part of the workflow, CCI 'pairsplit -S' comm, and is invoked on the pair represented by the selected protection scheme, along with the options chosen by the user. Success or failure of the action is determined by the success or failure of 'pairsplit' comm, and. Refer to **Outputs , and Errors** table below for details.

CCI Comm, and: pairsplit -g <name> -S.

Inputs:

UI Input	The inputKey Name	Description
Shadow Image Name	DELETE_SI_OPER_ON, DELETE_SI_OPER_ON_TYPE	Select the shadow image name from the drop-down list.

Outputs , and Errors:



The DELETE_SI_RC key is set with an exit status of 'pairsplit' comm, and.

The following are the possible values:

- A return code '0' indicates success.
- All other values indicates failure.

DELETE_SI_RC value	Description
0	This value indicates that the replication group is successfully deleted.
NonZero	This value indicates some failure in splitting of group.
236	This value indicates an unmatched volume status within the group.
229	This value indicates an inconsistent status in group.
222	This value indicates an invalid volume status.
235	This value indicates a Pair Volume combination error.
228	This value indicates an invalid pair status
234	This value indicates a Pair suspended at WAIT state.

14.5.1 Prechecks

- Configuration – Action is configured with the input of Key Values or Advance Properties.
- Agent connectivity.
- Authentication (Password check for agentless).

14.6 Create ShadowImage

Description:



This action creates the replication relationship between the Primary volume , and the Secondary volume. The action returns after the initial copy is initiated between the Primary , and the Secondary Volumes. The usershould verify the Replica status to check the desired status. The replication properties, such as, type of replication (sync/async) or fence level (Data/status etc) would be the same as per the setting present while discovering the protection scheme or default values.

The action provides an option to choose the direction of replication: It can be forward (Selected protection scheme as Primary) or reverse (selected protection scheme as Secondary).

When the action is run as a part of the workflow, CCI 'paircreate' comm, and is invoked on the pair represented by the selected protection scheme, along with the options present while discovery of object. Success or failure of the action is determined by the success or failure of 'paircreate' comm, and. Refer to **Outputs , and Errors** table below for details.

CCI Comm, and: paircreate -g <name> -vl (if The userhas selected FORWARD option) or -vr (if The userhas selected REVERSE option).

Inputs:

UI Input	The inputKey Name	Description
Shadow Image Name	CREATE_SI_OPER_ON, CREATE_SI_OPER_ON_TYPE	Select the shadow image name from the drop-down list.
Replication Direction	CREATE_SI_REPL_DIRECTION	Select Forward or Reverse from the drop-down list.

Outputs , and Errors:

The CREATE_SI_RC key is set with an exit status of 'paircreate' comm, and.

The following are the possible values:

- A return code '0' indicates success.
- All other values indicates failure.

CREATE_SI_RC value	Description
0	This value indicates that the replication group is successfully created.
NonZero	This value indicates some failure in creation of replication group.



CREATE_SI_RC value	Description
236	This value indicates an unmatched volume status within the group.
229	This value indicates an inconsistent status in group.
222	This value indicates an invalid volume status.
228	This value indicates an invalid pair status
212	This value indicates a Pair suspended at WAIT state.
217	This value indicates that there are not enough CT groups in the RAID.
215	This value indicates that no CT groups are left for OPEN Vol use.

14.6.1 Prechecks

- Configuration – Action is configured with the input of Key Values or Advance Properties.
- Agent connectivity.
- Authentication (Password check for agentless).

14.7 Restore ShadowImage

Description:

This action does the reverse resync function. It synchronizes the Primary volume with data from the Secondary volume. It is applicable for Hitachi ShadowImage only. The action completes after initiating the resync request , and does not wait for resynchronization to complete. The 'Check Status' or 'Verify Status' action should be used to check if the pair has arrived to a particular state.

The action provides an option to choose: "resync mode" - quick or normal. If the mode is normal, pairresync will be performed as Non quick mode, regardless of the setting of \$HORCC_RSYN environment variable , and/or the mode (87) via SVP (Remote console). if mode = quick, pairresync will be performed as Quick Resync, regardless of the setting of \$HORCC_RSYN environment variable , and/or the mode (87) via SVP (Remote console). If this option will not be specified, then performing pairresync is dependent on \$HORCC_RSYN environment variable , and or the mode setting through the SVP (Remote console) whether the operation of BC is executed by Quick or not.



When the action is run as a part of the workflow, CCI 'pairresync -restore' comm, and is invoked on the pair represented by the selected protection scheme, along with the options chosen by the user. Success or failure of the action is determined by the success or failure of 'pairresync' comm, and. Refer to **Outputs , and Errors** table below for details.

CCI comm, and: pairresync -g <name> -restore -fq <normal or quick>.

Note:

-fq option is ignored for an older version of cci where it is not supported.

Inputs:

UI Input	The inputKey Name	Description
Shadow Image Name	RESTORE_SI_OPER_ON, RESTORE_SI_OPER_ON_TYPE	Select the shadow image name from the drop-down list.
Resync Mode	RESTORE_SI_MODE	Select an appropriate option from the drop-down list. The options are: <ul style="list-style-type: none"> ▪ NORMAL ▪ QUICK

Outputs , and Errors:

The RESTORE_SI_RC key is set with an exit status of 'pairresync -restore' comm, and.

The following are the possible values:

- A return code '0' indicates success.
- All other values indicates failure.

RESTORE_SI_RC value	Description
0	This value indicates that all the pairs in the group are successfully reverse resynced.



RESTORE_SI_RC value	Description
NonZero	This value indicates some failure in resync of group.
236	This value indicates an unmatched volume status within the group.
229	This value indicates an inconsistent status in group.
222	This value indicates an invalid volume status.
228	This value indicates an invalid pair status

14.7.1 Prechecks

- Configuration – Action is configured with the input of Key Values or Advance Properties.
- Agent connectivity.
- Authentication (Password check for agentless).

14.8 Is Shadow Image

Description:

This action checks whether the protection service name represented is a Shadow Image protection service. The action fails if it is of a different type.

Inputs:

UI Input	The inputKey Name	Description
Protection Scheme Name	IS_SI_OPER_ON , IS_SI_OPER_ON_TYPE (DYNAMIC or STATIC)	It should always be configured as static , and then the production scheme name has to be given. Note: Does not support the Dynamic operation.

Outputs , and Errors:

None

14.8.1 Prechecks



- Configuration – Action is configured with the input of Key Values or Advance Properties.
- Agent connectivity.
- Authentication (Password check for agentless).



15 HP XP BusinessCopy

15.1 Resync XP BusinessCopy

Description:

This action re-establishes a split pair , and then restarts the update copy operations to the Secondary volume. If it is successful, all the changes done on the Primary starts getting updated on the Secondary volume. The action completes after initiating the resync request , and does not wait for resynchronization to complete. The 'Check Status' or 'Verify Status' action should be used to check if the pair has arrived to a particular state.

The action provides an option to choose: "resync mode" - quick or normal. If the mode is normal, pairresync will be performed as Non quick mode, regardless of setting of \$HORCC_RSYN environment variable , and/or the mode (87) via SVP (Remote console). if mode = quick, pairresync will be performed as Quick Resync, regardless of the setting of \$HORCC_RSYN environment variable , and/or the mode (87) via SVP (Remote console). If this option will not be specified, then performing pairresync is dependent on \$HORCC_RSYN environment variable , and or the mode setting through the SVP (Remote console) whether the operation of BC is executed by Quick or not. This option is ignored for an older version of cci where -fq option is not supported.

When the action is run as a part of the workflow, CCI 'pairresync' comm, and is invoked on the pair represented by the selected protection scheme, along with the options chosen by the user. If all the pairs of groups are successfully resynced, the action returns as a success. In all other cases, it returns as a failure. The success or failure of the action depends on the success or failure of 'pairresync' comm, and. Refer to **Outputs , and Errors** table below for details.

CCI comm, and: pairresync -g <name> -fq <normal or quick>.

Note:

-fq option is ignored for the older version of cci where it is not supported.

Inputs:

UI Input	The inputKey Name	Description
XP BusinessCopy Name	RESYNC_SI_OPER_ON, RESYNC_SI_OPER_ON_TYPE	Select the shadow image name from the drop-down list.
Resync Mode	RESYNC_SI_MODE	Select an appropriate option from the drop-down list. The options are: <ul style="list-style-type: none"> ▪ NORMAL ▪ QUICK



Outputs , and Errors:

The RESYNC_SI_RC key is set with an exit status of 'pairresync' comm, and.

The following are the possible values:

- A return code '0' indicates success.
- All other values indicates failure.

RESYNC_SI_RC value	Description
0	This value indicates that all the pairs in the group are successfully resynced.
NonZero	This value indicates some failure in the resync of group.
236	This value indicates an unmatched volume status within the group.
229	This value indicates an inconsistent status in group.
222	This value indicates an invalid volume status.
228	This value indicates an invalid pair status.

15.1.1 Prechecks

- Configuration – Action is configured with the input of Key Values or Advance Properties.
- Agent connectivity.
- Authentication (Password check for agentless).

15.2 Split XP BusinessCopy

Description:

This action stops the replication of a replicating pair. When successful, the updates of the Primary volume do not go to the Secondary volume. This does not delete the pair, hence, it can be resynced later. The action returns success when splitting of the pair is successful.

When the action is run as a part of the workflow, CCI 'pairsplit' comm, and is invoked on the pair represented by the selected protection scheme, along with the options chosen by the user. The success or failure of the action is determined by the success or failure of 'pairsplit' comm, and. Refer to **Outputs , and Errors** table below for details.



CCI comm, and: pairresync -g <name> -fq <normal or quick>.

Note:

-fq option is ignored for older version of cci where it is not supported.

Inputs:

UI Input	The inputKey Name	Description
XP BusinessCopy Name	SPLIT_SI_OPER_ON, SPLIT_SI_OPER_ON_TYPE	Select the shadow image name from the drop-down list.
Split Mode	SPLIT_SI_MODE	Select an appropriate option from the drop-down list. The options are: <ul style="list-style-type: none"> ▪ NORMAL ▪ QUICK

Outputs , and Errors:

The SPLIT_SI_RC key is set with an exit status of 'pairsplit' comm, and.

The following are the possible values:

- A return code '0' indicates success.
- All other values indicates failure.

SPLIT_SI_RC value	Description
0	This value indicates that all the pairs in the group are successfully suspended.
NonZero	This value indicates some failure in splitting of group.
236	This value indicates an unmatched volume status within the group.
229	This value indicates an inconsistent status in group.
222	This value indicates an invalid volume status.
235	This value indicates a Pair Volume combination error.



228	This value indicates an invalid pair status.
234	This value indicates a Pair suspended at WAIT state.

15.2.1 Prechecks

- Configuration – Action is configured with the input of Key Values or Advance Properties.
- Agent connectivity.
- Authentication (Password check for agentless).

15.3 Get Status

Description:

This action reports the volume status (whether paired or not paired , and if paired, whether it is SVol or PVol) , and pair status (HP XP specific pair status that indicates the current state of replication).

When the action is run as a part of workflow, CCI 'pairvolchk' comm, and is invoked on the volume represented by the selected protection scheme, along with the options chosen by the user. Success or failure of the action is determined by the success or failure of 'pairvolchk' comm, and. Refer to **Outputs , and Errors** table below for details.

CCI comm, and: pairvolchk -g <name>.

Input:

UI Input	The inputKey Name	Description
XP BusinessCopy Name	GET_SI_STATUS_OPER_ON, GET_SI_STATUS_OPER_ON_TYPE	Select the shadow image name from the drop-down list.

Outputs , and Errors:

The GET_SI_STATUS_RC key is set with an exit status of 'pairvolchk' comm, and.

The following are possible values:

- GET_SI_STATUS_VOL_STATUS indicates volume status. Possible values are PVOL/SVOL/SMPL.
- GET_SI_STATUS_PAIR_STATUS indicates pair status. possible values are status value for pair like PAIR/COPY/PSUS etc.
- Return code 0-127 indicates success of action. All other value indicates failure.



GET_SI_STATUS_RC value	Description
0-127	These values indicates specific exit codes that represents the state of volume , and pair (e.g. 22: PVOL_COPY). Refer to HP XP CCI documentation for details.
236	This value indicates an unmatched volume status within the group.
235	This value indicates a Pair Volume combination error.

15.3.1 Prechecks

- Configuration – Action is configured with the input of Key Values or Advance Properties.
- Agent connectivity.
- Authentication (Password check for agentless).

15.4 Verify Status

Description:

This action is used to verify the status of a pair. When run it checks the current status of a pair , and returns a success, if it matches what The user has asked for. If the user has specified an optional timeout value, then the action periodically checks the status till either the status of the pair becomes the expected value or the timeout expires. The action is successful if the status of the pair is what The user has asked for. In all other cases, the action fails.

The action provides an option to specify the timeout value. It is specified in Seconds. If no timeout value is specified, then the action completes immediately. Otherwise, the action waits till the timeout value or status becomes the expected value, whichever happens, earlier. The action provides an option to choose one of the possible states.

When the action is run as a part of the workflow, CCI 'pairevwait' comm, and is invoked on the pair represented by the selected protection scheme, along with the options chosen by the user. Success or failure of the action is determined by the success or failure of 'pairevwait' comm, and. Refer to **Outputs , and Errors** table below for details.

CCI Comm, and:

- (if timeout option is not specified) pairevwait -g <name> -s <state> -nowait.
- (if timeout option is specified) pairevwait -g <name> -s <state> -t <timeout value>.



Inputs:

UI Input	The inputKey Name	Description
XP BusinessCopy Name	VERIFY_SI_STATUS_OPER_ON, VERIFY_SI_STATUS_OPER_ON_TYPE	Select the shadow image name from the drop-down list.
Timeout (in Seconds) Range:0-1999999	VERIFY_SI_STATUS_TO	Enter a numeric value in seconds.
Replication Group State	VERIFY_SI_STATUS_STATE	Select the replication group state from the list of various states.

Outputs , and Errors:

The VERIFY_SI_STATUS_RC key is set with an exit status of 'pairevwait' comm, and.

The following are the possible values:

- A return code '0' indicates that the action is successful.
- All other values indicates failure.

VERIFY_SI_STATUS_RC value	Description
0	This value indicates that the current status of pair matches with the userspecified status.
Other than 0-127	This value indicates a failure to get the current status or current status does not match with the userspecified value.
236	This value indicates an unmatched volume status within the group.
229	This value indicates an inconsistent status in group.



VERIFY_SI_STATUS_RC value	Description
222	This value indicates an invalid volume status.
235	This value indicates a Pair Volume combination error.
234	This value indicates a Pair suspended at WAIT state.
233	This value indicates a timeout waiting for specified status.
232	This value indicates a timeout waiting for specified status on the local host.

15.4.1 Prechecks

- Configuration – Action is configured with the input of Key Values or Advance Properties.
- Agent connectivity.
- Authentication (Password check for agentless).

15.5 Delete XP BusinessCopy

Description:

This action deletes the replication relationship between the Primary volume , and the Secondary volume. The user cannot resync the delta changes between the Primary , and the Secondary volume once it is deleted.

When the action is run as a part of the workflow, CCI 'pairsplit -S' comm, and is invoked on the pair represented by the selected protection scheme, along with the options chosen by the user. The success or failure of the action is determined by the success or failure of 'pairsplit' comm, and. Refer to **Outputs , and Errors** table below for details.

CCI Comm, and: pairsplit -g <name> -S.

Inputs:

UI Input	The inputKey Name	Description
XP BusinessCopy Name	DELETE_SI_OPER_ON, DELETE_SI_OPER_ON_TYPE	Select the shadow image name from the drop-down list.



Outputs , and Errors:

The DELETE_SI_RC key is set with an exit status of 'pairsplit' comm, and.

The following are the possible values:

- A return code '0' indicates success.
- All other values indicates failure.

DELETE_SI_RC value	Description
0	This value indicates that the replication group is successfully deleted.
NonZero	This value indicates some failure in splitting of group.
236	This value indicates an unmatched volume status within the group.
229	This value indicates an inconsistent status in group.
222	This value indicates an invalid volume status.
235	This value indicates a Pair Volume combination error.
228	This value indicates an invalid pair status.
234	This value indicates a Pair suspended at WAIT state.

15.5.1 Prechecks

- Configuration – Action is configured with the input of Key Values or Advance Properties.
- Agent connectivity.
- Authentication (Password check for agentless).

15.6 Create XP BusinessCopy

Description:

This action creates the replication relationship between the Primary volume , and the Secondary volume. The action returns after the initial copy is initiated between the Primary , and the Secondary Volumes. The users should verify the Replica status to check the desired status. The replication properties, such as, type of replication (sync/async) or fence level (Data/status etc) would be the same as per the setting present while discovering protection scheme or default values.



The action provides an option to choose the direction of replication: It can be forward (Selected protection scheme as Primary) or reverse (selected protection scheme as Secondary).

When the action is run as a part of the workflow, CCI 'paircreate' comm, and is invoked on the pair represented by the selected protection scheme, along with the options present while discovery of object. Success or failure of the action is determined by the success or failure of 'paircreate' comm, and. Refer to **Outputs , and Errors** table below for details.

CCI Comm, and: paircreate -g <name> -vl (if The userhas selected FORWARD option) or -vr (if The userhas selected REVERSE option).

Inputs:

UI Input	The inputKey Name	Description
XP BusinessCopy Name	CREATE_SI_OPER_ON, CREATE_SI_OPER_ON_TYPE	Select the shadow image name from the drop-down list.
Replication Direction	CREATE_SI_REPL_DIRECTION	Select Forward or Reverse from the drop-down list.

Outputs , and Errors:

The CREATE_SI_RC key is set with an exit status of 'paircreate' comm, and.

The following are the possible values:

- A return code '0' indicates success.
- All other values indicates failure.

CREATE_SI_RC value	Description
0	This value indicates that the replication group is successfully created.
NonZero	This value indicates some failure in creation of replication group.
236	This value indicates an unmatched volume status within the group.
229	This value indicates an inconsistent status in group.



CREATE_SI_RC value	Description
222	This value indicates an invalid volume status.
228	This value indicates an invalid pair status.
212	This value indicates a Pair suspended at WAIT state.
217	This value indicates that there are not enough CT groups in the RAID.
215	This value indicates that no CT groups are left for OPEN Vol use.

15.6.1 Prechecks

- Configuration – Action is configured with the input of Key Values or Advance Properties.
- Agent connectivity.
- Authentication (Password check for agentless).

15.7 Restore XP BusinessCopy

Description:

This action does the reverse resync function. It synchronizes the Primary volume with data from the Secondary volume. It is applicable for HP XP BusinessCopy only. The action completes after initiating the resync request , and does not wait for resynchronization to complete. The 'Check Status' or 'Verify Status' action should be used to check if the pair has arrived to a particular state.

The action provides an option to choose: "resync mode" - quick or normal. If mode is normal, pairresync will be performed as Non quick mode, regardless of setting of \$HORCC_RSYN environment variable , and/or the mode (87) via SVP (Remote console). if mode = quick, pairresync will be performed as Quick Resync, regardless of the setting of \$HORCC_RSYN environment variable , and/or the mode (87) via SVP (Remote console). If this option will not be specified, then performing pairresync is dependent on \$HORCC_RSYN environment variable , and or the mode setting through the SVP (Remote console) whether the operation of BC is executed by Quick or not.

When the action is run as a part of the workflow, CCI 'pairresync -restore' comm, and is invoked on the pair represented by the selected protection scheme, along with the options chosen by the user. The success or failure of the action is determined by the success or failure of 'pairresync' comm, and. Refer to **Outputs , and Errors** table below for details.

CCI comm, and: pairresync -g <name> -restore -fq <normal or quick>.



Note:

-fq option is ignored for older version of cci where it is not supported.

Inputs:

UI Input	The inputKey Name	Description
XP BusinessCopy Name	RESTORE_SI_OPER_ON, RESTORE_SI_OPER_ON_TYPE	Select the XP BusinessCopy name from the drop-down list.
Resync Mode	RESTORE_SI_MODE	Select an appropriate option from the drop-down list. The options are: <ul style="list-style-type: none"> ▪ NORMAL ▪ QUICK

Outputs , and Errors:

The RESTORE_SI_RC key is set with exit status of 'pairresync -restore' comm, and.

The following are the possible values:

- A return code '0' indicates success.
- All other values indicates failure.

RESTORE_SI_RC value	Description
0	This value indicates that all the pairs in the group are successfully reverse resynced.
NonZero	This value indicates some failure in the resync of group.
236	This value indicates an unmatched volume status within the group.



229	This value indicates an inconsistent status in group.
222	This value indicates an invalid volume status.
228	This value indicates an invalid pair status.

15.7.1 Prechecks

- Configuration – Action is configured with the input of Key Values or Advance Properties.
- Agent connectivity.
- Authentication (Password check for agentless).

15.8 is XP BusinessCopy

Description:

This action checks whether the protection service name represented is a XP BusinessCopy protection service. The action fails if it is of different type.

Inputs:

UI Input	The inputKey Name	Description
Protection Scheme Name	IS_SI_OPER_ON , IS_SI_OPER_ON_TYPE (DYNAMIC or STATIC)	It should always be configured as static , and then the production scheme name has to be given. Note: Does not support the Dynamic operation.

Outputs , and Errors:

None

15.8.1 Prechecks

- Configuration – Action is configured with the input of Key Values or Advance Properties.
- Agent connectivity.
- Authentication (Password check for agentless).



16 HP XP Continuous Access

16.1 Resync XP Continuous Access

Description:

This action re-establishes a split pair , and then restarts the update copy operations to the Secondary volume. If successful, all the changes done on the Primary starts getting updated on the Secondary volume. The action completes after initiating the resync request , and does not wait for the resynchronization to complete. 'Check Status' or 'Verify Status' action should be used to check if the pair has arrived at a particular state.

When the action is run as a part of workflow, CCI 'pairresync' comm, and is invoked on the pair represented by the selected protection scheme, along with the options chosen by the user. If all the pairs of groups are successfully resynced, the action returns as a success. In all other cases, it returns as failure. Success or failure of the action depends on the success or failure of the 'pairresync' comm, and. Refer to **Outputs , and Errors** table below for details.

CCI comm, and: pairresync -g <name>.

Input:

UI Input	The inputKey Name	Description
Protection Scheme Name	RESYNC_TC_OPER_ON, RESYNC_TC_OPER_ON_TYPE	Select the protection scheme name configured for the group from the drop-down list. Note: If the group is attached with more than one pair of protection subsystem then do not select "Current Production Service" or "Current DR Service". Instead, select the actual protection subsystem to configure the operation.

Outputs , and Errors:

The RESYNC_TC_RC key is set with an exit status of 'pairresync' comm, and.

The following are the possible values:

- A return code '0' indicates success.



- All other values indicates failure.

RESYNC_TC_RC value	Description
0	This value indicates that all the pairs in the group are successfully resynced.
NonZero	This value indicates some failure in the resync of group.
236	This value indicates an unmatched volume status within the group.
229	This value indicates an inconsistent status in group.
222	This value indicates an invalid volume status.
228	This value indicates an invalid pair status

16.1.1 Prechecks

- Configuration – Action is configured with the input of Key Values or Advance Properties.
- Agent connectivity.
- Authentication (Password check for agentless).

16.2 Split XP Continuous Access

Description:

This action stops the replication of a replicating pair. When successful, the updates of the Primary volume do not go to the Secondary volume. This does not delete the pair, hence, it can be resynced later. The action returns as success, when the splitting of pair is successful.

The action provides an option to choose SVOL access: READ or READWRITE. If the user has selected READWRITE, then the Secondary volume will be in READWRITE mode after the successful split.

When the action is run as a part of workflow, CCI 'pairsplit' comm, and is invoked on the pair represented by the selected protection scheme, along with the options chosen by the user. The success or failure of the action is determined by the success or failure of 'pairsplit' comm, and. Refer to **Outputs , and Errors** table below for details.

CCI comm, and:



- If the user has selected default value for SVOL Access: pairsplit -g <name>.
- If read: pairsplit -g <name> -r.
- If The user has selected readwrite: pairsplit -g <name> -rw.

Inputs:

UI Input	The inputKey Name	Description
Protection Scheme Name	SPLIT_TC_OPER_ON, SPLIT_TC_OPER_ON_TYPE	Select the protection scheme name configured for the group from the drop-down list. Note: If the group is attached with more than one pair of protection subsystem then do not select "Current Production Service" or "Current DR Service". Instead, select the actual protection subsystem to configure the operation.
SVOL Access	SPLIT_TC_SVOL_ACCESS	Select an appropriate option from the drop-down list. The options are: <ul style="list-style-type: none"> ▪ READ ▪ READWRITE

Outputs , and Errors:

The SPLIT_TC_RC key is set with an exit status of 'pairsplit' comm, and.

The following are the possible values:

- A return code '0' indicates success.
- All other values indicates failure.

SPLIT_TC_RC value	Description
0	This value indicates that all the pairs in the group are successfully suspended.
NonZero	This value indicates some failure in splitting of group.



SPLIT_TC_RC value	Description
236	This value indicates an unmatched volume status within the group.
229	This value indicates an inconsistent status in group.
222	This value indicates an invalid volume status.
235	This value indicates a Pair Volume combination error.
228	This value indicates an invalid pair status
234	This value indicates a Pair suspended at WAIT state.

16.2.1 Prechecks

- Configuration – Action is configured with the input of Key Values or Advance Properties.
- Agent connectivity.
- Authentication (Password check for agentless).

16.3 Get Status

Description:

This action reports the volume status (whether paired or not, , and if paired, whether it is SVol or PVol) , and pair status (HP XP specific pair status that indicates the current state of replication).

When the action is run as a part of the workflow, CCI 'pairvolchk' comm, and is invoked on the volume represented by the selected protection scheme, along with the options chosen by the user. Success or failure of the action is determined by the success or failure of 'pairvolchk' comm, and. Refer to **Outputs , and Errors** table below for details.

CCI comm, and: pairvolchk -g <name>.

Input:



UI Input	The inputKey Name	Description
Protection Scheme Name	GET_TC_STATUS_OPER_ON, GET_TC_STATUS_OPER_ON_TYPE	<p>Select the protection scheme name configured for the group from the drop-down list.</p> <p>Note:</p> <p>If the group is attached with more than one pair of protection subsystem then do not select "Current Production Service" or "Current DR Service". Instead, select the actual protection subsystem to configure the operation.</p>

Outputs , and Errors:

The GET_TC_STATUS_RC key is set with an exit status of 'pairvolchk' comm, and.

The following are possible values:

- GET_TC_STATUS_VOL_STATUS indicates volume status. The possible values are PVOL/SVOL/SMPL.
- GET_TC_STATUS_PAIR_STATUS indicates the pair status. The possible values are status value for pairs, such as PAIR/COPY/PSUS
- The return code 0-127 indicates the success of the action. All other values indicates failure.

GET_TC_STATUS_RC value	Description
0-127	<p>These values indicates specific exit codes that represents the state of volume , and pair. (e.g. 22: PVOL_COPY).</p> <p>Refer to HP XP CCI documentation for details.</p>
236	This value indicates an unmatched volume status within the group.
235	This value indicates a Pair Volume combination error.

16.3.1 Prechecks

- Configuration – Action is configured with the inputof Key Values or Advance Properties.
- Agent connectivity.



- Authentication (Password check for agentless).

16.4 Verify Status

Description:

This action is used to verify the status of a pair. When run it checks for the current status of a pair , and returns success if a match occurs with what the user has asked for.

The action provides an option to specify the timeout value. It is specified in Seconds. If no timeout value is specified, then the action completes immediately. Otherwise, the action waits till the timeout value or status becomes the expected value, whichever happens, earlier. The action provides an option to choose one of the possible states.

When the action is run as a part of the workflow, CCI 'pairevwait' comm, and is invoked on the pair represented by the selected protection scheme, along with the options chosen by the user. The success or failure of the action is determined by the success or failure of 'pairsevwait' comm, and. Refer to **Outputs , and Errors** table below for details.

CCI Comm, and:

- (if timeout option is not specified) pairevwait -g <name> -s <state> -nowait.
- (if timeout option is specified) pairevwait -g <name> -s <state> -t <timeout value>.

Inputs:

UI Input	The inputKey Name	Description
Protection Scheme Name	VERIFY_TC_STATUS_OPER_ON, VERIFY_TC_STATUS_OPER_ON_TYPE	Select the protection scheme name configured for the group from the drop-down list. Note: If the group is attached with more than one pair of protection subsystem then do not select "Current Production Service" or "Current DR Service". Instead, select the actual protection subsystem to configure the operation.
Timeout (in Seconds) Range:0-1999999	VERIFY_TC_STATUS_TO	Enter a numeric value in seconds.
Replication Group State	VERIFY_TC_STATUS_STATE	Select the replication group state from the list of various states.

Outputs , and Errors:



The VERIFY_TC_STATUS_RC key is set with an exit status of 'pairevwait' comm, and.

The following are the possible values:

- A return code '0' indicates that the action is successful.
- All other values indicates failure.

VERIFY_TC_STATUS_RC value	Description
0	This value indicates that the current status of pair matches with the userspecified status.
Other than 0-127	This value indicates a failure to get the current status or current status does not match with the userspecified value.
236	This value indicates an unmatched volume status within the group.
229	This value indicates an inconsistent status in group.
222	This value indicates an invalid volume status.
235	This value indicates a Pair Volume combination error.
234	This value indicates a Pair suspended at WAIT state.
233	This value indicates a timeout waiting for specified status.
232	This value indicates a timeout waiting for specified status on the local host.

16.4.1 Prechecks

- Configuration – Action is configured with the inputof Key Values or Advance Properties.
- Agent connectivity.
- Authentication (Password check for agentless).

16.5 Takeover

Description:

This action executes the HP XP 'horctakeover' comm, and. The horctakeover is a scripted comm, and for executing several HP XP Continuous Access operations. The takeover comm, and checks the specified volumes or groups attributes (paircurchk), decides the takeover function based on the attributes, executes the chosen takeover function, , and returns the result. The four HP XP



Continuous Access takeover functions designed for HA software operation are takeover-switch, swap-takeover, PVOL-takeover, , and SVOL-takeover.

The action provides an option to choose: "SVOL Takeover" : If Selected, it executes SVOL-takeover. The target volume of the local host must be an S-VOL.

A group can be specified as the target of the XP Continuous Access takeover comm, and. If SVOL-takeover is specified for a group, the data consistency check is executed for all volumes in the group, , and all the inconsistent volumes are found in the execution log file , and displayed (same as paircurchk comm, and). The takeover comm, and allows swapping of the Primary , and Secondary volumes so that if the Primary or the Secondary volume is switched due to a server error or package transfer, duplex operations can be continued using the reversed volumes. When control is h, anded over to the current node, swapping the volumes again eliminates the need to copy them. The takeover comm, and also allows the Secondary volume to be separated for disaster a recovery operations.

The takeover comm, and, when activated by a control script, checks for the combination of attributes of the local , and remote volumes , and determines the proper takeover action. Various take over functions that can be executed are Nop-takeover, Swap-takeover, SVOL-takeover, PVOL-SMPL-takeover, PVOL-PSUE-takeover, , and SVOL-SSUS-takeover. If the comm, and fails, the error message , and the error code are returned. If the comm, and succeeds, the return code , and the message tells which takeover sub-function is executed. To get the details about the horctakeover sub-functions , and what state cause which function to initiate, please refer to the applicable Comm, and Control Reference guide.

Note:

HP XP horctakeover comm, and many times returns currency error even if the volumes are consistent. In such cases, takeover action returns failure. The useris expected to verify the volumes before proceeding to the next action. For more details, please refer to CCI guide (paircuchk).

CCI comm, and:

- If SVOL takeover option is not selected: horctakeover -g <name>.
- If SVOL takeover option is selected: horctakeover -g <name> -S.

Inputs:

UI Input	The inputKey Name	Description
Protection Scheme Name	TAKEOVER_TC_OPER_ON, TAKEOVER_TC_OPER_ON_TYPE	Select the protection scheme name configured for the group from the drop-down list.



UI Input	The inputKey Name	Description
		Note: If the group is attached with more than one pair of protection subsystem then do not select "Current Production Service" or "Current DR Service". Instead, select the actual protection subsystem to configure the operation.
Volume Option	TAKEOVER_TC_VOL_OPTIONS	Select SVOL takeover from the drop-down list.
Timeout (in Seconds)	TAKEOVER_TC_TO	Enter a value in the numeric field. This is applicable for syncreplication type.

Outputs , and Errors:

The TAKEOVER_TC_RC key is set with an exit status of 'horctakeover' comm, and.

The following are the possible values:

- Values 0-5 indicates the success of the action.
- All other values indicates failure of action.

TAKEOVER_TC_RC value	Description
0	This value indicates a Nop-takeover (no operation).
1	This value indicates that a Swap-takeover was successfully executed.
2	This value indicates that a SVOL-takeover was successfully executed.
3	This value indicates that a PVOL-SMPL-takeover was successfully executed.
4	This value indicates the following: <ul style="list-style-type: none"> ▪ PVOL-PSUE-takeover was successfully executed.



TAKEOVER_TC_RC value	Description
	<ul style="list-style-type: none"> ▪ SVOL-SSUS-takeover was successfully executed. (This value depends on the microcode level.)
5	This value indicates that a SVOL-SSUS-takeover was successfully executed. (This value depends on the microcode level.)
236	This value indicates an unmatched volume status within the group.
229	This value indicates an inconsistent status in group.
235	This value indicates a Pair Volume combination error.
225	This value indicates a S-Vol currency error.
224	This value indicates a Local Volume currency error.
223	This value indicates a Local , and Remote Volume currency error.
233	This value indicates a timeout waiting for specified status.

16.5.1 Prechecks

- Configuration – Action is configured with the input of Key Values or Advance Properties.
- Agent connectivity.
- Authentication (Password check for agentless).

16.6 Delete XP Continuous Access

Description:

This action deletes the replication relationship between the Primary volume , and the Secondary volume. The user cannot resync the delta changes between the Primary , and the Secondary volume, once it is deleted.

The action provides an option to choose "Force" : If selected, it brings the Secondary volume into the simplex mode forcibly. It is issued by the secondary host if the host possessing the Primary volume is down or has failed.

When the action is run as a part of the workflow, CCI 'pairsplit -S' comm, and is invoked on the pair represented by the selected protection scheme, along with the options chosen by the user. The



success or failure of the action is determined by the success or failure of 'pairsplit' comm, and. Refer to **Outputs , and Errors** table below for details.

CCI Comm, and:

- if the force option is not selected: pairsplit -g <name> -S.
- if the force option is selected: pairsplit -g <name> -S -R.

Inputs:

UI Input	The inputKey Name	Description
Protection Scheme Name	DELETE_TC_OPER_ON, DELETE_TC_OPER_ON_TYPE	Select the protection scheme name configured for the group from the drop-down list. Note: If the group is attached with more than one pair of protection subsystem then do not select "Current Production Service" or "Current DR Service". Instead, select the actual protection subsystem to configure the operation.
Force	DELETE_TC_FORCE	Select True or False from the drop-down list.

Outputs , and Errors:

The DELETE_TC_RC key is set with an exit status of 'pairsplit' comm, and.

The following are the possible values:

- A return code '0' indicates success.
- All other values indicates failure.

DELETE_TC_RC value	Description
	This value indicates that the replication group is successfully deleted.
NonZero	This value indicates some failure in a splitting of group.



DELETE_TC_RC value	Description
236	This value indicates an unmatched volume status within the group.
229	This value indicates an inconsistent status in group.
222	This value indicates an invalid volume status.
235	This value indicates a Pair Volume combination error.
228	This value indicates an invalid pair status.
234	This value indicates a Pair suspended at WAIT state.

16.6.1 Prechecks

- Configuration – Action is configured with the input of Key Values or Advance Properties.
- Agent connectivity.
- Authentication (Password check for agentless).

16.7 Create XP Continuous Access

Description:

This action creates the replication relationship between the Primary volume , and the Secondary volume. The action returns after the initial copy is initiated between the Primary , and the Secondary Volumes. The users should verify the Replica status to check the desired status. The replication properties, such as, type of replication (sync/async) or fence level (Data/status etc) would be the same as per the setting present while discovering the protection scheme or default values.

The action provides an option to choose the direction of replication: forward (Selected protection scheme as Primary) or reverse (selected protection scheme as Secondary).

The action provides an option to choose fence level: possible values can be status, data , and never. Please refer to HP XP Continuous Access The userguide for details on the fence level.

When the action is run as a part of workflow, CCI 'paircreate' comm, and is invoked on the pair represented by the selected protection scheme, along with the options present while the discovery of object. The success or failure of the action is determined by the success or failure of 'paircreate' comm, and. Refer to **Outputs , and Errors** table below for details.



CCI Comm, and: paircreate -g <name> -f <fence> -vl (if The userhas selected FORWARD option) or -vr (if the userhas selected REVERSE option).

Inputs:

UI Input	The inputKey Name	Description
Protection Scheme Name	CREATE_TC_OPER_ON, CREATE_TC_OPER_ON_TYPE	Select the protection scheme name configured for the group from the drop-down list. Note: If the group is attached with more than one pair of protection subsystems then do not select "Current Production Service" or "Current DR Service". Instead, select the actual protection subsystem to configure the operation.
Replication Direction	CREATE_TC_REPL_DIRECTION	Select Forward or Reverse from the drop-down list.
Fence Level	CREATE_TC_FENCE	Select the appropriate fence level from the following: <ul style="list-style-type: none"> ▪ Data ▪ Status ▪ Never

Outputs , and Errors:

The CREATE_TC_RC key is set with an exit status of 'paircreate' comm, and.

The following are the possible values:

- A return code '0' indicates success.



- All other values indicates failure.

CREATE_TC_RC value	Description
0	This value indicates that the replication group is successfully created.
NonZero	This value indicates some failure in creation of replication group.
236	This value indicates an unmatched volume status within the group.
229	This value indicates an inconsistent status in group.
222	This value indicates an invalid volume status.
228	This value indicates an invalid pair status.
212	This value indicates a Pair suspended at WAIT state.

16.7.1 Prechecks

- Configuration – Action is configured with the input of Key Values or Advance Properties.
- Agent connectivity.
- Authentication (Password check for agentless).

16.8 Role Switch

Description:

This action re-establishes a split pair in the reverse direction. The Primary volume becomes the Secondary volume , and vice versa. If it is successful, all the changes done on the Secondary start getting updated on the Primary volume. The action completes after reversing the role , and initiating the reverse resync request. It does not wait for resynchronization to complete. The 'Check Status' or 'Verify Status' action should be used to check if the pair has arrived at a particular state.

When the action is run as a part of the workflow, CCI 'pairresync -swapp or -swaps' comm, and is invoked on the pair represented by the selected protection scheme, along with the options chosen by the user. The success or failure of the action is determined by the success or failure of 'pairresync' comm, and. Refer to **Outputs , and Errors** table below for details.

CCI Comm, and: pairvolchk -g <name> , and pairresync -g <name> -swapp.

Input:



UI Input	The inputKey Name	Description
Protection Scheme Name	ROLE_SWITCH_TC_OPER_ON, ROLE_SWITCH_TC_OPER_ON_TYPE	<p>Select the protection scheme name configured for the group from the drop-down list.</p> <p>Note:</p> <p>If the group is attached with more than one pair of protection subsystem then do not select "Current Production Service" or "Current DR Service". Instead, select the actual protection subsystem to configure the operation.</p>

Outputs , and Errors:

The ROLE_SWITCH_TC_RC key is set with an exit status of 'pairresync' comm, and.

The following are the possible values:

- A return code '0' indicates success.
- All other values indicates failure.

ROLE_SWITCH_TC_RC value	Description
0	This value indicates that the role for all the pairs in the group are successfully reversed.
NonZero	This value indicates some failure in resync of group.
236	This value indicates an unmatched volume status within the group.
229	This value indicates an inconsistent status in group.
222	This value indicates an invalid volume status.
228	This value indicates an invalid pair status.

16.8.1 Prechecks

- Configuration – Action is configured with the input of Key Values or Advance Properties.
- Agent connectivity.



- Authentication (Password check for agentless).

16.9 Check Consistency

Description:

This action checks for the consistency of the Secondary volume. The action call HP XP CCI 'paircurchk' comm, and, which checks for the currency of the HP XP Continuous Access Secondary volume(s), by evaluating the data consistency based on pair status , and fence level. The action fails if the Secondary volume is not consistent. Please refer to the HP XP CCI reference manual to know about the data consistency for each possible state of a HP XP Continuous Access volume.

When the action is run as a part of the workflow, CCI 'paircurchk' comm, and is invoked on the pair represented by the selected protection scheme, along with the options chosen by the user. The action returns success if the data volumes are consistent. In all other cases, it fails. Refer to **Outputs , and Errors** table below for details.

Note

HP XP paircurchk comm, and many times returns currency error even if the volumes are consistent. In such cases, consistency check action returns failure. For more details, please refer to CCI guide (paircuchk).

CCI Comm, and: paircurchk -g <name>.

Inputs:

UI Input	The inputKey Name	Description
Protection Scheme Name	CHECK_CONSISTENCY_TC_OPER_ON, CHECK_CONSISTENCY_TC_OPER_ON_TYPE	Select the protection scheme name configured for the group from the drop-down list. Note: If the group is attached with more than one pair of protection subsystem then do not select "Current Production Service" or "Current DR Service". Instead, select the actual protection subsystem to configure the operation.

Outputs , and Errors:



The CHECK_CONSISTENCY_TC_RC key is set with an exit status of 'paircurchk' comm, and.

The following are possible values:

- A return code '0' indicates Secondary volumes are consistent.
- All other value indicates failure or warnings.

CHECK_CONSISTENCY_TC_RCvalue	Description
0	This value indicates that the data is consistent.
225	This value indicates a S-Vol currency error.

16.9.1 Prechecks

- Configuration – Action is configured with the input of Key Values or Advance Properties.
- Agent connectivity.
- Authentication (Password check for agentless).

16.10 is XP Continuous Access

Description:

This action checks whether the protection service name represented is a XP Continuous Access protection service. The action fails if it is of different type.

Action will have the following Private configuration.

- The user gets a drop-down list with names of all the protection schemes attached to the group. Users need to select one of the protection scheme

Inputs:

UI Input	The inputKey Name	Description
Protection Scheme Name	IS_SI_OPER_ON , IS_SI_OPER_ON_TYPE (DYNAMIC or STATIC)	It should always be configured as static , and then the protection scheme name has to be given. Note:



		Does not support the Dynamic operation.
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Outputs , and Errors:

None

16.10.1 Prechecks

- Configuration – Action is configured with the input of Key Values or Advance Properties.
- Agent connectivity.
- Authentication (Password check for agentless).



17 HP XP Continuous Access Journal

17.1 Resync XP Continuous Access Journal

Description:

This action re-establishes a split pair , and then restarts the update copy operations to the Secondary volume. If it is successful, all the changes done on the Primary starts getting updated on the Secondary volume. The action completes after initiating the resync request , and does not wait for the resynchronization to complete. The 'Check Status' or 'Verify Status' action should be used to check if the pair has arrived to a particular state.

When the action is run as a part of the workflow, CCI 'pairresync' comm, and is invoked on the pair represented by the selected protection scheme, along with the options chosen by the user. If all the pairs of groups are successfully resynced, the action returns as a success. In all other cases, it returns as a failure. Success or failure of the action depends on the success or failure of 'pairresync' comm, and. Refer to **Outputs , and Errors** table below for details.

CCI comm, and: pairresync -g <name>.

Input:

UI Input	The inputKey Name	Description
Protection Scheme Name	RESYNC_UR_OPER_ON, RESYNC_UR_OPER_ON_TYPE	Select the protection scheme name configured for the group from the drop-down list. Note: If the group is attached with more than one pair of protection subsystem then do not select "Current Production Service" or "Current DR Service". Instead, select the actual protection subsystem to configure the operation.

Outputs , and Errors:

The RESYNC_UR_RC key is set with an exit status of 'pairresync' comm, and.

The following are the possible values:

- A return code '0' indicates success.
- All other values indicates failure.



RESYNC_UR_RC value	Description
0	This value indicates that all the pairs in the group are successfully resynced.
NonZero	This value indicates some failure in resync of group.
236	This value indicates an unmatched volume status within the group.
229	This value indicates an inconsistent status in group.
222	This value indicates an invalid volume status.
228	This value indicates an invalid pair status.

17.1.1 Prechecks

- Configuration – Action is configured with the input of Key Values or Advance Properties.
- Agent connectivity.
- Authentication (Password check for agentless).

17.2 Split XP Continuous Access Journal

Description:

This action stops the replication of a replicating pair. When successful, the updates of the Primary volume do not go to the Secondary volume. This does not delete the pair, hence, it can be resynced later. The action returns success when splitting of pair is successful.

The action provides an option to choose SVOL access: READ or READWRITE. If the user has selected READWRITE, then the Secondary volume will be in READWRITE mode after the successful split.

When the action is run as a part of the workflow, CCI 'pairsplit' comm, and is invoked on the pair represented by the selected protection scheme, along with the options chosen by the user. Success or failure of the action is determined by the success or failure of 'pairsplit' comm, and. Refer to **Outputs , and Errors** table below for details.

CCI comm, and:

- If the user has selected the default value for SVOL Access: pairsplit -g <name>.



- If read: pairsplit -g <name> -r.
- If The userhas selected readwrite: pairsplit -g <name> -rw.

Inputs:

UI Input	The inputKey Name	Description
Protection Scheme Name	SPLIT_UR_OPER_ON, SPLIT_UR_OPER_ON_TYPE	Select the protection scheme name configured for the group from the drop-down list. Note: If the group is attached with more than one pair of protection subsystem then do not select "Current Production Service" or "Current DR Service". Instead, select the actual protection subsystem to configure the operation.
SVOL Access	SPLIT_UR_SVOL_ACCESS	Select an appropriate option from the drop-down list. The options are: <ul style="list-style-type: none"> ▪ READ ▪ READWRITE

Outputs , and Errors:

The SPLIT_UR_RC key is set with an exit status of 'pairsplit' comm, and.



The following are the possible values:

- A return code '0' indicates success.
- All other values indicates failure.

SPLIT_UR_RC value	Description
0	This value indicates that all the pairs in the group are successfully suspended.
NonZero	This value indicates some failure in splitting of group.
236	This value indicates an unmatched volume status within the group.
229	This value indicates an inconsistent status in group.
222	This value indicates an invalid volume status.
235	This value indicates a Pair Volume combination error.
228	This value indicates an invalid pair status.
234	This value indicates a Pair suspended at WAIT state.

17.2.1 Prechecks

- Configuration – Action is configured with the input of Key Values or Advance Properties.
- Agent connectivity.
- Authentication (Password check for agentless).

17.3 Get Status

Description:

This action reports the volume status (whether paired or not paired, , and if paired, whether it is SVol or PVol) , and pair status (HP XP specific pair status that indicates the current state of replication).

When the action is run as a part of the workflow, CCI 'pairvolchk' comm, and is invoked on the volume represented by the selected protection scheme, along with the options chosen by the user.



Success or failure of the action is determined by the success or failure of 'pairvolchk' comm, and. Refer to **Outputs , and Errors** table below for details.

CCI comm, and: pairvolchk -g <name>.

Input:

UI Input	The inputKey Name	Description
Protection Scheme Name	GET_UR_STATUS_OPER_ON, GET_UR_STATUS_OPER_ON_TYPE	Select the protection scheme name configured for the group from the drop-down list. Note: If the group is attached with more than one pair of protection subsystem then do not select "Current Production Service" or "Current DR Service". Instead, select the actual protection subsystem to configure the operation.

Outputs , and Errors:

The GET_UR_STATUS_RC key is set with an exit status of 'pairvolchk' comm, and.

The following are possible values:

- GET_UR_STATUS_VOL_STATUS indicates volume status. Possible values are PVOL/SVOL/SMPL.
- GET_UR_STATUS_PAIR_STATUS indicates pair status. possible values are status value for pair like PAIR/COPY/PSUS etc.
- Return code 0-127 indicates success of action. All other value indicates failure.

GET_UR_STATUS_RC value	Description
0-127	These values indicates specific exit codes that represents the state of volume , and pair. (e.g. 22: PVOL_COPY).



	Refer to HP XP CCI documentation for details.
236	This value indicates an unmatched volume status within the group.
235	This value indicates a Pair Volume combination error.

17.3.1 Prechecks

- Configuration – Action is configured with the input of Key Values or Advance Properties.
- Agent connectivity.
- Authentication (Password check for agentless).

17.4 Verify Status

Description:

This action is used to verify the status of a pair. When run it checks the current status of a pair, and returns a success, if it matches with what the user has asked for. If the user has specified an optional timeout value, then the action periodically checks the status till either the status of the pair becomes the expected value, or the timeout expires. The action is successful if the status of pair is what the user has asked for. In all other cases, the action fails.

The action provides an option to specify the timeout value. It is specified in Seconds. If no timeout value is specified, then the action completes immediately. Otherwise, the action waits till timeout value or status to become expected value, whichever happens earlier. The action provides an option to choose one of the possible states.

When the action is run as a part of workflow, CCI 'pairevwait' comm, and is invoked on the pair represented by the selected protection scheme, along with the options chosen by the user. Success or failure of the action is determined by the success or failure of 'pairevwait' comm, and. Refer to **Outputs, and Errors** table below for details.

CCI Comm, and:

- (if timeout option is not specified) pairevwait -g <name> -s <state> -nowait.
- (if timeout option is specified) pairevwait -g <name> -s <state> -t <timeout value>.

Inputs:



UI Input	The inputKey Name	Description
Protection Scheme Name	VERIFY_UR_STATUS_OPER_ON, VERIFY_UR_STATUS_OPER_ON_TYPE	Select the protection scheme name configured for the group from the drop-down list. Note: If the group is attached with more than one pair of protection subsystem then do not select "Current Production Service" or "Current DR Service". Instead, select the actual protection subsystem to configure the operation.
Timeout (in Seconds) Range:0-1999999	VERIFY_UR_STATUS_TO	Enter a numeric value in seconds.
Replication Group State	VERIFY_UR_STATUS_STATE	Select the replication group state from the list of various states.

Outputs , and Errors:

The VERIFY_UR_STATUS_RC key is set with an exit status of 'pairevwait' comm, and.

The following are the possible values:

- A return code '0' indicates that the action is successful.
- All other values indicates failure.

VERIFY_UR_STATUS_RC value	Description
0	This value indicates that the current status of pair matches with the userspecified status.
Other than 0-127	This value indicates a failure to get the current status or current status does not match with the userspecified value.



VERIFY_UR_STATUS_RC value	Description
236	This value indicates an unmatched volume status within the group.
229	This value indicates an inconsistent status in group.
222	This value indicates an invalid volume status.
235	This value indicates a Pair Volume combination error.
234	This value indicates a Pair suspended at WAIT state.
233	This value indicates a timeout waiting for specified status.
232	This value indicates a timeout waiting for specified status on the local host.

17.4.1 Prechecks

- Configuration – Action is configured with the input of Key Values or Advance Properties.
- Agent connectivity.
- Authentication (Password check for agentless).

17.5 Takeover

Description:

This action executes the HP XP 'horctakeover' comm, and. The horctakeover is a scripted comm, and for executing several HP XP Continuous Access operations. The takeover comm, and checks the specified volumes or groups attributes (paircurchk), decides the takeover function based on the attributes, executes the chosen takeover function, , and returns the result. The four HP XP Continuous Access takeover functions designed for HA software operation are takeover-switch, swap-takeover, PVOL-takeover, , and SVOL-takeover.

The action provides an option to choose: "SVOL Takeover" : If Selected, it executes SVOL-takeover. The target volume of the local host must be an S-VOL.

A group can be specified as the target of the XP Continuous Access takeover journal comm, and. If SVOL-takeover is specified for a group, the data consistency check is executed for all volumes in the group, , and all the inconsistent volumes are found in the execution log file , and displayed (same as



paircurchk comm, and). The takeover comm, and allows swapping of the Primary , and Secondary volumes, so that if the Primary or the Secondary volume is switched due to a server error or package transfer, duplex operations can be continued using the reversed volumes. When control is handed over to the current node, swapping the volumes again eliminates the need to copy them. The takeover comm, and also allows the Secondary volume to be separated for disaster a recovery operations.

The takeover comm, and, when activated by a control script, checks the combination of attributes of the local , and remote volumes , and determines the proper takeover action. Various take over functions that can be executed are Nop-takeover, Swap-takeover, SVOL-takeover, PVOL-SMPL-takeover, PVOL-PSUE-takeover , and SVOL-SSUS-takeover. If the comm, and fails, the error message , and the error code is returned. If the comm, and succeeds, the return code , and the message tells which takeover sub function is executed. To get details about the horctakeover sub functions , and what state cause which function to initiate, please refer to the applicable Comm, and Control Reference guide.

Note:

HP XP horctakeover comm, and many times returns currency error even if the volumes are consistent. In such cases, takeover action returns failure. The useris expected to verify the volumes before proceeding to next action. For more details, please refer to CCI guide (paircuchk).

CCI comm, and:

- If SVOL takeover option is not selected: horctakeover -g <name> -t timeout.
- If SVOL takeover option is selected: horctakeover -g <name> -t timeout -S.

Inputs:

UI Input	The inputKey Name	Description
Protection Scheme Name	TAKEOVER_UR_OPER_ON, TAKEOVER_UR_OPER_ON_TYPE	Select the protection scheme name configured for the group from the drop-down list. Note: If the group is attached with more than one pair of protection subsystem then do not select "Current Production Service" or "Current DR Service". Instead, select the actual protection subsystem to configure the operation.



Volume Option	TAKEOVER_UR_VOL_OPTIONS	Select SVOL takeover from the drop-down list.
Timeout (in Seconds)	TAKEOVER_UR_TO	Enter a value in the numeric field.

Outputs , and Errors:

The REPL_TAKEOVER_RC key is set with an exit status of 'horctakeover' comm, and.

The following are the possible values:

- Values 0-5 indicates success of action.
- All other values indicates failure of action.

REPL_TAKEOVER_RC value	Description
0	This value indicates a Nop-takeover (no operation).
1	This value indicates that a Swap-takeover was successfully executed.
2	This value indicates that a SVOL-takeover was successfully executed.
3	This value indicates that a PVOL-SMPL-takeover was successfully executed.
4	This value indicates the following: <ul style="list-style-type: none"> ▪ PVOL-PSUE-takeover was successfully executed. ▪ SVOL-SSUS-takeover was successfully executed. (This value depends on the microcode level.)
5	This value indicates that a SVOL-SSUS-takeover was successfully executed. (This value depends on the microcode level.)
236	This value indicates an unmatched volume status within the group.
229	This value indicates an inconsistent status in group.



235	This value indicates a Pair Volume combination error.
225	This value indicates a S-Vol currency error.
224	This value indicates a Local Volume currency error.
223	This value indicates a Local , and Remote Volume currency error.
233	This value indicates a timeout waiting for specified status.

17.5.1 Prechecks

- Configuration – Action is configured with the input of Key Values or Advance Properties.
- Agent connectivity.
- Authentication (Password check for agentless).

17.6 Delete XP Continuous Access Journal

Description:

This action deletes the replication relationship between the Primary volume , and the Secondary volume. The user cannot resync delta changes between the Primary , and the Secondary volume once it is deleted.

The action provides an option to choose "Force" : If selected, it brings the Secondary volume into the simplex mode forcibly. It is issued by the secondary host, if the host possessing the Primary volume is down or has failed.

When the action is run as a part of the workflow, CCI 'pairsplit -S' comm, and is invoked on the pair represented by the selected protection scheme, along with the options chosen by the user. Success or failure of the action is determined by the success or failure of pairsplit comm, and. Refer to **Outputs , and Errors** table below for details.

CCI Comm, and:

- if the force option is not selected: pairsplit -g <name> -S.
- if force option is selected: pairsplit -g <name> -S -R.

Inputs:

UI Input	The inputKey Name	Description
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Protection Scheme Name	DELETE_UR_OPER_ON, DELETE_UR_OPER_ON_TYPE	Select the protection scheme name configured for the group from the drop-down list. Note: If the group is attached with more than one pair of protection subsystem then do not select "Current Production Service" or "Current DR Service". Instead, select the actual protection subsystem to configure the operation.
Force	DELETE_UR_FORCE	Select True or False from the drop-down list.

Outputs , and Errors:

The DELETE_UR_RC key is set with an exit status of 'pairsplit' comm, and.

The following are the possible values:

- A return code '0' indicates success.
- All other values indicates failure.

DELETE_UR_RC value	Description
0	This value indicates that the replication group is successfully deleted.
NonZero	This value indicates some failure in splitting of group.
236	This value indicates an unmatched volume status within the group.
229	This value indicates an inconsistent status in group.
222	This value indicates an invalid volume status.
235	This value indicates a Pair Volume combination error.
228	This value indicates an invalid pair status.



234	This value indicates a Pair suspended at WAIT state.
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17.6.1 Prechecks

- Configuration – Action is configured with the input of Key Values or Advance Properties.
- Agent connectivity.
- Authentication (Password check for agentless).

17.7 Create XP Continuous Access Journal

Description:

This action creates the replication relationship between the Primary volume , and the Secondary volume. The action returns after the initial copy is initiated between the Primary , and the Secondary Volumes. The users should verify the Replica status to check the desired status. The replication properties, such as, type of replication (sync/async) or fence level (Data/status etc) would be the same as per the setting present while discovering protection scheme or default values.

The action provides an option to choose the direction of replication: forward (Selected protection scheme as Primary) or reverse (selected protection scheme as Secondary).

The action provides an option to choose Journal ID for Primary volume , and Secondary volume. This ID refers to the journal group which will be used for asynchronous data transfer for data volumes.

The action provides an option to specify the consistency group number: The concept of XP Continuous Access Journal consistency group number equals to Continuous Access Asynchronous consistency group numbers. Therefore, we can create an XP Continuous Access Journal pair with the consistency group numbers from CCI as is the case with XP Continuous Access synchronous. In XP Continuous Access Journal operations, the consistency group numbers that are specified from CCI are assigned to the journal group numbers.

When the action is run as a part of the workflow, CCI 'paircreate' comm, and is invoked on the pair represented by the selected protection scheme, along with the options present while discovery of object. Success or failure of the action is determined by the success or failure of 'paircreate' comm, and. Refer to **Outputs , and Errors** table below for details.

CCI Comm, and: paircreate -g <name> -f <fence> -vl (if The user has selected FORWARD option) or -vr (if The user has selected REVERSE option).

Inputs:



UI Input	The inputKey Name	Description
Protection Scheme Name	CREATE_UR_OPER_ON, CREATE_UR_OPER_ON_TYPE	Select the protection scheme name configured for the group from the drop-down list. Note: If the group is attached with more than one pair of protection subsystem then do not select "Current Production Service" or "Current DR Service". Instead, select the actual protection subsystem to configure the operation.
Replication Direction	CREATE_UR_REPL_DIRECTION	Select Forward or Reverse from the drop-down list.
Primary Volume Journal ID (Range: 1 - 15)	CREATE_UR_PVOL_JNL_ID	Enter a value between 1 , and 15.
Secondary Volume Journal ID (Range: 1 - 15)	CREATE_UR_SVOL_JNL_ID	Enter a value between 1 , and 15.
Consistency Volume Group (Range: 0 - 127)	CREATE_UR_CTG_NUM	Enter a value between 0 , and 127.

Outputs , and Errors:

The CREATE_UR_RC key is set with an exit status of 'paircreate' comm, and.

The following are the possible values:

- A return code '0' indicates success.
- All other values indicates failure.

CREATE_UR_RC value	Description
0	This value indicates that the replication group is successfully created.



NonZero	This value indicates some failure in creation of replication group.
236	This value indicates an unmatched volume status within the group.
229	This value indicates an inconsistent status in group.
222	This value indicates an invalid volume status.
228	This value indicates an invalid pair status.
212	This value indicates a Pair suspended at WAIT state.
217	This value indicates that there are not enough CT groups in the RAID.
215	This value indicates that no CT groups are left for OPEN Vol use.

17.7.1 Prechecks

- Configuration – Action is configured with the input of Key Values or Advance Properties.
- Agent connectivity.
- Authentication (Password check for agentless).

17.8 Role Switch

Description:

This action re-establishes a split pair in the reverse direction. The Primary volume becomes the Secondary volume , and vice versa. If it is successful, all the changes done on the Secondary starts getting updated on the Primary volume. The action completes after reversing the role , and initiating the reverse resync request. It does not wait for resynchronization to complete. The 'Check Status' or 'Verify Status' action should be used to check if the pair has arrived to a particular state.

When the action is run as a part of the workflow, CCI 'pairresync -swapp or -swaps' comm, and is invoked on the pair represented by the selected protection scheme, along with the options chosen by the user. Success or failure of the action is determined by the success or failure of 'pairresync' comm, and. Refer to **Outputs , and Errors** table below for details.

CCI Comm, and: pairvolchk -g <name> , and pairresync -g <name> -swapp.

Input:



UI Input	The inputKey Name	Description
Protection Scheme Name	ROLE_SWITCH_UR_OPER_ON, ROLE_SWITCH_UR_OPER_ON_TYPE	<p>Select the protection scheme name configured for the group from the drop-down list.</p> <p>Note:</p> <p>If the group is attached with more than one pair of protection subsystem then do not select "Current Production Service" or "Current DR Service". Instead, select the actual protection subsystem to configure the operation.</p>

Outputs , and Errors:

The ROLE_SWITCH_UR_RC key is set with an exit status of 'pairresync' comm, and.

The following are the possible values:

- A return code '0' indicates success.
- All other values indicates failure.

ROLE_SWITCH_UR_RC value	Description
0	This value indicates that the role for all the pairs in the group are successfully reversed.
NonZero	This value indicates some failure in resync of group.
236	This value indicates an unmatched volume status within the group.
229	This value indicates an inconsistent status in group.
222	This value indicates an invalid volume status.
228	This value indicates an invalid pair status.



17.8.1 Prechecks

- Configuration – Action is configured with the input of Key Values or Advance Properties.
- Agent connectivity.
- Authentication (Password check for agentless).

17.9 Sync Wait

Description:

This action is used to make sure that all the changes on the Primary are updated on the Secondary volume. The action takes a timeout parameter, that indicates the duration for which action waits for completion on synchronization. It should be issued after the application completes its write function , and is shutdown or quiesced.

The action provides an option to specify the timeout value for which the action waits for all the pending transfer to complete. Unit is 100 ms.

When the action is run as a part of the workflow, CCI 'pairsyncwait' comm, and is invoked on the pair represented by the selected protection scheme, along with the options chosen by the user. The action is successful if synchronization is complete for the device group. For all other cases, it fails. Refer to **Outputs , and Errors** table below for details.

CCI Comm, and: pairsyncwait -g <name> -t <timeout>.

Inputs:

UI Input	The inputKey Name	Description
Protection Scheme Name	SYNC_WAIT_UR_OPER_ON, SYNC_WAIT_UR_OPER_ON_TYPE	Select the protection scheme name configured for the group from the drop-down list. Note: If the group is attached with more than one pair of protection subsystem then do not select "Current Production Service" or "Current DR Service". Instead, select the actual protection subsystem to configure the operation.
Timeout (in 100ms)	SYNC_WAIT_UR_TO	Enter an appropriate numeral value.

Outputs , and Errors:

The SYNC_WAIT_RC key is set with an exit status of 'pairsyncwait' comm, and.

The following are the possible values:



- A return code '0' indicates synchronization is done.
- All other values indicates failure.

SYNC_WAIT_UR_RC value	Description
0	This value indicates that the synchronization is complete.
1	This value indicates the status as timeout.
2	This value indicates that the Status is broken (Synchronization process is rejected.)
3	This value indicates that the status is CHANGED (Q-marker is invalid due to resynchronize).
222	This value indicates an invalid volume status.

17.9.1 Prechecks

- Configuration – Action is configured with the input of Key Values or Advance Properties.
- Agent connectivity.
- Authentication (Password check for agentless).

17.10 Check Consistency

Description:

This action checks the consistency of the Secondary volume. The action calls HP XP CCI 'paircurchk' comm, and which checks the currency of the HP XP Continuous Access Secondary volume(s) by evaluating the data consistency based on pair status , and fence level. The action fails if the Secondary volume is not consistent. Please refer to HP XP CCI reference manual to know about the data consistency for each possible state of a HP XP Continuous Access volume.

When the action is run as a part of the workflow, CCI 'paircurchk' comm, and is invoked on the pair represented by the selected protection scheme, along with the options chosen by the user. The action returns success if the data volumes are consistent. In all other cases, it fails. Refer to **Outputs** , **and Errors** table below for details.

Note



HP XP paircurchk comm, and many times returns currency error even if the volumes are consistent. In such cases, consistency check action returns failure. For more details, please refer to CCI guide (paircuchk).

CCI Comm, and: paircurchk -g <name>.

Inputs:

UI Input	The inputKey Name	Description
Protection Scheme Name	CHECK_CONSISTENCY_UR_OPER_ON, CHECK_CONSISTENCY_UR_OPER_ON_TYPE	Select the protection scheme name configured for the group from the drop-down list. Note: If the group is attached with more than one pair of protection subsystem then do not select "Current Production Service" or "Current DR Service". Instead, select the actual protection subsystem to configure the operation.

Outputs , and Errors:

The CHECK_CONSISTENCY_UR_RC key is set with an exit status of paircurchk comm, and.

The following are possible values:

- A return code '0' indicates Secondary volumes are consistent.
- All other value indicates failure or warnings.

CHECK_CONSISTENCY_UR_RCvalue	Description
0	This value indicates that the data is consistent.
225	This value indicates a S-Vol currency error.

17.10.1 Prechecks

- Configuration – Action is configured with the inputof Key Values or Advance Properties.
- Agent connectivity.
- Authentication (Password check for agentless).

17.11 Is XP Continuous Access Journal

Description:



This action checks whether the protection service name represented is a XP Continuous Access Journal protection service. The action fails if it is of different type.

Inputs:

UI Input	The inputKey Name	Description
Protection Scheme Name	IS_UR_OPER_ON , IS_UR_OPER_ON_TYPE (DYNAMIC or STATIC)	It should always be configured as static , and then the production scheme name has to be given. Note: Does not support the Dynamic operation.

Outputs , and Errors:

None

17.11.1 Prechecks

- Configuration – Action is configured with the input of Key Values or Advance Properties.
- Agent connectivity.
- Authentication (Password check for agentless).

kyndryl™

18 Kyndryl CSM

18.1 KyndrylCSMEnableCopySite1

Description

This RAL will enable copysite1.

Inputs	Output
NA (All the values will be picked from the protection schema)	On Success: Copy site 1 will be enabled On Failure: Copy site 1 will not be enabled

Authorization requirements: cmdsess

Authorization requirements for this operation are:

- Administrator
- Operator

18.2 KyndrylCSMEnableCopySite2

Description

This RAL will enable copysite2.

Inputs	Output
NA (All the values will be picked from the protection schema)	On Success: Copy site 2 will be enabled On Failure: Copy site 2 will not be enabled

Authorization requirements: cmdsess

Authorization requirements for this operation are:

- Administrator
- Operator

18.3 KyndrylCSMThe flash

Description

This RAL ensures that all I2s are consistent, , and then the flashes the data from I2 to the H2 volumes



Inputs	Output
NA (All the values will be picked from protection schema)	On Success: The flash copy will be enabled On Failure: The flash copy will not be enabled

Authorization requirements: cmdsess

Authorization requirements for this operation are:

- Administrator
- Operator

18.4 KyndrylCSMThe flashWait

Description

This RAL will wait till the flash copy is completed

Inputs	Output
NA (All the values will be picked from the protection schema)	On Success: Wait for the flash to complete On Failure: Will not wait for the flash to complete

Authorization requirements:

Authorization requirements for this operation are:

- Administrator
- Operator
- Monitor

18.5 KyndrylCSMgetStatus

Description

This RAL will check the status of session.

Inputs	Output
NA (All the values will be picked from protection schema)	On Success: Session status will be displayed Session status will fail

Authorization requirements:



Authorization requirements for this operation are:

- Administrator
- Operator
- Monitor

18.6 KyndryICSMgetTgStatus

Description

This RAL will wait till session status is Target available.

Inputs	Output
NA (All the values will be picked from protection schema).	On Success: Session status will be displayed. On Failure: Session status will fail.

Authorization requirements: Isrolepairs

Authorization requirements for this operation are:

- Administrator
- Operator
- Monitor

18.7 KyndryICSMRecover

Description

This RAL is used to recover the session to the target site.

Inputs	Output
NA (All the values will be picked from protection schema)	On Success: Session recover is started On Failure: Session recover will not be started

Authorization requirements: cmdsess

Authorization requirements for this operation are:

- Administrator
- Operator

18.8 KyndryICSMRecoverWait

Description

This RAL will wait till the data is copied.



Inputs	Output
NA (All the values will be picked from protection schema)	On Success: This action wait till the data is copied On Failure: Will not wait for a recovery to complete

Authorization requirements:

This operation has the following authorization requirements:

- Administrator
- Operator
- Monitor

18.9 KyndrylCSMStart

Description

This RAL Establishes all relationships , and begins the process necessary to start forming consistency groups.

Inputs	Output
NA (All the values will be picked from protection schema)	On Success: Session will be started On Failure: Session will not be started

Authorization requirements: cmdsess

This operation has the following authorization requirements:

- Administrator
- Operator

18.10 KyndrylCSMStartH1H2

Description

This RAL starts copying data from H1 to H2 in a Global Mirror Failover/Failback session.

Inputs	Output
NA (All the values will be picked from protection schema)	On Success: Copies data between H1 , and H2 On Failure: Copy data between H1 , and H2 fails

Authorization requirements: cmdsess



Authorization requirements for this operation are:

- Administrator
- Operator

18.11 KyndrylCSMStartH2H1

Description

This RAL starts copying data from H2 to H1 in a failover , and failback session for DS8000.

Inputs	Output
NA (All the values will be picked from the protection schema)	On Success: Data copy is started On Failure: Data copy will not start

Authorization requirements:

Authorization requirements for this operation are:

- Administrator
- Operator

18.12 KyndrylCSMStartSession

Description

This RAL will start the session.

Inputs	Output
NA (All the values will be picked from protection schema)	On Success: Session will start On Failure: Session will not start

Authorization requirements:

Authorization requirements for this operation are:

- Administrator
- Operator

18.13 KyndrylCSMStop

Description



This RAL suspends updates to all the targets of pairs in a session. You can issue this comm, and at any time during an active session.

Inputs	Output
NA (All the values will be picked from protection schema)	On Success: Session updates will be stopped On Failure: Session updates will not stop

Authorization requirements:

Authorization requirements for this operation are:

- Administrator
- Operator

18.14 KyndrylCSMSuspend

Description

This RAL will Pause the Global Mirror primary session, which causes the session to stop forming consistency groups, , and suspends the H1 to H2 Global Copy pairs.

Inputs	Output
NA (All the values will be picked from protection schema)	On Success: Session is Suspended On Failure: Session is not suspended

Authorization requirements: cmdsess

Authorization requirements for this operation are:

- Administrator
- Operator

18.15 KyndrylCSMSyncWaitH1H2

Description

This RAL will wait till H1 , and H2 data is sync

Inputs	Output
NA (All the values will be picked from protection schema)	On Success: Wait till data is synced/p> On Failure: Will not wait for data sync



Authorization requirements:

Authorization requirements for this operation are:

- Administrator
- Operator
- Monitor

18.16 KyndrylCSMSyncWaitH1I2

Description

RAL will wait till data is synched between H1 , and I2.

Inputs	Output
NA (All the values will be picked from protection schema)	On Success: Wait till data is synchronized On Failure: Will not wait till data synchronization

Authorization requirements:

Authorization requirements for this operation are:

- Administrator
- Operator
- Monitor

18.17 KyndrylCSMSyncWaitH2H1

Description

This RAL will wait till data is synched between H2 , and H1

Inputs	Output
NA (All the values will be picked from protection schema)	On Success: Wait till data is synchronized. On Failure: Will not wait till data is synchronized.

Authorization requirements:

Authorization requirements for this operation are:

- Administrator
- Operator
- Monitor

18.18 KyndrylCSMWaitThe flashComplete



Description

This RAL will wait till the flash copy is completed.

For this RAL, the timeout value has to be changed based on the current load. The default timeout value is 1800 seconds.

Inputs	Output
NA (All the values will be picked from protection schema)	On Success: Wait for the flash to complete. On Failure: Will not wait for the flash to complete.

Authorization requirements:

Authorization requirements for this operation are:

- Administrator
- Operator
- Monitor

18.19 KyndrylCSM_GetLogEvents

Description

This RAL will get all the log events , and messages for the given session from the KyndrylCSMDS8K server.

Inputs	Output
SESSION_NAME	<p>On Success:</p> <p>Lists out all the log events, and messages for all recoverable images from KyndrylCSMDS8K server.</p> <p>Along with 2 out Key's</p> <ol style="list-style-type: none"> 1. A RECOVERY_EVENT_FOUND (True or False) 2. A RECOVERY_EVENT_TIMESTAMP (if A RECOVERY_EVENT_FOUND is true then will get this key which will have a recovery timestamp in ms). <p>On Failure:</p> <p>Fails to list out the log events, and messages.</p>

Authorization requirements:

Authorization requirements for this operation are:

- Administrator



- Operator
- Monitor



19 Kyndryl GDPS

19.1 Kyndryl GDPS Activate Ipar

Description

This RAL activates the zOS LPAR.

Input	Output
KV - LPAR_Name, ZCMD_PATH	Displays error if it fails, otherwise displays the success message.

19.2 Kyndryl GDPS CSF Status

Description

This RAL checks the status of CSF.

Input	Output
KV - ZCMD_PATH	Displays error if it fails, otherwise displays the success message.

19.3 Kyndryl GDPS Deactivate Ipar

Description

This RAL deactivates the LPAR.

Input	Output
KV - ZCMD_PATH, LPAR_Name	Displays error if it fails, otherwise displays the success message.

19.4 Kyndryl GDPS The flash copy

Description

This RAL creates The flashCopy relationship from B-disks to FC1-disks.



Input	Output
KV - ZCMD_PATH	Displays error if it fails, otherwise displays the success message.

19.5 Kyndryl GDPS The flash Copy Ipl mode

Description

This RAL points to a particular set of Load address / Load parameters.

Input	Output
KV - ZCMD_PATH, LPAR_Name, LPAR_Name	Displays error if it fails, otherwise displays the success message.

19.6 Kyndryl GDPS The flash Copy Ipl type

Description

This RAL points to a particular set of Load address / Load parameters.

Input	Output
KV - ZCMD_PATH, LPAR_Name	Displays error if it fails, otherwise displays the success message.

19.7 Kyndryl GDPS The flash Copy Withdraw

Description

This RAL withdraws any existing The flashCopy relationships between B-disks , and FC1-disks.

Input	Output
KV - ZCMD_PATH	Displays error if it fails, otherwise displays the success message.

19.8 Kyndryl GDPS GCI Status

Description



This RAL checks the status of GCI.

Input	Output
KV - ZCMD_PATH	Displays error if it fails, otherwise displays the success message.

19.9 Kyndryl GDPS Ipl mode

Description

This RAL points to a particular set of Load address / Load parameters.

Input	Output
KV - ZCMD_PATH, LPAR_Name, LPAR_Name	Displays error if it fails, otherwise displays the success message.

19.10 Kyndryl GDPS Ipl type

Description

This RAL points to a particular set of Load address / Load parameters.

Input	Output
KV - ZCMD_PATH, LPAR_Name	Displays error if it fails, otherwise displays the success message.

19.11 Kyndryl GDPS load lpar

Description

This RAL loads the LPAR.

Input	Output
KV - ZCMD_PATH, LPAR_Name	Displays error if it fails, otherwise displays the success message.

19.12 Kyndryl GDPS Recover



Description

This RAL recovers the Global Copy secondary devices.

Input	Output
KV - ZCMD_PATH	Displays error if it fails, otherwise displays the success message.

19.13 Kyndryl GDPS Recover check

Description

This RAL verifies Global Copy , and The flashCopy relationships to decide on the a recovery method.

Input	Output
KV - ZCMD_PATH	Displays error if it fails, otherwise displays the success message.

19.14 Kyndryl GDPS Replication status

Description

This RAL checks the replication status between primary , and secondary systems.

Input	Output
KV - ZCMD_PATH	Displays error if it fails, otherwise displays the success message.

19.15 Kyndryl GDPS Reset lpar

Description

This RAL resets LPAR.

Input	Output
KV - ZCMD_PATH, LPAR_Name	Displays error if it fails, otherwise displays the success message.



19.16 Kyndryl GDPS RPO

Description

This RAL checks data RPO.

Input	Output
KV - ZCMD_PATH	Displays error if it fails, otherwise displays the success message.

19.17 Kyndryl GDPS RPO Datalag

Description

This RAL checks Datalag.

Input	Output
KV - ZCMD_PATH	Displays error if it fails, otherwise displays the success message.

19.18 Kyndryl GDPS Secondary Start

Description

This RAL resumes Global Mirror operations without performing a full initial copy.

Input	Output
KV - ZCMD_PATH	Displays error if it fails, otherwise displays the success message.

19.19 Kyndryl GDPS SSH Status

Description:

This RAL checks the SSH status.

Input	Output
--------------	---------------



KV - ZCMD_PATH

Displays error if it fails, otherwise displays the success message.



20 Sanovi Internal (This is not for field use.)

20.1.1 Generate Raw Files

Not for field use.

Description

This action generates the RAW file from the data file, and offset file. It is used mainly in the VMware solution. **Inputs**

The inputKey Name	The inputType	Optional/ M, andatory
COMPONENT_NAME	Provide discovered component name	M, andatory
COMPONENT_TYPE	Provide component type	Optional (By default, STATIC)
DATA_PATH_LOCATION	Absolute Data File directory location	M, andatory
OFFSET_FILE_PATH	Absolute Offset File location	M, andatory
RAW_FILE_SIZE	RAW file size in MB(vmware's VM size)	M, andatory
RAW_FILE_PATH	Absolute RAW filepath location	M, andatory

Output

Output Name	Output Key Name	Description
raw file path	RAW_FILE_PATH	Created/Updated RAW filepath location

Notes:

Supports multiple RAW file generation. All inputs can be given comma separation. Data files should be present in DATA_FILE_LOCATION based on the offset's file. Only Linux local/remote agent is supported to execute RAL.

20.1.2 Generate Changed Data Files

Not for field use.

Description



This action generates the data files , and offset files for the VM based on change ID. **Pre-requisite:** VM must have the Operating System in it , and CBT must be enabled. **Inputs**

The inputKey Name	The inputType	Optional/M, andatory
PANVC_MGMT_SVC_NAME	Provide discovered vcenter management service name in Kyndryl Resiliency Orchestration	M, andatory
PANVC_DC_NAME	Provide datacenter name	M, andatory
PANVC_VM_NAME	Provide Virtual Machine name	M, andatory
PANVC_VMDK_PATH	Provide VM's VMDK path. Multiple paths can be comma separated	M, andatory
PANVC_VM_SNAPSHOT_ID	Provide snapshot ID	M, andatory
PANVC_REPLICATION_APPLIANCE	Provide the discovered Linux component name as replication appliances where the CBT is running.	M, andatory
PANVC_DATA_PATH	Provide data/offset directory. Eg: /opt/CBT. Data , and offset file are generated under /opt/CBT/VMName/VMDKName. Generated Offset file name will be offset.txt	M, andatory

Output

Output Name	Output Key Name	Description
	PANVC_CHNAGED_DATA_INFO	[vmdkpath]:[changeid]:[data output path]

20.1.3 OracleAppendEntriesTopfile

Notfor field use. Input:

Dataset Name should be given as the inputwhich has to be updated in the pfile with DG config.

pfile name should <sidname>.ora **Result:** Based on PR/DR machines the following configuration will be appended to the pfile.**For PR machine:**



```
*.db_unique_name='<dbSID>PR'*.log_archive_config='dg_config=(<dbSID>PR,<d
bSID>DR) '

*.fal_client='<dbSID>PR'*.fal_server='<dbSID>DR'

*.log_archive_dest_2='SERVICE=<dbSID>DR LGWR ASYNC
VALID_FOR=(ONLINE_LOGFILES,PRIMARY_ROLE)

DB_UNIQUE_NAME=<dbSID>DR'
```

For DR machine:

```
*.db_unique_name='<dbSID>DR'*.log_archive_config='dg_config=(<dbSID>DR,<d
bSID>PR) '

*.fal_client='<dbSID>DR'

*.fal_server='<dbSID>PR'*.log_archive_dest_2='SERVICE=<dbSID>PR LGWR
ASYNC VALID_FOR=(ONLINE_LOGFILES,PRIMARY_ROLE) DB_UNIQUE_NAME=<dbSID>PR'
```

Before appending DG entries to Pfile it will take the backup of the pfile , and spfile.

NOTE:

- Before appending it will create the backup file in the same folder with the name <sidname>.ora_<sidname>.ora_bkp for pfile , and spfile backup will be created in ORACLE_HOME/dbs folder as spfile<sidname>.ora_<sidname>.ora_bkp KV PANORA_PROVISIONING_PR_DATASET as pr datasetname , and RAL description should have production.
- KV PANORA_PROVISIONING_DR_DATASET as dr datasetname , and RAL description should have secondary.
- If you want to append PR entries to a Pfile in PR then Pfile path need to be specified KV as PANORA_PR_PFILE_PATH else it will create in \$HOME/oradata/<dbname>/fulldump/<dbname> path , and in DR default it creates in /oradata/config/ folder only for PR we can specify path in KV to create PFILE If we want to execute the RAL at Primary then mention'production' in WAAS Context in the RAL description or select from advance properties in group context.
- If we want to execute the RAL at DR then mention 'secondary' in WAAS Context in RAL description or select from advance properties in group context.

20.1.4 OracleAppendEntriesToTNSFile

Notfor field use. Input: Dataset Name should be given as the inputin which we want to update the tnsnames.ora with DG config.

DryRun: tnsnames.ora file should exist at the path \$ORACLE_HOME/network/admin/ in PR , and at path /oradata/config on DR on Linux machines

NOTE:



- If the file exists in both the places then Ral will detect the file at this path /oradata/config.

If the file does not exist in above mentioned two paths then error will be displayed in DryRun report.**Result:**

```
<dbSID>PR = (DESCRIPTION =  
  
  (ADDRESS = (PROTOCOL = TCP) (HOST = <PR_IP>) (PORT = <port>))  
  
  (CONNECT_DATA =  
  
    (SERVER = DEDICATED)  
  
    (SERVICE_NAME = <dbSID>)  
  
  )  
  
)  
  
<dbSID>DR =  
  
  (DESCRIPTION =  
  
    (ADDRESS = (PROTOCOL = TCP) (HOST = <DR_IP>) (PORT = <port>))  
  
    (CONNECT_DATA =  
  
      (SERVER = DEDICATED)  
  
      (SERVICE_NAME = <dbSID>)
```

NOTE:

- If the file exists in both the places then Ral will detect the file at this path /oradata/config.
- Before appending it will create the backup file in the same folder with the name tnsnames.ora_bkp.
- KV PANORA_PROVISIONING_PR_DATASET as pr datasetname.
- KV PANORA_PROVISIONING_DR_DATASET as dr datasetname.
- If we want to execute the RAL at Primary then the RAL description should mention 'production' in WAAS Context or we can select from advance properties in group context.
- If we want to execute the RAL at DR then the RAL description should mention 'secondary' in WAAS Context or we can select from advance properties in group context.

If the file does not exist in the above mentioned two paths, then an error will displayed in dryRun report.OracleDBPreconfigurationOnAWS **Notfor field use. Input:**



Dataset Name should be given as the input in which we want to create directory structure for provisioning directory same as DR dataset.

DryRun:

Check for free space in the machine to create directories.

This RAL works in two modes. If the user selects DB Provisioning from Advance Properties, then the RAL does the below provisioning steps.

Set the ORACLE_HOME, ORACLE_UNQNAME, ORACLE_SID , and export path to oracle home in the .bash_profile.

sudo su – oracle (login with oracle), and set the below

```
ORACLE_HOME=/u01/app/oracle/product/11.2.0/db1
```

```
ORACLE_BASE=/u01/app/oracle
```

```
ORACLE_SID=
```

```
PATH=$PATH:$ORACLE_HOME/bin/
```

```
export ORACLE_HOME ORACLE_SID ORACLE_BASE PATH
```

Assign privatekey to oracle user:

Create .ssh dir in the oracle The userhome , and copy the authorized keys file from the ec2-The userhome to the created directory , and change the permission , and give permission to oracle for that file.

```
Chown oracle:oinstall .ssh/authorizedkeys
```

```
chmod 777 ssh/authorizedkeys
```

Create the directory structure in the attached volume (which is mounted on /oradata) as shown below:

1.For the Archive log path , and for taking fulldump

```
mkdir -p /oradata/< dbName >/fulldump/< dbName>/ archive
```

2. For the redo logfiles ctl files , and db files

```
mkdir -p /oradata/< dbName >/data/< dbName >
```

3.For the all configuration files like pwd , spfile, listener , and tnsname files



```
mkdir -p /oradata/config
```

4. For the adump dpdump , and pfile

```
mkdir -p /oradata/< dbName >/admin/< db_name >/adump
```

```
mkdir -p /oradata/< dbName >/admin/< db_name >/dpdump
```

mkdir -p /oradata/< dbName >/admin/< db_name >/pfileFormat the volume by below comm, and

```
mkfs.ext4 /dev/xvdf
```

Mount the volume - mount /dev/xvdf /oradata

Give Oracle permission to the directory on which volume is mounted.

```
chown oracle:oinstall /oradata
```

If The userselects SymbolicLink from Advance Properties, then RAL does below provisioning steps.
create softlinks as below:

Note: create softlinks according to PR directory structure

1. For the dbf, ctl, redolog file

```
ln -s /oradata/< dbName >/data $ORACLE_BASE/oradata
```

2. For the adump dpdump pfile

```
ln -s /oradata/< dbName >/admin/ $ORACLE_BASE/admin
```

3. For the archive , and full dump

```
ln -s /oradata/< dbName >/fulldump/< dbName>/ /app/<db_name>(As In the PR )
```

4. For the configuration files(pwd,spfile,listner& tnsname.ora file)

```
a. ln -s /oradata/config/<pwd file name> / $ORACLE_HOME/dbs/<pwd file name>
```

```
b. ln -s /oradata/config/<spfile name> /$ORACLE_HOME/dbs/< spfile name>
```

```
c. ln -s /oradata/config/<listener.ora> / $ORACLE_HOME/network/admin/< listener.ora>
```

```
d. ln -s /oradata/config/<tnsname.ora> $ORACLE_HOME/network/admin/<tnsnames.ora>
```

5. Path in which we have taken backup ctl , and datafiles at PR
--



```
a) sudo ln -s /oradata/<dbname>/fulldump/<dbname> to
/home/oracle/oradata/<dbname>/fulldump/<dbname> (if KV for bkp
is not given)

b) sudo ln -s /oradata/<dbname>/fulldump/<dbname> to
bkppath (if KV for bkppath is given in kv)
```

KV

- PANORA_PROVISIONING_DR_DATASET as DR static dataset name
- PANORA_PROVISIONING_PR_DATASET as PR dataset name, as RAL needs to read PR dataset ORACLE_HOME
- PANORA_EC2_ADVANCE_PROVISIONING as DBProvisioning or SymbolicLink.
- AWS_DEVICE as /dev/xvdfOracleDBConfigFilesCreation

20.1.5 Not for field use.

20.2 CreateListenerFile RAL

Input: Select Dataset Name in which we want to create Oracle Static Listener. File at location /oradata/config with SID entries (DB to be provisioned).

Select Control File to create: Select the file needed to be created (to create listener file, select listener.ora) **DryRun:** Check the basic dryRun , and check the folder \$HOME/oradata/config exists or not.

Result: Creates oracle Static Listener File (listener.ora)at location /oradata/config with SID entries (DB to be provisioned).

Content of the file

```
SID_LIST_LISTENER =
(SID_LIST = (SID_DESC =
(GLOBAL_DBNAME = ltdg)
(ORACLE_HOME = /u01/app/oracle/product/11.1.0/db_1)
(SID_NAME = ltdg)
)
)
```




```
LISTENER =  
  
(DESCRIPTION_LIST =  
  
(DESCRIPTION =  
  
(ADDRESS = (PROTOCOL = TCP) (HOST = 172.168.1.60) (PORT = 1521))  
  
(ADDRESS = (PROTOCOL = IPC) (KEY = EXTPROC1521))  
  
)  
  
)
```

20.2.1 NOTE:

KV PANORA_PROVISIONING_DR_DATASET as DR static dataset name (If you want to create listener file in DR machine) KV PANORA_PROVISIONING_PR_DATASET as PR static dataset name (If you want to create listener file in PR machine) KV PANORA_CONFIG_FILE = LISTENER

20.3 CreateTnsnamesFile RAL

Input: Dataset Name: Select Dataset name in which we wanted to create an oracle Static tnsnames.ora. File at location /oradata/config with SID entries (DB to be provisioned).

Select Control File to create: Select the file needed to be created (for creating tnsnames.ora file select tnsnames.ora). DB to be provisioned.

DryRun: Check the basic dryRun , and check the folder /oradata/config exists or not.

Result: Creates oracle Static tnsnames.ora File at location /oradata/config with SID entries (DB to be provisioned).

Content of the file

```
LTDG =(DESCRIPTION =  
  
(ADDRESS = (PROTOCOL = TCP) (HOST = 172.168.1.60) (PORT =  
1522)) (CONNECT_DATA =  
  
(SERVER = DEDICATED)  
  
(SERVICE_NAME = ltdg)  
  
)  
  
)
```



- NOTE: KV PANORA_CONFIG_FILE = TNSNAMES.
- KV PANORA_PROVISIONING_DR_DATASET as DR static dataset name (If you want to create tnsnames file in DR machine).
- KV PANORA_PROVISIONING_PR_DATASET as PR static dataset name (If you want to create tnsnames file in PR machine).

20.4 CreatePfileFile RAL Input:

Dataset Name: Select Dataset Name in which you want to create a oracle Static PFile File at location /oradata/config with SID entries (DB to be provisioned).

Select Control File to create: Select the file need to be created (for creating PFile file select PFile) (DB to be provisioned).

DryRun: Check the basic DryRun , and check the folder /oradata/config exists or not. **Result:** Creates oracle Static PFile File at location /oradata/config with SID entries with name <sid>Init_stdby.ora(DB to be provisioned).Content of the file

```
ltdg.__db_cache_size=436207616
ltdg.__java_pool_size=16777216
ltdg.__large_pool_size=16777216
ltdg.__oracle_base='/u01/app/oracle'#ORACLE_BASE set from environment
ltdg.__pga_aggregate_target=318767104
ltdg.__sga_target=973078528
ltdg.__shared_io_pool_size=0
ltdg.__shared_pool_size=486539264
ltdg.__streams_pool_size=0

*.audit_file_dest='/u01/app/oracle/admin/ltdg/adump'

*.audit_trail='db'

*.compatible='11.1.0.0.0'

*.control_files='/u01/app/oracle/oradata/ltdg/control01.ctl','/u01/app/oracle/oradata/ltdg/control02.ctl','/u01/app/oracle/oradata/ltdg/control03.ctl'
```



```
*.db_block_size=8192
*.db_domain=
*.db_name='ltdg'
*.db_a_recovery_file_dest='/u01/app/oracle/the_flash_a_recovery_area'
*.db_a_recovery_file_dest_size=2147483648
*.db_unique_name='ltdg_DR'
*.diagnostic_dest='/u01/app/oracle'
*.dispatchers='(PROTOCOL=TCP) (SERVICE=ltdgXDB) '
*.fal_client='ltdg_DR'
*.fal_server='ltdg_PR'
*.local_listener='LISTENER_LTDG'
*.log_archive_dest_1='LOCATION=/app/ltdg/archive'
*.log_archive_dest_2='SERVICE=ltdg_PR LGWR ASYNC
VALID_FOR=(ONLINE_LOGFILES,PRIMARY_ROLE) DB_UNIQUE_NAME=ltdg_PR'
*.log_archive_dest_state_2='ENABLE'
*.log_archive_format='%t_%s_%r.dbf'
*.memory_target=1287651328
*.open_cursors=300
*.processes=150
*.remote_login_passwordfile='EXCLUSIVE'
*.undo_tablespace='UNDOTBS1'
```

- NOTE: KV PANORA_CONFIG_FILE = PFILE.
- KV PANORA_PROVISIONING_DR_DATASET as DR static dataset name (If you want to create pfile file in DR machine).
- KV PANORA_PROVISIONING_PR_DATASET as PR static dataset name (If you want to create pfile file in PR machine).



- If you want to create a Pfile in PR then Pfile path need to be specified KV as PANORA_PR_PFILE_PATH else it will create in \$HOME/oradata/<dbname>/fulldump/<dbname> path (path should have including the pfilename eg:\$HOME/oradata/<dbname>/fulldump/<dbname>/<SID.ora>) In DR, by default it creates in /oradata/config OracleBackupDatabaseFileForAWS RAL

20.4.1 Notfor field use.

20.5 Databasebackupfile RAL

Input:

Dataset Name should be given as the input in which we want to take a backup of the database , and the database name.

DryRun: Check the database is available or not.

Result: Creates the backup file i.e. Data file at location /app/<SID_NAME>/

OPERATION:

Login rman target sys/password@instancename nocatalog msgno

backup database format =

'\$HOME/oradata/" + oaco.SID + "/fulldump/" + oaco.SID + "/" + oaco.SID + "%d_%s_%t.data' include current control file for st, andby;

NOTE:

- If KV is not given it will create the directory \$HOME/oradata/<SID>/fulldump/<oaco> , and it creates the backup data files.
- If KV is provided then the file will be created in that path only.
- KV PANORA_BACKUP_DATABASE_FILE_PATH as path in which st, andby data file needs to be created.
- KV PANORA_PROVISIONING_PR_DATASET as PR static dataset name.

20.6 OracleCopyDBDataControlFileForAWS

Not for field use. Input: From Dataset Name , and to Dataset Name should be given as input. (Works with SCP Comm, and).

DryRUN: Check the space to copy files.

Result: Copies all the data files, control files, pfile , and password file to machine copies the following files from one machine to another.



- datafile to the same location as on primary backup e.g. /home/oracle/oradata/pocdg/fulldump/pocdg/*data to oracle@20.0.0.126:/oradata/pocdg/fulldump/pocdg/ OR from backup path on production to oracle@20.0.0.126:/oradata/pocdg/fulldump/pocdg/ (scp -i /tmp/oracleDGPOC.pem -o StrictHostKeyChecking=no -r \$HOME/oradata/pocdg/fulldump/pocdg/* oracle@20.0.0.177:/oradata/pocdg/fulldump/pocdg/) controlfile to controlfile location of st, andby equal to number of control files on primary. e.g. /home/oracle/oradata/pocdg/fulldump/pocdg/*ctl to oracle@20.0.0.126:/oradata/pocdg/fulldump/pocdg/ spfile to \$ORACLE_HOME/dbs folder on Unix. e.g. /u01/app/oracle/product/11.2.0/db_1/dbs/spfilepocdg.ora to oracle@20.0.0.126:/oradata/config/ passwordfile to /oradata/config/ folder on Unix. e.g. /u01/app/oracle/product/11.2.0/db_1/dbs/orapwpocdg to oracle@20.0.0.126:/oradata/config/ pfile to \$ORACLE_HOME/dbs folder on unix. e.g. /home/oracle/oradata/pocdg/fulldump/pocdg/*ora to oracle@20.0.0.126:/oradata/config/ **KV** PANORA_PROVISIONING_PR_DATASET as PR static dataset name.
- PANORA_PROVISIONING_DR_DATASET as DR dataset name, as files to be copied to DR EC2.

20.7 OracleRestoreDatabaseFileForAWS

20.7.1 Not for field use.

20.7.2 RestoreDatabase RAL

Input: Dataset Name should be given as the input in which we want to restore database.

DryRun: Check the control file exists or not in the path.

Result: Restore dataset.

OPERATION:

rman target sys/password@instancename nocatalog msgno

RMAN>restore controlfile from '<KVPATH>/<SID>_st, andby.ctl'; - if KV of the path is given, this comm, and gets executed.

RMAN>restore controlfile from '\$HOME/oradata/<SID>/fulldump/<SID>/<SID>_st, andby.ctl'; - if kv of the path is not given then the comm, and gets executed from directory /oradata/<SID>/fulldump/<SID>/

sqlplus "sys/password@instancename as sysdba"

alter database mount st, andby database;-mount database in st, andby.

rman target sys/password@instancename nocatalog msgno

RMAN> RESTORE DATABASE; -Restores Database.



- NOTE: KV PANORA_RESTORE_CTL_FILE_PATH as the path of the control file to restore. KV PANORA_PROVISIONING_DR_DATASET as DR static dataset name.
- This Ral restores both control file , and database file.

OracleRollbackProvisioningConfiguration **Notfor field use.** This RAL has to fired on Production Dataset , and this RAL will Delete/Revert the below content of the file.

1. Rollback of PFile : mv
\$HOME/oradata/<dbname>/fulldump/<dbname>/<dbname>.ora_<dbname>_bkp
\$HOME/oradata/<dbname>/fulldump/<dbname>/<dbname>.ora)
If Pfile is in (some other path specified through wizard)<path>/<dbname>.ora_<dbname>_bkp
<path>/<dbname>.ora
2. Rollback of SPFILE : mv \$ORACLE_HOME/spfile<dbname>.ora_<dbname>_bkp
\$ORACLE_HOME/spfile<dbname>.ora
3. Rollback of Tns file: (e.g. mv
/u01/app/oracle/product/11.2.0/db1/network/admin/tnsnames.ora_<dbname>_bkp
/u01/app/oracle/product/11.2.0/db1/network/admin/tnsnames.ora)
4. Data file , and control file:

```
rm -rf $HOME/oradata/pocdg/fulldump/pocdg/*.data /rm -rf  
/oradata/pocdg/fulldump/pocdg/*.ctl)
```

If Backup od data , and control is in (some other path specified through wizard) rm -rf <path>/*.data /
rm -rf <path>/*.ctl)

NOTE:

kv PANORA_PROVISIONING_PR_DATASET as PR static dataset name OracleDBConfigFilesCreation-

20.8 CreateSPfileFile

Not for field use.

Input:

Dataset Name: Should select Dataset Name. In which we want to create an Oracle Static SPFile File at location /oradata/config with SID entries (DB to be provisioned).

Select Control File to create: Select the file that needs to be created (for creating SPFile file select SPFile) (DB to be provisioned).

DryRun:Check the basic DryRun , and check the folder /oradata/config exists or not.

Result: Creates Oracle Static SPFile File at location /oradata/config with SID entries with name <sid>Init_stdby.ora(DB to be provisioned).



NOTE:

- KV PANORA_CONFIG_FILE = SPFILE
- KV PANORA_PROVISIONING_DR_DATASET as DR static dataset name (If you want to create pfile file in DR machine), and description of RAL should have secondary.
- KV PANORA_PROVISIONING_PR_DATASET as PR static dataset name (If you want to create pfile file in PR machine) , and description of RAL should have production.
- If you want to create a SPfile in PR , and you want to specify the Pfile path then specify KV as PANORA_PR_PFILE_PATH else it will take the Pfile path as \$HOME/oradata/<dbname>/fulldump/<dbname> path (if you specify the kv then path should have including the pfilename eg:\$HOME/oradata/<dbname>/fulldump/<dbname>/<SID.ora>).

In DR default pfile path takes from /oradata/config It will create a SPfile in the path \$ORACLE_HOME/dbsSetup

20.9 AWS Security Group

Not for field use.

Description

This action validates the Security group on AWS using the App stack ID. **Inputs**

The inputKey Name	The inputType	Optional/ M, andatory
APP_STACK_ID	Provide App stack ID	M, andatory

20.10 Get Disk Changed Data

Not for field use.

Description

This action generates the data files , and offset files for the VM based on changelID.**Inputs**



The inputKey Name	The inputType	Optional/M, andatory
PANVC_MGMT_SVC_NAME	Provide discovered vcenter management service name in Kyndryl Resiliency Orchestration	M, andatory
PANVC_DC_NAME	Provide datacenter name	M, andatory
PANVC_VM_NAME	Provide Virtual Machine name	M, andatory
PANVC_VMDK_PATH	Provide VM's VMDK path. Multiple paths can be given comma separated	M, andatory
PANVC_VM_SNAPSHOT_ID	Provide snapshot ID	M, andatory
PANVC_REPLICATION_APPLIANCE	Provide the discovered Linux component name as replication appliances where the CBT is running.	M, andatory
PANVC_DATA_PATH	Provide data/offset directory. Eg: /opt/CBT. Data , and offset file will be generated under /opt/CBT/VMName/VMDKName. Generated Offset file name will be offset.txt	M, andatory

Output

PANVC_CHNAGED_DATA_INFO=[vmdkpath]:[changeid]:[data output path] Eg:
 PANVC_CHNAGED_DATA_INFO=[datastore1] Test_Gaurav/Test_Gaurav_1.vmdk:52 ec ba cf 56 03 13 6b-:/data/datastore1_Test_Gaurav/Test_Gaurav_1 Note: VM must have Operating System in it , and CBT must be enabled.



21 Kyndryl iSeries with Mimix

MimixAS400 RALs are executed using Kyndryl Resiliency Orchestration AS400 CL programs binaries. For all actions that require Kyndryl Resiliency Orchestration AS400 CL programs binaries, The user needs to copy the Kyndryl Resiliency Orchestration AS400 CL programs binaries, which is available in the EAMSROOT/scripts/repeatable/MIMIX/Sclm/SANOVISAV obj file of the Resiliency Orchestration server to primary , and DR AS400 machine. Restore the file to SANОВI library using rstobj comm, and. For more information to install Kyndryl Resiliency Orchestration AS400 CL programs binaries, refer to the Kyndryl Resiliency Orchestration Installation Guide.

RALs Available for the Solution

The following RALs are available in the Kyndryl Resiliency Orchestration Application for the Kyndryl iSeries with Mimix Solution:

21.1 MimixAS400CheckNodeRole

There is no information available for this RAL.

21.2 MimixAS400AGReplicationStatus

21.2.1 Description

This RAL obtains the replication status of the AG.

Inputs	Output
This RAL fetches values from the MIMIX Protection Schema configuration.	Gets the AG replication status , and checks for ACTIVE status , and displays the AG status on console.

21.3 MimixAS400CheckforVirtualSwitchMsg

21.3.1 Description

This RAL waits for the virtual switch procedure message after creating the virtual switch test setup.

Inputs	Output
This RAL fetches values from the MIMIX Protection Schema configuration.	Obtains SWTVRT procedure *MSG , and displays a message showing that the



	required message is present , and needs to check for virtual switch ready status.
--	---

21.4 MimixAS400CheckStartAGProcStatus

21.4.1 Description

This RAL obtains the AG START procedure status.

Inputs	Output
This RAL fetches values from the MIMIX Protection Schema configuration.	Displays the COMPLETED status of the START procedure.

21.5 MimixAS400IsAnyAGProcedureRunning

21.5.1 Description

This RAL confirms whether there is any AG level procedure running prior to submitting a procedure.

Input	Output
This RAL fetches values from the MIMIX Protection Schema configuration.	Displays a message, which confirms that no procedure is running , and you can run the required procedure.

21.6 MimixAS400IsNodeDR

21.6.1 Description

This RAL confirms whether the given Mimix node is DR.

Inputs	Output
This RAL fetches values from the MIMIX Protection Schema configuration.	Displays success when given Mimix node is DR otherwise, it fails with the node status.

21.7 MimixAS400IsNodePrimary



21.7.1 Description

This RAL confirms whether the Mimix node is primary.

Inputs	Output
This RAL fetches values from the MIMIX Protection Schema configuration.	Displays success when the Mimix node is primary. Otherwise, it fails , and displays the failure message with the node status.

21.8 MimixAS400IsVirtualSwitchCompleted

21.8.1 Description

This RAL confirms whether the SWTVRT procedure is completed.

Inputs	Output
This RAL fetches values from the MIMIX Protection Schema configuration.	Displays the COMPLETED status of the SWTVRT procedure. Otherwise, it fails , and displays the failure message with actual status.

21.9 MimixAS400IsVirtualSwitchTestReady

21.9.1 Description

This RAL obtains the AG replication status if it is VRTSWTTST , and then it informs the user that the test setup is available.

Inputs	Output
This RAL fetches values from the MIMIX Protection Schema configuration.	Displays the success message that failover test setup is created , and available for testing with IP address of test setup , and AG name.

21.10 MimixAS400NodeStatus

21.10.1 Description

This RAL obtains the Mimix node status.



Inputs	Output
This RAL fetches values from the MIMIX Protection Schema configuration.	Displays the error message if node status is not ACTIVE. Otherwise, it displays the success message.

21.11 MimixAS400PlannedSwitchProcStatus

21.11.1 Description

This RAL obtains the SWTPLAN procedure status.

Inputs	Output
This RAL fetches values from the MIMIX Protection Schema configuration.	Displays the COMPLETED status of the SWTPLAN procedure. Otherwise, it fails with the actual procedure status.

21.12 MimixAS400PrecheckProcStatus

Description: This RAL obtains the PRECHECK procedure status.

Inputs	Output
This RAL fetches values from the MIMIX Protection Schema configuration.	Displays the COMPLETED status of the PRECHECK procedure. Otherwise, it fails with the actual procedure status.

21.13 MimixAS400PreSwtPlanProcStatus

21.13.1 Description

This RAL confirms the SWTPLAN procedure status prior to running the switchover.

Inputs	Output
This RAL fetches values from the MIMIX Protection Schema configuration.	Displays the COMPLETED / ACK status of the SWTPLAN procedure. Otherwise, it fails with the actual procedure status as error.

21.14 MimixAS400PreSwtUnPlanProcStatus

21.14.1 Description



This RAL confirms the SWTUNPLAN procedure status prior to running failover.

Inputs	Output
This RAL fetches values from the MIMIX Protection Schema configuration.	Displays the COMPLETED / ACK status of the SWTUNPLAN procedure. Otherwise, it fails with the actual procedure status as error.

21.15 MimixAS400PreVirtualSwitchProcStatus

21.15.1 Description

This RAL confirms the SWTVRT procedure status prior to running failover test exercise.

Inputs	Output
This RAL fetches values from the MIMIX Protection Schema configuration.	Displays the COMPLETED / ACK status of the SWTVRT procedure. Otherwise, it fails with the actual procedure status as error.

21.16 MimixAS400RunPlannedSwitchAG

21.16.1 Description

This RAL runs the PLANNED switch procedure , and verifies if it has started.

Inputs	Output
This RAL fetches values from the MIMIX Protection Schema configuration.	Starts the SWTPLAN procedure , and displays the message that the procedure has started successfully.

21.17 MimixAS400RunPrecheck

21.17.1 Description

This RAL runs the PRECHECK procedure , and verifies if it has started.

Inputs	Output
This RAL fetches values from the MIMIX Protection Schema configuration.	Starts the PRECHECK procedure , and displays the message that the procedure has started successfully.

MimixAS400RunSwitchVirtual



21.17.2 Description

This RAL runs the SWTVRT procedure , and verifies if it has started.

Inputs	Output
This RAL fetches values from the MIMIX Protection Schema configuration.	Starts the SWTVRT procedure , and displays the message that the procedure has started successfully.

21.18 MimixAS400RunUnplannedSwitchAG

21.18.1 Description

This RAL runs the SWUNPLAN procedure , and verifies if it has started.

Inputs	Output
This RAL fetches values from the MIMIX Protection Schema configuration.	Starts the SWUNPLAN procedure , and displays the message that the procedure has started successfully.

21.19 MimixAS400StartAG

21.19.1 Description

This RAL runs the START procedure , and verifies if it started or not.

Inputs	Output
This RAL fetches values from the MIMIX Protection Schema configuration.	Starts the START procedure , and displays the message that the procedure has started successfully.

21.20 MimixAS400UnPlannedSwitchProcStatus

21.20.1 Description

This RAL checks for the SWUNPLAN procedure status.

Inputs	Output
This RAL fetches values from the MIMIX Protection Schema configuration.	Displays the COMPLETED status of the SWUNPLAN procedure. Otherwise, it fails with the actual procedure status.



21.21 CallAS400CLProgram.tcl

21.21.1 Description

This tcl script helps to call the customer written CL programs from workflows.

Inputs	Output
It accepts The following KV's as input. <ul style="list-style-type: none"> • CLPROGRAM_PATH • CLINPUT_ARGS • CLARGS_LENGTH • CL_OUTPUT 	Compares the cl program output with the CL_OUTPUT KV , and displays the success message if it is same. Otherwise, it displays the actual return value of the program.

21.22 CallAS400Comm, and.tcl

21.22.1 Description

This tcl script helps to call the AS400 commands from workflows.

Inputs	Output
It accepts The following KV's as input. <ul style="list-style-type: none"> • AS400COMM, AND • AS400COMM, AND_OUTPUT 	Compares the AS400 comm, and output with the AS400COMM, AND_OUTPUT KV , and displays the success message if it is same. Otherwise, it displays the actual return value of the program.

21.23 MimixAS400VirtualPrecheckProcStatus



Inputs	Output
It accepts The following KV's as input. <ul style="list-style-type: none"> AG NAME PRECHKVRT (proc name) 	Mimix virtual PRECHECK procedure has been started successfully. Status is QUEUED/ACTIVE. Expected error: Mimix VIRTUAL PRECHECK procedure could not be started.

21.24 MimixAS400RunVirtualPrecheck

Inputs	Output
It accepts The following KV's as input. <ul style="list-style-type: none"> AG NAME PRECHKVRT (proc name) 	Virtual Precheck Proc Status is COMPLETED. Expected error: if PRECHKVRT procedure not completed then throw error showing Virtual switch procedure status is *ATTN.

21.25 MimixAS400CheckDGActiveEntries

Inputs	Output
It accepts The following KV's as input. <ul style="list-style-type: none"> DG NAME, or ALL DGs 	Output: There are no active/failed DG entries, switch over /switch back can be performed Expected error: if PRECHKVRT procedure not completed then throw error showing Virtual switch procedure status is *ATTN.

21.26 MimixAS400CheckDGAllCompareFileEntries

Inputs	Output
It accepts The following KV's as input. <ul style="list-style-type: none"> DG NAME, or ALL DGs 	Output: There are no difference in DG file entries between primary , and DR nodes, switch over /switch back can be performed. Expected error: SwitchOver or Switch back can't be performed as there are DG file entries are different. For more info check WRKDGFSVAL(*ALLCMP) comm, and.

21.27 MimixAS400CheckDGIFSTrakingEntries



Inputs	Output
It accepts The following KV's as input. <ul style="list-style-type: none"> • DG NAME, or • ALL DGs 	Output: There are no inactive DG IFS entries, switch over /switch back can be performed. Expected error: SwitchOver or Switch back can't be performed as there are inactive DG IFS entries. For more info check run WRKDGIFSTE STSVAL(*INACTIVE) comm, and.

21.28 MimixAS400CheckDGInactiveFileEntries

Inputs	Output
It accepts The following KV's as input. <ul style="list-style-type: none"> • DG NAME, or • ALL DGs 	Output: There are no inactive DG IFS entries, switch over /switch back can be performed. Expected error: SwitchOver or Switch back can't be performed as there are inactive DG IFS entries. For more info check run WRKDGIFSTE STSVAL(*INACTIVE) comm, and.

21.29 MimixAS400CheckDGObjectTrackingEntries

Inputs	Output
It accepts The following KV's as input. <ul style="list-style-type: none"> • DG NAME, or • ALL DGs 	Output: There are no inactive DG OBJ entries, switch over /switch back can be performed Expected error: SwitchOver or Switch back can't be performed as there are inactive DG OBJ entries. For more info check run WRKDGOBJTE STSVAL(*INACTIVE) comm, and.



22 Kyndryl zSystem

22.1 zFetchSyslogMessage

Description

This RAL searches for the syslog Message for the past 24 hours , and responds on Successfully finding the Message.

Note: The OMVS should be in the same TimeZone as the zOS.

UI Input	M, andatory/ Optional	Description	Key Value
IBM zSystem Servers	M, andatory	Server name where the RAL has to execute	
Message to Fetch	M, andatory	Syslog Message to Fetch for	MESSAGE_TO_FETCH
Time Out (sec)	M, andatory	Amount of time consumed to perform the action.	

Example

For the checking FFST Status after shutdown

IBMzSystem server – Name of the LPAR – PRD1

Message to Fetch – EPWFFST ended with RC=0000

Timeout (sec) - 180

22.2 zJobSubmit

Description

This RAL submits the JCL , and validates for success , and failure of the steps.

Note - This RAL can Capture the Return code , and compare with the MaxCC set in the RAL.



UI Input	M, andatory/ Optional	Description	Key Value
IBM zSystem Servers	M, andatory	Server name where the RAL has to execute	
Data Set Name	M, andatory	Name of the dataset	DATASET_NAME
Member Name	M, andatory	Member name in the dataset	MEMBER_NAME
Job Name	M, andatory	Job name in the Job Statement of the Member dataset	JOB_NAME
Maximum Return Code	M, andatory	Maximum Return Code expected (or) Condition to Check for in the Job output.	MAXIMUM_RETURN_CODE
Expected Runtime	M, andatory	Expected Run time of the Job	EXPECTED_RUN_TIME
Time Out (sec)	M, andatory	Amount of time consumed to perform the action.	

Example

Assuming we would want the execute the Job SANОВI in the Mainframe
 The following details are to be filled.

The server That the job needs to run on. - (PRD1)

Dataset name - PDS Dataset name - (USERID.JCLLIB)

Member Name - PS Name in which Job is stored - (SANОВI)

Job Name - Name of the Job / First 8 Characters in the PS - (USERID01)

Maximum Return Code - The Highest Return code which will mark successful Completion of the job - (0004)



Expected Run time – The amount of time the Job will normally execute for – (300) in secs

Timeout in Secs – The seconds the RAL should be checking the output for. (400)

Note: Please put the timeout in secs larger than the Expected runtime.

The RAL will submit the comm, and , and verify the Submission , and the Execution of the job.

If the Job is in Hold Then it fails asking then to release , and Manually make it successful else proceeds to check for the status every 30 secs until it reaches print queue.

Then compares the return code , and Marks it for success , and Failure.

22.3 zOSComm, and

Description

This RAL submits the zOS Comm, and , and validates for success .

UI Input	M, andatory/ Optional	Description	Key Value
IBM zSystem Servers	M, andatory	Server name where the RAL has to execute	
Enter zOS Comm, and	M, andatory	Comm, and to be Sent to Mainframe	ZOS_COMM, AND
Enter Success Pattern	M, andatory	Success Pattern to Check in the output	SUCCESS_PATTERN
Time Out (sec)	M, andatory	Amount of time consumed to perform the action.	

Example

For the Comm, and D A, L to the Mainframe , and Verify the jes2 is up , and running.

IBMzSystem server – Name of the LPAR – PRD1



Enter zOS Comm, and – D A,L

Enter Success Pattern – JES2 (Subsystem/STC Name)

Timeout (sec) – 180

22.4 zSWTORreply

Description

The RAL is used to respond to WTOR messages after the TCP/IP is up , and running.

UI Input	M, andatory/ Optional	Description	Key Value
IBM zSystem Servers	M, andatory	Server name where the RAL has to execute	
Message ID to Fetch For	M, andatory	ID Of the Message or The String to Search for.	MESSAGE_ID
WTOR reply to be Given	M, andatory	Response to the Message ID	MESSAGE_RESPONSE
Time Out (sec)	M, andatory	Amount of time consumed to perform the action.	

Example:

1. If the Comm, and **P FFST** is throwing the response

*03 **EPW0309I** ENTER 'YES' TO CONTINUE TERMINATION, 'NO' TO KEEP FFST ACTIVE

2. The Message ID to fetch would be anything in the Phrase from the **Message ID to Fetch for - EPW0309I**
3. The WTOR Reply to be Given Field should be the reply you would want to give, in our Case Yes.
WTOR reply to be Given - yes
4. The Final output the Action is going to give would be **03,yes** will be published to the Mainframe.

22.5 zSysplexRouteComm, and



Description

This RAL submits the zOS Comm, and using route the System name in the sysplex , and validates for success .

UI Input	M, andatory/ Optional	Description	Key Value
IBM zSystem Servers	M, andatory	Server name where the RAL has to execute	
Sysplex System Name	M, andatory	Sysplex System Name where comm, and to be passed .	SYSPLEX_SYSTEM_NAME
Sysplex zOS Comm, and	M, andatory	Comm, and to be Sent to Sysplex system Mainframe	SYSPLEX_ZOS_COMM, AND
Enter Success Pattern	M, andatory	Success Pattern to Check in the output	SUCCESS_PATTERN
Time Out (sec)	M, andatory	Amount of time consumed to perform the action.	

Example

For the Comm, and D A,L to the Sysplex Mainframe , and Verify the jes2 is up , and running.

PRD1 , and PRD2 is in SYSPLEX

IBMzSystem server – Name of the LPAR – PRD1

SYSPLEX System Name – PRD2/ALL

SYSPLEX zOS Comm, and – D A,L

Enter Success Pattern – JES2 (Subsystem/STC Name)

Timeout (sec) - 180

22.6 executezOsComm, and



Description:

Execute zOS runs a comm, and/script, captures the output , and success condition is evaluated in accordance with st, andard output. The comm, and or script needs to be configured with the time out (in seconds) so that The userdoes not wait for indefinite time for commands to complete.

The zOS commands need to be prefixed with '/u/sanovi/zcmd.sh' when entering in the UI field zOS Comm, and.

For example, if The userwants to run a zOS comm, and 'd a,l', the userneeds to enter: /u/sanovi/zcmd.sh 'd a,l'

Please note that this RAL is a replacement for [zOS Custom RAL](#).

Inputs:

Below table describes the inputs for the RAL.

UI Input	M, andatory/Optional	Description
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Kyndryl z System Server	M, andatory	Select the component name from the drop-down list.
Comm, and/Script Name	M, andatory	Enter the comm, and/script name.
Success Condition	M, andatory	Can provide the predictable multiple success patterns from Comm, and script/path.
Time Out (in Secs)	M, andatory	Enter the execution wait time in seconds. The value '0' in this field defines indefinite wait.

Examples of success condition:

Below are some of the examples for Success Condition. Please note that CMD_STDOUT, CMD_STDERR , and CMD_EXITCODE are handles which hold the comm, and output.

Comm, and output means the comm, and is executed successfully , and has provided an output. For this CMD_STDOUT should be used. If CMD_STDOUT is used, RAL will be marked as success if the mentioned string is found in the comm, and output.

Comm, and error output means the comm, and is executed but failed , and has provided some output.

Example: Invalid comm, and

For this CMD_STDERR should be used. If CMD_STDERR is used, RAL will be marked as success if the mentioned string is found in comm, and error output.

Success Condition	Description
CMD_STDOUT.contains("testString")	If comm, and output contains testString, comm, and would be successful otherwise failed
CMD_STDOUT.contains("testString1") CMD_STDOUT.contains("testString2")	If comm, and output contains either of testString1 or testString2, comm, and would be successful
CMD_STDOUT.endsWith("testString") && CMD_STDOUT.contains("testString2")	If comm, and output ends with testString1 , and contains testString2, comm, and would be successful
CMD_STDOUT.startsWith("testString1") && CMD_STDOUT.endsWith("testString2")	If comm, and output starts with testString1 , and ends with testString2, comm, and would be successful



CMD_STDOUT!^"testString1"	If comm, and output does not start with testString1, comm, and would be successful
CMD_STDOUT!^"testString1" && CMD_STDOUT=^"testString2"	If comm, and output does not start with testString1 , and starts with testString2, comm, and would be successful.
CMD_STDERR.contains("testString")	If comm, and error output contains testString, comm, and would be successful otherwise failed
CMD_EXITCODE==1	Comm, and execution is successful
CMD_EXITCODE==0	Comm, and execution is not successful

Note: String literal can start , and end with either ' or " delimiters. Example - "Hello world" , and 'Hello world'. In case the success condition does not work in some cases; please enclose the string within single quotes; like "'Hello World'".

For example; success condition:

CMD_STDOUT.contains("'Hello World'")

validates to true if comm, and output is having "Hello World".

Outputs:

Output Name	Description
Std, andard Out Message	The output message of the comm, and/script.
Std, andard Error Message	The error message of the comm, and/script.

Additional notes:



1. The user can enter the commands having special characters like pipes ('|') etc. It can execute any format which is supported by the target system. For example: `ls -ltr | grep test.txt` would be executed successfully on a Linux target system.
2. In case target system does not support the comm, and, RAL execution will fail, and STDOUT message will be logged.
3. In case The user does not have permission to execute the comm, and/script, RAL execution will fail, and STDOUT will be logged.
4. In case comm, and execution goes beyond the TIME OUT configured, the RAL execution will be considered 'failed', and TIME OUT message will be logged.
5. In case comm, and execution results in native UI display at the target system, the execution would result in TIME OUT.

22.7 HMCCheckDRLparStatus

Description

This RAL will get the DR LPAR status.

Inputs	API	Output
HMC_IP, HMC_API_PORT, LPAR_NAME & CPC_NAME	api/logical-partitions/\$lparid	On Success: Displays LPAR status. On Failure: Error is displayed.

Authorization requirements:

Authorization requirements for this operation are:

- Object access permission to the Logical Partition object designated by \$lparid.
- Object access permission to the logical partition's parent CPC object.

22.8 HMCActivateLPAR

Description

This RAL is an HMC action where it activates LPAR.

Inputs	API	Output
HMC_IP, HMC_API_PORT,	api/virtual-servers/\$virtualServerID/operations/activate	Displays success message if LPAR activation is successful.



LPAR_NAME , and CPC_NAME	Otherwise, displays an error.
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Authorization requirements:

Authorization requirements for this operation are:

- Object access permission to the Logical Partition object designated by \$lparid
- Action/task permission for the **Activate** task.
- Object access permission to the logical partition's parent CPC object.

22.9 HMCCheckLPARStatus

Description

This RAL confirms the LPAR status , and it fails if LPAR is not running or not in proper state.

Inputs	API	Output
HMC_IP, HMC_API_PORT, LPAR_NAME , and CPC_NAME	api/logical- partitions/\$lparid	Displays success message if LPAR is connected , and operating. Otherwise, it displays the status of the LPAR.

Authorization requirements:

Authorization requirements for this operation are:

- Object access permission to the Logical Partition object designated by \$lparid.
- Object access permission to the logical partition's parent CPC object.

22.10 zMCDeactivateLPAR

Description

This RAL deactivates LPAR.

Inputs	API	Output
HMC_IP, HMC_API_PORT, LPAR_NAME , and CPC_NAME	api/virtual- servers/\$virtualServerID/operations/deactivate	Displays success message if LPAR is deactivated. Otherwise, it displays an error.



Authorization requirements:

Authorization requirements for this operation are:

- Object access permission to the Logical Partition object designated by *\$lparid*
- Action/task permission for the **Deactivate** task.
- Object access permission to the logical partition's parent CPC object.

22.11 HMCgetLPARStatus

Description

This RAL obtains the LPAR status.

Inputs	API	Output
HMC_IP, HMC_API_PORT, LPAR_NAME , and CPC_NAME	api/logical-partitions/\$lparid	Displays the LPAR status if it obtains the LPAR status successfully. Otherwise, it displays an error.

Authorization requirements:

Authorization requirements for this operation are:

- Object access permission to the Logical Partition object designated by *\$lparid*.
- Object access permission to the logical partition's parent CPC object.

22.12 HMCJobStatus

Description

All intrusive operations of HMC provides the job ID to you. This action provides its status.

Inputs	API	Output
HMC_IP, HMC_API_PORT, LPAR_NAME, CPC_NAME , and JOB_ID	api/jobs/\$jobID	Displays the LPAR status if it obtains the LPAR status successfully. Otherwise, it displays an error.

Authorization requirements:

This operation has the following authorization requirement:

- The user must be correctly authenticated.



22.13 HMCLoadLPARParam

Description

This RAL loads the IPL of an LPAR corresponding to the load address , and param configured.

Inputs	API	Output
HMC_IP, HMC_API_PORT, LPAR_NAME, CPC_NAME, LOAD_ADDRESS, , and LOAD_PARAMETER	api/logical-partitions/\$lparID/operations/load	Displays success message if IPL is loaded successfully. Otherwise, it displays an error.

Authorization requirements:

Authorization requirements for this operation are:

- Object access permission to the Logical Partition object designated by *{logical-partition-id}*
- Action/task permission for the **Load** task.
- Object access permission to the logical partition's parent CPC object.

22.14 HMCLogOff

Description

This RAL logs off The userfrom the HMC console.

Inputs	API	Output
N/A	api/sessions/ this-session	Displays success message if when the useris successfully logged off from the HMC console..

Authorization requirements:

This operation has the following authorization requirement:

- No explicit authorization is required, however the client application must possess , and present a valid **session-id** of the session to be closed.

22.15 HMCLogOn

Description

This RAL allows the userto login to HMC console.



Inputs	API	Output
N/A	api/sessions/ this-session	Displays success message if the user is successfully logged in to console. Otherwise, it displays an error message.

Authorization requirements:

This operation has the following authorization requirement:

- The HMC The userProfile or The userTemplate selected by the **userid** field must be configured to allow use of the Web Services API.

22.16 HMCgetVersion

Description

This RAL obtains the HMC API version.

Inputs	API	Output
HMC_IP, HMC_API_PORT, CREDS (Group Credentials LABEL)	api/session	Displays the success message if it successfully obtains the HMC API version. Otherwise it displays an error.

Authorization requirements:

This operation has the following authorization requirement:

- The HMC The userProfile or The userTemplate selected by the **userid** field must have access to web Services API.

22.17 HMCListImageProfile

Description

This RAL obtains the CPC Image profile properties.

Inputs	API	Output
HMC_IP, HMC_API_PORT, LPAR_NAME, CPC_NAME , and PROFILE_NAME	api/cpcs/\$pcid/ image- activation- profiles/\$profile	Displays the success message when it obtains the CPC Image profile properties successfully.



Authorization requirements

Authorization requirements for this operation are:

- Object access permission to the Logical Partition object designated by *\$lparid*
- Object access permission to the logical partition's parent CPC object.

22.18 HMCResetClear

Description

This RAL will reset the PR LPAR.

Inputs	API	Output
HMC_IP, HMC_API_PORT, LPAR_NAME, CPC_NAME & PROFILE_NAME	api/logical-partitions/\$lparid/operations/reset-clear	Displays the lpar name , and status else displayed error codes.

Authorization requirements

Authorization requirements for this operation are:

- Object-access permission to the Logical Partition object designated by *\$lparid*
- Action/task permission for the Reset Clear task.
- Object-access permission to the logical partition's parent CPC object.

22.19 HMCStopLparClear

Description

This RAL will stop the PR Lpar.

Inputs	API	Output
HMC_IP, HMC_API_PORT, LPAR_NAME, CPC_NAME & PROFILE_NAME	/api/logical-partitions/\$lparid/operations/stop	Displays the lpar name , and status else displayed error codes.



Authorization requirements

Authorization requirements for this operation are:

- Object-access permission to the Logical Partition object designated by \$lparid
- Action/task permission for the Reset Clear task.
- Object-access permission to the logical partition's parent CPC object.

22.20 HMCRRResetClear

Description

This RAL will reset the DR LPAR.

Inputs	API	Output
HMC_IP, HMC_API_PORT, LPAR_NAME, CPC_NAME & PROFILE_NAME	/api/logical-partitions/\$lparid/operations/reset-clear	Displays the lpar name , and status else displayed error codes.

Authorization requirements

Authorization requirements for this operation are:

- Object-access permission to the Logical Partition object designated by \$lparid
- Action/task permission for the Reset Clear task.
- Object-access permission to the logical partition's parent CPC object.

22.21 HMCRRStopLpar

Description

This RAL will stop the DR Lpar.

Inputs	API	Output
HMC_IP, HMC_API_PORT, LPAR_NAME, CPC_NAME & PROFILE_NAME	/api/logical-partitions/\$lparid/operations/stop	Displays the lpar name , and status else displayed error codes.



Authorization requirements

Authorization requirements for this operation are:

- Object-access permission to the Logical Partition object designated by \$lparid
- Action/task permission for the Stop task.
- Object-access permission to the logical partition's parent CPC object.

22.22 HMCDREOD

Description

Issue the HALT EOD comm, and to ensure that important job , and system statistics , and data records in storage are recorded on DR system.

Inputs	API	Output
HMC_IP, HMC_API_PORT, HMCCREDS, HMC_SESSION_ID, LPAR_NAME, CPC_NAME, CPC_ID, LPAR_ID OS_COMM, AND_IS_PRIORITY=false	Z EOD	On Success – EOD Completed successfully On Failure – Exception - Check the message ID

Authorization requirements:

Authorization requirements for this operation are:

- Object access permission to the logical partition's parent CPC object.
- Object access permission to the Logical Partition object designated by \$lparid
- Action/task permission for the Activate task.

22.23 HMCDRInitializeResponse

Description

System is trying to initialize or join a sysplex which will have outst, anding response IXC405D REPLY I TO INITIALIZE THE SYSPLEX, J TO JOIN SYSPLEX.

If the response ID IXC405D is not available, then the RAL will fail. To proceed, click on Continue as Successful.

The script will respond as 00,I. Response is based on runbook.



Inputs	API	Output
HMC_IP, HMC_API_PORT, HMCCREDS, HMC_SESSION_ID, LPAR_NAME, CPC_NAME, CPC_ID, LPAR_ID OS_COMM, AND_IS_PRIORITY=false	00,I	On Success – Comm, and Successfully sent On Failure – Comm, and not issued successfully. Check the message \$osMessageID
OS_COMM, AND		The user must configure the OS comm, and that is required to track the messages.

Authorization requirements:

Authorization requirements for this operation are:

- Object access permission to the logical partition's parent CPC object.
- Object access permission to the Logical Partition object designated by \$lparid
- Action/task permission for the **Activate** task.

22.24 HMCDRInitializeResponseDRL

Description

System is trying to initialize or join a sysplex which will have outst, anding response IXC405D REPLY I TO INITIALIZE THE SYSPLEX, J TO JOIN SYSPLEX.

This RAL will send comm, and D R,L Over to the Mainframe , and Fetch the response of that Reply, Post which will send the OS Reply over to the Reply ID Fetched.

Inputs	API	Output
HMC_IP, HMC_API_PORT, HMCCREDS, HMC_SESSION_ID, LPAR_NAME, CPC_NAME,	##,I	On Success – Comm, and Successfully sent



CPC_ID, LPAR_ID, OS_COMM, AND_IS_PRIORITY=false		On Failure – Comm, and not issued successfully. Check the message \$osMessageID
OS_COMM, AND		The user must configure the OS comm, and that is required to track the changes.

Authorization requirements:

Authorization requirements for this operation are:

- Object access permission to the logical partition's parent CPC object.
- Object access permission to the Logical Partition object designated by \$lparid
- Action/task permission for the Activate task.

22.25 HMC DR Initialize Response Continue

Description

Open processing is waiting for the operator to confirm that the data set can be used. ILR031A REPLY 'DENY' TO PREVENT ACCESS, 'CONTINUE' TO ALLOW USE OF dsname. The script will respond as 00,CONTINUE. Response is based on runbook.

If the response ID ILR031A is not available, then the RAL will fail. To proceed, click on Continue as Successful.

Inputs	API	Output
HMC_IP, HMC_API_PORT, HMCCREDS, HMC_SESSION_ID, LPAR_NAME, CPC_NAME, CPC_ID, LPAR_ID OS_COMM, AND_IS_PRIORITY=false	00, CONTINUE	On Success – Comm, and Successfully sent On Failure – Comm, and not issued successfully

Authorization requirements:

Authorization requirements for this operation are:



- Object access permission to the logical partition's parent CPC object.
- Object access permission to the Logical Partition object designated by \$lparid
- Action/task permission for the **Activate** task.

22.26 HMCDRMessageAllServicesCompleted

Description

Check the message "ALL AVAILABLE FUNCTIONS COMPLETE" before stopping JES2.

Inputs	API	Output
HMC_IP, HMC_API_PORT, HMCCREDS, HMC_SESSION_ID, LPAR_NAME, CPC_NAME, CPC_ID, LPAR_ID OS_COMM, AND_IS_PRIORITY=false	N/A	On Success – All Available functions complete On Failure – All functions are not down

Authorization requirements:

Authorization requirements for this operation are:

- Object access permission to the logical partition's parent CPC object.
- Object access permission to the Logical Partition object designated by \$lparid
- Action/task permission for the **Activate** task.

22.27 HMCDRStopCSF

Description

Script will stop CSF (crypto services) on the DR via HMC.

Inputs	API	Output



HMC_IP, HMC_API_PORT, HMCCREDS, HMC_SESSION_ID, LPAR_NAME, CPC_NAME, CPC_ID, LPAR_ID OS_COMM, AND_IS_PRIORITY=false	C CSF	On Success – CSF Stopped successfully On Failure – Check the message ID or CSF is not running
--	-------	--

Authorization requirements:

Authorization requirements for this operation are:

- Object access permission to the logical partition's parent CPC object.
- Object access permission to the Logical Partition object designated by \$lparid
- Action/task permission for the **Activate** task.

22.28 HMCDRStopFFST

Description

Script will stop FFST on the DR system via HMC.

Inputs	API	Output
HMC_IP, HMC_API_PORT, HMCCREDS, HMC_SESSION_ID, LPAR_NAME, CPC_NAME, CPC_ID, LPAR_ID OS_COMM, AND_IS_PRIORITY=false	P FFST	On Success – FFST Stopped successfully On Failure – Check the message ID or FFST is not running

Authorization requirements:

Authorization requirements for this operation are:

- Object access permission to the logical partition's parent CPC object.



- Object access permission to the Logical Partition object designated by \$lparid
- Action/task permission for the **Activate** task.

22.29 HMCDRStopHZSPROC

Description

Script will stop HZSPROC on the DR system via HMC.

Inputs	API	Output
HMC_IP, HMC_API_PORT, HMCCREDS, HMC_SESSION_ID, LPAR_NAME, CPC_NAME, CPC_ID, LPAR_ID OS_COMM, AND_IS_PRIORITY=false	P HZSPROC	On Success – HZSPROC Stopped successfully On Failure – Check the message ID or HZSPROC is not running

Authorization requirements:

Authorization requirements for this operation are:

- Object access permission to the logical partition's parent CPC object.
- Object access permission to the Logical Partition object designated by \$lparid
- Action/task permission for the **Activate** task.

22.30 HMCDRStopJES2

Description

Script will stop JES2 on the DR system via HMC.

Inputs	API	Output



HMC_IP, HMC_API_PORT, HMCCREDS, HMC_SESSION_ID, LPAR_NAME, CPC_NAME, CPC_ID, LPAR_ID OS_COMM, AND_IS_PRIORITY=false	\$PJES2	On Success – JES2 Stopped successfully On Failure – Check the message ID or JES2 is not running
--	---------	--

Authorization requirements:

Authorization requirements for this operation are:

- Object access permission to the logical partition's parent CPC object.
- Object access permission to the Logical Partition object designated by \$lparid
- Action/task permission for the **Activate** task.

22.31 HMCDRStopOMVS

Description

This script will stop OMVS on DR system via HMC.

Inputs	API	Output
HMC_IP, HMC_API_PORT, HMCCREDS, HMC_SESSION_ID, LPAR_NAME, CPC_NAME, CPC_ID, LPAR_ID OS_COMM, AND_IS_PRIORITY=false	FOMVS,SHUTDOWN	On Success – OMVS Stopped successfully On Failure – Check the message ID or OMVS is not running

Authorization requirements:

Authorization requirements for this operation are:

- Object access permission to the logical partition's parent CPC object.
- Object access permission to the Logical Partition object designated by \$lparid
- Action/task permission for the **Activate** task.

22.32 HMCDRStopOSASF

Description



Script will stop OSASF on the DR system via HMC.

Inputs	API	Output
HMC_IP, HMC_API_PORT, HMCCREDS, HMC_SESSION_ID, LPAR_NAME, CPC_NAME, CPC_ID, LPAR_ID OS_COMM, AND_IS_PRIORITY=false	P OSASF	On Success – OSASF Stopped successfully On Failure – Check the message ID or OSASF is not running

Authorization requirements:

Authorization requirements for this operation are:

- Object access permission to the logical partition's parent CPC object.
- Object access permission to the Logical Partition object designated by \$lparid
- Action/task permission for the **Activate** task.

22.33 HMC DR Stop RMF

Description

Script will stop RMF on the production system via HMC.

Inputs	API	Output
HMC_IP, HMC_API_PORT, HMCCREDS, HMC_SESSION_ID, LPAR_NAME, CPC_NAME, CPC_ID, LPAR_ID OS_COMM, AND_IS_PRIORITY=false	P RMF	On Success – RMF Stopped successfully On Failure – Check the message ID or RMF is not running

Authorization requirements:



Authorization requirements for this operation are:

- Object access permission to the logical partition's parent CPC object.
- Object access permission to the Logical Partition object designated by \$lparid
- Action/task permission for the **Activate** task.

22.34 HMCDRStopTCPIP

Description

Script will stop TCPIP on the DR system via HMC.

Inputs	API	Output
HMC_IP, HMC_API_PORT, HMCCREDS, HMC_SESSION_ID, LPAR_NAME, CPC_NAME, CPC_ID, LPAR_ID OS_COMM, AND_IS_PRIORITY=false	P TCPIP	On Success – TCPIP Stopped successfully On Failure – Check the message ID or TCPIP is not running

Authorization requirements:

Authorization requirements for this operation are:

- Object access permission to the logical partition's parent CPC object.
- Object access permission to the Logical Partition object designated by \$lparid
- Action/task permission for the **Activate** task.

22.35 HMCDRStopVTAM

Description

Script will stop VTAM on the DR system via HMC.

Inputs	API	Output
HMC_IP, HMC_API_PORT, HMCCREDS, HMC_SESSION_ID,	ZNET,QUICK	On Success – VTAM Stopped successfully



LPAR_NAME, CPC_NAME, CPC_ID, LPAR_ID OS_COMM, AND_IS_PRIORITY=false	On Failure – Check the message ID or VTAM is not running
---	--

Authorization requirements:

Authorization requirements for this operation are:

- Object access permission to the logical partition's parent CPC object.
- Object access permission to the Logical Partition object designated by \$lparid
- Action/task permission for the **Activate** task.

22.36 HMCDRVaryConsoleinDebugmode

Description

Script vary console in debug mode to issue any comm, and on DR system.

Inputs	API	Output
HMC_IP, HMC_API_PORT, HMCCREDS, HMC_SESSION_ID, LPAR_NAME, CPC_NAME, CPC_ID, LPAR_ID OS_COMM, AND_IS_PRIORITY=false	VARY CN(*),ACTIVATE	On Success – Vary comm, and issued successfully On Failure – Vary comm, and failed to execute

Authorization requirements:

Authorization requirements for this operation are:

- Object access permission to the logical partition's parent CPC object.
- Object access permission to the Logical Partition object designated by \$lparid
- Action/task permission for the **Activate** task.

22.37 HMCDRVaryConsoleinDebugmodeafterInit

Description

Script will vary console in debug mode to Issue any comm, and after IPLing (system initialization) on DR system.



Inputs	API	Output
HMC_IP, HMC_API_PORT, HMCCREDS, HMC_SESSION_ID, LPAR_NAME, CPC_NAME, CPC_ID, LPAR_ID OS_COMM, AND_IS_PRIORITY=false	VARY CN(*),ACTIVATE	On Success – Vary comm, and issued successfully On Failure – Vary comm, and failed to execute

Authorization requirements:

Authorization requirements for this operation are:

- Object access permission to the logical partition's parent CPC object.
- Object access permission to the Logical Partition object designated by \$lparid
- Action/task permission for the **Activate** task.

22.38 HMCPREOD

Description

Issue the HALT EOD comm, and to ensure that important job , and system statistics , and data records in storage are recorded on Production system.

Inputs	API	Output
HMC_IP, HMC_API_PORT, HMCCREDS, HMC_SESSION_ID, LPAR_NAME, CPC_NAME, CPC_ID, LPAR_ID OS_COMM, AND_IS_PRIORITY=false	Z EOD	On Success – EOD Completed successfully On Failure – Exception - Check the message ID

Authorization requirements:

Authorization requirements for this operation are:

- Object access permission to the logical partition's parent CPC object.
- Object access permission to the Logical Partition object designated by \$lparid
- Action/task permission for the **Activate** task.

22.39 HMCPRMessageAllServicesCompleted

Description



Check the message "ALL AVAILABLE FUNCTIONS COMPLETE" before stopping JES2 on production system.

Inputs	API	Output
HMC_IP, HMC_API_PORT, HMCCREDS, HMC_SESSION_ID, LPAR_NAME, CPC_NAME, CPC_ID, LPAR_ID OS_COMM, AND_IS_PRIORITY=false	N/A	On Success – All Available functions complete On Failure – All functions are not down

Authorization requirements:

Authorization requirements for this operation are:

- Object access permission to the logical partition's parent CPC object.
- Object access permission to the Logical Partition object designated by \$lparid
- Action/task permission for the **Activate** task.

22.40 HMCPRStopCSF

Description

Script will stop CSF (crypto services) on the production via HMC.

Inputs	API	Output
HMC_IP, HMC_API_PORT, HMCCREDS, HMC_SESSION_ID, LPAR_NAME, CPC_NAME, CPC_ID, LPAR_ID OS_COMM, AND_IS_PRIORITY=false	C CSF	On Success – CSF Stopped successfully On Failure – Check the message ID or CSF is not running

Authorization requirements:

Authorization requirements for this operation are:



- Object access permission to the logical partition's parent CPC object.
- Object access permission to the Logical Partition object designated by \$lparid
- Action/task permission for the **Activate** task.

22.41 HMCPRStopFFST

Description

Script will stop FFST on the PR system via HMC.

Inputs	API	Output
HMC_IP, HMC_API_PORT, HMCCREDS, HMC_SESSION_ID, LPAR_NAME, CPC_NAME, CPC_ID, LPAR_ID OS_COMM, AND_IS_PRIORITY=false	p FFST	On Success – FFST Stopped successfully On Failure – Check the message ID or FFST is not running

Authorization requirements:

Authorization requirements for this operation are:

- Object access permission to the logical partition's parent CPC object.
- Object access permission to the Logical Partition object designated by \$lparid
- Action/task permission for the **Activate** task.

22.42 HMCPRStopHZSPROC

Description

Script will stop HZSPROC on the PR system via HMC.

Inputs	API	Output
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HMC_IP, HMC_API_PORT, HMCCREDS, HMC_SESSION_ID, LPAR_NAME, CPC_NAME, CPC_ID, LPAR_ID OS_COMM, AND_IS_PRIORITY=false	P HZSPROC	On Success – HZSPROC Stopped successfully On Failure – Check the message ID or HZSPROC is not running
--	-----------	---

Authorization requirements:

Authorization requirements for this operation are:

- Object access permission to the logical partition's parent CPC object.
- Object access permission to the Logical Partition object designated by \$lparid
- Action/task permission for the **Activate** task.

22.43 HMCPRStopJES2

Description

Script will stop JES2 on the PR system via HMC.

Inputs	API	Output
HMC_IP, HMC_API_PORT, HMCCREDS, HMC_SESSION_ID, LPAR_NAME, CPC_NAME, CPC_ID, LPAR_ID OS_COMM, AND_IS_PRIORITY=false	\$PJES2	On Success – JES2 Stopped successfully On Failure – Check the message ID or JES2 is not running



Authorization requirements:

Authorization requirements for this operation are:

- Object access permission to the logical partition's parent CPC object.
- Object access permission to the Logical Partition object designated by \$lparid
- Action/task permission for the **Activate** task.

22.44 HMCPRStopOMVS

Description

This script will stop OMVS on PR system via HMC.

Inputs	API	Output
HMC_IP, HMC_API_PORT, HMCCREDS, HMC_SESSION_ID, LPAR_NAME, CPC_NAME, CPC_ID, LPAR_ID OS_COMM, AND_IS_PRIORITY=false	FOMVS,SHUTDOWN	On Success – OMVS Stopped successfully On Failure – Check the message ID or OMVS is not running

Authorization requirements:

Authorization requirements for this operation are:

- Object access permission to the logical partition's parent CPC object.
- Object access permission to the Logical Partition object designated by \$lparid
- Action/task permission for the **Activate** task.

22.45 HMCPRStopOSASF

Description

Script will stop OSASF on the PR system via HMC.



Inputs	API	Output
HMC_IP, HMC_API_PORT, HMCCREDS, HMC_SESSION_ID, LPAR_NAME, CPC_NAME, CPC_ID, LPAR_ID OS_COMM, AND_IS_PRIORITY=false	P OSASF	On Success – OSASF Stopped successfully On Failure – Check the message ID or OSASF is not running

Authorization requirements:

Authorization requirements for this operation are:

- Object access permission to the logical partition's parent CPC object.
- Object access permission to the Logical Partition object designated by \$lparid
- Action/task permission for the **Activate** task.

22.46 HMCPRStopRMF

Description

Script will stop RMF on the production system via HMC.

Inputs	API	Output
HMC_IP, HMC_API_PORT, HMCCREDS, HMC_SESSION_ID, LPAR_NAME, CPC_NAME, CPC_ID, LPAR_ID OS_COMM, AND_IS_PRIORITY=false	P RMF	On Success – RMF Stopped successfully On Failure – Check the message ID or RMF is not running

Authorization requirements:

Authorization requirements for this operation are:

- Object access permission to the logical partition's parent CPC object.
- Object access permission to the Logical Partition object designated by \$lparid
- Action/task permission for the **Activate** task.



22.47 HMCPRStopTCPIP

Description

Script will stop TCPIP on the PR system via HMC.

Inputs	API	Output
HMC_IP, HMC_API_PORT, HMCCREDS, HMC_SESSION_ID, LPAR_NAME, CPC_NAME, CPC_ID, LPAR_ID OS_COMM, AND_IS_PRIORITY=false	P TCPIP	On Success – TCPIP Stopped successfully On Failure – Check the message ID or TCPIP is not running

Authorization requirements:

Authorization requirements for this operation are:

- Object access permission to the logical partition's parent CPC object.
- Object access permission to the Logical Partition object designated by \$lparid
- Action/task permission for the **Activate** task.

22.48 HMCPRStopVTAM

Description

Script will stop VTAM on the PR system via HMC.

Inputs	API	Output
HMC_IP, HMC_API_PORT, HMCCREDS, HMC_SESSION_ID, LPAR_NAME, CPC_NAME, CPC_ID, LPAR_ID OS_COMM, AND_IS_PRIORITY=false	ZNET,QUICK	On Success – VTAM Stopped successfully On Failure – Check the message ID or VTAM is not running



Authorization requirements:

Authorization requirements for this operation are:

- Object access permission to the logical partition's parent CPC object.
- Object access permission to the Logical Partition object designated by \$lparid
- Action/task permission for the **Activate** task.

22.49 HMCPRVaryConsoleinDebugmode

Description

Script vary console in debug mode to issue any comm, and on PR system.

Inputs	API	Output
HMC_IP, HMC_API_PORT, HMCCREDS, HMC_SESSION_ID, LPAR_NAME, CPC_NAME, CPC_ID, LPAR_ID OS_COMM, AND_IS_PRIORITY=false	VARY CN(*),ACTIVATE	On Success – Vary comm, and issued successfully On Failure – Vary comm, and failed to execute

Authorization requirements:

Authorization requirements for this operation are:

- Object access permission to the logical partition's parent CPC object.
- Object access permission to the Logical Partition object designated by \$lparid
- Action/task permission for the **Activate** task.

22.50 HMCPRVaryConsoleinDebugmodeafterInit

Description

Script will vary console in debug mode to Issue any comm, and after IPLing PR system.



Inputs	API	Output
HMC_IP, HMC_API_PORT, HMCCREDS, HMC_SESSION_ID, LPAR_NAME, CPC_NAME, CPC_ID, LPAR_ID OS_COMM, AND_IS_PRIORITY=false	VARY CN(*),ACTIVATE	On Success - Vary comm, and issued successfully On Failure - Vary comm, and failed to execute

Authorization requirements:

Authorization requirements for this operation are:

- Object access permission to the logical partition's parent CPC object.
- Object access permission to the Logical Partition object designated by \$lparid
- Action/task permission for the **Activate** task.

22.51 HMCCPClisting

Description : The RAL is used to list the processor information of the CPC.

Inputs	API	Output
HMC IP or Host ID, HMC port, HMC credentials, Session id, CPC Name, CPC ID, Record ID	https://HMC IP or HOST NAME :6794/api/cpcs/\$cpcid	On Success – Displays the processor information of the CPC On Failure – Displays the failure status code , and failure information.

Authorization requirements:

Authorization requirements for this operation are:



- Require access to CPC to list the object id.

Example Output:

Processors assigned to the CPC: 'AFPS03SE' are :
 GCP count is - 33
 AAP count is - 2
 ICF count is - 0
 SAP count is - Not set
 IIP count is - 2
 IFL count is - 0

22.52 HMCCPCrecord

Description : The RAL can be used to validate the record id , and processor information.

Inputs	API	Output
HMC IP or Host ID, HMC port, HMC credentials, Session id, CPC Name, CPC ID & Record ID	https://HMC IP or HOST NAME:6794/api/cpcs/\$cpcid/capacity-records/\$recordid	On Success – Displays the capacity id , and Processor information On Failure – Displays the failure status code , and failure information.

Authorization requirements:

Authorization requirements for this operation are:

- Require access to CPC to list the object id.

Example the input, and output



Manual entry Key-Value:

RECORD_ID = CBBMNJD3

Output:

Capacity record information is --

```
{ "capacity-record": [ { "element-uri": "/api/cpcs/23d74460-3bd6-378c-8fb5-659b3069058d/capacity-records/CBBMNJD3", "record-identifier": "CBBMNJD3" }, { "element-uri": "/api/cpcs/23d74460-3bd6-378c-8fb5-659b3069058d/capacity-records/CBBN9DL2", "record-identifier": "CBBN9DL2" } ] }
```

Processor information for record ID 'CBBMNJD3' is --

```
[ { "processor-step": 0, "max-number-processors": -1, "remaining-processor-days": -1, "type": "cp", "remaining-msu-days": -1, "speed-step": null }, { "processor-step": 0, "max-number-processors": 1, "remaining-processor-days": -1, "type": "iip", "remaining-msu-days": null, "speed-step": null } ]
```

Software-Model information is --

```
[ { "processor-step": 0, "software-model": "733", "billable-msu-delta": 0, "billable-msu-cost": 0, "speed-step": 0 }, { "processor-step": 1, "software-model": "734", "billable-msu-delta": 93, "billable-msu-cost": 93, "speed-step": 0 } ]
```

22.53 HMCCPCaddtemprecords

Description :

The RAL is used to add the temporary processors to the CPC.

Note - Support element should be logged off while performing this RAL.

Inputs	API	Output
--------	-----	--------



HMC IP or Host ID, HMC port, HMC credentials, Session id, CPC Name, CPC ID, Record ID, Software model, Processor information, Test validation, Force	https://HMC IP or HOST NAME:6794/api/cpcs/\$cpcid}/operations/add-temp-capacity	On Success – Displays the success return code of 204. On Failure – Displays the failure status code , and failure information.
--	--	---

Authorization requirements:

Authorization requirements for this operation are:

- Require access to CPC to list the object id.

Should have access to perform add temporary capacity to the CPC.

Example - Use the format below to add the processor information as key value. To add more processors continue adding as an array as show below.

Manual entry Key-Value:

```

CAPACITY_RECORD_ADD={ "record-id":"123CBBN9DL2", "software-model":"733",
"processor-info":[{"processor-type":"iip","num-processor-steps":1},{ "processor-
type":"ifl","num-processor-steps":1}], "force":false, "test":true }
    
```



22.54 HMCPCRemovetemprecords

Description :

The RAL is used to remove the added processor to the CPC.

Note - Support element should be logged off while performing this RAL

Inputs	API	Output
HMC IP or Host ID, HMC port, HMC credentials, Session id, CPC Name, CPC ID, Record ID, Software model, Processor information	https://HMC IP or HOST NAME:6794/api/cpcs/\$cpcid/operations/remove-temp-capacity	On Success – Displays the success return code of 204. On Failure – Displays the failure status code , and failure information.

Authorization requirements:

Authorization requirements for this operation are:

- Require access to CPC to list the object id.

Should have permissions to remove the processors to the CPC.

Example - Use the format below to add the processor information as key value. To add more processors continue adding as an array as show below.

Manual entry Key-Value:

```
CAPACITY_RECORD_REMOVE={ "record-id":"CBBN9DL2", "software-model":"733", "processor-info":[{"processor-type":"iip","num-processor-steps":1},{ "processor-type":"ifl","num-processor-steps":1}] }
```

22.55 HMCIssuezOSComm, and



Description: This RAL issues commands to the HMC Operating system console, these can be NIP comm, and or z/OS commands.

The input- OS_COMM, AND_IS_PRIORITY, OS_COMM, AND

Output - OS Comm, and Executed Successfully.

22.56 zOS custom RAL

Description

zOS Custom RAL under workflows is available to execute TSO, MVS, , and JES2 commands directly.

This RAL is being replaced with [executezOScomm, and](#) RAL.



22.57 zOSValidateSzCP

Description

This RAL confirms whether SzCP tools are installed in a proper location.

UI Input	M, andatory/ Optional	Description
ZComm, and Tool Path ZCMD_PATH	M, andatory	Specify the zComm, and processor path
Time Out (Sec)	M, andatory	Amount of time consumed to perform the action.
Kyndryl zSystem Servers	M, andatory	Server where the RAL has to execute.

Output
Displays the success message if the validation is successful. Otherwise it displays an error.

Authorization Requirements:

Authorization requirements for this operation are:

- The TSO ID should have OMVS access with UID(0).
 - ATTRIBUTES=SPECIAL OPERATIONS.

22.58 zOSStatusDB2

Description

This RAL confirms if DB2 is running/stopped.

UI Input	M, andatory/ Optional	Description
ZComm, and Tool Path ZCMD_PATH	M, andatory	Specify the zComm, and processor path
Time Out (Sec)	M, andatory	Amount of time consumed to perform the action.
Kyndryl zSystem Servers	M, andatory	Server where the RAL has to execute.



UI Input	M, andatory/Optional	Description
ZComm, and Tool Path ZCMD_PATH	M, andatory	Specify the zComm, and processor path
DB2 Database Name DB2_NAME	M, andatory	Enter the DB2 Name
Time Out (Sec)	M, andatory	Amount of time consumed to perform the action.

Output:
Displays the success message if it obtains the DB2 status successfully. Otherwise it displays an error.

Authorization Requirements:

Authorization requirements for this operation are:

- The TSO ID should have OMVS access with UID(0).
 - ATTRIBUTES=SPECIAL OPERATIONS.
- The TSO ID should have access to perform console operations.

22.59 zOSStartDB2

Description

This RAL starts a DB2 instance in zOS LPAR.

Output
Displays the success message if DB2 instance starts successfully. Otherwise it displays an error.

Authorization Requirements:

Authorization requirements for this operation are:

- The TSO ID should have OMVS access with UID(0).



- ATTRIBUTES=SPECIAL OPERATIONS.
- The TSO ID should have access to perform console operations.

22.60 zOSStopTSO

Description

This RAL stops a TSO instance in zOS LPAR.

UI Input	M, andatory/ Optional	Description
ZComm, and Tool Path ZCMD_PATH	M, andatory	Specify the zComm, and processor path
Time Out (Sec)	M, andatory	Amount of time consumed to perform the action.
Kyndryl zSystem Servers	M, andatory	Server where the RAL has to execute.

Output
Displays the success message if TSO stops , and not running. Otherwise it displays an error.

Authorization Requirements:

Authorization requirements for this operation are:

- The TSO ID should have OMVS access with UID(0).
 - ATTRIBUTES=SPECIAL OPERATIONS.
- The TSO ID should have access to perform console operations.

22.61 zOSStopSDSF

Description

This RAL stops SDSF services in zOS LPAR "Spool Display , and Search Facility" , and "SDSFAUX-Spool Display , and Search Facility Auxillary".

UI Input	M, andatory/ Optional	Description
ZComm, and Tool Path ZCMD_PATH	M, andatory	Specify the zComm, and processor path
Time Out (Sec)	M, andatory	Amount of time consumed to perform the action.
Kyndryl zSystem Servers	M, andatory	Server where the RAL has to execute.



Output
Displays the success message if SDSF stops successfully. Otherwise it displays an error.

Authorization Requirements:

Authorization requirements for this operation are:

- The TSO ID should have OMVS access with UID(0).
 - ATTRIBUTES=SPECIAL OPERATIONS.
- The TSO ID should have access to perform console operations.

22.62 zOSStopRRS

Description

This RAL stops RRS services in zOS LPAR "Resource A recovery Services".

UI Input	M, andatory/ Optional	Description
ZComm, and Tool Path ZCMD_PATH	M, andatory	Specify the zComm, and processor path
Time Out (Sec)	M, andatory	Amount of time consumed to perform the action.
Kyndryl zSystem Servers	M, andatory	Server where the RAL has to execute.

Output
Displays the success message if RRS stops successfully. Otherwise it displays an error.

Authorization Requirements:

Authorization requirements for this operation are:

- The TSO ID should have OMVS access with UID(0).
 - ATTRIBUTES=SPECIAL OPERATIONS.
- The TSO ID should have access to perform console operations.



22.63 zOSStopAPPC

Description

This RAL stops APPC services in zOS LPAR "Advanced Program to Program Communications".

UI Input	M, andatory/ Optional	Description
ZComm, and Tool Path ZCMD_PATH	M, andatory	Specify the zComm, and processor path
Time Out (Sec)	M, andatory	Amount of time consumed to perform the action.
Kyndryl zSystem Servers	M, andatory	Server where the RAL has to execute.

Output

Displays the success message if APPC stops successfully. Otherwise it displays an error.

Authorization Requirements:

Authorization requirements for this operation are:

- The TSO ID should have OMVS access with UID(0).
 - ATTRIBUTES=SPECIAL OPERATIONS.
- The TSO ID should have access to perform console operations.

22.64 zOSStopROAPPC

Description

This RAL will stop APPC services in zOS lpar "Advanced Program to Program Communications" .

UI Input	M, andatory/ Optional	Description
ZComm, and Tool Path ZCMD_PATH	M, andatory	Specify the zComm, and processor path
System Name	Optional	Will be sent as key value by previous RAL.



		zOSgetPrMasterActiveCompStatus/ zOSgetDrMasterActiveCompStatus
Time Out (sec)	M, andatory	Amount of time consumed to perform the action.
Kyndryl zSystem Servers	Optional	Will be sent as key value by previous RAL. zOSgetPrMasterActiveCompStatus/ zOSgetDrMasterActiveCompStatus

Output
Displays the success message if APPC stops successfully. Otherwise it displays an error.

Authorization Requirements:

Authorization requirements for this operation are:

- The TSO ID should have OMVS access with UID(0).
 - ATTRIBUTES=SPECIAL OPERATIONS.
- The TSO ID should have access to perform console operations.

22.65 zOSStopFFST

Description

This RAL stops FFST services in zOS LPAR "First Failure Support Technology".

UI Input	M, andatory/ Optional	Description
ZComm, and Tool Path ZCMD_PATH	M, andatory	Specify the zComm, and processor path
Time Out (Sec)	M, andatory	Amount of time consumed to perform the action.
Kyndryl zSystem Servers	M, andatory	Server where the RAL has to execute.

Output
Displays the success message if FFST stops successfully. Otherwise it displays an error.



Authorization Requirements:

Authorization requirements for this operation are:

- The TSO ID should have OMVS access with UID(0).
 - ATTRIBUTES=SPECIAL OPERATIONS.
- The TSO ID should have access to perform console operations.

22.66 zOSStopROHZSPROC

Description

This RAL stops HZSPROC services in zOS lpar.

UI Input	M, andatory/ Optional	Description
ZComm, and Tool Path ZCMD_PATH	M, andatory	Specify the zComm, and processor path
System Name	Optional	Will be sent as key value by previous RAL. zOSgetPrMasterActiveCompStatus/ zOSgetDrMasterActiveCompStatus
Time Out (sec)	M, andatory	Amount of time consumed to perform the action.
Kyndryl zSystem Servers	Optional	Will be sent as key value by previous RAL. zOSgetPrMasterActiveCompStatus/ zOSgetDrMasterActiveCompStatus

Output

Displays the success message if HZSPROC stops successfully. Otherwise it displays an error.

Authorization Requirements:

Authorization requirements for this operation are:

- The TSO ID should have OMVS access with UID(0).
 - ATTRIBUTES=SPECIAL OPERATIONS.

The TSO ID should have access to perform console operations

22.67 zOSStopROJES2



Description

This RAL stops JES2 services in zOS lpar.

UI Input	M, andatory/ Optional	Description
ZComm, and Tool Path ZCMD_PATH	M, andatory	Specify the zComm, and processor path
System Name	Optional	Will be sent as key value by previous RAL. zOSgetPrMasterActiveCompStatus/ zOSgetDrMasterActiveCompStatus
Time Out (sec)	M, andatory	Amount of time consumed to perform the action.
Kyndryl zSystem Servers	Optional	Will be sent as key value by previous RAL. zOSgetPrMasterActiveCompStatus/ zOSgetDrMasterActiveCompStatus

Output
Displays the success message if JES2 services stop successfully. Otherwise it displays an error.

Authorization Requirements:

Authorization requirements for this operation are:

- The TSO ID should have OMVS access with UID(0).
 - ATTRIBUTES=SPECIAL OPERATIONS.
- The TSO ID should have access to perform console operations.

22.68 zOSStopROOMVS

Description

This RAL stops OMVS services in zOS lpar.

UI Input	M, andatory/ Optional	Description
ZComm, and Tool Path ZCMD_PATH	M, andatory	Specify the zComm, and processor path
System Name	Optional	Will be sent as key value by previous RAL.



		zOSgetPrMasterActiveCompStatus/ zOSgetDrMasterActiveCompStatus
Time Out (sec)	M, andatory	Amount of time consumed to perform the action.
Kyndryl zSystem Servers	Optional	Will be sent as key value by previous RAL. zOSgetPrMasterActiveCompStatus/ zOSgetDrMasterActiveCompStatus

Output
Displays the success message if OMVS services stop successfully. Otherwise it displays an error.

Authorization Requirements:

Authorization requirements for this operation are:

- The TSO ID should have OMVS access with UID(0).
 - ATTRIBUTES=SPECIAL OPERATIONS.
- The TSO ID should have access to perform console operations.

22.69 zOSStopROFFST

Description

This RAL stops FFST services in zOS Ipar "First Failure Support Technology".

UI Input	M, andatory/ Optional	Description
ZComm, and Tool Path ZCMD_PATH	M, andatory	Specify the zComm, and processor path
System Name	Optional	Will be sent as key value by previous RAL. zOSgetPrMasterActiveCompStatus/ zOSgetDrMasterActiveCompStatus
Time Out (sec)	M, andatory	Amount of time consumed to perform the action.
Kyndryl zSystem Servers	Optional	Will be sent as key value by previous RAL. zOSgetPrMasterActiveCompStatus/ zOSgetDrMasterActiveCompStatus



Output
Displays the success message if FFST services stop successfully. Otherwise it displays an error.

Authorization Requirements:

Authorization requirements for this operation are:

- The TSO ID should have OMVS access with UID(0).
 - ATTRIBUTES=SPECIAL OPERATIONS.
- The TSO ID should have access to perform console operations.

22.70 zOSStopRMF

Description

This RAL stops RMF services in zOS LPAR "Resource Monitoring Facility".

UI Input	M, andatory/ Optional	Description
ZComm, and Tool Path ZCMD_PATH	M, andatory	Specify the zComm, and processor path
Time Out (Sec)	M, andatory	Amount of time consumed to perform the action.
Kyndryl zSystem Servers	M, andatory	Server where the RAL has to execute.

Output
Displays the success message if RMF stops successfully. Otherwise it displays an error.

Authorization Requirements:

Authorization requirements for this operation are:

- The TSO ID should have OMVS access with UID(0).
 - ATTRIBUTES=SPECIAL OPERATIONS.
- The TSO ID should have access to perform console operations.



22.71 zOSStopRORMF

Description

This RAL stops RMF services in zOS lpar "Resource Monitoring Facility".

UI Input	M, andatory/ Optional	Description
ZComm, and Tool Path ZCMD_PATH	M, andatory	Specify the zComm, and processor path
System Name	Optional	Will be sent as key value by previous RAL. zOSgetPrMasterActiveCompStatus/ zOSgetDrMasterActiveCompStatus
Time Out (sec)	M, andatory	Amount of time consumed to perform the action.
Kyndryl zSystem Servers	Optional	Will be sent as key value by previous RAL. zOSgetPrMasterActiveCompStatus/ zOSgetDrMasterActiveCompStatus

Output
Displays the success message if RMF services stop successfully. Otherwise it displays an error.

Authorization Requirements:

Authorization requirements for this operation are:

- The TSO ID should have OMVS access with UID(0).
 - ATTRIBUTES=SPECIAL OPERATIONS.
- The TSO ID should have access to perform console operations.

22.72 zOSStopROTCPIP

Description

This RAL stops TCP/IP services in zOS lpar.

UI Input	M, andatory/ Optional	Description
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Output
Displays the success message if TCP/IP services stop successfully. Otherwise it displays an error.

ZComm, and Tool Path ZCMD_PATH	M, andatory	Specify the zComm, and processor path
System Name	Optional	Will be sent as key value by previous RAL. zOSgetPrMasterActiveCompStatus/ zOSgetDrMasterActiveCompStatus
Time Out (sec)	M, andatory	Amount of time consumed to perform the action.
Kyndryl zSystem Servers	Optonal	Will be sent as key value by previous RAL. zOSgetPrMasterActiveCompStatus/ zOSgetDrMasterActiveCompStatus

Authorization Requirements:

Authorization requirements for this operation are:

- The TSO ID should have OMVS access with UID(0).
 - ATTRIBUTES=SPECIAL OPERATIONS.
- The TSO ID should have access to perform console operations.

22.73 zOSStopROVTAM

Description

This RAL stops the VTAM sub system installed.

UI Input	M, andatory/ Optional	Description
ZComm, and Tool Path ZCMD_PATH	M, andatory	Specify the zComm, and processor path
System Name	Optional	Will be sent as key value by previous RAL.



		zOSgetPrMasterActiveCompStatus/ zOSgetDrMasterActiveCompStatus
Time Out (sec)	M, andatory	Amount of time consumed to perform the action.
Kyndryl zSystem Servers	Optional	Will be sent as key value by previous RAL. zOSgetPrMasterActiveCompStatus/ zOSgetDrMasterActiveCompStatus

Output
Displays the success message if VTAM services stop successfully. Otherwise it displays an error.

Authorization Requirements:

Authorization requirements for this operation are:

- The TSO ID should have OMVS access with UID(0).
 - ATTRIBUTES=SPECIAL OPERATIONS.
- The TSO ID should have access to perform console operations.

22.74 zOSStopDB2

Description

This RAL stops the installed DB2 subsystem.

UI Input	M, andatory/ Optional	Description
ZComm, and Tool Path ZCMD_PATH	M, andatory	Specify the zComm, and processor path
Time Out (Sec)	M, andatory	Amount of time consumed to perform the action.
Kyndryl zSystem Servers	M, andatory	Server where the RAL has to execute.



Output
Displays the success message if DB2 stops successfully. Otherwise it displays an error.

Authorization Requirements:

Authorization requirements for this operation are:

- The TSO ID should have OMVS access with UID(0).
 - ATTRIBUTES=SPECIAL OPERATIONS.
- The TSO ID should have access to perform console operations.

22.75 zOSVersionCheck

Description

This RAL confirms the zOS version.

UI Input	M, andatory/ Optional	Description
ZComm, and Tool Path ZCMD_PATH	M, andatory	Specify the zComm, and processor path
Time Out (Sec)	M, andatory	Amount of time consumed to perform the action.
Kyndryl zSystem Servers	M, andatory	Server where the RAL has to execute.

Output
Displays the success message if the current zOS version is supported. Otherwise it displays an error.



Authorization Requirements:

Authorization requirements for this operation are:

- The TSO ID should have OMVS access with UID(0).
 - ATTRIBUTES=SPECIAL OPERATIONS.
- The TSO ID should have access to perform console operations.

22.76 zOSActivatePolicy

Description

This RAL activates the DR policy.

UI Input	M, andatory/ Optional	Description
ZComm, and Tool Path ZCMD_PATH	M, andatory	Specify the zComm, and processor path
Time Out (Sec)	M, andatory	Amount of time consumed to perform the action.
Kyndryl zSystem Servers	M, andatory	Server where the RAL has to execute.

Output
Displays the policy status. Otherwise it displays policy failed.

Authorization Requirements:

Authorization requirements for this operation are:

- The TSO ID should have OMVS access with UID(0).
 - ATTRIBUTES=SPECIAL OPERATIONS.
- The TSO ID should have access to perform console operations , and issue SET commands

22.77 zOSFOSetMasterLpar

Description

This RAL sets one LPAR as active.

UI Input	M, andatory/ Optional	Description
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ZComm, and Tool Path ZCMD_PATH	M, andatory	Specify the zComm, and processor path
Master Component Name	M, andatory	Specify the primary LPAR name
Time Out (sec)	M, andatory	Amount of time consumed to perform the action.
Kyndryl zSystem Servers	Optional	Will be sent as key value by previous RAL.

Output
Displays the identified active LPAR details.

Authorization Requirements:

Authorization requirements for this operation are:

- The TSO ID should have OMVS access with UID(0).
 - ATTRIBUTES=SPECIAL OPERATIONS.
- The TSO ID should have access to perform console operations.

22.78 zOSSetMasterLpar

Description

This RAL sets one LPAR as active.

UI Input	M, andatory/ Optional	Description
ZComm, and Tool Path ZCMD_PATH	M, andatory	Specify the zComm, and processor path
Time Out (Sec)	M, andatory	Amount of time consumed to perform the action.
Kyndryl zSystem Servers	M, andatory	Server where the RAL has to execute.



Output
Displays the identified active LPAR details.

Authorization Requirements:

Authorization requirements for this operation are:

- The TSO ID should have OMVS access with UID(0).
 - ATTRIBUTES=SPECIAL OPERATIONS.
- The TSO ID should have access to perform console operations.

22.79 zOSgetDrMasterActiveCompStatus

Description

This RAL checks if the status of DR LPAR gets active comp .

UI Input	M, andatory/ Optional	Description
Time Out (Sec)	M, andatory	Amount of time consumed to perform the action.
Kyndryl zSystem Servers	M, andatory	Server where the RAL has to execute.

Output
Displays the active or Inactive status of DR LPAR.

Authorization Requirements:

Authorization requirements for this operation are:

- The action is performed on DRM Server

22.80 zOSgetDrMasterInactiveCompStatus

Description

This RAL checks if the status of DR LPAR gets inactive comp.



UI Input	M, andatory/ Optional	Description
Time Out (Sec)	M, andatory	Amount of time consumed to perform the action.
Kyndryl zSystem Servers	M, andatory	Server where the RAL has to execute.

Output
Displays the active or Inactive status of DR LPAR.

Authorization Requirements:

Authorization requirements for this operation are:

- The action is performed on DRM Server

22.81 zOSgetPrMasterActiveCompStatus

Description

This RAL checks if the status of PR LPAR gets the active component.

UI Input	M, andatory/ Optional	Description
Time Out (Sec)	M, andatory	Amount of time consumed to perform the action.
Kyndryl zSystem Servers	M, andatory	Server where the RAL has to execute.

Output
Displays the active or Inactive status of PR LPAR.

Authorization Requirements:

Authorization requirements for this operation are:

- The action is performed on DRM Server



22.82 zOSgetPrMasterInactiveCompStatus

Description

This RAL checks if the status of PR LPAR gets inactive comp.

UI Input	M, andatory/ Optional	Description
Time Out (Sec)	M, andatory	Amount of time consumed to perform the action.
Kyndryl zSystem Servers	M, andatory	Server where the RAL has to execute.

Output
Displays the active or Inactive status of PR LPAR.

Authorization Requirements:

Authorization requirements for this operation are:
The action is performed on DRM Server

22.83 zOSList

Description

This RAL lists the active started tasks.

UI Input	M, andatory/ Optional	Description
ZComm, and Tool Path ZCMD_PATH	M, andatory	Specify the zComm, and processor path
Time Out (Sec)	M, andatory	Amount of time consumed to perform the action.
Kyndryl zSystem Servers	M, andatory	Server where the RAL has to execute.

Output



Displays the active started tasks.

Authorization Requirements:

Authorization requirements for this operation are:

- The TSO ID should have OMVS access with UID(0).
 - ATTRIBUTES=SPECIAL OPERATIONS.
- The TSO ID should have access to perform console operations , and issue SET commands

22.84 zOSROEOD

Description

This RAL ensures that important job, system statistics, , and data records in storage are recorded.

UI Input	M, andatory/ Optional	Description
ZComm, and Tool Path ZCMD_PATH	M, andatory	Specify the zComm, and processor path
System Name	Optional	Will be sent as key value by previous RAL. zOSgetPrMasterActiveCompStatus/ zOSgetDrMasterActiveCompStatus
Time Out (sec)	M, andatory	Amount of time consumed to perform the action.
Kyndryl zSystem Servers	Optional	Will be sent as key value by previous RAL. zOSgetPrMasterActiveCompStatus/ zOSgetDrMasterActiveCompStatus

Output

Displays EOD is successful or unsuccessful.

Authorization Requirements:

Authorization requirements for this operation are:

- The TSO ID should have OMVS access with UID(0).
 - ATTRIBUTES=SPECIAL OPERATIONS.



- The TSO ID should have access to perform console operations , and issue SET commands

22.85 zOSStopOSASF

Description

This RAL stops OSASF (Open Systems Adapter/Support Facility).

UI Input	M, andatory/ Optional	Description
ZComm, and Tool Path ZCMD_PATH	M, andatory	Specify the zComm, and processor path
Time Out (Sec)	M, andatory	Amount of time consumed to perform the action.
Kyndryl zSystem Servers	M, andatory	Server where the RAL has to execute.

Output
Displays if OSASF has been stopped successfully.

Authorization Requirements:

Authorization requirements for this operation are:

- The TSO ID should have OMVS access with UID(0).
 - ATTRIBUTES=SPECIAL OPERATIONS.
- The TSO ID should have access to perform console operations , and issue SET commands

22.86 zOSROVeryOffline

Description

This RAL very offline LPAR from sysplex.

UI Input	M, andatory/ Optional	Description
ZComm, and Tool Path ZCMD_PATH	M, andatory	Specify the zComm, and processor path



System Name	Optional	Will be sent as key value by previous RAL. zOSgetPrMasterActiveCompStatus/ zOSgetDrMasterActiveCompStatus
Time Out (sec)	M, andatory	Amount of time consumed to perform the action.
Kyndryl zSystem Servers	Optional	Will be sent as key value by previous RAL. zOSgetPrMasterActiveCompStatus/ zOSgetDrMasterActiveCompStatus

Output
Displays very is successful or unsuccessful.

Authorization Requirements:

Authorization requirements for this operation are:

- The TSO ID should have OMVS access with UID(0).
 - ATTRIBUTES=SPECIAL OPERATIONS.
- The TSO ID should have access to perform console operations , and issue SET commands

22.87 zOSMountFS

Description

This RAL will mount the file.

UI Input	M, andatory/ Optional	Description
TComm, and Tool Path TCMD_PATH	M, andatory	Specify the TComm, and processor path
File System Type FS_TYPE	M, andatory	Type of the File (HFS / ZFS)
File System FILE_SYSTEM	M, andatory	File name
Mount Point MOUNT_POINT	M, andatort	Specify the mount path
Time Out (sec)	M, andatory	Amount of time consumed to perform the action.



Kyndryl zSystem Servers	Optional	Will be sent as key value by previous RAL.
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Output
On Success – Successfully mounted <File Name>
On Failure – Failed to mount <File Name> <Error message>

22.88 zOSUnMountFS

Description

This RAL will unmount the file.

UI Input	M, andatory/ Optional	Description
TComm, and Tool Path TCMD_PATH	M, andatory	Specify the TComm, and processor path
File System FILE_SYSTEM	M, andatory	File name
Time Out (sec)	M, andatory	Amount of time consumed to perform the action.
Kyndryl zSystem Servers	Optonal	Will be sent as key value by previous RAL.

Output
On Success – Successfully unmounted <File Name>
On Failure – Failed to unmount <File Name> <Error message>

22.89 zOSJobStatus

Description

This RAL submits the JCL , and validates for success , and failure of the steps.



Note - The RAL can capture basic return codes like JCL errors, 806, 4, 8, 12, SOC.

UI Input	M, andatory/ Optional	Description	Key Value
zComm, and Tool Path	M, andatory	Specify the zComm, and processor path	ZCMD_PATH
Data Set Name	M, andatory	Name of the dataset	DATASET_NAME
Member Name	M, andatory	Member name in the dataset	MEMBER_NAME
Time Out (sec)	M, andatory	Amount of time consumed to perform the action.	
Kyndryl zSystem Servers	M, andatory	Server name where the RAL has to execute	

Authorization Requirements:

Authorization requirements for this operation are:

- The TSO ID should have OMVS access with UID(0).
 - ATTRIBUTES=SPECIAL OPERATIONS.
- The TSO ID should have access to TSO subsystem to perform JCL submissions, capture output, create/delete dataset, create/delete file under USS.

22.90 zOSVaryDevices

Description

This RAL varies multiple devices online or offline , and verify its status.

UI Input	M, andatory/ Optional	Description	Key Value
zComm, and Tool Path	M, andatory	Specify the zComm, and processor path	ZCMD_PATH
Vary Comm, and	M, andatory	Vary comm, and (Online or Offline)	VARY_CMD
Time Out (sec)	M, andatory	Amount of time consumed to perform the action.	



Kyndryl zSystem Servers	M, mandatory	Server name where the RAL has to execute	
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Authorization Requirements:

Authorization requirements for this operation are:

- The TSO ID should have OMVS access with UID(0).
 - ATTRIBUTES=SPECIAL OPERATIONS.
- The TSO ID should have access to perform console operations.

22.91 HMCCheckDRLparStatus

Description

This RAL will get the DR LPAR status.

Inputs	API	Output
HMC_IP, HMC_API_PORT, LPAR_NAME & CPC_NAME	api/logical-partitions/\$lparid	On Success: Displays LPAR status. On Failure: Error is displayed.

Authorization requirements:

This operation has the following authorization requirements

- Object access permission to the Logical Partition object designated by \$lparid.
- Object access permission to the logical partition's parent CPC object.

22.92 HMCDeactivateLPAR

Description

This RAL deactivates LPAR.



Inputs	API	Output
HMC_IP, HMC_API_PORT, LPAR_NAME , and CPC_NAME	api/virtual- servers/\$virtualServerID/operations/deactivate	Displays success message if LPAR is deactivated. Otherwise, it displays an error.

Authorization requirements:

Authorization requirements for this operation are:

- Object access permission to the Logical Partition object designated by \$lparid
- Action/task permission for the Deactivate task.
- Object access permission to the logical partition's parent CPC object.

22.93 HMC Stop Lpar Clear

Description

This RAL will stop the PR Lpar.

Inputs	API	Output
HMC_IP, HMC_API_PORT, LPAR_NAME, CPC_NAME & PROFILE_NAME	/api/logical- partitions/\$lparid/operations/stop	Displays the lpar name , and status else displayed error codes.

Authorization requirements

Authorization requirements for this operation are:



- Object-access permission to the Logical Partition object designated by \$lparid
- Action/task permission for the Stop task.
- Object-access permission to the logical partition's parent CPC object.

22.94 zOS Stop RO CSF

Description

This RAL will stop CSF services in zOS lpar.

Inputs	Output
ZCMD_PATH	Displays the success message if CSF stops successfully. Otherwise it displays an error.

Authorization Requirements:

Authorization requirements for this operation are:

- The TSO ID should have OMVS access with UID(0).
- ATTRIBUTES=SPECIAL OPERATIONS.
- The TSO ID should have access to perform console operations.

22.95 zOSWTORResponse

Description

The RAL is used to respond to WTOR messages after the TCP/IP is up , and running.

UI Input	M, andatory/ Optional	Description	Key Value
zComm, and Tool Path	M, andatory	Specify the zComm, and processor path	ZCMD_PATH
Message ID	M, andatory	ID of the message to respond	MESSAGE_ID
Message Response	M, andatory	Response to the Message ID	MESSAGE_RESPO NSE



Time Out (sec)	M, mandatory	Amount of time consumed to perform the action.	
Kyndryl zSystem Servers	M, mandatory	Server name where the RAL has to execute	

Authorization Requirements:

Authorization requirements for this operation are:

- The TSO ID should have OMVS access with UID(0).
 - ATTRIBUTES=SPECIAL OPERATIONS.



23 SQL

23.1 MSSQL Primary Stop DB

Description: This RAL stops the database on the primary server.

Inputs	Outputs	Description
ServerIP	The database will be in the offline status.	The server IP is obtained from the primary component.
ServerName, database name, database userId, database password	The database will be in the offline status.	The required details are obtained from the primary dataset.

23.2 MSSQL Primary Start DB

Description: This RAL starts the database on the primary server.

Inputs	Outputs	Description
ServerIP	The database will be in the online status.	The server IP is obtained from the primary component.
ServerName, database name, database userId, database password	The database will be in the online status.	The required details are obtained from the primary dataset.

23.3 MSSQL DR Stop DB

Description: This RAL stops the database on DR.



Inputs	Outputs	Description
ServerIP	The database will be in the offline status.	The server IP is obtained from the remote component.
ServerName, database name, database userId, database password	The database will be in the offline status.	The required details are obtained from the remote dataset.

23.4 MSSQL DR Start DB

Description: This RAL starts the database on DR.

Inputs	Outputs	Description
ServerIP	The database will be in the online status.	The server IP is obtained from the remote component.
ServerName, database name, database userId, database password	The database will be in the online status.	The required details are obtained from the remote dataset.



24 MSSQL Mirroring

24.1 Failover

Description

This action performs failover on DR.

Inputs

The inputName	The inputType	The inputKey Name	Optional/M, andatory	Description
Dataset Name	String	PANMSSQL_DATASET_NAME	M, andatory	Select the dataset name from the drop-down list.

Outputs

Action fails, if the agent is unable to connect or execution of the failover query on the DR database fails.

Action fails, if RAL is executed on Production Dataset.

Success Output: *FAILOVER COMPLETED for database_name*

24.1.1 Prechecks

- Dataset – Configured with the input of Key Values or Advance Properties.
- Authentication for the database.
- Selected dataset is active.
- Reduced Privileges (sysadmin on DR). Reduced privileges are the minimum privileges required to execute the action.
- Configured dataset is the current DR dataset.

24.2 Get Database Mode

Description

This action gets the database mode.

Inputs



The inputName	The inputType	The inputKey Name	Optional/M,andatory	Description
Dataset Name	String	PANMSSQL_DATASET_NAME	M,andatory	Select the dataset name from the drop-down list.

Outputs

Action fails if the agent is unable to connect , and execute the query on the database.

Output Name	Output Key Name	Description
RAL Execution Result	PANMSSQL_GET_DBMODE	RAL Execution Result

Success Output: *The Database is ONLINE*

24.2.1 Prechecks

- Dataset – Configured with the input of Key Values or Advance Properties.
- Authentication for the database.
- Selected dataset is active.
- Reduced Privileges (PUBLIC role The user on PR; sysadmin on DR).
Reduced privileges are the minimum privileges required to execute the action.
- Dry Run comm, and:


```
sql comm, and for precheck: :select state_desc from sys.databases where name = 'database_name';
```

24.3 Get Mirror Safety Level

Description

This RAL action gets the current mirror safety level.

Inputs



The inputName	The inputType	The inputKey Name	Optional/M, andatory	Description
Dataset Name	String	PANMSSQL_DATASET_NAME	M, andatory	Select the dataset name from the drop-down list.

Outputs

Output Name	Output Key Name	Description
RAL Execution Result	PANMSSQL_GET_MIRROR_SAFETY_LEVEL	RAL Execution Result

Action fails, if the agent is unable to connect or execute a query on the database.

Success Output: Mirroring Safety Level: FULL for database: <database_name> on component <component_name> (IP_Address)

24.3.1 Prechecks

- Dataset – Configured with the input of Key Values or Advance Properties.
- Authentication for the database.
- Selected dataset is active.
- Reduced Privileges (PUBLIC role The user on PR; sysadmin on DR).
Reduced privileges are the minimum privileges required to execute the action.
- Dry Run comm, and:

```
sql comm, and for precheck: :select top 1
mirroring_role_desc,mirroring_state_desc,mirroring_safety_level_desc from
sys.database_mirroring,sys.databases where
sys.databases.database_id=sys.database_mirroring.database_id , and name =
'database_name';
```

24.4 Get Mirroring Status

Description

This RAL action provides the current mirroring status.

Inputs



The inputName	The inputType	The inputKey Name	Optional/M, andatory	Description
Dataset Name	String	PANMSSQL_DATASET_NAME	M, andatory	Select the dataset name from the drop-down list.

Outputs

Output Name	Output Key Name	Description
RAL Execution Result	PANMSSQL_GET_MIRRORSTATUS	RAL Execution Result

Action fails, if the agent is unable to connect or execute a query on the database.

Success Output: *Mirroring Status for database <database_name> is SYNCHRONIZED on component <component_name> (IP_Address)*

24.4.1 Prechecks

- Dataset – Configured with the input of Key Values or Advance Properties.
- Authentication for the database.
- Selected dataset is active.
- Reduced Privileges (PUBLIC role The user on PR; sysadmin on DR).
Reduced privileges are the minimum privileges required to execute the action.
- Dry Run comm, and:

```
sql comm, and for precheck: :select top 1
mirroring_role_desc,mirroring_state_desc,mirroring_safety_level_desc from
sys.database_mirroring,sys.databases where
sys.databases.database_id=sys.database_mirroring.database_id , and name =
'database_name';
```

24.5 Role Switch

Description

This action switches the roles.



Inputs

The inputName	The inputType	The inputKey Name	Optional/M, andatory	Description
Dataset Name	String	PANMSSQL_DATASET_NAME	M, andatory	Select the dataset name from the drop-down list.

Outputs

Action fails if the agent is unable to connect , and execute the query on the database.

Success Output: The roles are changed for database <database_name> on component <component_name> (IP_Address).

24.5.1 Prechecks

- Dataset – Configured with the input of Key Values or Advance Properties.
- Authentication for the database.
- Selected dataset is active.
- Reduced Privileges (sysadmin/dbcreator or db_owner fixed role The user on PR). Reduced privileges are the minimum privileges required to execute the action.
- Configured dataset is current production dataset.
- Mirroring is setup correctly.
- Replication (mirroring of data) is working.
- Dry Run comm, and:

```
sql comm, and for precheck: : select top 1
mirroring_role_desc,mirroring_state_desc,mirroring_safety_level_desc from
sys.database_mirroring,sys.databases where
sys.databases.database_id=sys.database_mirroring.database_id , and name =
'database_name';
```

24.6 Start Mirroring

Description

This action Starts Mirroring on both PR , and DR. If RAL execution is successful, then Mirror state is changed from SUSPENDED to SYNCHRONIZED.



Inputs

The inputName	The inputType	The inputKey Name	Optional/M, andatory	Description
Dataset Name	String	PANMSSQL_DATASET_NAME	M, andatory	Select the dataset name from the drop-down list.

Outputs

Action fails, if the agent is unable to start mirroring.

Success Output: Successfully Resumed Mirroring for database <database_name> on component <component_name> (IP_Address)

24.6.1 Prechecks

- Dataset – Configured with the input of Key Values or Advance Properties.
- Authentication for the database.
- Selected dataset is active.
- Reduced Privileges (sysadmin/dbcreator or db_owner fixed role The user on PR; sysadmin on DR). Reduced privileges are the minimum privileges required to execute the action.
- Mirroring is setup correctly.
- Replication (mirroring of data) is working.
- Dry Run comm, and:

```
sql comm, and for precheck: :select top 1
mirroring_role_desc,mirroring_state_desc,mirroring_safety_level_desc from
sys.database_mirroring,sys.databases where
sys.databases.database_id=sys.database_mirroring.database_id , and name =
'database_name';
```

24.7 Stop Mirroring

Description

This action Stops Mirroring on both PR , and DR. If RAL execution is successful, then PR/DR Mirror state is changed from SYNCHRONIZED to SUSPENDED.



Inputs

The inputName	The inputType	The inputKey Name	Optional/M, andatory	Description
Dataset Name	String	PANMSSQL_DATASET_NAME	M, andatory	Select the dataset name from the drop-down list.

Outputs

Action fails, if the agent is unable to connect or stop the mirroring.

Success Output, Suspended Mirroring for database <database_name> on component <component_name> (IP_Address)

24.7.1 Prechecks

- Dataset – Configured with the input of Key Values or Advance Properties.
- Authentication for the database.
- Selected dataset is active.
- Reduced Privileges (sysadmin/dbcreator or db_owner fixed role The user on PR; sysadmin on DR). Reduced privileges are the minimum privileges required to execute the action.
- Mirroring is setup correctly.
- Replication (mirroring of data) is working.
- Dry Run comm, and:

```
sql comm, and for precheck: : select top 1
mirroring_role_desc,mirroring_state_desc,mirroring_safety_level_desc from
sys.database_mirroring,sys.databases where
sys.databases.database_id=sys.database_mirroring.database_id , and name =
'database_name';
```

24.8 Verify Database Mode

Description

This action verifies whether the database is in the required mode or not.

Inputs

The inputName	The inputType	The inputKey Name	Optional/M, andatory	Description
---------------	---------------	-------------------	----------------------	-------------



Dataset Name	String	PANMSSQL_DATASET_NAME	M, mandatory	Select the dataset name from the drop-down list.
Dataset Mode	String	PANMSSQL_VERIFY_DB_MODE	M, mandatory	Select the option db mode from the drop-down list. Valid Keys - OFFLINE, ONLINE, SUSPEND, RECOVERING, A RECOVERY_PENDING, EMERGENCY, RESTORING

Outputs

Action fails, if the agent is unable to connect or execute a query on the database.

Action fails, if the database mode the input from drop down or KV does not match with the database mode of Production Dataset or DR Dataset.

Success Output: DB Mode Successfully Verified as ONLINE for database <database_name> on component <component_name> (IP_Address)

24.8.1 Prechecks

- Dataset – Configured with the input of Key Values or Advance Properties.
- Database Mode – Configured with the input of Key Values or Advance Properties.
- Authentication for the database.
- Selected dataset is active.
- Reduced Privileges (PUBLIC role The user on PR; sysadmin on DR).
Reduced privileges are the minimum privileges required to execute the action.
- Dry Run comm, and:

```
sql comm, and for precheck: :select state_desc from sys.databases where name = 'database_name';
```

24.9 Verify Mirror Safety Level

Description

This action verifies the Mirror Safety Level of the database. For this database is selected , and respective mirroring safety level is provided by the user.

Inputs



The inputName	The inputType	The inputKey Name	Optional/M, andatory	Description
Dataset Name	String	PANMSSQL_DATASET_NAME	M, andatory	Select the dataset name from the drop-down list.
Mirroring Status	String	PANMSSQL_VERIFY_MIRROR_SAFETY_LEVEL	M, andatory	Select the mirror status from the drop-down list. Valid Keys - FULL, OFF

Outputs

Action fails, if the agent is unable to connect or execute a query on the database.

Action fails, if the Mirror Safety Level the inputfrom drop down or KV does not match with the Mirror Safety Level of database.

Success Output: Mirror Safety Level Successfully Verified as FULL for database <database_name> on component <component_name> (IP_Address)

24.9.1 Prechecks

- Dataset – Configured with the inputof Key Values or Advance Properties.
- Authentication for the database.
- Mirror Safety Level – configured with the inputKey Values or Advance Properties.
- Selected dataset is active.
- Reduced Privileges (PUBLIC role The useron PR; sysadmin on DR).
Reduced privileges are the minimum privileges required to execute the action.
- Dry Run comm, and:

```
sql comm, and for precheck: :select top 1
mirroring_role_desc,mirroring_state_desc,mirroring_safety_level_desc from
sys.database_mirroring,sys.databases where
sys.databases.database_id=sys.database_mirroring.database_id , and name =
'database_name';
```

24.10 Set Mirror Safety Level



Description

This action Sets the Mirror Safety Level of the database.

Inputs

The inputName	The inputType	The inputKey Name	Optional/M,andatory	Description
Dataset Name	String	PANMSSQL_DATASET_NAME	M,andatory	Select the dataset name from the drop-down list.
Safety Level	String	PANMSSQL_SET_MIRROR_SAFETY_LEVEL	M,andatory	Select the safety level from the drop-down list. Valid Keys - FULL,OFF

Outputs

Action fails, if the agent is unable to connect or execute a query on the database.

Success Output: Safety Level Updated Successfully for database:<database_name> on component <component_name> (IP_Address)

24.10.1 Prechecks

- Dataset – Configured with the input of Key Values or Advance Properties.
- Authentication for the database.
- Selected dataset is active.
- Reduced Privileges (sysadmin/dbcreator or db_owner fixed role The user on PR). Reduced privileges are the minimum privileges required to execute the action.
- Configured dataset is the current Production dataset.
- MSSQL Enterprise Edition.
- This RAL Action can only be executed for SQL Server 2005 Enterprise Edition Service Pack 1 (SP1) , and later versions"

24.11 Verify Mirroring Status

Description



This action verifies whether the database is in the required status or not. For this database is selected, and respective mirroring state is provided by the user. The current mirroring status is matched with The user the input for verification.

Inputs

The inputName	The inputType	The inputKey Name	Optional/M, andatory	Description
Dataset Name	String	PANMSSQL_DATASET_NAME	M, andatory	Select the dataset name from the drop-down list.
Mirroring Status	String	PANMSSQL_VERIFY_MIRROR_STATUS	M, andatory	Select the mirror status from the drop-down list. Valid Keys - SYNCHRONIZED, SYNCHRONIZING, UNSYNCHRONIZED, SUSPENDED, DISCONNECTED, PENDING_FAILOVER

Outputs

Action fails, if the agent is unable to connect or execute a query on the database.

Action fails, if the Mirroring State the input from drop-down or KV does not match with the Mirror State of Production Dataset.

Success Output: Mirror State Successfully Verified as SYNCHRONIZED for database :<database_name> on component <component_name> (IP_Address).

24.11.1 Prechecks

- Dataset – Configured with the input of Key Values or Advance Properties.
- Mirror Status – Configured with the input of Key Values or Advance Properties.
- Authentication for the database.
- Selected dataset is active.
- Reduced Privileges (PUBLIC role The user on PR; sysadmin on DR).
Reduced privileges are the minimum privileges required to execute the action.
- Dry Run comm, and:



```
sql comm, and for precheck: :select top 1
mirroring_role_desc,mirroring_state_desc,mirroring_safety_level_desc from
sys.database_mirroring,sys.databases where
sys.databases.database_id=sys.database_mirroring.database_id , and name =
'database_name';
```

24.12 Verify Mirror Role

Description

This RAL action verifies the current mirroring role from PR to be PRINCIPAL.

Inputs

The inputName	The inputType	The inputKey Name	Optional/ M, andatory	Description
Dataset Name	String	PANMSSQL_DATASET_NAME	M, andatory	Select the dataset name from the drop-down list.
Mirror Role	String	PANMSSQL_VERIFY_MIRROR_ROLE	M, andatory	Select the mirror role from the drop-down list. Valid Keys - PRINCIPAL, MIRROR

Outputs

Action fails, if the agent is unable to connect or execute a query on the database.

Success Output: Mirror Role Successfully Verified as PRINCIPAL for database <database_name> on component <component_name> (IP_Address)

24.12.1 Prechecks

- Dataset – Configured with the inputof Key Values or Advance Properties.
- Mirror Role – Configured with the inputof Key Values or Advance Properties.
- Authentication for the database.
- Selected dataset is active.
- Reduced Privileges (PUBLIC role The useron PR; sysadmin on DR).
Reduced privileges are the minimum privileges required to execute the action.



- Dry Run comm, and:

```
sql comm, and for precheck: :select top 1
mirroring_role_desc,mirroring_state_desc,mirroring_safety_level_desc from
sys.database_mirroring,sys.databases where
sys.databases.database_id=sys.database_mirroring.database_id , and name =
'database_name';
```



25 MS Exchange

25.1 Verify Database State

Description

This action get the current Status of the database.

Inputs

The inputName	The inputType	The inputKey Name	Optional/M, andatory	Description
Dataset Name	String	NA	M, andatory	Select the dataset from the drop-down list.
Expected State	String	NA	M, andatory	Select the state from the drop-down list.

Outputs

Action fails if the agent is unable to connect , and execute the script.

25.2 Activate Database

Description

Mounts active copy of the database on host , and replicate to other instances of the database.

Inputs

The inputName	The inputType	The inputKey Name	Optional/M, andatory	Description
Dataset Name	String	NA	M, andatory	Select the dataset from the drop-down list.

Outputs

Action fails, if the agent is unable to connect to the server or in case of any script error.



25.3 Resume Database Copy

Description

Resumes the Database replication.

Inputs

The inputName	The inputType	The inputKey Name	Optional/M, andatory	Description
Dataset Name	String	NA	M, andatory	Select the dataset from the drop-down list.

Outputs

Action fails, if the agent is unable to start the server.

25.4 Suspend Database Copy

Description

This action suspends the Database replication.

Inputs

The inputName	The inputType	The inputKey Name	Optional/M, andatory	Description
Dataset Name	String	NA	M, andatory	Select the dataset from the drop-down list.

Outputs

Action fails, if the agent is unable to start the server.



26 MySQL

26.1 Change Master

26.1.1 Description

This action changes the primary information on DR database.

26.1.2 Inputs

The inputName	The inputType	The inputKey Name	Optional/ M, andatory	Description
Dataset Name	String	PANMYSQL_DATASET_NAME	M, andatory	Select the dataset from the drop-down list
Master Host	String	PANMYSQL_CHANGE_MASTER_HOST	M, andatory	Primary host IP address
Master Port	Integer	PANMYSQL_CHANGE_MASTER_PORT	M, andatory	Primary Port
Master User	String	PANMYSQL_CHANGE_MASTER_USER	M, andatory	Primary Username
Master Password	String	PANMYSQL_CHANGE_MASTER_PASSWORD	M, andatory	Primary Password
Master Log File	String	PANMYSQL_CHANGE_MASTER_LOG_FILE	M, andatory	Primary Log File
Master Log Position	String	PANMYSQL_CHANGE_MASTER_LOG_POS	M, andatory	Primary Log Position

26.1.3 Outputs

Action fails, if unable to change Primary details on DR database.

26.1.4 Prechecks

- Dataset – Configured with the input of Key Values or Advance Properties.
- Authentication.
- Selected dataset is active.
- Privileges before executing any comm, and.



- Database connectivity.
- Database is in st, andby state.
- St, andby is in operation or not.

26.2 Execute SQL

26.2.1 Description

This action executes the SQL query by connecting to the database.

26.2.2 Inputs

The inputName	The inputType	The inputKey Name	Optional/M, andatory	Description
Dataset Name	String	PANMYSQL_DATASET_NAME	M, andatory	Select the dataset from the drop-down list.
SQL	String	PANMYSQL_SQL	M, andatory	Enter the SQL query that needs to be executed.

26.2.3 Outputs

Output Name	Output Key Name	Description
Output of the SQL	PANMYSQL_SQL_RESULT	Output of the SQL

Action fails, if the agent is unable to connect or execute a query on the database.

26.2.4 Prechecks

- Dataset – configured with the inputKey Values or Advance Properties.
- Authentication.
- Selected dataset is active.
- Privileges before executing any comm, and.
- Database connectivity.

26.3 Get Master Status

26.3.1 Description



This action gets the primary status.

26.3.2 Inputs

The inputName	The inputType	The inputKey Name	Optional/M, andatory	Description
Dataset Name	String	PANMYSQL_DATASET_NAME	M, andatory	Select the dataset from the drop-down list.

26.3.3 Outputs

Action fails if the agent is unable to connect , and execute the query on the database.

Output Name	Output Key Name	Description
Master Log File	PANMYSQL_MASTER_LOG_FILE	Primary Log File
Master Log Position	PANMYSQL_MASTER_LOG_POS	Primary Log Position

26.3.4 Prechecks

- Dataset – Configured with the inputof Key Values or Advance Properties.
- Authentication.
- Selected dataset is active.
- Privileges before executing any comm, and.
- Database connectivity.
- Database is on Production.

26.4 Start Slave

26.4.1 Description

This action starts the St, andby.

26.4.2 Inputs



The inputName	The inputType	The inputKey Name	Optional/M, andatory	Description
Dataset Name	String	PANMYSQL_DATASET_NAME	M, andatory	Select the dataset from the drop-down list.
Thread type	String	PANMYSQL_SLAVE_THREAD	M, andatory	Select the thread type from the drop-down list.

26.4.3 Outputs

Action fails, if the agent is unable to start the st, andby.

26.4.4 Prechecks

- Dataset – Configured with the input of Key Values or Advance Properties.
- Authentication.
- Selected dataset is active.
- Privileges before executing any comm, and.
- Database connectivity.
- Database is in st, andby state.
- St, andby is in operation or not.

26.5 Stop Slave

26.5.1 Description

This action stops the St, andby.

26.5.2 Inputs

The inputName	The inputType	The inputKey Name	Optional/M, andatory	Description
Dataset Name	String	PANMYSQL_DATASET_NAME	M, andatory	Select the dataset from



				the drop-down list.
Thread type	String	PANMYSQL_SLAVE_THREAD	M, mandatory	Select the thread type from the drop-down list.

26.5.3 Outputs

Action fails, if the agent is unable to connect or stop the St, andby.

26.5.4 Prechecks

- Dataset – Configured with the input of Key Values or Advance Properties.
- Authentication.
- Selected dataset is active.
- Privileges before executing any comm, and.
- Database connectivity.
- Database is in st, andby state.
- St, andby is in operation or not.

26.6 Verify Database Mode

26.6.1 Description

This action checks whether the database is in the required mode or not. The verification is done by connecting to the database , and checking various parameters of the database.

26.6.2 Inputs

The inputName	The inputType	The inputKey Name	Optional/ M, mandatory	Description
Dataset Name	String	PANMYSQL_DATASET_NAME	M, mandatory	Select the dataset from the drop-down list.
Database Mode	String	PANMYSQL_DB_MODE	M, mandatory	Select the option from the drop-down list. The options



The inputName	The inputType	The inputKey Name	Optional/M, andatory	Description
				are <i>primary</i> , and <i>St</i> , and <i>by</i> .

26.6.3 Outputs

Action fails, if the agent is unable to connect or execute a query on the database.

26.6.4 Prechecks

- Dataset – Configured with the input of Key Values or Advance Properties.
- Authentication.
- Selected dataset is active.
- Privileges before executing any comm, and.
- Database connectivity.

26.7 Verify Received Log

26.7.1 Description

This action checks whether the database has received the given transaction log location or not. Optionally it will wait for the database to receive the log until the given location.

Inputs

The inputName	The inputType	The inputKey Name	Optional/M, andatory	Description
Dataset Name	String	PANMYSQL_DATASET_NAME	M, andatory	Select the dataset from the drop-down list.



Log File	String	PANMYSQL_VERIFY_LOG_FILE	M, mandatory	Log file name that needs to be verified .
Log Location	String	PANMYSQL_VERIFY_LOG_POS	M, mandatory	Location of the log that needs to be verified.
Wait for Sync	Checkbox	PANMYSQL_WAIT_FOR_SYNC	M, mandatory	Wait for the log to be received.

The possible values for PANMYSQL_WAIT_FOR_SYNC key is either 1 or 0.

26.7.2 Outputs

Action fails, if the agent is unable to connect or execute a query on the database.

26.7.3 Prechecks

- Dataset – Configured with the input of Key Values or Advance Properties.
- Authentication.
- Selected dataset is active.
- Privileges before executing any comm, and.
- Database connectivity.
- Database is in st, andby state.



27 NetApp SnapMirror

27.1 LunMap

Description

This action makes LUN accessible to initiators in the specified group. On the netapp filer, map the LUN to an igroup. All required values are taken from the protection object passed as argument.

Inputs

The inputName	Description	The inputKey Name	Optional/M, andatory
Protection Scheme Name	Select the protection scheme name configured for the group from the drop-down list.	Production or DR Protection Scheme	M, andatory
Force	Checkbox to enable forceful online so that LUN mapping conflict checks are not done on the cluster partner.		Optional
LUN Path	The mount path is taken from the volume name or LUN path in the protection object or The user can provide key MOUNT_PATH.	MOUNT_PATH	Optional
LUN ID	The user should provide the LUN id or he can provide key LUN_ID.	LUN_ID	Optional
Initiator Group	The user should provide the IGroup or he can provide key I_GROUP.	I_GROUP	Optional



NetApp Comm, and

```
lun map $LunPath$IGroup $LunId
```

Outputs

There are no output keys for this action.

27.2 LunUnmap

Description

This action removes a previously configured mapping. On the netapp filer, unmapall the LUNs of an igroup. All required values are taken from the protection object passed as argument.

Inputs

The inputName	Description	The inputKey Name	Optional/ Mandatory
Protection Scheme Name	Select the protection scheme name configured for the group from the drop-down list.	Production or DR Protection Scheme	Mandatory
LUN Path	The mount path is taken from the volume name or LUN path in the protection object or The user can provide key MOUNT_PATH.	MOUNT_PATH	Optional
Initiator Group	The user should provide the IGroup or he can provide key I_GROUP.	I_GROUP	Optional



NetApp Comm, and

lununmap\$LunPath\$IGroup

Outputs

There are no output keys for this action.

27.3 Create Clone

Description

This action creates a new flexible volume that is a clone of parent_flexvol or parent_snapshot. The clone name has to be provided by the RAL The user or set in key value CLONE_NAME.

Inputs

The inputName	Description	The inputKey Name	Optional/M, andatory
Protection Scheme Name	Select the protection scheme name configured for the group from the drop-down list.	Production or DR Protection Scheme	M, andatory
Volume Name	If the volume is different from the one in the above protection object, provide it here in Advanced Properties or in key value VOLUME_NAME.	VOLUME_NAME	Optional
Clone Name	The clone name has to be provided by the RAL The user in Advanced Properties or set in key value CLONE_NAME	CLONE_NAME	M, andatory
LUN Path	If the clone's parent volume does not belong to the protection object , and the clone was chosen during workflow execution by the "Choose Clone" RAL action then the user should provide the full LUN path or he can provide key MOUNT_PATH. If clone parent volume belongs to the protection object then the action will build the LUN path from the volume name.	MOUNT_PATH	Optional
Clone from latest snapshot	Select this option if you want to create clone from the latest snapshot	Not applicable	Optional



The inputName	Description	The inputKey Name	Optional/M, andatory
Clone from New Snapshot	Select this option if you want to create clone from a new snapshot	Not applicable	Optional

NetApp Comm, and

```
vol clone create $CloneName -s volume -b $VolumeName
```

Outputs

This action returns key values that can be used by later actions.

Output Name	Output Key Name	Description
Clone Name	CLONE_NAME	The name of the newly created clone.
Clone Mount Path	CLONE_MOUNT_PATH	The mount path for the created clone. The mount path is constructed from the "Clone Name" parameter using the format "/vol/<Clone Name>".
Storage IP	STORAGE_IP	The IP address of the protection object's component.
Cifs Share	CIFS_SHARE_NAME	Cifs Share Name

27.4 Destroy Clone

Description

This action removes the clone volume from the filer. The clone name has to be provided by the RAL. The user or set in key value CLONE_NAME.

Inputs

The inputName	Description	The inputKey Name	Optional/M, andatory
---------------	-------------	-------------------	----------------------



Protection Scheme Name	Select the protection scheme name configured for the group from the drop-down list.	Production or DR Protection Scheme	M, andatory
Volume Name	Name of the netapp Volume	VOLUME_NAME	M, andatory
Clone Name	Name of the clone volume	CLONE_NAME	M, andatory

NetApp Comm, and

```
vol destroy $CloneName
```

Outputs

There are no output keys for this action.

27.5 Choose Clone

Description

This action allows the user to choose a clone from the list of existing clones of the volume or create a new clone.

OR

If The user wants to create a new clone, it is created from the latest available snapshot. This action only works on the DR protection object.

Inputs

The inputName	Description	The inputKey Name	Optional/ M, andatory
Protection Scheme Name	Select the protection scheme name configured for the group from the drop-down list.	Production or DR Protection Scheme	M, andatory

NetApp Comm, and

If we select volume Clone option, need to execute below comm, and in case creating new volume clone:

```
vol clone create $CloneName -s volume -b $VolumeName
```

If we select LUN Clone option, need to execute below comm, and in case creating new LUN clone:

```
volume file clone create -volume volumeName -source-path /myfile -destination-path /myfile_copy
```



Outputs

Output Name	Output Key Name	Description
Clone Name	CLONE_NAME	The name of the newly created clone.
Clone Mount Path	CLONE_MOUNT_PATH	The mount path for the created clone. The mount path is constructed from the "Clone Name" parameter using the format "/vol/<Clone Name>".
Storage IP	STORAGE_IP	The IP address of the protection object's component.
Cifs Share	CIFS_SHARE_NAME	Cifs Share Name

27.6 Volume Online

Description

This action takes the volume in protection object passed as argument online.

Inputs

The inputName	Description	The inputKey Name	Optional/M, andatory
Protection Scheme Name	Select the protection scheme name configured for the group from the drop-down list.	Production or DR Protection Scheme	M, andatory
Volume Name	If the volume is different from the one in the above protection object, provide it here in Advanced Properties or in key value VOLUME_NAME.	VOLUME_NAME	Optional

NetApp Comm, and

```
vol online $filerName:$qtreename
```

Outputs

There are no output keys for this action.

27.7 Volume Offline



Description

This action takes the volume in protection object passed as argument offline.

Inputs

The inputName	Description	The inputKey Name	Optional/M, andatory
Protection Scheme Name	Select the protection scheme name configured for the group from the drop-down list.	Production or DR Protection Scheme	M, andatory
Volume Name	If the volume is different from the one in the above protection object, provide it here in Advanced Properties or in key value VOLUME_NAME.	VOLUME_NAME	Optional

NetApp Comm, and

```
vol offline$filerName:$qtreeName
```

Outputs

There are no output keys for this action.

27.8 Lun Online

Description

This action enables access to the LUNs in protection object, on the netapp filer.

Inputs

The inputName	Description	The inputKey Name	Optional/M, andatory
Protection Scheme Name	Select the protection scheme name configured for the group from the drop-down list.	Production or DR Protection Scheme	M, andatory
force	Checkbox to enable forceful online so that LUN mapping	Not applicable	Optional



	conflict checks are not done on the cluster partner.		
LUN Path	Provide the full LUN path or he can provide key MOUNT_PATH	MOUNT_PATH	Optional

NetApp Comm, and

`lunonline$LunPath`

Outputs

There are no output keys for this action.

27.9 Lun Offline

Description

This action disables access to the LUNs in protection object, on the netapp filer.

Inputs

The inputName	Description	The inputKey Name	Optional/M, andatory
Protection Scheme Name	Select the protection scheme name configured for the group from the drop-down list.	Production or DR Protection Scheme	M, andatory
LUN Path	Provide the full LUN path or he can provide key MOUNT_PATH	MOUNT_PATH	Optional

NetApp Comm, and

`lunoffline$LunPath`

Outputs

There are no output keys for this action.

27.10 Clone Online



Description

This action makes the clone online, on the netapp filer. The clone name has to be provided by the RAL The useror set in key value CLONE_NAME.

Inputs

The inputName	Description	The inputKey Name	Optional/M, andatory
Protection Scheme Name	Select the protection scheme name configured for the group from the drop-down list.	Production or DR Protection Scheme	M, andatory
Clone Name	The clone name has to be provided by the RAL The useror set in key value CLONE_NAME. It can also be set by the Choose Clone RAL action.	CLONE_NAME	Optional

NetApp Comm, and

```
vol online $CloneName
```

Outputs

There are no output keys for this action.

27.11 Clone Offline

Description

This action makes the clone offline, on the netapp filer. The clone name has to be provided by the RAL The useror set in key value CLONE_NAME.

Inputs

The inputName	Description	The inputKey Name	Optional/M, andatory
---------------	-------------	-------------------	----------------------



Protection Scheme Name	Select the protection scheme name configured for the group from the drop-down list.	Production or DR Protection Scheme	M, mandatory
Clone Name	The clone name has to be provided by the RAL The user set in key value CLONE_NAME.	CLONE_NAME	Optional

NetApp Comm, and

```
vol offline $CloneName
```

Outputs

There are no output keys for this action.

27.12 Clone Map

Description

This action maps a clone LUN to the Initiator Group.

Inputs

The inputName	Description	The inputKey Name	Optional/M, mandatory
Protection Scheme Name	Select the protection scheme name configured for the group from the drop-down list.	Production or DR Protection Scheme	M, mandatory
Clone LUN Path	If clone already existed , and its parent volume does not belong to the protection object , and the clone was chosen during workflow execution by the "Choose Clone" RAL action then the usershould provide the full clone LUN path or he can provide key CLONE_MOUNT_PATH. If clone parent volume belongs to the protection object then the action will	CLONE_MOUNT_PATH	Optional



The inputName	Description	The inputKey Name	Optional/M,andatory
	build the clone LUN path from protection object.		
Clone Initiator Group	If clone already existed , and its parent volume does not belong to the protection object , and the clone was chosen during workflow execution by the "Choose Clone" RAL action then the usershould provide the clone IGroup or he can provide key CLONE_I_GROUP. If clone parent volume belongs to the protection object then the action will use the IGroup from protection object.	CLONE_I_GROUP	Optional
Clone LUN Id	If clone already existed , and its parent volume does not belong to the protection object , and the clone was chosen during workflow execution by the "Choose Clone" RAL action then the usershould provide the clone LUN id or he can provide key CLONE_LUN_ID. If clone parent volume belongs to the protection object then the action will use the lun id from protection object.	CLONE_LUN_ID	Optional
Force	Checkbox to enable forceful online so that LUN mapping conflict checks are not done on the cluster partner.		Optional

NetApp Comm, and

```
lun map $LunPath $IGroup $LunId
```

Outputs

There are no output keys for this action.

27.13 Clone Unmap

Description

This action unmaps a clone LUN from the Initiator Group.

Inputs



The inputName	Description	The inputKey Name	Optional/M,andatory
Protection Scheme Name	Select the protection scheme name configured for the group from the drop-down list.	Production or DR Protection Scheme	M,andatory
Clone LUN Path	If clone already existed , and its parent volume does not belong to the protection object , and the clone was chosen during workflow execution by the "Choose Clone" RAL action then the usershould provide the full clone LUN path or he can provide key CLONE_MOUNT_PATH. If clone parent volume belongs to the protection object then the action will build the clone LUN path from protection object.	CLONE_MOUNT_PATH	Optional
Clone Initiator Group	If clone already existed , and its parent volume does not belong to the protection object , and the clone was chosen during workflow execution by the "Choose Clone" RAL action then the usershould provide the clone IGroup or he can provide key CLONE_I_GROUP. If clone parent volume belongs to the protection object then the action will use the IGroup from protection object.	CLONE_I_GROUP	Optional

NetApp Comm, and

```
lununmap $LunPath $IGroup
```

Outputs

There are no output keys for this action.

27.14 Clone Lun Online

Description

This action enables access to clone LUN, on the netapp filer.

Inputs



The inputName	Description	The inputKey Name	Optional/ M, andatory
Protection Scheme Name	Select the protection scheme name configured for the group from the drop-down list.	Production or DR Protection Scheme	M, andatory
Clone LUN Path	If clone already existed , and its parent volume does not belong to the protection object , and the clone was chosen during workflow execution by the “Choose Clone” RAL action then the usershould provide the full clone LUN path or he can provide key CLONE_MOUNT_PATH. If clone parent volume belongs to the protection object then the action will build the clone LUN path from protection object.	CLONE_MOUNT_PATH	Optional
Force	Checkbox to enable forceful online so that LUN mapping conflict checks are not done on the cluster partner.		Optional

NetApp Comm, and

```
lunonline[-f] $CloneLunPath
```

Outputs

There are no output keys for this action.

27.15 Clone Lun Offline

Description

This action disables access to clone LUN, on the netapp filer.

Inputs



The inputName	Description	The inputKey Name	Optional/ M, andatory
Protection Scheme Name	Select the protection scheme name configured for the group from the drop-down list.	Production or DR Protection Scheme	M, andatory
Clone LUN Path	If clone already existed , and its parent volume does not belong to the protection object , and the clone was chosen during workflow execution by the “Choose Clone” RAL action then the usershould provide the full clone LUN path or he can provide key CLONE_MOUNT_PATH. If clone parent volume belongs to the protection object then the action will build the clone LUN path from protection object.	CLONE_MOUNT_PATH	Optional

NetApp Comm, and

lunoffline\$CloneLunPath

Outputs

There are no output keys for this action.

27.16 Update Replication

Description

This action gets the current snapshot sequence number on protection object passed as argument. Then update replication so that next snapshot is created. It gets the latest snapshot sequence number , and ensure it is greater than previous. The loop waits till snapmirror is in ‘Idle’ state.

Inputs

The inputName	Description	The inputKey Name	Optional/ M, andatory
Protection Scheme Name	Select the protection scheme name configured for the group from the drop-down list.	Production or DR Protection Scheme	M, andatory

NetApp Comm, and



```

snap list -o $filerName:$qtreeName
snapmirrorupdate $filerName:$qtreeName
snap list -o $filerName:$qtreeName
    
```

Outputs

There are no output keys for this action.

27.17 Quiesce Replication

Description

This action quiesces replication on protection object passed as argument.

Inputs

The inputName	Description	The inputKey Name	Optional/ M, andatory
Protection Scheme Name	Select the protection scheme name configured for the group from the drop-down list.	Production or DR Protection Scheme	M, andatory

NetApp Comm, and

```

snapmirrorquiesce $filerName:$qtreeName
    
```

Outputs

There are no output keys for this action.

27.18 Break Replication

Description

This action breaks replication on protection object passed as argument. The object’s volumes become read write.

Inputs

The inputName	Description	The inputKey Name	Optional/ M, andatory
Protection Scheme Name	Select the protection scheme name configured for the group from the drop-down list.	Production or DR Protection Scheme	M, andatory



NetApp Comm, and

```
snapmirrorbreak $filerName:$qtreeName
```

Outputs

There are no output keys for this action.

27.19 Resync Replication

Description

This action resynchronizes replication to protection object passed as argument.

Inputs

The inputName	Description	The inputKey Name	Optional/ M, andatory
Protection Scheme Name	Select the protection scheme name configured for the group from the drop-down list.	Production or DR Protection Scheme	M, andatory

NetApp Comm, and

```
snapmirrorresync -f $filerName:$qtreeName
```

Outputs

There are no output keys for this action.

27.20 Resume Replication

Description

This action resumes replication to protection object passed as argument.

Inputs

The inputName	Description	The inputKey Name	Optional/ M, andatory
Protection Scheme Name	Select the protection scheme name configured for the group from the drop-down list.	Production or DR	M, andatory



		Protection Scheme	
--	--	-------------------	--

NetApp Comm, and

```
snapmirror resume $filerName:$qtreeName
```

Outputs

There are no output keys for this action.

27.21 NetApp Create Snap mirror Relation

27.21.1 Description

This RAL establishes the snap mirror protection.

27.21.2 Inputs

The inputName	Description	The inputKey Name	Optional/M, andatory
Target Protection Scheme Name	Select the target protection scheme name from the drop-down list.	Production or DR Protection Scheme	M, andatory
Source Volume	Enter the source volume name from which to create a copy	SOURCE_VOLUME	M, andatory
Copy Policy from existing relation	Checkbox to enable Copy Policy from existing relation.		Optional

27.22 Release SnapMirror

Description



This action releases replication on protection object passed as argument. No further snapshots will be created , and existing ones will be deleted.

Inputs

The inputName	Description	The inputKey Name	Optional/ M, andatory
Protection Scheme Name	Select the protection scheme name configured for the group from the drop-down list.	Production or DR Protection Scheme	M, andatory
Destination volume	Enter the destination volume name	Volume Name	M, andatory

NetApp Comm, and

```
snapmirrorrelease $fileName:$qtreeName
```

Outputs

There are no output keys for this action.

27.23 Get Mount Path

Description

This action retrieves mount information from the NetApp protection object passed as argument so that later OS level actions can use it without requiring access to the protection object.

The inputName	Description	The inputKey Name	Optional/ M, andatory
Protection Scheme Name	Select the protection scheme name configured for the group from the drop-down list.	Production or DR Protection Scheme	M, andatory
Volume Name	If the volume is different from the one in the above protection object, provide it here in Advanced Properties or in key value VOLUME_NAME.	VOLUME_NAME	Optional
Mount Path	The mount path is taken from the volume name or LUN path in the	MOUNT_PATH	Optional



	protection object or The user can provide key MOUNT_PATH.		
--	---	--	--

Outputs

This action returns key values that can be used by later actions.

Output Name	Output Key Name	Description
Clone Name	CLONE_NAME	The name of the newly created clone.
Clone Mount Path	CLONE_MOUNT_PATH	The mount path as set in parameters in the protection object. 1. If the "LUN/QTree Path" is not empty, it is used as mount path. If it does not contain a "/", the mount path is taken to be /vol/<Volume Name>/<LUN/QTree Path> 2. If the "LUN/QTree Path" is empty, the format /vol/<Volume Name> is used as mount path.
Storage IP	STORAGE_IP	The IP address of the protection object's component.
Cifs Share	CIFS_SHARE_NAME	Cifs Share Name

27.24 Get Clone Mount Path

Description

Retrieves clone mount information from the NetApp protection object passed as arguments so that later O.S. level actions can use it without requiring access to the protection object.

The inputName	Description	The inputKey Name	Optional/ M, andatory
Protection Scheme Name	Select the protection scheme name configured for the group from the drop-down list.	Production or DR Protection Scheme	M, andatory



Volume Name	If the volume is different from the one in the above protection object, provide it here in Advanced Properties or in key value VOLUME_NAME.	VOLUME_NAME	Optional
Clone Name	The clone name has to be provided by the RAL The user or set in key value CLONE_NAME. It can also be set by the Choose Clone RAL action.	CLONE_NAME	Optional
Clone Mount Path	If mounting a clone volume not belonging to the protection object then the user should provide the mount path with IP address in Advanced Properties or in key CLONE_MOUNT_PATH.	CLONE_MOUNT_PATH	Optional

Outputs

This action returns key values that can be used by later actions.

Output Name	Output Key Name	Description
Storage IP	STORAGE_IP	The IP address of the protection object's component.
Clone Mount Path	CLONE_MOUNT_PATH	The clone mount path as set in parameters in the protection object. 1. If the "LUN/QTree Path" is not empty, it is used as clone mount path. If it does not contain a "/", the clone mount path is taken to be /vol/<Clone Name>/<LUN/QTree Path> 2. If the "LUN/QTree Path" is empty, the format /vol/<Clone Name> is used as clone mount path.
Cifs Share	CIFS_SHARE_NAME	Cifs Share Name

27.25 CIFS Share Create

Description



This action creates a CIFS share on the netapp filer.

Inputs

The inputName	Description	The inputKey Name	Optional/M, andatory
Protection Scheme Name	Select the protection scheme name configured for the group from the drop-down list.	Production or DR Protection Scheme	M, andatory
Mount Path	If mounting a volume not belonging to the protection object then the usershould provide the mount path with IP address in Advanced Properties or in key MOUNT_PATH. If volume to mount belongs to the protection object, leave this parameter blank , and the "LUN/Qtree Path" parameter of the protection object is used. If this parameter is also not set, the mount path is constructed from the "Volume Name" parameter using the format "/vol/<Volume Name>".	MOUNT_PATH	Optional
Share Name	CIFS share name	CIFS_SHARE_NAME	Optional

NetApp Comm, and

```
cifs shares -add $ShareName $Path
```

Outputs

This action returns key values that can be used by later actions.

Output Name	Output Key Name	Description
Cifs Share	CIFS_SHARE_NAME	Cifs Share Name

27.26 CIFS Share Delete

Description

This action deletes a CIFS share on the netapp filer.

Inputs



The inputName	Description	The inputKey Name	Optional/M, andatory
Protection Scheme Name	Select the protection scheme name configured for the group from the drop-down list.	Production or DR Protection Scheme	M, andatory
Share Name	CIFS share name	CIFS_SHARE_NAME	Optional

NetApp Comm, and

```
cifs shares -delete $ShareName
```

Outputs

There are no output keys for this action.

27.27 Clone CIFS Share Create

Description

This action creates a CIFS share on the netapp filer based on clone.

Inputs

The inputName	Description	The inputKey Name	Optional/M, andatory
Protection Scheme Name	Select the protection scheme name configured for the group from the drop-down list.	Production or DR Protection Scheme	M, andatory
Clone Mount Path	If mounting a volume not belonging to the protection object then the usershould provide the mount path with IP address or he can provide the same in key MOUNT_PATH. If volume to mount belongs to the protection object, leave this parameter blank , and the "LUN/Qtree Path" parameter of the protection object is used. If this parameter is also not set, the mount path is constructed from the "Volume Name" parameter using the format "/vol/<Volume Name>".	CLONE_MOUNT_PATH	Optional



Share Name	CIFS share name	CIFS_SHARE_NAME	Optional
------------	-----------------	-----------------	----------

NetApp Comm, and

```
cifs shares -add $ShareName $Path
```

Outputs

This action returns key values that can be used by later actions.

Output Name	Output Key Name	Description
Cifs Share	CIFS_SHARE_NAME	Cifs Share Name

27.28 Clone CIFS Share Delete

Description

This action deletes a CIFS share on the netapp filer based on clone.

Inputs

The inputName	Description	The inputKey Name	Optional/M, andatory
Protection Scheme Name	Select the protection scheme name configured for the group from the drop-down list.	Production or DR Protection Scheme	M, andatory
Share Name	CIFS share name	CIFS_SHARE_NAME	Optional

NetApp Comm, and

```
cifs shares -delete $ShareName
```

Outputs

There are no output keys for this action.

27.29 Mount Junction Path

Description



This is used to mount volume on another volume with a junction-path.

Inputs

The inputName	Description	The inputKey Name	Optional/M, andatory
Protection Scheme Name	Select the protection scheme name configured for the group from the drop-down list.	Production or DR Protection Scheme	M, andatory
Volume Name	If the volume is different from the one in the above protection object, provide it here in Advanced Properties or in key value VOLUME_NAME.	VOLUME_NAME	Optional
Junction Path	This specifies the junction path of the mounted volume. The junction path name is case insensitive , and must be unique within a Vserver's namespace.	JUNCTION_PATH	M, andatory

NetApp Comm, and

volume mount -vserver vs0 -volume user_tsmith -junction-path /user/tsmith

Outputs

There are no output keys for this action.

27.30 Unmount Junction Path

Description

This is used to unmount the junction path volume.

Inputs

The inputName	Description	The inputKey Name	Optional/M, andatory
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Protection Scheme Name	Select the protection scheme name configured for the group from the drop-down list.	Production or DR Protection Scheme	M, andatory
Volume Name	If the volume is different from the one in the above protection object, provide it here in Advanced Properties or in key value VOLUME_NAME.	VOLUME_NAME	Optional

NetApp Comm, and

```
volume unmount -vserver vs0 -volume vol2
```

Outputs

There are no output keys for this action.

27.31 Create LUN Clone

Description

This action creates a new LUN Clone that is a clone of LUN. The LUN clone name has to be provided by the RAL The useror set in key value CLONE_NAME.

Inputs

The inputName	Description	The inputKey Name	Optional/ M, andatory
Protection Scheme Name	Select the protection scheme name configured for the group from the drop-down list.	Production or DR Protection Scheme	M, andatory
Volume Name	If the volume is different from the one in the above protection object, provide it here in Advanced Properties or in key value VOLUME_NAME.	VOL_NAME	Optional
Lun path(s)	If the clone's parent volume does not belong to the protection object , and the clone was chosen during workflow execution by the "Choose Clone" RAL action then the usershould provide the full LUN path or he can provide key MOUNT_PATH. If clone parent volume belongs to the protection object then the	MOUNT_PATH	Optional



The inputName	Description	The inputKey Name	Optional/ M, andatory
	action will build the LUN path from the volume name.		
Clone Name(s)	The clone name has to be provided by the RAL The user or set in key value CLONE_NAME. It can also be set by the Choose Clone RAL action.	CLONE_NAME	Optional

NetApp Comm, and

```
volume file clone create -volume $volumeName -source-path /myfile -destination-path /myfile_copy
```

Outputs

This action returns key values that can be used by later actions.

Output Name	Output Key Name	Description
Clone Name	CLONE_NAME	The name of the newly created clone.
Clone Mount Path	CLONE_MOUNT_PATH	The mount path for the created clone. The mount path is constructed from the "Clone Name" parameter using the format "/vol/<Clone Name>".

27.32 Delete LUN Clone

Description

This action deletes a LUN Clone that is a clone of LUN.

Inputs

The inputName	Description	The inputKey Name	Optional/ M, andatory
Protection Scheme Name	Select the protection scheme name configured for the group from the drop-down list.	Production or DR Protection Scheme	M, andatory



Clone LUN Path	If clone already existed , and its parent volume does not belong to the protection object , and the clone was chosen during workflow execution by the “Choose Clone” RAL action then the usershould provide the full clone LUN path or he can provide key CLONE_MOUNT_PATH. If clone parent volume belongs to the protection object then the action will build the clone LUN path from protection object.	CLONE_MOUNT_PATH	Optional
----------------	---	------------------	----------

NetApp Comm, and

```
volume file clone autodelete /vol/volume1/lun_clone -enable true -vserver vs1
```

Outputs

There are no output keys for this action.



28 Oracle

28.1 Alter Database

28.1.1 Description:

This action alters the state of the database. This assumes that the database is already in a state wherein it is valid to move it to a new state.

28.1.2 Inputs:

UI Input	The inputKey Name	Description
Dataset Name	Not Applicable	Select the dataset from the drop-down list.
Select Database State	PANORA_ALTER_DB_MODE	Select the state to which you want to change the current database state, from the drop-down list. The options are: st , andby , mount read only , read write , switchover to primary , , and switchover to st , andby . This field is mandatory.

28.1.3 Outputs:

Alter Database action does not return any value.

28.1.4 Error Codes:

Error Code	Description
PAN-DORA-0000	Internal Error.
PAN-DORA-0153	Agent not connected.
PAN-DORA-0127	Unable to execute method on agent.
PAN-DORA-0081	<ul style="list-style-type: none"> ▪ Oracle version not supported. ▪ Wrong arguments passed. ▪ SID/UserName/Password is(are) null.



Error Code	Description
	<ul style="list-style-type: none"> ▪ OS is not supported. ▪ Unknown type specified to execute query.
PAN-DORA-0010	Oracle instance is not available.

28.1.5 Prechecks

- Dataset – Configured with the input of Key Values or Advance Properties.
- Authentication for the Operating System , and Database.
- Selected dataset is active.
- Privileges before executing any comm, and.
- If database is in st, and by state, then it should be in read/write mode.
- If database is in read/write, then it should be in mounted read.
- If database is in switchover to primary state, then Production should be in read/write mode , and DR on mounted mode.
- If database is in switchover to st, and by state, then Production should be in mounted mode , and DR on read/write mode.

28.2 Apply Logs

28.2.1 Description:

This action recovers/applies the available archived logs which are not applied on the database. This assumes that the archive logs are already copied/available in the right location.

28.2.2 Inputs:

UI Input	The inputKey Name	Description
Dataset Name	Not Applicable	Select the dataset from the drop-down list.
Apply Log Delay	PANORA_APPLY_LOG_DELAY	Enter the log delay time in minutes. Default value for this field is zero. This field is mandatory.

28.2.3 Outputs:



Output Name	Output Key Name	Description
Applied Sequence Number	PANORA_APPLY_LOG_SEQ_NUM	Sequence number of the last log which got applied.

28.2.4 Error Codes:

Error Code	Description
PAN-DORA-0000	Internal Error.
PAN-DORA-0153	Agent not connected.
PAN-DORA-0127	Unable to execute method on agent.
PAN-DORA-0081	<ul style="list-style-type: none"> ▪ Oracle version not supported. ▪ Wrong arguments passed. ▪ SID/UserName/Password is(are) null. ▪ OS is not supported. ▪ Unknown type specified to execute query.
PAN-DORA-0010	Oracle instance is not available.

28.2.5 Prechecks

- Dataset – Configured with the input of Key Values or Advance Properties.
- Authentication for the Operating System , and Database.
- Selected dataset is active.
- Privileges before executing any comm, and.
- Database is in st, andby state.
- Locate archive folder.

28.3 Append PFILE

28.3.1 Description

This action appends the DG Configuration entries to PFILE files.

28.3.2 Inputs:



UI Input	The inputKey Name	Description
Dataset Name	Not Applicable	Select the dataset from the drop-down list.

28.3.3 Outputs:

Successfully appended entries to the PFILE files.

28.3.4 Error Codes:

Error Code	Description
PAN-DORA-0000	Internal Error.
PAN-DORA-0153	Agent not connected.
PAN-DORA-0127	Unable to execute method on agent.
PAN-DORA-0081	<ul style="list-style-type: none"> ▪ Oracle version not supported. ▪ Wrong arguments passed. ▪ SID/UserName/Password is(are) null. ▪ OS is not supported. ▪ Unknown type specified to execute query.
PAN-DORA-0010	Oracle instance is not available.

28.4 Append TNSFILE

28.4.1 Description

This action appends the DG Configuration entries to TNSFILE files.

28.4.2 Inputs:

UI Input	The inputKey Name	Description
Dataset Name	Not Applicable	Select the dataset from the drop-down list.



28.4.3 Outputs:

Successfully appended entries to the TNSFILE files.

28.4.4 Error Codes:

Error Code	Description
PAN-DORA-0000	Internal Error.
PAN-DORA-0153	Agent not connected.
PAN-DORA-0127	Unable to execute method on agent.
PAN-DORA-0081	<ul style="list-style-type: none"> ▪ Oracle version not supported. ▪ Wrong arguments passed. ▪ SID/UserName/Password is(are) null. ▪ OS is not supported. ▪ Unknown type specified to execute query.
PAN-DORA-0010	Oracle instance is not available.

28.5 Backup Control File

28.5.1 Description:

This action backs up the control file of the database to a trace file. This trace file can be used to recreate the control file.

28.5.2 Inputs:

UI Input	The inputKey Name	Description
Dataset Name	Not Applicable	Select the dataset from the drop-down list.
Trace File Name	PANORA_BACKUP_CTL_FILE	Enter the trace file name. This field is mandatory.
Reset Log	PANORA_BACKUP_CTL_RESET_OPTION	Select this check box if you want to reset the log.



		This field is mandatory.
--	--	--------------------------

28.5.3 Outputs:

Backup Control File action does not return any value.

28.5.4 Error Codes:

Error Code	Description
PAN-DORA-0000	Internal Error.
PAN-DORA-0153	Agent not connected.
PAN-DORA-0127	Unable to execute method on agent.
PAN-DORA-0081	<ul style="list-style-type: none"> ▪ Oracle version not supported. ▪ Wrong arguments passed. ▪ SID/UserName/Password is(are) null. ▪ OS is not supported. ▪ Unknown type specified to execute query.
PAN-DORA-0010	Oracle instance is not available.

28.5.5 Prechecks

- Dataset – Configured with the input of Key Values or Advance Properties.
- Authentication for the Operating System , and Database.
- Selected dataset is active.
- Privileges before executing any comm, and.
- For Production, database is in read/write mode.
- For DR, database is in mounted mode.

28.6 Cancel Managed A recovery

28.6.1 Description:

This action cancels the already active managed a recovery.If no managed a recovery is in active, the action is failed.

28.6.2 Inputs:



UI Input	The inputKey Name	Description
Dataset Name	Not Applicable	Select the dataset from the drop-down list.

28.6.3 Outputs:

Cancel Managed A recovery action does not return any value.

28.6.4 Error Codes:

Error Code	Description
PAN-DORA-0000	Internal Error.
PAN-DORA-0153	Agent not connected.
PAN-DORA-0127	Unable to execute method on agent.
PAN-DORA-0081	<ul style="list-style-type: none"> ▪ Oracle version not supported. ▪ Wrong arguments passed. ▪ SID/UserName/Password is(are) null. ▪ OS is not supported. ▪ Unknown type specified to execute query.
PAN-DORA-0010	Oracle instance is not available.

28.6.5 Prechecks

- Dataset – Configured with the input of Key Values or Advance Properties.
- Authentication for the Operating System , and Database.
- Selected dataset is active.
- Privileges before executing any comm, and.
- Database is in active managed a recovery mode.



28.7 Check Archive Gap

Check Archive Gap - Gets the first archive gap information from the DR database.

28.7.1 Description:

This action gets the first archive gap information from the DR database. It checks the archive gap , and fetches Low or High sequence numbers. A value of -1 indicates no archive gap found. Any value greater than -1 indicates the missing sequence number.

28.7.2 Inputs:

UI Input	The inputKey Name	Description
Dataset Name	Not Applicable	Select the dataset from the drop-down list.

28.7.3 Outputs:

Output Name	Output Key Name	Description
Low Sequence Number	PANORA_ARCHIVE_GAP_LOW_SEQ	Low Sequence number of missing archive in range.
High Sequence Number	PANORA_ARCHIVE_GAP_HIGH_SEQ	High Sequence number of missing archive in range.

28.7.4 Error Codes:

Error Code	Description
PAN-DORA-0000	Internal Error.
PAN-DORA-0153	Agent not connected.
PAN-DORA-0127	Unable to execute method on agent.
PAN-DORA-0081	<ul style="list-style-type: none"> ▪ Oracle version not supported. ▪ Wrong arguments passed. ▪ SID/UserName/Password is(are) null. ▪ OS is not supported. ▪ Unknown type specified to execute query.



Error Code	Description
PAN-DORA-0010	Oracle instance is not available.

28.7.5 Prechecks

- Dataset – Configured with the input of Key Values or Advance Properties.
- Authentication for the Operating System , and Database.
- Selected dataset is active.
- Privileges before executing any comm, and.
- Database is in st, andby state.
- Locate archive folder.

28.8 Create Control File

28.8.1 Description:

This action creates a control trace file of the database or a st, andby control file.

28.8.2 Inputs:

UI Input	The inputKey Name	Description
Dataset Name	Not Applicable	Select the dataset from the drop-down list.
Create Control File	PANORA_CREATE_CTL_OPTION	Select the Create Control File, from the drop-down list. The options are: As St, andby Control File , , and From Trace File . This field is m, andatory.
Create Control File/Trace File Name	Not Applicable	If you select the option As St, andby Control File , then Control File Name appears. If you select the option From Trace File , then Trace File Name appears.

28.8.3 Outputs:

Create Control File action does not return any value.

28.8.4 Error Codes:



Error Code	Description
PAN-DORA-0000	Internal Error.
PAN-DORA-0153	Agent not connected.
PAN-DORA-0127	Unable to execute method on agent.
PAN-DORA-0081	<ul style="list-style-type: none"> ▪ Oracle version not supported. ▪ Wrong arguments passed. ▪ SID/UserName/Password is(are) null. ▪ OS is not supported. ▪ Unknown type specified to execute query.
PAN-DORA-0010	Oracle instance is not available.

28.8.5 Prechecks

- Dataset – Configured with the input of Key Values or Advance Properties.
- Authentication for the Operating System , and Database.
- Selected dataset is active.
- Privileges before executing any comm, and.
- If create control file option is from st, and by control file, then database should be on Production
- If create control file option is from trace file, then database should be on DR.
- Locate folder.

28.9 Execute SQL

28.9.1 Description:

This action is used for executing any SQL comm, and.

28.9.2 Inputs:

UI Input	The inputKey Name	Description
Dataset Name	Not Applicable	Select the dataset from the drop-down list.



UI Input	The inputKey Name	Description
		Check the Show All check box to see all the Oracle datasets that are discovered on the “Server Components” attached to the group.
SQL to Execute	PANORA_EXEC_SQL	Enter the SQL comm, and to execute. This field is m, andatory.
Expected Output	PANORA_PASS_CRITERIA	Enter the expected output. This field is optional.
Role	PANORA_ROLE	Enter the expected role. This field is m, andatory. Note: <ul style="list-style-type: none"> ▪ If username is sys, then the role is sysdba. It is not m, andatory to enter the role. ▪ If no role specified then query will be executed by sysdba role.

28.9.3 Outputs:

Execute SQL action does not return any value.

28.9.4 Error Codes:

Error Code	Description
PAN-DORA-0000	Internal Error.
PAN-DORA-0153	Agent not connected.
PAN-DORA-0127	Unable to execute method on agent.
PAN-DORA-0081	<ul style="list-style-type: none"> ▪ Oracle version not supported. ▪ Wrong arguments passed. ▪ SID/UserName/Password is(are) null. ▪ OS is not supported. ▪ Unknown type specified to execute query.



Error Code	Description
PAN-DORA-0010	Oracle instance is not available.

28.9.5 Prechecks

- Dataset – Configured with the input of Key Values or Advance Properties.
- Authentication for the Operating System , and Database.
- Selected dataset is active.
- Privileges before executing any comm, and.

28.10 Execute SQL File

Execute SQL File - Executes any file which contains SQL comm, and.

28.10.1 Description:

This action is used for executing any file which contains SQL comm, and. The SQL comm, and can also contain a PL/SQL procedure or a set of individual SQL commands etc.

28.10.2 Inputs:

UI Input	The inputKey Name	Description
Dataset Name	Not Applicable	Select the dataset from the drop-down list.
SQL File to Execute	PANORA_EXEC_SQLFILE	Enter the path of the file which contains SQL comm, and. This field is m, andatory.
Pass criteria	PANORA_EXECFILE_PASS_CRITERIA	Enter the expected output when the execution is successful. This field is optional.
Role	PANORA_EXECFILE_ROLE	Enter the expected role. This field is m, andatory. Note:



UI Input	The inputKey Name	Description
		<ul style="list-style-type: none"> ▪ If username is sys, then the role is sysdba. It is not mandatory to enter the role. ▪ If no role specified then query will be executed by sysdba role.

28.10.3 Outputs:

Execute SQL File action does not return any value.

28.10.4 Error Codes:

Error Code	Description
PAN-DORA-0000	Internal Error.
PAN-DORA-0153	Agent not connected.
PAN-DORA-0127	Unable to execute method on agent.
PAN-DORA-0081	<ul style="list-style-type: none"> ▪ Oracle version not supported. ▪ Wrong arguments passed. ▪ SID/UserName/Password is(are) null. ▪ OS is not supported. ▪ Unknown type specified to execute query.
PAN-DORA-0010	Oracle instance is not available.

28.10.5 Prechecks

- Dataset – Configured with the input of Key Values or Advance Properties.
- Authentication for the Operating System , and Database.
- Selected dataset is active.



- Privileges before executing any comm, and.
- Locate SQL file.

28.11 Get Applied Log Files

Get Applied Log Files - Gets the list of archive log files which were already applied on the database , and is older than a specified time.

28.11.1 Description:

This action gets the list of archive log files which were already applied on the database , and is older than a specified time. This can be used to identify the older archive log files which are no longer needed , and so can be deleted/moved to free up space in the disk.

28.11.2 Inputs:

UI Input	The inputKey Name	Description
Dataset Name	Not Applicable	Select the dataset from the drop-down list.
Files Older than	PANORA_APPLIED_LOGFILES _OLDER_THEN	Enter the time in hours to list the files older than the specified time. Default value for this field is zero. This field is m, andatory.

28.11.3 Outputs:

Output Name	Output Key Name	Description
Old Applied Filenames	PANORA_APPLIED_FILENAMES	List of old applied file names separated by comma.

28.11.4 Error Codes:

Error Code	Description
PAN-DORA-0000	Internal Error.
PAN-DORA-0153	Agent not connected.
PAN-DORA-0127	Unable to execute method on agent.
PAN-DORA-0081	<ul style="list-style-type: none"> ▪ Oracle version not supported.



	<ul style="list-style-type: none"> ▪ Wrong arguments passed. ▪ SID/UserName/Password is(are) null. ▪ OS is not supported. ▪ Unknown type specified to execute query.
PAN-DORA-0010	Oracle instance is not available.

28.11.5 Prechecks

- Dataset – Configured with the input of Key Values or Advance Properties.
- Authentication for the Operating System , and Database.
- Selected dataset is active.
- Privileges before executing any comm, and.
- Database is in st, andby state.
- Locate archive folder , and view its permissions.

28.12 Get Current Sequence Number

Get Current Sequence Number - Gets the current archive log sequence number.

28.12.1 Description:

This action gets the current archive log sequence number. This number would be the sequence number of the last archived file if it is a production database , and will be the sequence number of the last applied file if it is a st, andby database.

28.12.2 Inputs:

UI Input	The inputKey Name	Description
Dataset Name	Not Applicable	Select the dataset from the drop-down list.

28.12.3 Outputs:

Output Name	Output Key Name	Description
Sequence Number	PANORA_GET_CURR_SEQ_NUM	Current Sequence number of the log which got archived/applied.



28.12.4 Error Codes:

Error Code	Description
PAN-DORA-0000	Internal Error.
PAN-DORA-0153	Agent not connected.
PAN-DORA-0127	Unable to execute method on agent.
PAN-DORA-0081	<ul style="list-style-type: none"> ▪ Oracle version not supported. ▪ Wrong arguments passed. ▪ SID/UserName/Password is(are) null. ▪ OS is not supported. ▪ Unknown type specified to execute query.
PAN-DORA-0010	Oracle instance is not available.

28.12.5 Prechecks

- Dataset – Configured with the input of Key Values or Advance Properties.
- Authentication for the Operating System , and Database.
- Selected dataset is active.
- Privileges before executing any comm, and.

28.13 Listener Control

Listener Control - Starts/stops , and checks the status of the listener specified by listener name parameter.

28.13.1 Description:

This action starts/stops , and checks the status of the listener specified by listener name parameter. If no listener name is specified, operation is executed on default listener.

28.13.2 Inputs:

UI Input	The inputKey Name	Description
Dataset Name	Not Applicable	Select the dataset from the drop-down list.



Listener Control is	PANORA_LISTENER_CTL	Select the listener control from the drop-down list. The options are: Running , Start , , and Stop . This field is m, andatory.
Listener Name	PANORA_LISTENER_NAME	Enter the listener name. This field is optional.

28.13.3 Outputs:

Execute SQL File action does not return any value.

28.13.4 Error Codes:

Error Code	Description
PAN-DORA-0000	Internal Error.
PAN-DORA-0153	Agent not connected.
PAN-DORA-0127	Unable to execute method on agent.
PAN-DORA-0081	<ul style="list-style-type: none"> ▪ Oracle version not supported. ▪ Wrong arguments passed. ▪ SID/UserName/Password is (are) null. ▪ OS is not supported. ▪ Unknown type specified to execute query.
PAN-DORA-0010	Oracle instance is not available.
PAN-DORA-0088	Operation not supported.

28.13.5 Prechecks

- Dataset – Configured with the inputof Key Values or Advance Properties.
- Authentication for the Operating System , and Database.
- Selected dataset is active.
- Privileges before executing any comm, and.
- Listener is static or dynamic.



- If operation is start, then listener should be stopped
- If operation is stop, then listener should be running

28.14 Oracle Audit

28.14.1 Description:

This RAL will give the transaction details during drill. We need to provide SQL queries to get transaction details.

Below is the sample query that we need to provide in RAL input.

Oracle Comm, and:

Example 1:

select NEXT_TIME from v\$archived_log where NEXT_TIME>'{0}' , and NEXT_TIME< '{1}';

- {0}- Allies of Start Date (Switchover end time)
- {1}- Allies end date (Switchback start time)

Example 2:

select NEXT_TIME from v\$archived_log where NEXT_TIME>'10-Aug-2016';

28.14.2 Inputs:

The inputName	The inputType	The inputKey Name	Optional/ M, andatory	Description
Dataset Name	String	PANORA_DATASET_NAME	M, andatory	Select the dataset name from the drop-down list.
SQL Query	String	PANORA_ORACLE_AUDIT	M, andatory	Provide the query with startdate/enddate alies.

28.14.3 Outputs:

1. Switchover , and switchback need to complete to execute this RAL Otherwise it will give NullPointerException.
2. Success Output:



28.14.4 Prechecks

- Dataset – configured with the inputKey Values or Advance Properties.
- Authentication.
- Selected dataset is active.
- Privileges before executing any comm, and.
- Database connectivity.

28.15 Recover Database

Recover Database - Recovers the database.

28.15.1 Description:

This action recovers the database. The behavior of this action is same as "recover database" oracle comm, and.

For example, database should be in mounted state for this action to be successful , and fails if no a recovery required which is the also the behavior of "recover database" oracle comm, and.

28.15.2 Inputs:

UI Input	The inputKey Name	Description
Dataset Name	Not Applicable	Select the dataset from the drop-down list.

28.15.3 Outputs:

Recover Database action does not return any value.

28.15.4 Error Codes:

Error Code	Description
PAN-DORA-0000	Internal Error.
PAN-DORA-0153	Agent not connected.
PAN-DORA-0127	Unable to execute method on agent.
PAN-DORA-0081	<ul style="list-style-type: none"> ▪ Oracle version not supported. ▪ Wrong arguments passed.



Error Code	Description
	<ul style="list-style-type: none"> ▪ SID/UserName/Password is(are) null. ▪ OS is not supported. ▪ Unknown type specified to execute query.
PAN-DORA-0010	Oracle instance is not available.

28.15.5 Prechecks

- Dataset – Configured with the input of Key Values or Advance Properties.
- Authentication for the Operating System , and Database.
- Selected dataset is active.
- Privileges before executing any comm, and.
- Database is mounted.

28.16 Shutdown Database

Shutdown Database - Shuts down the database.

28.16.1 Description:

This action shuts down the database. This assumes that the database is already started , and is running when this action is executed. It will fail if the database is already shutdown.

28.16.2 Inputs:

UI Input	The inputKey Name	Description
Dataset Name	Not Applicable	Select the dataset from the drop-down list.
Shutdown Mode	PANORA_SHUTDOWN_DB_MODE	Select the shutdown mode from the drop-down list. The options are: normal, immediate, transactional, , and abort. This field is m, andatory.



28.16.3 Outputs:

Shutdown Database action does not return any value.

28.16.4 Error Codes:

Error Code	Description
PAN-DORA-0000	Internal Error.
PAN-DORA-0153	Agent not connected.
PAN-DORA-0127	Unable to execute method on agent.
PAN-DORA-0081	<ul style="list-style-type: none"> ▪ Oracle version not supported. ▪ Wrong arguments passed. ▪ SID/UserName/Password is(are) null. ▪ OS is not supported. ▪ Unknown type specified to execute query.
PAN-DORA-0010	Oracle instance is not available.
PAN-DORA-0009	Invalid shutdown mode.

28.16.5 Prechecks

- Dataset – Configured with the input of Key Values or Advance Properties.
- Authentication for the Operating System , and Database.
- Selected dataset is active.
- Privileges before executing any comm, and.
- Database is in operating state.
- Listener is static or dynamic.

28.17 Start Managed A recovery

28.17.1 Description:

This action starts the managed a recovery process , and log apply services in the database.

28.17.2 Inputs:



UI Input	The inputKey Name	Description
Dataset Name	Not Applicable	Select the dataset from the drop-down list.
A recovery Delay	PANORA_START_MR_DELAY	<p>Enter the a recovery delay time in minutes.</p> <p>It is the time interval log apply services will wait before applying the individual archived redo logs.</p> <p>Default value for this field is zero.</p> <p>This field is m, andatory.</p> <p>Note:</p> <p>Oracle 12C version onwards, Delay option is not applicable.</p>

28.17.3 Outputs:

Start Managed A recovery action does not return any value.

28.17.4 Error Codes:

Error Code	Description
PAN-DORA-0000	Internal Error.
PAN-DORA-0153	Agent not connected.
PAN-DORA-0127	Unable to execute method on agent.
PAN-DORA-0081	<ul style="list-style-type: none"> ▪ Oracle version not supported. ▪ Wrong arguments passed. ▪ SID/UserName/Password is(are) null. ▪ OS is not supported. ▪ Unknown type specified to execute query.
PAN-DORA-0010	Oracle instance is not available.

28.17.5 Prechecks



- Dataset – Configured with the input of Key Values or Advance Properties.
- Authentication for the Operating System , and Database.
- Selected dataset is active.
- Privileges before executing any comm, and.
- Apply should not be running.

28.18 Startup Database

Startup Database - Starts the database.

28.18.1 Description:

This action starts the database. This assumes that the database is not running when this action is executed , and will fail if the database is already running. In case of error, this would leave the database in the shutdown state.

For example, if the database is in 'startup open' mode , and it failed while opening the database (succeeded in starting , and mounting), it would not leave it in mounted state, but leaves the database in shutdown state.

This operation requires a static entry in the listener.ora file so that Kyndryl agent can connect to the idle instance if the oracle database is shutdown.

28.18.2 Inputs:

UI Input	The inputKey Name	Description
Dataset Name	Not Applicable	Select the dataset from the drop-down list.
Initialization Type	PANORA_START_DB_INIT_TYPE	Select the initialization type from the drop-down list. The options are: pfile , spfile , and default . This field is m, andatory.
Database Mode	PANORA_START_DB_MODE	Select the database mode from the drop-down list. The options are: open , mount , and nomount . This field is m, andatory.

28.18.3 Outputs:



Startup Database action does not return any value.

28.18.4 Error Codes:

Error Code	Description
PAN-DORA-0000	Internal Error.
PAN-DORA-0153	Agent not connected.
PAN-DORA-0127	Unable to execute method on agent.
PAN-DORA-0081	<ul style="list-style-type: none"> ▪ Oracle version not supported. ▪ Wrong arguments passed. ▪ SID/UserName/Password is(are) null. ▪ OS is not supported. ▪ Unknown type specified to execute query.
PAN-DORA-0010	Oracle instance is not available.
PAN-DORA-0076	Unable to start database with PFILE.
PAN-DORA-0002	DB Version not supported.
PAN-DORA-0080	Unknown database mode.
PAN-DORA-0115	Unable to start database with SPFILE.
PAN-DORA-0072	Unable to start DB.

28.18.5 Prechecks

- Dataset – Configured with the input of Key Values or Advance Properties.
- Authentication for the Operating System , and Database.
- Selected dataset is active.
- Privileges before executing any comm, and.
- Database is in shutdown state.
- Locate pfile or spfile, depending on the initialisation file. .
- Listener is static or dynamic.



28.19 Switch Log File

Switch Log File - Switches the current redo log causing it to be archived/dumped.

28.19.1 Description:

This action switches the current redo log causing it to be archived/dumped. This assumes that archive logging is enabled so that the switched log will be archived. If archive logging is not enabled, switching of the logs will still succeed but it will not be archived.

28.19.2 Inputs:

UI Input	The inputKey Name	Description
Dataset Name	Not Applicable	Select the dataset from the drop-down list.

28.19.3 Outputs:

Output Name	Output Key Name	Description
Archived Sequence Number	PANORA_SWITCH_LOG_SEQ_NUM	Sequence number of the log which got archived.
Archived File Name	PANORA_SWITCH_LOG_FILE_NAME	File name of the log which got archived.

28.19.4 Error Codes:

Error Code	Description
PAN-DORA-0000	Internal Error.
PAN-DORA-0153	Agent not connected.
PAN-DORA-0127	Unable to execute method on agent.
PAN-DORA-0081	<ul style="list-style-type: none"> ▪ Oracle version not supported. ▪ Wrong arguments passed. ▪ SID/UserName/Password is(are) null. ▪ OS is not supported. ▪ Unknown type specified to execute query.



Error Code	Description
PAN-DORA-0010	Oracle instance is not available.

28.19.5 Prechecks

- Dataset – Configured with the input of Key Values or Advance Properties.
- Authentication for the Operating System , and Database.
- Selected dataset is active.
- Privileges before executing any comm, and.
- Database is on Production.
- Locate archive folder.

28.20 Verify Applied Sequence Number

Verify Applied Sequence Number - Checks whether the archived log with the given sequence number is applied in the database or not.

28.20.1 Description:

This action checks whether the archived log with the given sequence number is applied in the database or not. It will also optionally wait for the archive log to be applied , and will come out only after it is applied.

28.20.2 Inputs:

UI Input	The inputKey Name	Description
Dataset Name	Not Applicable	Select the dataset from the drop-down list.
Sequence Number to Verify	PANORA_VERIFY_CURR_SEQ_NUM	Enter the sequence number of the archived log to verify. This field is m, andatory.
Wait For Sync	PANORA_WAIT_FOR_SYNC	Select the check-box to wait for the archive log to be applied. This field is m, andatory.

28.20.3 Outputs:

Verify Applied Sequence Number action does not return any value.



28.20.4 Error Codes:

Error Code	Description
PAN-DORA-0000	Internal Error.
PAN-DORA-0153	Agent not connected.
PAN-DORA-0127	Unable to execute method on agent.
PAN-DORA-0081	<ul style="list-style-type: none"> ▪ Oracle version not supported. ▪ Wrong arguments passed. ▪ SID/UserName/Password is(are) null. ▪ OS is not supported. ▪ Unknown type specified to execute query.
PAN-DORA-0183	Sequence not yet applied.
PAN-DORA-0010	Oracle instance is not available.

28.20.5 Prechecks

- Dataset – Configured with the input of Key Values or Advance Properties.
- Authentication for the Operating System , and Database.
- Selected dataset is active.
- Privileges before executing any comm, and.

28.21 Verify Database State

28.21.1 Description:

This action checks whether the database is in the given state or not.

28.21.2 Inputs:

UI Input	The inputKey Name	Description
Dataset Name	Not Applicable	Select the dataset from the drop-down list.
Database State	PANORA_VERIFY_DB_STATE	Select the database state from the drop-down list. The options are: Open Read Write (Production), Read Only, Mounted, No Mount, Primary, St,



UI Input	The inputKey Name	Description
		<p>andby, Instance Not Running, , and Archive Log Mode.</p> <p>This field is mandatory.</p> <p>Note:</p> <p>If The user selects the Read only option, it handles both Read only , and Read only with apply open modes from Oracle 11G onwards.</p>

28.21.3 Outputs:

Verify Database State action does not return any value.

28.21.4 Error Codes:

Error Code	Description
PAN-DORA-0000	Internal Error.
PAN-DORA-0153	Agent not connected.
PAN-DORA-0127	Unable to execute method on agent.
PAN-DORA-0081	<ul style="list-style-type: none"> ▪ Oracle version not supported. ▪ Wrong arguments passed. ▪ SID/UserName/Password is(are) null. ▪ OS is not supported. ▪ Unknown type specified to execute query.
PAN-DORA-0010	Oracle instance is not available.

28.21.5 Prechecks

- Dataset – Configured with the input of Key Values or Advance Properties.
- Authentication for the Operating System , and Database.
- Selected dataset is active.
- Privileges before executing any comm, and.

28.22 Verify Switchover State



Verify Switchover State - Checks the switchover state of the database.

28.22.1 Description:

This action checks the switchover state of the database. This can be used before switchover to check if switchover is allowed or not.

TO PRIMARY - This is a st, andby database , and is allowed to switch over to a primary database.

TO ST, ANDBY - This is a primary database , and is allowed to switch over to a st, andby database.

28.22.2 Inputs:

UI Input	The inputKey Name	Description
Dataset Name	Not Applicable	Select the dataset from the drop-down list.
Switchover State to Verify	PANORA_VERIFY_SO_STATE	Select the database state from the drop-down list. The options are: Primary , and St, andby . This field is m, andatory.

28.22.3 Outputs:

Verify Switchover State action does not return any value.

28.22.4 Error Codes:

Error Code	Description
PAN-DORA-0000	Internal Error.
PAN-DORA-0153	Agent not connected.
PAN-DORA-0127	Unable to execute method on agent.
PAN-DORA-0081	<ul style="list-style-type: none"> ▪ Oracle version not supported. ▪ Wrong arguments passed. ▪ SID/UserName/Password is(are) null. ▪ OS is not supported. ▪ Unknown type specified to execute query.



Error Code	Description
PAN-DORA-0010	Oracle instance is not available.

28.22.5 Prechecks

- Dataset – Configured with the input of Key Values or Advance Properties.
- Authentication for the Operating System , and Database.
- Selected dataset is active.
- Privileges before executing any comm, and.
- Dry Run Comm, and.

28.23 OracleVerifysidParameter

This RAL verifies Oracle database SID parameter directory path on target Oracle host.

Example:

Directory path for these parameters <Oracle home directory, Oracle control file, Archive log, Datafile, Redo file, St, and by archive log> defined in CR Dataset for the A recovery Group.

Output:

Success:

Oracle SID parameter files are available: PARAMETER DIRECTORY PATH

Failure:

Oracle SID dirs are not available, retry after Creating the Directories: <PARAMETER DIRECTORY PATH>

28.24 OracleVerifyIsnrFile

Verify Oracle SID listener configuration file (listener.ora, tnsnames.ora) , and SID PWD file on target Oracle host.

The input parameters:

ORACLE_SID_NAME

ORACLE_HOME

Output:

Success:

Oracle Config files are available: <list config filenames>

Error:

The following Oracle listener file(s) not available: <List unavailable config filenames>



28.25 OracleVerifyListenerService

Verify Oracle SID Listener service on target Oracle host.

The inputparameters:

ORACLE_SID_NAME

ORACLE_HOME

Output:

Success:

SID_NAME: SID ORACLE LSNRCTL: listener service is active

Error:

SID_NAME: ORACLE LSNRCTL: listener is inactive kindly verify listener config , and start service

28.26 OracleVerifysidDBservice

Verify Oracle SID Database service on target Oracle host.

The inputparameters:

ORACLE_SID_NAME

Output:

Success:

SID_NAME: ORACLE SID_NAME Database process is not active on Remote Oracle Host

Error:

SID_NAME: Database process is currently active. Kindly verify Oracle host , and perform cleanup.

28.27 OracleVerifypfileParameter

Verify Oracle SID database pfile parameter <directory_path> from Actifio mounted snapshot on target Oracle host

The inputparameters:

ORACLE_SID_NAME

Actifio SNAPSHOT MOUNT_POINT

Output:

Success:

All required Oracle sub-directory mount_points available on target host: <list pfile parameter directory path>

Error:



These files directories are not available, Kindly retry after creating directories, files : <list pfile parameter directory path not available on Target Oracle host>

28.28 OracleRmanRestoreControlFile

Performs Oracle SID database control file restore from Actifio mounted snapshot on target Oracle host.

The inputparameters:

ORACLE_SID_NAME

ORACLE_HOME_DIR

ORACLE_SID credential

Actifio SNAPSHOT MOUNT_POINT

Output:

Success:

SID_NAME: controlfile restore Completed Successfully

Error:

SID_NAME: controlfile restore failed , and error is errormsg.

28.29 OracleRmanCreateCatalog

Create Oracle Rman catalog for datafile , and Archivelog using Actifio mounted snapshot location on Target Oracle host once CONTROLFILE is restored from the same mounted SNAPSHOT.

The inputparameters:

ORACLE_SID_NAME

ORACLE_HOME_DIR

ORACLE_SID credential

Actifio SNAPSHOT MOUNT_POINT

MOUNT_LIST_FILE – It contains Actifio mounted snapshot datafile , and Archivelog location.

This key_name is setup in OracleRmanRestoreControlfile

Output:

Success:

Catalog the datafiles , and archive logs is successfully Completed

OR

RMAN Catalog is already in place, no files found to be unknown to the database

Error:



Catalog the datafiles , and archive logs failed, , and error is errormsg

28.30 OracleRmanRestoreDatabase

Perform Oracle database restore once RMAN Catalog is created once Oracle RMAN Catalog is created on target Oracle host.

The inputparameters:

ORACLE_SID_NAME

ORACLE_HOME_DIR

ORACLE_SID credential

Output:

Success:

RMAN Restore JOB completed

OR

Restore completed successfully

Error:

SID_NAME: RMAN JOB Failed at TIME_STAMP, Kindly review , and perform cleanup, restart DB_SID in MOUNTED STATE on REMOTE Oracle host , and retry

OR

Restore failed , and error is errormsg

28.31 OracleRmanRecoverDatabase

Perform Oracle database a recovery which restores , and applies the necessary logs to the database

The inputparameters:

ORACLE_SID_NAME

ORACLE_HOME_DIR

ORACLE_SID credential

Output:

Success:

Recover Completed Successfully

OR

DBA recovery: RMAN JOB is completed



OR

DB A recovery completed before the unknown archived logseq – logsequence.

Error:

SID_NAME: RMAN A recovery JOB Failed at <timestamp>, Kindly check DB_SID on REMOTE Oracle host: errormsg"

OR

DB a recovery failed: errormsg

28.32 OracleValidatelsnrFile

Verify Oracle listener configuration file (listener.ora, tnsnames.ora) on target Oracle host.

The inputparameters:

ORACLE_HOME

Output:

Success:

Oracle Config files are available: <list config filenames>

Error:

Oracle listener file(s) not available: <List unavailable config filenames>

28.33 OracleValidateListenerService

Verify Oracle SID Listener service on target Oracle host.

The inputparameters:

ORACLE_SID_NAME

ORACLE_HOME

Output:

Success:

ORACLE LSNRCTL: listener service is active

Error:

ORACLE LSNRCTL: listener is not active on Target Oracle host.



29 PFR

29.1 PFR Operation

The PFR insertible action, displayed as PFR Operation in Kyndryl Resiliency Orchestration, provides flexibility to add customized PFR actions in the workflows. This action is applicable only for generic (non-concrete) solution templates.

To configure the PFR Operation action, first add it in the workflow using Insert tab , and configure it using **Properties** tab. Perform the following steps in the **Advanced** tab in the Action Properties section.

1. Select **PFR Operation** action in the workflow.
2. Click the **Advanced** tab.
3. From the **Operation Type** drop-down list, select the desired operation type.
4. Based on one of the following options, you select different fields displayed to fill the information.

- **CREATE FILESET**

CREATE FILESET - Creates the fileset for replication.

Inputs:

UI Input	The inputKey Name	Description
Operation Type	Not Applicable	Select CREATE FILESET , from the drop-down list.
Operation On	Not Applicable	Select the appropriate server or service on which you want to run this action. Note: If the group is attached with more than one pair of protection subsystem then do not select "Current Production Service" or "Current DR Service". Instead, select the actual protection subsystem to configure the operation.
Enable Replication	Not Applicable	Select this check box to enable the replication.



UI Input	The inputKey Name	Description
Source Host	Not Applicable	<p>Select the appropriate host from which you want to replicate the fileset, from the drop-down list.</p> <p>Most of the time, this field is dynamically filled by Kyndryl Resiliency Orchestration based on the settings you have specified at the time of Group creation.</p> <p>These dynamic options are Current Production Component , and Current DR Component.</p>
Target Host	Not Applicable	<p>Select the appropriate host to which you want to replicate the fileset, from the drop-down list.</p> <p>Most of the time, this field is dynamically filled by Kyndryl Resiliency Orchestration based on the settings you have specified at the time of Group creation.</p> <p>These dynamic options are Current Production Component , and Current DR Component.</p>
Replication State	Not Applicable	<p>Select the replication state from the drop-down list.</p> <p>The Options are ENABLED, , and DISABLED.</p>
Replication Interval	Not Applicable	Enter the desired value in seconds.
Source Dir/File	Not Applicable	Enter the directory or file from which you want to replicate.
Target Dir/File	Not Applicable	Enter the directory or file to which you want to replicate the data.



- Click **Add**.
- Click **Remove**, if you want to discard the Source , and Target Directory/ File path you have mapped , and configure it afresh.
- Click **Advanced Configuration** to filter the replication configuration.

Note:

The **Advanced Configuration** is applicable for only CREATE FILESET, MODIFY FILESET, , and TRANSFER FILESET.

The **Advanced Configuration** is NOT applicable for DELETE FILESET, STOP FILESET, START FILESET, , and REPLICATE FILESET

Advanced Configuration:

UI Input	The inputKey Name	Description
Symbolic link option	Not Applicable	Select the appropriate symbolic option. The options are: <ul style="list-style-type: none"> ▪ Do not replicate symbolic link: If the file is a symbolic link then skip it during replication. ▪ Replicate symbolic link only: Replicate only this symbolic link file but not the actual file it is pointing to. This is the default behavior. ▪ Replicate symbolic link , and files: Replicate this symbolic link file , and the actual file it is pointing to. Symbolic links are specific to operating system. For example, Windows does not have symbolic links.
<p>Filters</p> <p>By default, all the files/folders from the source path will be replicated to the targeted path. At times, not all the files/folders are required to be replicated to the target path.</p> <p>Filters are used to exclude/include specific file(s)/folders matching some pattern or based on wild card.</p>		
Source Folder	Not Applicable	Enter the folder from which you want to filter.
File/Folder Name (or wildcard):	Not Applicable	Enter the file or folder name. You can also enter the file or folder name with wildcards using * or ?.
Filters	Not Applicable	Select any one of the following filter option: <ul style="list-style-type: none"> ▪ Exclude - This filter is used to exclude specific files/folders from replication.



UI Input	The inputKey Name	Description
		<ul style="list-style-type: none"> ▪ Include - This filter is used to compulsorily include specific files/folders to be replicated. <p>Select Files, or Directories, or Both option.</p> <p>Select any or both the following wildcard option:</p> <ul style="list-style-type: none"> ▪ Case Sensitive - It is used to specify whether the wild card is case sensitive or not. For example: If the wild card is a*.log , and case sensitive is turned off then files matching a*.LOG, A*.log, A*.LOG, will also be filtered ▪ Recursive – If it is not selected, then the filter is applied only on files within the source folder. If selected, the filter is applied on all the files within the source folder , and its sub-folders.
Initial Synchronization	Not Applicable	<p>Select any one of the following initial synchronization type:</p> <ul style="list-style-type: none"> ▪ Replicate Files Created/Modified after File<absolute filename & path> - It is used to filter the files to be replicated that are created or modified after the specified file. ▪ Replicate Files Created/Modified afterTimestamp<date , and time> - It is used to filter the files to be replicated that are created or modified after the specified date , and time. ▪ Avoid Full Copy - It is used to replicate the files that are created or modified after the configuration of creating fileset. ▪ None - No initial synchronization, it replicate all the files with the filtered configuration. <p>This option is applicable only for CREATE FILESET, , and TRANSFER FILESET.</p> <p>This option is not applicable for MODIFY FILESET.</p>
Sync delete files		<p>Automatically deletes files/folders on target server when deleted on source server. Note: The files/folders will be deleted on target server only when it is not part of exclusion list , and fileset is Enabled , and PFR Service on target server has sufficient privileges/permission for deletion</p>
Large File Support		<ul style="list-style-type: none"> ▪ Enable Large File Support - Select this check box to enable Large File Support <p>PFR Large File Support</p> <p>Normally, PFR uses open-tar transport mechanism to replicate changed files from source to destination. In order to minimize the impact of</p>



UI Input	The inputKey Name	Description
		<p>network failures on large file transfers , and to optimize the resources, PFR replicates large files using Block-segments mechanism, so that only changed blocks of the large file is replicated. In this mechanism, the file is divided into multiple segments of a pre-configured size , and a checksum of each of these segments is computed on source , and destination files , and is compared. Only those file segments whose checksums differ, are replicated to the destination. This mechanism ensures that only changed blocks are replicated to the destination irrespective of the size of the file.</p> <p>Additionally, it also retires any failed transfers on the large files from the point of failure so that the whole file is not copied once again.</p> <p>PFR provides an option to configure the Large File Size in Create Fileset , and Modify Fileset operations. All files of size larger than the configured size will be replicated using Block-segments mechanism. By default, the option is enabled to replicate large files using the Block-segments mechanism , and the default value for the Large File Size is set to 1024 MB.</p> <p>The Large File size cannot be less than the bucket size. By default the Large File size is set to 1024MB , and bucket size to 100 MB.</p> <p>If the user provides Large File size less than bucket size, system will reset the value to bucket size. For example, if Large File size is set to say 5 MB, system will reset to 100MB.</p> <p>If compression is enabled on a fileset, all the large files satisfying the specified “Large File Size” criteria will be compressed (in memory) on the source system , and the compressed data will be replicated. When PFR is replicating large files using this mechanism, a new process called rsync will be started on the source , and target systems to handle the transfer by PFR. There might be multiple rsync processes running. These services may terminate at the end of the transfer or continue to run, based on specific conditions. The “rsync” service needs TCP/IP port 46001 to be opened by default. The TCP/IP port is configurable in PFR UI [per PFRService] instance to a custom value if desired.</p> <p>PFR will fail if the configured “rsync” TCP/IP port is not opened for communication. PFR will also fail if it is unable to start the services of “rsync” for any other reason. In all failure cases, PFR will log an error , and retry the operation.</p> <p>As usual, events will be raised for failures marking the protection scheme INACTIVE/DEGRADED as</p>



UI Input	The inputKey Name	Description
		<p>the case may be. You can enable/disable the large file support for all filesets by modifying \$EAMSROOT/installconfig/PFRconfiguration.cfg file. To enable large file support, ensure that "PFR_RSYNC_LARGEFILE_SUPPORT_ENABLED" property should be set to "true". Large file support is enabled only if the value is true. To disable, "PFR_RSYNC_LARGEFILE_SUPPORT_ENABLED" property should be set to "false". When large file support is disabled using this property, none of the filesets will be replicated using Block Segment mechanism. If this property is not specified, then large file support is enabled by default. for this fileset.</p> <ul style="list-style-type: none"> ▪ Size (MB) - Enter the Large File Size value. The default value is 1024 MB. <p>The Large File size cannot be less than the bucket size. By default the Large File size is set to 1024MB , and bucket size to 100 MB.</p> <p>If the user provides Large File size less than bucket size, system will reset the value to bucket size. For example, if Large File size is set to say 5 MB, system will reset to bucket size.</p>

- Click **Add**.

Description:

This action creates the Fileset for replication.

Outputs:

The fileset will be created on the configured service/host.

Error Codes:

None.

Prechecks

- Source , and Target IPs are valid , and reachable. Recorded as **Error** if not valid or reachable.



- Read/Write/Modify/Delete permissions to directories/files. Permission to Read on source , and Write/Modify/Delete on target. Recorded as **Error** otherwise.
- Availability of free disk space on source , and target . Recorded as **Warning** if target is less than source. Recorded as **Error** if target is less than 80 percent of source.
- **DELETE FILESET**
DELETE FILESET - Deletes the fileset.

Inputs:

UI Input	The inputKey Name	Description
Operation Type	Not Applicable	Select DELETE FILESET , from the drop-down list.
Operation On	Not Applicable	Select the appropriate server or service on which you want to run this action. Note: If the group is attached with more than one pair of protection subsystem then do not select "Current Production Service" or "Current DR Service". Instead, select the actual protection subsystem to configure the operation.

Description:

This action deletes the fileset you have created earlier.

Outputs:

Deletes the existing fileset.

Error Codes:

None.



Prechecks

- Locate fileset. Recorded as **Warning** if fileset is unavailable.
 - Files are not pending for replication. Recorded as **Warning** if files are pending.
 - Fileset is in disabled state. Recorded as **Warning** if fileset is not in disabled state.
- **MODIFY FILESET**
MODIFY FILESET - Modifies the fileset.

Inputs:

UI Input	The inputKey Name	Description
Operation Type	Not Applicable	Select MODIFY FILESET , from the drop-down list.
Operation On	Not Applicable	Select the appropriate server or service on which you want to run this action. Note: If the group is attached with more than one pair of protection subsystem then do not select "Current Production Service" or "Current DR Service". Instead, select the actual protection subsystem to configure the operation.

Click **Advanced Configuration** to filter the replication configuration

UI Input	The inputKey Name	Description
Symbolic link option	Not Applicable	Select the appropriate symbolic option. The options are: <ul style="list-style-type: none"> ▪ Do not replicate symbolic link: If the file is a symbolic link then skip it during replication. ▪ Replicate symbolic link only: Replicate only this symbolic link file but not the actual file it is pointing to. This is the default behavior. ▪ Replicate symbolic link , and files: Replicate this symbolic link file , and the actual file it is pointing to.



UI Input	The inputKey Name	Description
		Symbolic links are specific to operating system. For example, Windows does not have symbolic links.
<p>Filters</p> <p>By default, all the files/folders from the source path will be replicated to the targeted path. At times, not all the files/folders are required to be replicated to the target path.</p> <p>Filters are used to exclude/include specific file(s)/folders matching some pattern or based on wild card.</p>		
Source Folder	Not Applicable	Enter the folder from which you want to filter.
File/Folder Name (or wildcard):	Not Applicable	Enter the file or folder name. You can also enter the file or folder name with wildcards using * or ?.
Filters	Not Applicable	Select any one of the following filter option: <ul style="list-style-type: none"> ▪ Exclude - This filter is used to exclude specific files/folders from replication. ▪ Include - This filter is used to compulsorily include specific files/folders to be replicated. Select Files , or Directories , or Both option. Select any or both the following wildcard option: <ul style="list-style-type: none"> ▪ Case Sensitive - It is used to specify whether the wild card is case sensitive or not. For example: If the wild card is a*.log , and case sensitive is turned off then files matching a*.LOG, A*.log, A*.LOG, will also be filtered ▪ Recursive – If it is not selected, then the filter is applied only on files within the source folder. If selected, the filter is applied on all the files within the source folder , and its sub-folders.
Initial Synchronization	Not Applicable	Select any one of the following initial synchronization type: <ul style="list-style-type: none"> ▪ Replicate Files Created/Modified after File<absolute filename & path> - It is used to filter the files to be replicated that are created or modified after the specified file. ▪ Replicate Files Created/Modified afterTimestamp<date , and time> - It is used to filter the files to be replicated that are created or modified after the specified date , and time.



UI Input	The inputKey Name	Description
		<ul style="list-style-type: none"> ▪ Avoid Full Copy - It is used to replicate the files that are created or modified after the configuration of creating fileset. ▪ None - No initial synchronization, it replicate all the files with the filtered configuration. <p>This option is applicable only for CREATE FILESET, , and TRANSFER FILESET.</p> <p>This option is not applicable for MODIFY FILESET.</p>
Sync delete files		Automatically deletes files/folders on target server when deleted on source server. Note: The files/folders will be deleted on target server only when it is not part of exclusion list , and fileset is Enabled , and PFR Service on target server has sufficient privileges/permission for deletion
Large File Support		<ul style="list-style-type: none"> ▪ Enable Large File Support - Select this check box to enable Large File Support <p>PFR Large File Support</p> <p>Normally, PFR uses open-tar transport mechanism to replicate changed files from source to destination. In order to minimize the impact of network failures on large file transfers , and to optimize the resources, PFR replicates large files using Block-segments mechanism, so that only changed blocks of the large file is replicated. In this mechanism, the file is divided into multiple segments of a pre-configured size , and a checksum of each of these segments is computed on source , and destination files , and is compared. Only those file segments whose checksums differ, are replicated to the destination. This mechanism ensures that only changed blocks are replicated to the destination irrespective of the size of the file.</p> <p>Additionally, it also retires any failed transfers on the large files from the point of failure so that the whole file is not copied once again.</p> <p>PFR provides an option to configure the Large File Size in Create Fileset , and Modify Fileset operations. All files of size larger than the configured size will be replicated using Block-segments mechanism. By default, the option is enabled to replicate large files using the Block-segments mechanism , and the default value for the Large File Size is set to 1024 MB.</p> <p>The Large File size cannot be less than the bucket</p>



UI Input	The inputKey Name	Description
		<p>size. By default the Large File size is set to 1024MB , and bucket size to 100 MB.</p> <p>If the user provides Large File size less than bucket size, system will reset the value to bucket size. For example, if Large File size is set to say 5 MB, system will reset to 100MB.</p> <p>If compression is enabled on a fileset, all the large files satisfying the specified “Large File Size” criteria will be compressed (in memory) on the source system , and the compressed data will be replicated. When PFR is replicating large files using this mechanism, a new process called rsync will be started on the source , and target systems to handle the transfer by PFR. There might be multiple rsync processes running. These services may terminate at the end of the transfer or continue to run, based on specific conditions. The “rsync” service needs TCP/IP port 46001 to be opened by default. The TCP/IP port is configurable in PFR UI [per PFRService] instance to a custom value if desired.</p> <p>PFR will fail if the configured “rsync” TCP/IP port is not opened for communication will also fail if it is unable to start the services of “rsync” for any other reason. In all failure cases, PFR will log an error , and retry the operation.</p> <p>As usual, events will be raised for failures marking the protection scheme INACTIVE/DEGRADED as the case may be.</p> <p>You can enable/disable the large file support for all filesets by modifying \$EAMROOT/installconfig/PFRconfiguration.cfg file. To enable large file support, ensure that "PFR_RSYNC_LARGEFILE_SUPPORT_ENABLED" property should be set to "true". Large file support is enabled only if the value is true. To disable, "PFR_RSYNC_LARGEFILE_SUPPORT_ENABLED" property should be set to "false". When large file support is disabled using this property, none of the filesets will be replicated using Block Segment mechanism. If this property is not specified, then large file support is enabled by default. for this fileset.</p> <ul style="list-style-type: none"> ▪ Size(MB) - Enter the Large File Size value. The default value is 1024 MB.



UI Input	The inputKey Name	Description
		<p>The Large File size cannot be less than the bucket size. By default the Large File size is set to 1024MB , and bucket size to 100 MB.</p> <p>If the user provides Large File size less than bucket size, system will reset the value to bucket size. For example, if Large File size is set to say 5 MB, system will reset to bucket size.</p>

Description:

This action modifies the fileset configuration details.

Outputs:

Modifies the existing fileset.

Error Codes:

None.

Prechecks

- Locate fileset. Recorded as **Error (Warning** in some cases) if fileset is unavailable.
 - Source , and Target IPs are valid , and reachable. Recorded as **Error** if not valid or reachable.
 - Files are not pending for replication. Recorded as **Warning** if files are pending.
 - Read/Write/Modify/Delete permissions to directories/files. Permission to Read on source , and Write/Modify/Delete on target. Recorded as **Error** otherwise.
 - Availability of free disk space on source , and target. Recorded as **Warning** if target is less than source. Recorded as **Error** if target is less than 80 percent of source.
- **STOP FILESET**
STOP FILESET - Stops the fileset.

Inputs:



UI Input	The inputKey Name	Description
Operation Type	Not Applicable	Select STOP FILESET , from the drop-down list.
Operation On	Not Applicable	Select the appropriate server or service on which you want to run this action. Note: If the group is attached with more than one pair of protection subsystem then do not select "Current Production Service" or "Current DR Service". Instead, select the actual protection subsystem to configure the operation.

Description:

This action stops the ongoing replication of the specified fileset, if it is enabled.

Outputs:

Stops the replication of the fileset.

Error Codes:

None.

Prechecks

- Fileset is valid. Recorded as **Warning** if fileset is not valid.
- Fileset is enabled. Recorded as **Warning** if fileset is not enabled.
- **START FILESET**
START FILESET - Starts the fileset.

Inputs:

UI Input	The inputKey Name	Description
Operation Type	Not Applicable	Select START FILESET , from the drop-down list.



Operation On	Not Applicable	<p>Select the appropriate server or service on which you want to run this action.</p> <p>Note:</p> <p>If the group is attached with more than one pair of protection subsystem then do not select "Current Production Service" or "Current DR Service". Instead, select the actual protection subsystem to configure the operation.</p>
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Description:

This action starts the replication of the fileset.

Outputs:

Starts the replication of the fileset.

Error Codes:

None.

Prechecks

- Locate fileset. Recorded as **Error** if fileset is unavailable.
- Fileset is disabled. Recorded as **Warning** if fileset is not disabled.

▪ **REPLICATE FILESET**

REPLICATE FILESET - Starts the replication of pending files

Inputs:

UI Input	The inputKey Name	Description
Operation Type	Not Applicable	Select REPLICATE FILESET , from the drop-down list.
Operation On	Not Applicable	<p>Select the appropriate server or service on which you want to run this action.</p> <p>Note:</p>



		If the group is attached with more than one pair of protection subsystem then do not select "Current Production Service" or "Current DR Service". Instead, select the actual protection subsystem to configure the operation.
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Description:

This action starts the replication of pending files immediately without waiting for the regular replication interval to happen.

Note:

If the fileset is in disabled state, this action will enable it before synchronizing , and disable it after synchronization.

Outputs:

Starts the replication , and synchronizes the fileset.

Error Codes:

None.

Prechecks

- Locate fileset. Recorded as **Error** if fileset is unavailable.
- **TRANSFER FILESET**
TRANSFER FILESET - Transfers a fileset temporarily.

Inputs:

UI Input	The inputKey Name	Description
Operation Type	Not Applicable	Select TRANSFER FILESET , from the drop-down list.
Source Host	Not Applicable	Select the appropriate host from which you want to transfer the fileset, from the drop-down list. Most of the time, this field is dynamically filled by Kyndryl Resiliency Orchestration based on the



		<p>settings you have specified at the time of Group creation.</p> <p>These dynamic options are Current Production Component , and Current DR Component.</p>
Target Host	Not Applicable	<p>Select the appropriate host to which you want to transfer the fileset, from the drop-down list.</p> <p>Most of the time, this field is dynamically filled by Kyndryl Resiliency Orchestration based on the settings you have specified at the time of Group creation.</p> <p>These dynamic options are Current Production Component , and Current DR Component.</p>
Source Dir/File	Not Applicable	Enter the directory or file from which you want to transfer .
Target Dir/File	Not Applicable	Enter the directory or file to which you want to transfer the data.

Click **Advanced Configuration** to filter the replication configuration

UI Input	The inputKey Name	Description
Symbolic link option	Not Applicable	<p>Select the appropriate symbolic option.</p> <p>The options are:</p> <ul style="list-style-type: none"> ▪ Do not replicate symbolic link: If the file is a symbolic link then skip it during replication. ▪ Replicate symbolic link only: Replicate only this symbolic link file but not the actual file it is pointing to. This is the default behavior. ▪ Replicate symbolic link , and files: Replicate this symbolic link file , and the actual file it is pointing to. <p>Symbolic links are specific to operating system. For example, Windows does not have symbolic links.</p>
<p>Filters</p> <p>By default, all the files/folders from the source path will be replicated to the targeted path. At times, not all the files/folders are required to be replicated to the target path.</p> <p>Filters are used to exclude/include specific file(s)/folders matching some pattern or based on wild card.</p>		



Source Folder	Not Applicable	Enter the folder from which you want to filter.
File/Folder Name (or wildcard):	Not Applicable	Enter the file or folder name. You can also enter the file or folder name with wildcards using * or ?.
Filters	Not Applicable	<p>Select any one of the following filter option:</p> <ul style="list-style-type: none"> ▪ Exclude - This filter is used to exclude specific files/folders from replication. ▪ Include - This filter is used to compulsorily include specific files/folders to be replicated. <p>Select Files, or Directories, or Both option.</p> <p>Select any or both the following wildcard option:</p> <ul style="list-style-type: none"> ▪ Case Sensitive - It is used to specify whether the wild card is case sensitive or not. For example: If the wild card is a*.log , and case sensitive is turned off then files matching a*.LOG, A*.log, A*.LOG, will also be filtered ▪ Recursive – If it is not selected, then the filter is applied only on files within the source folder. If selected, the filter is applied on all the files within the source folder , and its sub-folders.
Initial Synchronization	Not Applicable	<p>Select any one of the following initial synchronization type:</p> <ul style="list-style-type: none"> ▪ Replicate Files Created/Modified after File<absolute filename & path> - It is used to filter the files to be replicated that are created or modified after the specified file. ▪ Replicate Files Created/Modified afterTimestamp<date , and time> - It is used to filter the files to be replicated that are created or modified after the specified date , and time. ▪ Avoid Full Copy - It is used to replicate the files that are created or modified after the configuration of creating fileset. ▪ None - No initial synchronization, it replicate all the files with the filtered configuration. <p>This option is applicable only for CREATE FILESET, , and TRANSFER FILESET.</p> <p>This option is not applicable for MODIFY FILESET.</p>
Sync delete files		Automatically deletes files/folders on target server when deleted on source server. Note: The files/folders will be deleted on target server only when it is not part of exclusion list , and fileset is



		Enabled , and PFR Service on target server has sufficient privileges/permission for deletion
Large File Support		<ul style="list-style-type: none"> ▪ Enable Large File Support - Select this check box to enable Large File Support <p>PFR Large File Support</p> <p>Normally, PFR uses open-tar transport mechanism to replicate changed files from source to destination. In order to minimize the impact of network failures on large file transfers , and to optimize the resources, PFR replicates large files using Block-segments mechanism, so that only changed blocks of the large file is replicated. In this mechanism, the file is divided into multiple segments of a pre-configured size , and a checksum of each of these segments is computed on source , and destination files , and is compared. Only those file segments whose checksums differ, are replicated to the destination. This mechanism ensures that only changed blocks are replicated to the destination irrespective of the size of the file.</p> <p>Additionally, it also retires any failed transfers on the large files from the point of failure so that the whole file is not copied once again.</p> <p>PFR provides an option to configure the Large File Size in Create Fileset , and Modify Fileset operations. All files of size larger than the configured size will be replicated using Block-segments mechanism. By default, the option is enabled to replicate large files using the Block-segments mechanism , and the default value for the Large File Size is set to 1024 MB.</p> <p>The Large File size cannot be less than the bucket size. By default the Large File size is set to 1024MB , and bucket size to 100 MB.</p> <p>If the user provides Large File size less than bucket size, system will reset the value to bucket size. For example, if Large File size is set to say 5 MB, system will reset to 100MB.</p> <p>If compression is enabled on a fileset, all the large files satisfying the specified “Large File Size” criteria will be compressed (in memory) on the source system , and the compressed data will be replicated. When PFR is replicating large files using this mechanism, a new process called rsync will be started on the source , and target systems to h, and the transfer by PFR. There might be multiple rsync processes running. These services may terminate at the end of the transfer or continue to</p>



		<p>run, based on specific conditions. The “rsync” service needs TCP/IP port 46001 to be opened by default. The TCP/IP port is configurable in PFR UI [per PFRService] instance to a custom value if desired.</p> <p>PFR will fail if the configured “rsync” TCP/IP port is not opened for communication. PFR will also fail if it is unable to start the services of “rsync” for any other reason. In all failure cases, PFR will log an error , and retry the operation.</p> <p>As usual, events will be raised for failures marking the protection scheme INACTIVE/DEGRADED as the case may be.</p> <p>You can enable/disable the large file support for all filesets by modifying \$EAMSR00T/installconfig/PFRconfiguration.cfg file. To enable large file support, ensure that "PFR_RSYNC_LARGEFILE_SUPPORT_ENABLED" property should be set to "true". Large file support is enabled only if the value is true.</p> <p>To disable, "PFR_RSYNC_LARGEFILE_SUPPORT_ENABLED" property should be set to "false". When large file support is disabled using this property, none of the filesets will be replicated using Block Segment mechanism. If this property is not specified, then large file support is enabled by default. for this fileset.</p> <ul style="list-style-type: none"> ▪ Size(MB) - Enter the Large File Size value. The default value is 1024 MB. <p style="margin-left: 40px;">The Large File size cannot be less than the bucket size. By default the Large File size is set to 1024MB , and bucket size to 100 MB.</p> <p style="margin-left: 40px;">If the user provides Large File size less than bucket size, system will reset the value to bucket size. For example, if Large File size is set to say 5 MB, system will reset to bucket size.</p>
--	--	---

- Click **Add**.
- Click **Remove**, if you want to discard the Source , and Target Directory/ File path you have mapped , and configure it afresh.

Description:



This action is used for replicating limited set of file(s) from one server to another server. This action would not be of periodic nature as that of replication.

Outputs:

Replicate file(s) from source machine to target machine. **Error Codes:**

If the replication fails due to network, permissions, IO etc., corresponding error message is displayed.

Note

If the dummy protection schema (e.g. PFRAgent-XXX) that is generated during a workflow, remains after BPI completion due to network failure, you have to manually delete them from Discover > Protection Schema , and PFR GUI respectively.

Prechecks

- Locate fileset. Recorded as **Error** if fileset is unavailable.
- **REPLICATE FILESET ONCE**
REPLICATE FILESET ONCE - Starts the replication cycle

Inputs:

UI Input	The inputKey Name	Description
Operation Type	Not Applicable	Select REPLICATE FILESET ONCE , from the drop-down list.
Operation On	Not Applicable	Select the appropriate server or service on which you want to run this action. Note: If the group is attached with more than one pair of protection subsystem then do not select "Current Production Service" or "Current DR Service". Instead, select the actual protection subsystem to configure the operation.

Description:



This action starts the replication cycle , and waits until the replication is finished.

Outputs:

Makes sure that one pass of replication is completed.

Error Codes:

None.

Prechecks

- Locate fileset. Recorded as **Error** if fileset is unavailable.
- **ROLE SWITCH FILESET**
 ROLE SWITCH FILESET - This operation switches the roles of fileset.

UI Input	The inputKey Name	Description
Operation Type	Not Applicable	Select ROLE SWITCH FILESET from the drop-down list.
Operation On	Not Applicable	Select the appropriate server or service on which you want to run this action.

Description:

This operation switches the roles of fileset. Before performing this operation, fileset should be in the DISABLED state.

Outputs:

Switches the roles of fileset.

29.1.1 Prechecks

- Locate fileset. Recorded as **Error** if fileset is unavailable.
 - Fileset is valid. Record as **Warning** if fileset is not valid.
 - Fileset is disabled. Recorded as **Warning** if fileset is not disabled.
1. From the **Operation On** drop-down list, select the desired operation to be performed. The **Operation On** drop-down list shows only the attached protection schemes by default.



2. To view all the PFR protection schemes check Show All box. Clicking on Show All, all the PFR protection schemes that are discovered on the “Server Components” that are dependent on the dataset(s) of the group will be shown.

Note:

- PFR Operation action does not take the directories from the datasets directly. You need to specify the directories manually that you want protect. You must make sure that you are specifying the right directories.
- Unlike the concrete solution templates, generic solution based PFR Operation action works on only one protection scheme at a time.



30 PostgreSQL

30.1 Execute SQL

Description: This action executes the SQL by connecting to the database.

Inputs

UI Input	The inputtype	The inputKey Name	The inputOptional/M, andatory	Description
Dataset Name	String	PANPG_DATASET_NAME	M, andatory	Select the dataset from the drop-down list
SQL	String	PANPG_SQL	M, andatory	Enter the SQL that needs to be executed

30.1.1 Outputs

If the agent is unable to connect , and execute the query on the database, then this action fails.

Output Name	Output Key Name	Description
Output of the SQL	PANPGS_SQL_RESULT	Output of the SQL

30.1.2 Prechecks

- Dataset – configured with the inputKey Values or Advance Properties.
- Authentication.
- Selected dataset is active.
- Privileges before executing any comm, and.
- Database connectivity.

30.2 Get Current Transaction Location

30.2.1 Description

This action get the current transaction location position of the database.

30.2.2 Inputs



UI Input	The inputType	The inputKey Name	The inputOptional/M, andatory	Description
Dataset Name	String	PANPG_DATASET_NAME	M, andatory	Select the dataset from the drop-down list.

30.2.3 Outputs

If the agent is unable to connect , and execute the query on the database, then this action fails.

Output Name	Output Key Name	Description
Transaction Log Position	PANPG_CURR_LOG_POSITION	Current Transaction Log Position

30.2.4 Prechecks

- Dataset – Configured with the input of Key Values or Advance Properties.
- Authentication.
- Selected dataset is active.
- Privileges before executing any comm, and.
- Database connectivity.
- Database is on Production.

30.3 Start Server

30.3.1 Description

This action starts the PostgreSQL server. It uses the pg_ctl comm, and to start the server on the PGDATA of the dataset which is configured in the action.

Example –

For Windows –

```
"<HOME PATH>\bin\pg_ctl.exe" -D "<DATA PATH>" start
```

For Linux –

```
<HOME PATH>/bin/pg_ctl -w -D <DATA PATH> start
```



Note - If you want to start the postgres database using windows service, then you have to customize the workflow to add custom RAL using comm, and sc start "<postgres services>".

30.3.2 Inputs

UI Input	The inputType	The inputKey Name	The inputOptional/ M, andatory	Description
Dataset Name	String	PANPG_DATASET_NAME	M, andatory	Select the dataset from the drop-down list.

30.3.3 Outputs

If the agent is unable to start the server, then this action fails.

30.3.4 Prechecks

- Dataset – Configured with the input of Key Values or Advance Properties.
- Authentication.
- Selected dataset is active.
- Privileges before executing any comm, and.
- Dataset credentials should be for Postgres.
- Locate PGDATA folder.

30.4 Stop Server

30.4.1 Description

This action stops the PostgreSQL server. It uses the pg_ctl comm, and to stop the server on the PGDATA of the dataset which is configured in the action.

Example –

For Windows –

```
"<HOME PATH>\bin\pg_ctl.exe" -D "<DATA PATH>" stop
```

For Linux –

```
<HOME PATH>/bin/pg_ctl -D <DATA PATH> -m <stopMode> stop
```

Note - If you want to stop the postgres database using windows service, then you have to customize the workflow to add custom RAL using comm, and sc stop "<postgres services>".



30.4.2 Inputs

UI Input	The inputType	The inputKey Name	The inputOptional/ M, andatory	Description
Dataset Name	String	PANPG_DATASET_NAME	M, andatory	Select the dataset from the drop-down list
Stop Mode	String	PANPG_SRVR_STOP_MODE	M, andatory	Select the stop mode from the drop-down list. The options are: <i>smart</i> , <i>fast</i> , and <i>immediate</i>

30.4.3 Outputs

if the agent is unable to connect or stop the server, then this action fails.

30.4.4 Prechecks

- Dataset – Configured with the input of Key Values or Advance Properties.
- Authentication.
- Selected dataset is active.
- Privileges before executing any comm, and.
- Dataset credentials should be for Postgres.
- Locate PGDATA folder.

30.5 Trigger Failover

30.5.1 Description

This action makes the current standby PostgreSQL as the primary server, and opens the database in read/write mode.

This is achieved by creating the trigger file mentioned in a recovery configuration. The agent process should have create/write permission for the trigger file location.

30.5.2 Inputs

UI Input	The inputtype	The inputKey Name	The inputOptional/ M, andatory	Description
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Dataset Name	String	PANPG_DATASET_NAME	M, andatory	Select the dataset from the drop-down list.
--------------	--------	--------------------	-------------	---

30.5.3 Outputs

If the was not able to bring up the database in primary mode, then this action fails.

30.5.4 Prechecks

- Dataset – Configured with the inputof Key Values or Advance Properties.
- Authentication.
- Selected dataset is active.
- Privileges before executing any comm, and.
- Database is in st, andby state.
- Permission to create file in the location during a failover.
- Locate PGDATA folder.

30.6 Verify Database Mode

30.6.1 Description

This action checks whether the database is in the required mode or not. The verification is done by connecting to the database , and checking various parameters of the database.

30.6.2 Inputs

UI Input	The inputType	The inputKey Name	The inputOptional/ M, andatory	Description
Dataset Name	String	PANPG_DATASET_NAME	M, andatory	Select the dataset from the drop-down list.
Database Mode	String	PANPG_DB_MODE	M, andatory	Select the option from the drop-down list. The options are <i>Production</i> , and <i>A recovery</i>

30.6.3 Outputs



If the agent is unable to connect or execute a query on the database, then this action fails.

30.6.4 Prechecks

- Dataset – Configured with the input of Key Values or Advance Properties.
- Authentication.
- Selected dataset is active.
- Privileges before executing any comm, and.
- Locate PGDATA folder.

30.7 Verify Transaction Received Location

30.7.1 Description

This action checks whether the database has received the given transaction log location or not. Optionally it will wait for the database to receive the log until the given location.

30.7.2 Inputs

UI Input	The inputType	The inputKey Name	The inputOptional/ M, mandatory	Description
Dataset Name	String	PANPG_DATASET_NAME	M, mandatory	Select the dataset from the drop-down list
Log Location	String	PANPG_VERIFY_LOG_POSITION	M, mandatory	Location of the log that needs to be verified
Wait for Sync	Check box	PANPG_WAIT_FOR_SYNC	M, mandatory	Wait for the log to be received

The possible value for PANPG_WAIT_FOR_SYNC key is either 1 or 0

30.7.3 Outputs

If the agent is unable to connect or execute a query on the database, then this action fails.

30.7.4 Prechecks

- Dataset – Configured with the input of Key Values or Advance Properties.
- Authentication.
- Selected dataset is active.
- Privileges before executing any comm, and.



- Database connectivity.
- Database is in st, andby state.



31 Process

31.1 Check Port in Use

Check Port in Use - Checks whether a particular communication port is in use.

Description:

This action checks whether a particular communication port is in use. This can be used to check whether an application has successfully started or not.

Inputs:

UI Input	The inputKey Name	Description
Component Name	Not Applicable	Select the component name from the drop-down list.
Port Number	PANOS_CHECK_PORT	Enter the port number. This field is mandatory.

Outputs:

Output Name	Output Key Name	Description
Process Found	PANOS_CHECK_PORT_RESULT	The output of this action will be a boolean value - 'true' if the port is in use, else 'false'.

Note:

- The OS agent needs to run with root/Administrator privileges for the proper output for ports requiring privileged access.
- In MS-Windows platform, OS agent running as "Local System Account" will inherit the security policy of the "Default User"(not the "Current User") , and by default provides no-barred access to all the ports , and the result provided by this method may be wrong. It is advised to run the OS agent as service under a user-defined account.(Refer <http://technet.microsoft.com/en-us/magazine/cc162523.aspx> for more details).

Error Codes:

Error Code	Description
PAN-CGEN-0002	Invalid component name.



Limitations:

Not supported when server is managed remotely [Agentless model].

Prechecks

- Login credentials.
- Validity of port number.

31.2 Start Process

Start Process - Starts application using a comm, and or script.

Description:

This action is used to start an application using a comm, and or script. This can be used to start an application where the application does not stop/end immediately , and keep running causing the comm, and/script not to complete. This action can be configured such that it will come out after a specified time interval so that it will not wait forever.

Inputs:

UI Input	The inputKey Name	Description
Component Name	Not Applicable	Select the component name from the drop-down list.
Comm, and/Script Name	PANOS_EXEC_FILE_PATH	Enter the comm, and/script name. This field is m, andatory.
Success Pattern	Not Applicable	Can provide the predictable multiple success patterns from Comm, and script/path. This field is optional.
Failure Pattern	Not Applicable	Can provide the predictable multiple failure patterns from Comm, and script/path. This field is optional.
Execution Wait Time	PANOS_EXEC_WAIT_MODE	Enter the execution wait time in seconds. The value '0' in this field defines indefinite wait. This field is m, andatory.



Outputs:

Output Name	Output Key Name	Description
Exit Code	PANOS_EXEC_EXIT_CODE	Exit code of the comm, and/script. Exit code of the process is available only when the PANOS_EXEC_WAIT_MODE is '0'.
Standard Out Message	PANOS_EXEC_STDOUT_MESSAGE	The output message of the comm, and/script.
Standard Error Message	PANOS_EXEC_STDERR_MESSAGE	The error message of the comm, and/script.

Note:

- Microsoft Windows OS requires you to pass the comm, and as 'Comm, and.com /C real-comm, and' or 'Cmd.exe /C real-comm, and' based on the version
- Start Process supports special characters which are executable in the console(Linux- eg. "|" , and";" . You can execute multiple commands using ';'


```
ps -ef|grep java , ./LinuxOSAgent.stop;./LinuxOSAgent.stop
```
- JVM does not open a terminal for executing process. Some commands may open windows on the native platform, when the application is not run on the terminal.
- Exit code of the process is available only when the PANOS_EXEC_WAIT_MODE is '0' (zero)
- Paths in the Microsoft Windows OS requires the path separator to be escaped (i.e C:\windows\tmp.exe maps to C:\\windows\\tmp.exe)
- Always specify the 8.3 format on Microsoft Windows OS
- Exit code of the process is available only when the PANOS_EXEC_WAIT_MODE is '0' (zero)
- Success , and Failure Pattern work on the following combinations:

Sl no	Success Pattern	Failure Pattern	Result Should be
1	Not Provided	Not Provided	Based on exit code
2	Not Provided	Provided	If any failure match is found then the comm, and is fail.



			If none of the failure pattern found in comm, and output, then it should display as success.
3	Provided	Not Provided	If any success match is found then the comm, and is success. If none of the success pattern found in output, it should fail with an error message "Did not find success pattern in the output".
4	Provided	Provided	Firstly, the failure patterns is matched; if match is found, then comm, and is fail. If none of the failure pattern is found then success pattern is matched; if match is found, then comm, and is success. If none of the patterns are found in the output: An error message "Did not find success pattern in the output" is displayed.

Note:

If multiple Success or Multiple Failure patterns are configured, then the output is dependent on EITHER the first Failure/Success pattern OR second Failure/Success pattern OR third Failure/Success pattern etc.

Error Codes:

Error Code	Description
PAN-CGEN-0002	Invalid component name.

31.2.1 Prechecks

- Login credentials.
- Comm, and or script is available on the machines.
- Comm, and for Windows , and the configured script path is the correct format for Kyndryl Resiliency Orchestration.
- The userpermission to start the process.

31.3 Find Process



Find Process - Checks whether a particular application/process is running by checking it's name against the names of the active application/process.

Description:

This action checks whether a particular application/process is running by checking it's name against the names of the active application/process.

Inputs:

UI Input	The inputKey Name	Description
Component Name	Not Applicable	Select the component name from the drop-down list.
Application/Process Name	PANOS_SEARCH_PROCESS	Enter the name of the application/process you want to check. Note: To find multiple process, enter process separated by comma. This field is m, andatory.

Outputs:

Output Name	Output Key Name	Description
Port in Use	PANOS_SEARCH_PROCESS_RESULT	The output of this action will be a boolean value - 'true' if the process is found, else 'false'.



Error Codes:

Error Code	Description
PAN-CGEN-0002	Invalid component name.

31.3.1 Prechecks

- Login credentials.
- Process is running on the machines.



32 Repeatable

32.1 Repeatable

1. Repeatable Actions/Add new Action to RAL catalogue Add provision in CLI to create new action
2. Provide name , and category (with in Custom RAL's)
3. Provide the comm, and/script , and its dependencies

It will be added to the custom RAL library

4. Add it to the workflow, the configured values are prefilled.

Execution will be similar to custom action.

CLI example:

```
[developer@fed14devt12 bin]$ ./AddRepeatableRAL.sh
Please enter action Name...
startwebapp
Please enter RAL category...
webserver
Please enter Type, 2 for script and 3 for TCL
2
Please enter Script name...
startwebserver.sh
Please enter Dependent scripts/Libraries(separated by comma) ..
webdep.sh,webdep2.sh
log4j:WARN No appenders could be found for logger (org.quartz.core.QuartzScheduler).
log4j:WARN Please initialize the log4j system properly.
[developer@fed14devt12 bin]$ █
```

Scripts should be copied to

{EAMSROOT}/scripts/repeatable/{category Name}/{Action Name}/{scripts , and its depended files}

Ex:

/opt/panaces/scripts/repeatable/checkStatus/checkStatus/ping.sh

/opt/panaces/scripts/repeatable/checkStatus/checkStatus /pingdep.sh

This has to be repeated for all the agents using this RAL , and server.

To Edit Repeatable RAL:



```
[root@oemdevln6 bin]# ./AddRepeatableRAL.sh
> Help: This script allows to add the RAL and Edit the RAL.
> Enter the Action category, Action Name, Exec type that is 1(for script) or 2(f
or tcl script), Name and its dependent lib/script.
> Note: Script and its dependent lib/Script must be at '$SEAMSROOT/script/repeata
ble/action_Category/action/' folder.

Please enter your option
 1 for Inserting the RAL
 2 for Editing the RAL
2
Repeatable Action Details
log4j:WARN No appenders could be found for logger (org.quartz.core.QuartzSchedul
er).
log4j:WARN Please initialize the log4j system properly.
ra_name          ra_category          ra_path          ra_exec
Type            ra_id            ra_depend
*****
*****
Action5 || AditiCategory          || scripts/repeatable/AditiCategory/Action5/Adit
i.sh          || 2          || 5          ||
Action    || AditiCategory          || scripts/repeatable/AditiCategory/Action/A3.sh
|| 2          || 6          ||

Please enter RALID for which details need to be modified
6
Please enter action name
Action
Please enter RAL category:
AditiCategory
Please enter Type, 1 for script and 2 for TCL
1
Please enter Script name:
Aditi.sh
```

Limitation:

1. On Adding RAL the first time we need to open the Action property before publishing.
2. Refresh is not allowed after adding RAL. (Script in Action property will go off).

In UI

1. Go to workflow Editor >Add >Action
2. Select Action Category >Add Action in Workflow , and Execute



33 Replication

33.1 Choose Replication Volume

Choose Replication Volume - Chooses Replication volume to operate on for further actions.

Description:

This action gets The usera list of Replication Volume for the configured group. The usercan choose one of the Replication Volume for further actions. This gives The userflexibility during test exercise or failover to choose Replication Volume that is more recent or consistent.

Configuration Options: Advanced properties provide The following options.

- **Choose at runtime**
When this is set at configuration time, action pops-up a The userthe inputwindow with a list of Replication volume for The userto choose one.
- **Choose default RPO PIT Copy**
Action will take the current RPO PIT Copy configured for the group.
- **Choose default FO PIT Copy**
Action will take the current FO PIT Copy configured for the group.
- **List of discovered Replication volume that is included in the group configuration**
List shows all the available replication volume configured for the group. The usercan choose one of it , and it will be considered as chosen replication volume while action executes.

Inputs:

UI Input	Description
Volume Name	Enter the replication volume name. This field is m, andatory.
Clone Type	Select the clone type from the list. Options are Volume Clones , and LUN Clones This field is m, andatory.

Outputs:



Output Name	Output Key Name	Description
Protection Service name	PANREPL_CHOOSE_REPL_VOL_SERVICE_NAME	Protection Service name of the chosen Replication volume.
Replication Volume details	PANREPL_CHOOSE_REPL_VOL_DETAILS	Replication Volume details.
Volume Group Details	PANREPL_CHOOSE_VOL_DETAILS	Volume group details like mount point information.

Error Codes:

None



34 SAP HANA RALs

Find information about the RALs available for the SAP HANA with SR Solution.

- HANAGetStatus
- HANAStartServices
- HANASTopServices
- HANAVerifyStartServices
- HANAVerifyStopServices
- HANAEnableSR
- HANARegisterSR
- HANACheckSRState
- HANATakeoverSR
- HANAFullSyncSR
- HANAVerifySyncState
- HANANearSite
- HANAFarSite
- HANAPrimarySite
- HANADisableSR
- CONFIRMATION
- TRANSPOSE
- GETHOST
- HanaRegisterSRASync
- HanaRegisterSRSync
- HanaRegisterSRDynamic
- RegistrationArgs

34.1 HanaCheckMode

Description: This RAL checks HANA replication site mappings , and transfer mode with the dataset details.

Inputs	Output
Site Name , Instance number , and SAP HANA DB The userName	If success: Displays success message. If Failure: Displays failure message.



Dry Run

Dry Run Verification	Comm, and executed on backend	Output
This RAL checks HANA replication site mappings , and transfer mode with the dataset details.	hdbnsutil -sr_state	<p>Success: Current System Replication, operation mode , and the configured Replication mode in RO matches.</p> <p>ERROR:</p> <p>Error1: Current modes of replication , and the operation does not match with the configured ones.</p>

34.2 HANAGetStatus

Description: This RAL is to check status of each process in SAP HANA System.

Inputs	Output
Site Name, Instance number , and SAP HANA DB The userName	<p>If success: Displays success message.</p> <p>If Failure: Displays failure message.</p>

Dryrun

Dry Run Verification	Comm, and executed on backend	Output
This RAL checks if SAP HANA processes are running fine or not.	sapcontrol -nr \$instance -function GetProcessList	<p>Success: SAP HANA services are running fine on the server</p> <p>Error: One or more SAP HANA Services found not running or not in a valid state.</p>



34.3 HANAStartServices

Description: This RAL is to start services on the site.

Inputs	Output
The userName , and Instance Number	If success: Displays success message. If Failure: Displays failure message.



Dry Run

Dry Run Verification	Comm, and Executed on Backend	Output
Check all services are stopped or not on a particular site. Based on the status, generate the dry run report.	/usr/sap/hostctrl/exe/sapcontrol -nr <InstanceNumber> -function GetProcessList	Success: No Process is available, the system is connected. Warning: If one or more processes are up or running. Fail: If the system is not connected / No response (Network issue).

34.1 HANAStopServices

Description: This RAL is to stop service on the site.

Inputs	Output
The userName , and Instance Number	If success: Displays success message. If Failure: Displays failure message.

Dry Run

Dry Run Verification	Comm, and Executed on Backend	Output
----------------------	-------------------------------	--------



<p>Check all services are started or not on a particular site. Based on the status, generate the dry run report.</p>	<pre> sapcontrol -port NI_HTTP -nr \$instance -function GetProcessList </pre>	<p>Success: All SAP HANA Processes are up , and running, can be stopped by the ral.</p> <p>Warning: One or more SAP HANA Process found already not running or not in a valid state on the server</p> <p>Error: SAP HANA Process found not running or not in a valid state.</p>
--	---	---

34.2 HANAVerifyStartServices

Description: This RAL is to verify if the SAP HANA services have started.

Inputs	Output
<p>The userName , and Instance Number</p>	<p>If success: Displays success message.</p> <p>If Failure: Displays failure message.</p>

Dry Run

Dry Run Verification	Comm, and Executed on Backend	Output
<p>Check all services are stopped or not on a particular site. Based on this, it generates the dry run report.</p>	<pre> /usr/sap/hostctrl/exe/sapcontrol -nr <InstanceNumber> -function GetProcessList </pre>	<p>Success: No Process should be available, System is connected.</p> <p>Warning: If one or more processes are up or running</p>



		Fail: If the system is not connected/No response (Network issue)
--	--	---

34.3 HANAVerifyStopServices

Description: This RAL is to verify if the SAP HANA services have stopped.

Inputs	Output
The userName , and Instance Number	If success: Displays success message. If Failure: Displays failure message.

Dry Run

Dry Run Verification	Comm, and Executed on Backend	Output
Check all services are started or not on a particular site. Based on this, it generates the dry run report.	/usr/sap/hostctrl/exe/sapcontrol -nr <InstanceNumber> -function GetProcessList	Success: If one or more processes are running, System is connected. Warning: If one or more Process is not available. Fail: If System is not connected/No response (Network issue)



34.4 HANAEnableSR

Description: This RAL is to start the replication between sites.

Inputs	Output
Site Name , and SAPHANA DB The userName	If success: Displays success message. If Failure: Displays failure message.

Dry Run

Dry Run Verification	Comm, and Executed on Backend	Output
Prior to enabling the replication, you need to check the primary system should be up , and running.	/usr/sap/hostctrl/exe/sapcontrol -nr <InstanceNumber> -function GetProcessList	<p>Success: If all nodes were up , and running (Primary Site), System is connected.</p> <p>Warning: If one or more nodes are not available (Primary site).</p> <p>Fail: If the system is not connected / No response (Network issue)</p>

34.5 HANARegisterSR

Description: This RAL is to register the system replication.



Inputs	Output
The userName, Remote Host, Instance number, Site Name, Replication Mode , and Operation Mode	If success: Displays success message. If Failure: Displays failure message.

Dry Run

Dry Run Verification	Comm, and Executed on Backend	Output
Check the SR configuration, replication status , and hostname for both PR , and DR.	hdbnsutil -sr_state	<p>Success: If no SR enabled. That means we should be able to register. Remote Host matched.</p> <p>Warning: If the SR is already configured , and replication is happening.</p> <p>Fail: If the system is not connected/No response (Network issue). Remote Host mismatched.</p>

34.6 HANACheckSRState

Description: This RAL is to check the replication status of the site.

Inputs	Output
Site Name , and SAPHANA DB The userName	If success: Displays success message. If Failure: Displays failure message.

Dry Run



Dry Run Verification	Comm, and Executed on Backend	Output
Check replication has been configured from Primary to secondary site , and Secondary to Tertiary.	hdbcons -e hdbindexserver "replication info" hdbnsutil -sr_state	Success: Replication Status is Active. Warning: Replication Status is Initializing. Error: Replication Status is not in found or not in valid state.

34.7 HANATakeoverSR

Description: This RAL is to take over the services to the DR site.

Inputs	Output
The userName	If success: Displays success message. If Failure: Displays failure message.

Dry Run

Dry Run Verification	Comm, and Executed on Backend	Output
Target server should be up , and running, , and check the instances list.	/usr/sap/hostctrl/exe/sapcontrol -nr <InstanceNumber> -function GetProcessList	Success: If all process were up , and running, System is connected. Warning: If one or more services are not available.



		Fail: If the system is not connected/No response (Network issue)
--	--	---

34.8 HANAFullSyncSR

Description: This RAL is to enable FullSync for System Replication on the server.

Inputs	Output
Site Name , and SAPHANA DB The userName	If success: Displays success message. If Failure: Displays failure message.

34.9 HANAVerifySyncState

Description: This RAL is to the Sync Status.

Inputs	Output
Group	If success: Displays success message. If Failure: Displays failure message.

Dry Run

Dry Run Verification	Comm, and Executed on Backend	Output



<p>This RAL basically checks if the ReplayLogPosition , and ShippedLogPosition are same or not.</p>	<pre>exec sudo su - \$username -c \\"hdbcons -e hdbindexserver \'replication info\\""</pre>	<p>Success: Log positions were same (shippedLogPos , and replyFinishLogPos).</p> <p>Warning: Log positions were not same (shippedLogPos , and replyFinishLogPos).</p> <p>Fail: If System is not connected/No response (Network issue)</p>
---	---	--

34.10 HANANearSite

Description: This RAL is to get current configured Near Site’s component name.

Inputs	Output
<p>Site Name , and SAPHANA DB The userName</p>	<p>If success: Displays success message. If Failure: Displays failure message.</p>

34.11 HANAFarSite

Description: This RAL is to get Current configured Far Site’s component name.

Inputs	Output
<p>GroupID</p>	<p>If success: Displays success message. If Failure: Displays failure message.</p>

34.12 HANAPrimarySite



Description: This RAL is to get current configured Primary Site’s component name.

Inputs	Output
Group ID	If success: Displays success message. If Failure: Displays failure message.

34.13 HANADisableSR

Description: This RAL is to stop the replication between sites.

Inputs	Output
Site Name , and SAPHANA DB The userName	If success: Displays success message. If Failure: Displays failure message.

34.14 CONFIRMATION

Description: This RAL stops the userfor confirmation to proceed to Far site, if the near site is not reachable.

Inputs	Output
Group	If success: Displays success message. If Failure: Displays failure message.

34.15 TRANSPOSE

Description: This RAL tranposes the output path based on the previous result, it is implemented for RTO calculation purpose.

Inputs	Output
NA	If success: Transposing to success path. If Failure: Transposing to failure path.

34.16 GETHOST



Description: This RAL gets the hostname for the given component in the key CUSTOM_ACTION_COMPONENT_NAME.

Inputs	Output
Group ID	If success: Displays success message. If Failure: Displays failure message.

34.17 HanaRegisterSRASync

Description: This RAL Registers Hana system for Async mode replication.

Inputs	Output
The userName, Remote Host, Instance number, Site Name , and Operation Mode	If success: Displays success message. If Failure: Displays failure message.

Dry Run

Dry Run Verification	Comm, and Executed on Backend	Output
Check the SR configuration , and replication status.	hdbnsutil -sr_state	<p>Success: If no SR enabled. That means we should be able to register.</p> <p>Warning: If the SR is already configured , and replication is happening.</p> <p>Fail: If the system is not connected / No response (Network issue)</p>

34.18 HanaRegisterSRSync



Description: This RAL Registers Hana system for sync mode replication.

Inputs	Output
The userName, Remote Host, Instance number, Site Name , and Operation Mode	If success: Displays success message. If Failure: Displays failure message.

Dry Run

Dry Run Verification	Comm, and Executed on Backend	Output
Check the SR configuration , and replication status.	hdbnsutil -sr_state	<p>Success: If no SR enabled. That means we should be able to register.</p> <p>Warning: If the SR is already configured , and replication is happening.</p> <p>Fail: If the system is not connected/No response (Network issue)</p>

34.19 HanaRegisterSRDynamic

Description: This RAL registers Hana system for replication with the mode given assigned to the Key REP_MODE.

Inputs	Output
REP_MODE	If success: Displays success message. If Failure: Displays failure message.

Dry Run



Dry Run Verification	Comm, and Executed on Backend	Output
Check the SR configuration , and replication status.	hdbnsutil –sr_state	<p>Success: If no SR enabled. That means we should be able to register.</p> <p>Warning: If the SR is already configured , and replication is happening.</p> <p>Fail: If the system is not connected/No response (Network issue)</p>

34.20 Takeover

Dry Run

Dry Run Verification	Comm, and executed on backend	Output
Pre-Check – Target server should be up , and running, check the instances list , and compare sap hana version as well.	exec sudo su - \$username -c \"sapcontrol -nr \$instance -function GetProcessList ; HDB version grep 'version:' xargs \"	<p>Success: If all process were up , and running, System is connected.</p> <p>Warning: If one or more services are not available.</p> <p>Error: If the system is not connected/No response (Network issue). Version mismatch</p>

34.21 RegistrationArgs

Description: This RAL sets the registration arguments for replication for the component name obtained in Key CUSTOM_ACTION_COMPONENT_NAME.

Inputs	Output
CUSTOM_ACTION_COMPONENT_NAME	<p>If success: Displays success message.</p> <p>If Failure: Displays failure message.</p>



35 SpectrumProtect

35.1 Spectrum Protect Primary Client Version Check

Description: This RAL runs on the primary Spectrum Protect Server , and provides the client version.

Inputs	Outputs	Description
PR Replication Management Server	node_name, platform_name, domain_name, tcp_address, client_version	The details are obtained from the primary protection scheme.

35.2 Spectrum Protect Remote Client Version Check

Description: This RAL runs on the remote Spectrum Protect Server , and provides the client version.

Inputs	Outputs	Description
DR Replication Management Server	node_name, platform_name, domain_name, tcp_address, client_version	The details are obtained from the remote protection scheme.

35.3 Spectrum Protect Server Version Check

Description: If the Spectrum Protect Server version is more than or equals to 8.1, the RAL provides the server version.

Inputs	Outputs	Description
DR Replication Management Server	If the Spectrum Protect Server version is higher than or equals to 8.1, the RAL provides the server version.	The details are obtained from the primary protection scheme.



36 SQL Server

36.1 Attach MSSQL Instance

This action attaches the database to msdb.

36.1.1 Description:

If RAL execution is successful then attaches the database to msdb. This RAL reads the mdf , and ldf file location/path from discovery dataset object , and attach the database.

Below is the query that gets executed in back-end on RAL execution.

SQL Comm, and: CREATE DATABASE database_name ON (FILENAME = 'mdf filename , and path'), (FILENAME = 'ldf filename , and path') FOR ATTACH ;

36.1.2 Inputs:

UI Input	The inputKey Name	Description
Dataset Name	PANMSSQL_DATASET_NAME	Select the dataset from the drop-down list.

36.1.3 Outputs

Action fails, if the agent is unable to attach the database.

Success Output: SUCCESS on component <component_name> (IP_Address)

36.2 Backup Logs

Backup Logs - Dumps a transactional log of the MSSQL database with respect to the dataset specified.

36.2.1 Description:

This action dumps a transactional log of the MSSQL database with respect to the dataset specified. This action is used in Normal Copy/Switch Over/Switch Back/Fail Over.

36.2.2 Inputs:

UI Input	The inputKey Name	Description
Dataset Name	Not Applicable	Select the dataset from the drop-down list.



UI Input	The inputKey Name	Description
Specify the full directory path where the log file needs to be backedup	PANSQL_BACKUP_LOGS_PATH	Enter the full directory path where you want to back up the log file. This field is optional.
Specify the log file name	PANSQL_BACKUPLOGS_LOGFILENAME	Enter the log file name relative to directory path. This field is optional.
Specify the Database log backup rate	PANSQL_BACKUPLOGS_BACKUPRATE_MBPS	Enter the database log backup rate in MBps. This property is used to compute action status, but not required for execution. Default value is 100. This field is optional.
Convert Database to St, andby	Not Applicable	Select this check-box to convert the database to st, and-by.
Specify the undo Log File Name with full path	PANSQL_BACKUPLOGS_UNDO_LOGDIR	Enter the undo log file name with full path.

36.2.3 Outputs:

Output Name	Output Key Name	Description
Return value(s) upon successful dump:		
Log file path	PANSQL_BACKUP_LOGS_PATH_OUTPUT	Path where the log file is dumped.
Log file name	PANSQL_BACKUPLOGS_LOGFILENAME_OUTPUT	Name of the log file relative to PANSQL_BACKUPLOGS_PATH.
Timestamp	PANSQL_BACKUPLOGS_LOGFILE_TIMESTAMP	Timestamp of the log file.
Checksum	PANSQL_BACKUPLOGS_LOGFILE_CHECKSUM	Checksum of the log file.
Last transaction ID	PANSQL_BACKUPLOGS_LASTTRANS_ID	Last transaction ID.



Last transaction timestamp	PANSQL_BACKUPLOGS_LASTTRANS_TIMESTAMP	Last transaction timestamp.
Return value(s) upon failure:		
Error message	PANSQL_BACKUPLOGS_ERROR	Error message specifying the nature of failure.

36.2.4 Error Codes:

Error Code	Description
PAN-DSQL-0047	Common exception if any error occurs during action execution on database.
PAN-DSQL-0080	Undo Log directory path is not set.
PAN-DSQL-0076	Backup log directory path is not set.
PAN-DSQL-0057	Unable to create log backup on database.

Notes:

- If the action is configured with a property, the same will be used during execution irrespective of the whether the corresponding the inputparameter is specified or not.
- The transactional logs that are backed up will be taken without any compression.

36.2.5 Prechecks

- Dataset – Configured with the inputof Key Values or Advance Properties.
 - PANSQL_BACKUPLOGS_BACKUPRATE_MBPS (backup rate) is configured with the inputof Key Values or Advance Properties.
 - PANSQL_BACKUPLOGS_UNDO_LOGDIR (undo log directory) is configured with the inputof Key Values or Advance Properties.
 - PANSQL_BACKUP_LOGS_PATH (backup log directory) is configured with the inputof Key Values or Advance Properties.
 - PANSQL_BACKUPLOGS_LOGFILENAME (backup log file name) is configured with the inputof Key Values or Advance Properties.
- Authentication.
- Selected dataset is active.



- Reduced Privileges (sysadmin/dbcreator or db_owner on PR; sysadmin on DR).
Reduced privileges are the minimum privileges required to execute the action.
- Locate directory for backup logs.
- Locate directory for undo logs.
- Database mode.
(Pre-check fails if database mode is simple or bulk logs).
- Configured dataset is the current Production dataset.



36.3 MSSQL Always ON Choose DR Availability Replica

36.3.1 Description:

This action replicates SQL Server Datasets from PR to DR.

Note:

- If there is only **one DR replica**, the RAL selects that DR replica by default.
- If there are **multiple DR replicas**, the user selects the replica on which the failover/ switchover operation must be performed.

36.3.2 Inputs:

UI Input	The inputKey Name	Description
DR_COMPONENT_NAME	DR_COMPONENT_NAME	Select the DR component name from the drop-down list.
PRIMARY_COMPONENT_NAME	PRIMARY_COMPONENT_NAME	Select the PR component name from the drop-down list.
PRIMARY_DATASET_NAME	PRIMARY_DATASET_NAME	Select the PR database name from the drop-down list.
DR_COMPONENT_IP	DR_COMPONENT_IP	Select the DR component IP address from the drop-down list.
DR_DATSET_COUNT	DR_DATASET_COUNT	Provide the number of DR databases in the text box.
PRIMARY_COMPONENT_IP	PRIMARY_COMPONENT_IP	Select the PR component IP address from the drop-down list.
PRIMARY_DATASET_COUNT	PRIMARY_DATASET_COUNT	Provide the number of PR databases in the text box.
DR_DATASET_NAME	DR_DATASET_NAME	Select the DR database name from the drop-down list.



36.4 Change DB Mode

Change DB Mode - Changes the database mode.

36.4.1 Description:

This action changes the database mode. You can change the database mode to online mode or single The usermode.

36.4.2 Inputs:

UI Input	The inputKey Name	Description
Dataset Name	Not Applicable	Select the dataset from the drop-down list.
Specify the new mode	PANSQL_CHANGE_DB_MODE	Select the mode to which you want to change the current database mode, from the drop-down list. The options are: Recover DB, Change to Single User, OFFLINE , and ONLINE. This field is m, andatory.

36.4.3 Outputs:

Output Name	Output Key Name	Description
Error message	PANSQL_CHANGE_DB_MODE_ERROR	Error message specifying the nature of failure while changing DB mode.

36.4.4 Error Codes:

Error Code	Description
PAN-DSQL-0047	Common exception if any error occurs during action execution on database.

36.4.5 Prechecks

- Dataset – Configured with the inputof Key Values or Advance Properties.



- PANSQL_CHANGE_DB_MODE (changeDBModeKey) is configured with the input of Key Values or Advance Properties.

- Authentication.
- Selected dataset is active.
- Reduced Privileges (sysadmin/dbcreator on PR; sysadmin on DR).
Reduced priviliges are the minimum privileges required to execute the action.

36.5 Choose DR Availability Replica

Choose DR Availability Replica - Chooses MSSQL AlwaysON available DR replica to operate for further actions.

36.5.1 Description

This action is used to get a list of DR Replica of AlwaysON for the configured group. The user can choose one of the DR Replica for further actions. This action gives a flexibility during test exercise or failover to choose DR Replica that is more recent or consistent.

36.5.2 Pre-requisites:

This action is applicable only for MSSQL AlwaysON solution's group.

36.5.3 Inputs:

None

36.5.4 Outputs:

Output Name	Output Key Name	Description
Dataset Name	DR_DATASET_NAME	Dataset name of the chosen DR Replica.
Total number of DR Dataset.	DR_DATASET_COUNT	Total number of DR Dataset.
Component Name	CUSTOM_ACTION_COMPONENT_NAME	Component Name of chosen DR Replica

36.6 Detach MSSQL Instance

This action detaches the database from msdb.

36.6.1 Description:

If RAL execution is successful then detaches the database from msdb.



Below is the query that gets executed in back-end on RAL execution.

SQL Comm, and: use master; exec sp_detach_db database_name;

36.6.2 Inputs:

UI Input	The inputKey Name	Description
Dataset Name	PANMSSQL_DATASET_NAME	Select the dataset from the drop-down list.

36.6.3 Outputs:

Action fails, if the agent is unable to detach the database.

Success Output: SUCCESS on component <component_name> (IP_Address)

36.7 Execute SQL

36.7.1 Description:

This action is used for executing any SQL comm, and.

36.7.2 Inputs:

UI Input	The inputKey Name	Description
Dataset Name	Not Applicable	Select the dataset from the drop-down list.
Specify the SQL to Execute	PANSQL_EXEC_SQL	Enter the SQL comm, and to execute.

36.7.3 Outputs:

Execute SQL action does not return any value.

36.7.4 Error Codes:

Error Code	Description
PAN-DSQL-0047	Common exception if any error occurs during action execution on database.

36.8 Execute SQL File



36.8.1 Description:

This action is used for executing .sql file have multiple sql comm, and/queries comm, and.

36.8.2 Inputs:

UI Input	The inputKey Name	Description
Dataset Name	PANMSSQL_DATASET_NAME	Select the dataset from the drop-down list.
Specify the SQL to Execute	PANMSSQL_EXECSQL_FILE_NAME	SQL file has to be kept in PR , and DR server similar to oracle solution’s execute sql file RAL. Note: <ul style="list-style-type: none"> • The file can have multiple commands, separated by a comma , and saved with .sql extension. • If the SQL file has incorrect queries, the file execution should fail , and display errors.

36.8.3 Outputs:

Displays the sql execution log of the sql file.

36.8.4 Error Codes:

Error Code	Description
PAN_DSQL_0077	Common exception if any error occurs during action execution on database.

Note:

- Execute SQL File RAL fails, if the path has space in between the folder name.
- If the SQL file has incorrect queries, the file execution should fail , and display errors.

If the property file ExecSQLRAL_FAILURE_PATTERNS_FILE is configured with error codes, when the Execute SQL File RAL execution finds any incorrect queries, which matches the configured error codes, it fails to execute the file , and displays error.

36.9 Get DB Mode

36.9.1 Description:

This action is used to get the current mode of the database.



36.9.2 Inputs:

UI Input	The inputKey Name	Description
Dataset Name	PANMSSQL_DATASET_NAME	Select the dataset from the drop-down list.

36.9.3 Outputs:

Output Name	Output Key Name	Description
Message	PANSQL_DB_MODE_STR	Gives information on the current database mode.
Code	PANSQL_DB_MODE_CODE	Code corresponding to the message.

36.9.4 Error Codes:

Error Code	Description
PAN-DSQL-0047	Common exception if any error occurs during action execution on database.

36.10 Load Logs

Load Logs - Loads/applies a transactional log of the MSSQL database with respect to the dataset specified.

36.10.1 Description:

This action loads/applies a transactional log of the MSSQL database with respect to the dataset specified. This action is used in Normal Copy/Switch Over/Switch Back/Fail Over.

36.10.2 Inputs:

UI Input	The inputKey Name	Description
Dataset Name	Not Applicable	Select the dataset from the drop-down list.
Specify the full directory path where the log file needs to be loaded	PANSQL_LOADLOG S_PATH	Enter the full directory path where you want to load/apply the log file.



UI Input	The inputKey Name	Description
		This field is optional.
Specify the list of log file names to restore	PANSQL_LOADLOGS_LOGFILES	Enter the log file name , and click Add. Select the log file name , and click Remove if you want to remove added log file from the list. This field is optional.
Specify the Database log restore rate	PANSQL_LOADLOGS_LOADRATE_MBPS	Enter the database log restore rate in MBps. Default value is 100. This field is optional.
Undo Log Directory	PANSQL_LOADLOGS_UNDO_LOGDIR	Enter the full path for undo log file. This field is optional.
Primary Component Name	PANSQL_BACKUPLOGS_COMPONENT	Enter the name of the component containing the backup Log. This information is used to compute checksum. This field is optional.
Backup Path on Primary	PANSQL_BACKUP_LOGS_PATH	Enter the path where the log file are dumped. This is the path from where SQL server gets transaction logs to apply. This field is optional.

36.10.3 Outputs:

Output Name	Output Key Name	Description
Return value(s) upon successful dump:		
Log file path	PANSQL_LOADLOGS_PATH_OUTPUT	Path where the log file is dumped.
Log file names	PANSQL_LOADLOGS_LOGFILES_OUTPUT	Comma separated log file names relative to PANSQL_LOADLOGS_PATH loaded/applied.



Output Name	Output Key Name	Description
Timestamp	PANSQL_LOADLOGS_LOGFILE_TIMESTAMP	Timestamp of the log file.
Last transaction timestamp	PANSQL_LOADLOGS_LASTTRANS_TIMESTAMP	Last Transaction timestamp
Return value(s) upon failure:		
Error message	PANSQL_LOADLOGS_ERROR	Error message specifying the nature of failure.

36.10.4 Error Codes:

Error Code	Description
PAN-DSQL-0047	Common exception if any error occurs during action execution on database.
PAN-DSQL-0080	Undo Log directory path is not set.
PAN-DSQL-0079	Restore log directory path is not set.
PAN-DSQL-0057	Unable to create log backup on database.

Note:

If the action is configured with a property, the same will be used during execution irrespective of the whether the corresponding the inputparameter is specified or not.

36.10.5 Prechecks

- Dataset – Configured with the input of Key Values or Advance Properties.
 - PANSQL_LOADLOGS_PATH (load logs path) is configured with the input of Key Values or Advance Properties.
 - PANSQL_LOADLOGS_LOGFILES (log file name) is configured with the input of Key Values or Advance Properties.
 - PANSQL_LOADLOGS_LOADRATE_MBPS (logs load rate) is configured with the input of Key Values or Advance Properties.



- PANSQL_LOADLOGS_UNDO_LOGDIR (undo directory path) is configured with the input of Key Values or Advance Properties.
 - PANSQL_BACKUP_LOGS_PATH (backup path on primary) is configured with the input of Key Values or Advance Properties.
- Authentication.
 - Selected dataset is active.
 - Reduced Privileges (sysadmin/dbcreator on PR; sysadmin on DR).
Reduced privileges are the minimum privileges required to execute the action.
 - Locate directory for load logs.
 - Checksum for files on backup of primary.
 - Configured dataset is the current DR dataset.

36.11 Start MSSQL Instance

This action starts mssql instance server.

36.11.1 Description:

If RAL execution is successful then starts mssql instance server.

Below is the query that gets executed in back-end on RAL execution.

SQL Comm, and: `exec net start /y mssqlserver;`

36.11.2 Inputs:

UI Input	The inputKey Name	Description
Dataset Name	PANMSSQL_DATASET_NAME	Select the dataset from the drop-down list.

36.11.3 Outputs:

Action fails, if the agent is unable to start mssql instance server.

Success Output: The SQL Server Agent (MSSQLSERVER) service was started successfully. on component (IP_Address)

36.12 Stop MSSQL Instance

This action stops mssql instance.



36.12.1 Description:

If RAL execution is successful then stop mssql instance.

Below is the query that gets executed in back-end on RAL execution.

SQL Comm, and: exec net stop /y mssqlserver;

36.12.2 Inputs:

UI Input	The inputKey Name	Description
Dataset Name	PANMSSQL_DATASET_NAME	Select the dataset from the drop-down list.

36.12.3 Outputs:

Action fails, if the agent is unable to stop mssql instance.

Success Output: The SQL Server (MSSQLSERVER) service was stopped successfully. on component (IP_Address) Additional info: {} <component_name> (IP_Address).

36.13 Verify DB Mode

36.13.1 Description:

This action is used to verify, whether the database is in the required status or not.

36.13.2 Inputs:

UI Input	The inputKey Name	Description
Dataset Name	PANMSSQL_DATASET_NAME	Select the dataset from the drop-down list.
Specify the database mode to be verified	PANMSSQL_VERIFY_DATABASE_MODE	Select the database mode to be verified from the drop-down list

36.13.3 Outputs:

Success Output: DB Mode Successfully Verified as NORMAL for database <database_name> on component <component_name> (IP_Address).



37 SyBase

37.1 Sybase BackUp Server Operation

37.1.1 Description:

This RAL will do 2 operation i.e. start, stop of Sybase backup server Instance

Below is the query that gets executed in back-end on RAL execution.

- START:startserver -f /opt/sybase/ASE-15_0/install/RUN_RHELSYBASE02_BS
- STOP:kill backup server process id

37.1.2 Inputs:

The inputName	The inputType	The inputKey Name	Optional/M, andatory	Description
Dataset Name	String	PANSYBASE_DATASET_NAME	M, andatory	Select the dataset name from the drop-down list.
Select DB2 Instance Operation	String	SYB_BACKUP_SERVER_OPERATION	M, andatory	Select the state from the drop-down list(START/STOP).

37.1.3 Outputs

- Action fails, if the agent is unable to start/stop the sybase instance
- Success Output:

START : Sybase backup server started successfully.

STOP : Sybase backup server stopped successfully.

37.2 SybaseDataServerOperation

37.2.1 Description:

This RAL will perform 2 operations i.e. start , and stop of Sybase data server Instance. Below is the query that gets executed in back-end on RAL execution.

- START:startserver -f /opt/sybase/ASE-15_0/install/RUN_RHELSYBASE02
- STOP:kill dataserver process id

37.2.2 Inputs:



The inputName	The inputType	The inputKey Name	Optional/M, andatory	Description
Dataset Name	String	PANSYBASE_DATASET_NAME	M, andatory	Select the dataset name from the drop-down list.
Select DB2 Instance Operation	String	SYB_DATA_SERVER_OPERATION	M, andatory	Select the state from the drop-down list(START/STOP).

37.2.3 Outputs

- Action fails, if the agent is unable to start/stop the sybase instance
- Success Output:

START : Sybase data server started successfully.

STOP : Sybase data server stopped successfully.

37.3 Sybase Execute SQL

37.3.1 Description:

This RAL will execute Sybase database query. Below is the sample query that we need to provide in RAL input.

Sybase Comm, and: sp_helpdb;

37.3.2 Inputs:

The inputName	The inputType	The inputKey Name	Optional/M, andatory	Description
Dataset Name	String	PANSYBASE_DATASET_NAME	M, andatory	Select the dataset name from the drop-down list.
Execute SQL	String	SYB_EXECUTE_SQL	M, andatory	Provide the dataset SQL query.



37.3.3 Output:

- Action fails if the Sybase database query has syntax error.
- Success output: Display output of the query. If the query has no output then it will print "Comm, and has executed successfully".

37.3.4 Prechecks

- Dataset – configured with the inputKey Values or Advance Properties.
- Authentication.
- Selected dataset is active.
- Privileges before executing any comm, and.
- Database connectivity.

37.4 Sybase Validate Server State

37.4.1 Description:

This RAL will show the validating running status of the server.

37.4.2 Inputs

The inputName	The inputType	The inputKey Name	Optional/M, andatory	Description
Dataset Name	String	PANSYBASE_DATASET_NAME	M, andatory	Select the dataset name from the drop-down list.
Select Database server type	String	SYB_DATABASE_SERVER_TYPE	M, andatory	Select the state from the drop-down list(DATASERVER/BACKUPSEVER).
Select server state	String	SYB_VALIDATE_SERVER_STATE	M, andatory	Select the state from the drop-down list(ONLINE/OFFLINE).

37.4.3 Outputs

- Data server ONLINE state verified
- Data server OFFLINE state verified
- Backup server ONLINE state verified
- Backup server OFFLINE state verified
- Data server state verification failed
- Backup server state verification failed



38 VMware vCenter

These RALs runs on VMware vCenter , and executed actions on VMware entities like Virtual Machines, Data stores, HBAs etc.

Pre-requisites for VMware VCenter RALs

- Configure Windows Server where VCenter Service is running as Component.
- Configure VCenter Server as Dataset with above as Component giving Credentials required to Login into VSphere client with Admin privileges.
- To execute these RALs, one group should have been created using above step as component.
- Make sure VMware vCenter Agent is up , and running on Admin page.

38.1 Add VMDK to Virtual Machine

38.1.1 Description

This action adds disk to Virtual Machine.

38.1.2 Inputs

The inputName	The inputType	Optional/ M, andatory	Description
VMware VC Dataset	String	M, andatory	Select the dataset from the dropdown list.
Virtual Machine(VM) Name	String	M, andatory	The inputthe VM name.
VMDK File Path	String	M, andatory	The inputthe path of VDMK file with data store.
Mode (Persistent, Independent-persistent, Independent-nonpersistent)	String	M, andatory	The inputthe mode of the VM.
Wait Till Completion	Checkbox	M, andatory	Control waits at Vcenter till the operation completes, if checked.

38.1.3 Outputs

Action fails if agent is not able to connect or execution fails at vCenter.



38.2 Create Snapshot of Virtual Machine

38.2.1 Description

This action creates a snapshot of Virtual Machine.

38.2.2 Inputs

The inputName	The inputType	Optional/ M, andatory	Description
VMware VC Dataset	String	M, andatory	Select the dataset from the dropdown list.
Virtual Machine(VM) Name	String	M, andatory	The inputthe VM name.
Snapshot Name	String	M, andatory	The inputthe Snapshot name.
Description	String	Optional	The inputthe description for Snapshot.
Wait Till Completion	Checkbox	M, andatory	Control waits at vCenter till the operation completes, if checked.

38.2.3 Outputs

Action fails if agent is not able to connect or execution fails at vCenter.

38.3 Delete Snapshot of Virtual Machine

38.3.1 Description

This action deletes a snapshot of Virtual Machine.

38.3.2 Inputs

The inputName	The inputType	Optional/ M, andatory	Description
VMware VC Dataset	String	M, andatory	Select the dataset from the dropdown list.
Virtual Machine(VM) Name	String	M, andatory	The inputthe VM name.



Snapshot Name	String	M, mandatory	The input the Snapshot name.
Wait Till Completion	Checkbox	M, mandatory	Control waits at Vcenter till the operation completes, if checked.

Note

This deletes the complete chain/hierarchy of snapshots.

38.3.3 Outputs

Action fails if agent is not able to connect or execution fails at vCenter.

38.4 Power on Virtual Machine

38.4.1 Description

This action initiates power on of a Virtual Machine.

38.4.2 Inputs

The inputName	The inputType	Optional/ M, mandatory	Description
VMware VC Dataset	String	M, mandatory	Select the dataset from the dropdown list.
Virtual Machine(VM) Name	String	M, mandatory	The input the VM name to be powered on.
Wait Till Completion	Checkbox	M, mandatory	Control waits at Vcenter till the operation completes, if checked.

38.4.3 Outputs

Action fails if agent is not able to connect or execution fails at vCenter.

38.5 Power off Virtual Machine

38.5.1 Description

This action initiates power off of a Virtual Machine.

38.5.2 Inputs

The inputName	The inputType	Optional/ M, mandatory	Description
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VMware VC Dataset	String	M, andatory	Select the dataset from the dropdown list.
Virtual Machine(VM) Name	String	M, andatory	The inputthe VM name to be powered off.
Wait Till Completion	Checkbox	M, andatory	Control waits at Vcenter till the operation completes, if checked.

38.5.3 Outputs

Action fails if agent is not able to connect or execution fails at vCenter.

38.6 Reboot Virtual Machine

38.6.1 Description

This action reboots a Virtual Machine.

38.6.2 Inputs

The inputName	The inputType	Optional/ M, andatory	Description
VMware VC Dataset	String	M, andatory	Select the dataset from the dropdown list.
Virtual Machine(VM) Name	String	M, andatory	The inputthe VM name to be rebooted.

38.6.3 Outputs

Action fails if agent is not able to connect or execution fails at vCenter.

38.7 Reset Virtual Machine

38.7.1 Description

This action resets a Virtual Machine.

38.7.2 Inputs

The inputName	The inputType	Optional/ M, andatory	Description
VMware VC Dataset	String	M, andatory	Select the dataset from the dropdown list.
Virtual Machine(VM) Name	String	M, andatory	The inputthe VM name to be reset.



The inputName	The inputType	Optional/ M, andatory	Description
Wait Till Completion	Checkbox	M, andatory	Control waits at Vcenter till the operation completes, if checked.

38.7.3 Outputs

Action fails if agent is not able to connect or execution fails at vCenter.

38.8 Re-configure CPU Allocation of Virtual Machine

38.8.1 Description

This action re-configures the CPU allocation of Virtual Machine.

38.8.2 Inputs

The inputName	The inputType	Optional/ M, andatory	Description
VMware VC Dataset	String	M, andatory	Select the dataset from the dropdown list.
Virtual Machine(VM) Name	String	M, andatory	The inputthe VM name for which the CPU allocation should be re-configured.
Limit (Maximum)	Number	M, andatory	The inputthe Integer number. Unit is in MHz.
Reservation (Maximum Guaranteed)	Number	M, andatory	The inputthe Integer number. Unit is in MHz. Note: Reservation cannot be greater than Limit.
Wait Till Completion	Checkbox	M, andatory	Control waits at Vcenter till the operation completes, if checked.

38.8.3 Outputs

Action fails if agent is not able to connect or execution fails at vCenter.

38.9 Re-configure Memory Allocation of Virtual Machine

38.9.1 Description



This action re-configures the memory allocation of Virtual Machine.

38.9.2 Inputs

The inputName	The inputType	Optional/M, andatory	Description
VMware VC Dataset	String	M, andatory	Select the dataset from the dropdown list.
Virtual Machine(VM) Name	String	M, andatory	The inputthe VM name for which the memory allocation should be re-configured.
Limit (Maximum)	Number	M, andatory	The inputthe Integer number. Unit is in MB.
Reservation (Maximum Guaranteed)	Number	M, andatory	The inputthe Integer number. Unit is in MB. Note: Reservation cannot be greater than Limit.
Wait Till Completion	Checkbox	M, andatory	Control waits at Vcenter till the operation completes, if checked.

38.9.3 Outputs

Action fails if agent is not able to connect or execution fails at vCenter.

38.10 Add Virtual Machine to Inventory

38.10.1 Description

This action adds Virtual Machine (VM) to the inventory.

38.10.2 Inputs

The following is a list of inputs that are required to perform this action.

The inputName	The inputType	Key Name	Optional/M, andatory	Description
VCenter Management Service	String	PANVC_MGMT_SVC_NAME	M, andatory	Select the VCenter Management service.
Datacenter Name	String	PANVC_DC_NAME	M, andatory	Select the Datacenter name.



The inputName	The inputType	Key Name	Optional/M,andatory	Description
ESX Host Name	String	PANVC_VM_HOST_NAME	M,andatory	Select the ESX host IP.
Resource Pool Name	String	PANVC_RESOURCE_POOL_NAME	Optional	Select the Resource Pool name where the new VM is to be added.
Datastore Name	String	PANVC_DATASTORE	M,andatory	Select the Datastore name.
VMX File Path	String	PANVC_VMX_PATH	M,andatory	Select the VMX path.
New VM Name	String	PANVC_VMX_NAME	M,andatory	The new VM name is the default name. The inputany text to provide a name for the new VM, if required.
Wait Till Completion	Checkbox	PANVC_WAIT_TILL_COMPLETION	Optional	Select the Wait Till Completion check box if the control needs to wait at VCenter till the operation completes.

38.10.3 Outputs

The following are the outputs for Add Virtual Machine (VM) to Inventory action:

- This action succeeds in adding VM to the inventory if all inputs are valid , and inputs are in required state.
- This action fails in case of any of the following events:
 - Agent is unable to connect.
 - Execution fails at VCenter.
 - The inputs are inappropriate.

38.11 Remove Virtual Machine from an Inventory

38.11.1 Description

This action removes existing Virtual Machine (VM) from an Inventory.

38.11.2 Inputs

The following is a list of inputs that are required to perform this action.



The inputName	The inputType	Key Name	Optional/M, andatory	Description
VCenter Management Service	String	PANVC_MGMT_SVC_NAME	M, andatory	Select the VCenter Management service.
Datacenter Name	String	PANVC_DC_NAME	M, andatory	Select the Datacenter name.
VMName	String	PANVC_VM_NAME	M, andatory	Select the VM name, which needs to be removed from an inventory.

38.11.3 Outputs

The following are the outputs of the Remove Virtual Machine from an Inventory action:

- This action succeeds in removing VM from an inventory if all inputs are valid , and the inputs are in required state.
- This action fails in case of any of the following events:
 - Agent is unable to connect
 - Execution fails at VCenter
 - The inputs are inappropriate

38.12 Remove VMDK from Virtual Machine

38.12.1 Description

This action removes VDMK file from Virtual Machine.

38.12.2 Inputs

The inputName	The inputType	Optional/M, andatory	Description
VMware VC Dataset	String	M, andatory	Select the dataset from the dropdown list.
Virtual Machine(VM) Name	String	M, andatory	The inputthe VM name.



Hard Disk Name	String	M, andatory	The inputthe name of the hard disk. <i>(For Example: Hard disk 1)</i>
Wait Till Completion	Checkbox	M, andatory	Control waits at Vcenter till the operation completes, if checked.

38.12.3 Outputs

Action fails if agent is not able to connect or execution fails at vCenter.

38.13 Restore Snapshot of Virtual Machine

38.13.1 Description

This action restores a snapshot of Virtual Machine.

38.13.2 Inputs

The inputName	The inputType	Optional/ M, andatory	Description
VMware VC Dataset	String	M, andatory	Select the dataset from the dropdown list.
Virtual Machine(VM) Name	String	M, andatory	The inputthe VM name.
Snapshot Name	String	M, andatory	The inputthe Snapshot name.
Wait Till Completion	Checkbox	M, andatory	Control waits at Vcenter till the operation completes, if checked.

38.13.3 Outputs

Action fails if agent is not able to connect or execution fails at vCenter.

38.14 Rescan HBA

38.14.1 Description

This action rescans HBA on the host.

38.14.2 Inputs



The inputName	The inputType	Optional/ M, andatory	Description
VMware VC Dataset	String	M, andatory	Select the dataset from the dropdown list.
Virtual Machine(VM) Name	String	M, andatory	The inputthe VM name.
HBA Name	String	M, andatory	The inputthe HBA name to be rescanned.

38.14.3 Outputs

Action is always successful even if at VCenter actual action fails.

38.15 Shutdown Virtual Machine

38.15.1 Description

This action shuts down a Virtual Machine.

38.15.2 Inputs

The inputName	The inputType	Optional/ M, andatory	Description
VMware VC Dataset	String	M, andatory	Select the dataset from the dropdown list.
Virtual Machine(VM) Name	String	M, andatory	The inputthe VM name to be shutdown.

38.15.3 Outputs

Action is always successful even if at vcenter actual execution fails.

38.16 Mount Datastore

38.16.1 Description

This RAL mounts the datastore to an ESXi or ESXi Cluster.

38.16.2 Inputs

The following is a list of inputs that are required to perform this action.



The inputName	M,andatory Field	Description
VMHost/ESXCluster	Yes	Specify a host where you want to create the new datastore.
Name	Yes	Specify a name for the new datastore.
Path	Yes	Three options. You should provide radio buttons , and according to the selection you should execute one of the above comm, and: 1. If you want to create a local datastore, specify the file path to the directory where the virtual machine data is stored. 2. If you want to create an NFS/CIFS datastore, specify the remote path of the NFS mount point. 3. If you want to create a VMFS datastore, specify the canonical name of the SCSI logical unit that will contain new VMFS datastores.
Vmfs	No	Indicates that you want to create a VMFS datastore.
BlockSizeMB	No	Specify the maximum file size of VMFS in megabytes (MB). If no value is given, the maximum file size for the current system platform is used.
Local	No	Indicates that you want to create a local datastore.
Nfs	No	Indicates that you want to create a NFS datastore.
NfsHost	Yes	Specify the NFS host where you want to create the new datastore.
ReadOnly	No	Indicates that the access mode for the mount point is ReadOnly. The default access mode is ReadWrite.
Cifs	No	Indicates that you want to create a CIFS datastore.
Username	Yes	Specify the username you want to use for authentication with the CIFS server.
Password	Yes	Specify the password you want to use for authentication with the CIFS server.

38.16.3 Outputs

The following are outputs for the Mount Datastore action:

- This action succeeds in mounting the datastore if the datastore is valid , and in unmounted state.
- This action fails in case of any of the following events:



- Agent is unable to connect.
- Execution fails at VCenter.
- Datastore is invalid.
- Datastore is in mounted state.

38.17 Unmount Datastore from Host

38.17.1 Description

This action unmounts the data store from the host.

38.17.2 Inputs

The inputName	The inputType	Optional/ M, andatory	Description
VMware VC Dataset	String	M, andatory	Select the dataset from the drop-down list.
Virtual Machine(VM) Name	String	M, andatory	The inputthe VM name.
Datastore Name	String	M, andatory	The inputthe data store name to be unmounted from the host.

38.17.3 Outputs

Action is always successful even if actual action on VCenter fails.

38.18 Create Route Table

38.18.1 Description

This action creates snapshot for the VMware's Virtual machine.

38.18.2 Inputs

The inputName	The inputType	The inputKey Name	Optional/ M, andatory
Vcenter Management Service	Choose from list of discovered vcenter management service	PANVC_MGMT_SVC_NAME	M, andatory



The inputName	The inputType	The inputKey Name	Optional/M, andatory
Datacenter Name	Choose datacenter once the vcenter is selected	PANVC_DC_NAME	M, andatory
Virtual Machine(VM) Name	Choose VM once datacenter is selected	PANVC_VM_NAME	M, andatory
Snapshot Name	Provide snapshot name	PANVC_VM_SNAPSHOT_NAME	M, andatory
Description	Provide description for snapshot	PANVC_VM_SNAPSHOT_DESC	Optional
Quiesce	select checkbox	PANVC_SNAPSHOT_QUIESCE	Optional

38.18.3 Outputs

Output Name	Output Key Name	Description
PANVC DC Name	PANVC_DC_NAME	Provided datacenter name
PANVC MGMT SVC Name	PANVC_MGMT_SVC_NAME	Provided vcenter management service name
PANVC VM Name	PANVC_VM_NAME	Provided VM name
PANVC VM Snapshot Id	PANVC_VM_SNAPSHOT_ID	Created snapshot ID
PANVC VM Snapshot Create Name	PANVC_SNAPSHOT_CREATE_TIME	Snapshot create time
PANVC VM Snapshot Name	PANVC_VM_SNAPSHOT_NAME	Provided snapshot name

38.19 Change Port Group Mapping for Virtual Machine



38.19.1 Description

This RAL is listed as VmwareChangePortgroupsMapping under VMware vCenter category. It is used to change, one or all source port groups of a VM to destination, as per the mapping provided by user. This action changes port groups mapping for VMware Virtual Machine (VM). This RAL is supported for vCenter with Standard switch, and Distributed switch.

38.19.2 Inputs

The inputName	The inputType	The inputKey Name	Optional/M, andatory	Description
Type of Search	Boolean	N/A	M, andatory	Select type of search as “VM Name” or “All”.
Search by VMName	String	N/A	Optional	Provide valid VMName to search
VCenter Management Service	String	PANVC_MGMT_SVC_NAME	M, andatory	Select the VCenter Management service.
Datacenter Name	String	PANVC_DC_NAME	M, andatory	Select the datacenter name.
Virtual Machine (VM) Name	String	PANVC_VM_NAME	M, andatory	Select the VM name.
Network Adapter Name (Source Port Group)	String	PANVC_PORTGROUP_NAME	Optional	Select the network adapter(if available from drop-down).
Available Port Group Name (Destination Port Group)	String	PANVC_AVAILABLE_PGS_NAME	M, andatory	Select the available port group.



Note: Port group mapping is mandatory to configure through UI Navigation: Discover/vCenter Resource Mapping/Port Group Mapping if network adaptor or available port group name is not configured.

- Select option to search based on the below mentioned search types:
 - VM Name
 - All
- The input type is radio button. It is mandatory to select one of the options. Default option will be “VM Name” radio button selected/checked on page load.
- If the user option is search by “VM Name”, then provide a valid VM Name in the textbox for “Search By VM Name” in the UI, and proceed. Observe that the selected VM Name populates in the dropdown field of “Virtual Machine(VM) Name”.
- If the user wants to select the VM from the dropdown list of “Virtual Machine(VM) Name”, then select the radio option “All”. Observe that the “Search By VM Name” text box is disabled. Select the VM from the dropdown list of “Virtual Machine(VM) Name”.
- In case of an invalid VM name is provided, observe that the Virtual Machine(VM) Name dropdown field is empty as the VM is not found with the given name in the selected Data Center.
- If inputs are given as part of key-value pairs, ensure the RAL UI values for “Network Adapter Name (Source Port Group)”, and “Available Port Group Name (Destination Port group)” is given from the **Select** drop-down. Else the key-value pairs may not be considered for a change of the port, or it displays an error.
- In cases where VMs have multiple network adaptors, Key Value should be used instead of RO UI.
- If the source port is not configured, then the user can only configure single destination port group.

38.20 VMware Guest OS Customization RAL

38.20.1 Description

This RAL is listed as VMwareVcGuestOsCustomization under VMware vCenter category. It is used to customize the Operating System parameters like password, DNS name, Computer Name, Workgroup, Organization Name, IP etc.

Prerequisite: In the ESXi, the Port number 443 needs to be open for the execution of this RAL.



The following is a list of inputs that are required to perform this action.

The inputName	The inputType	The inputKey Name	Optional/ M, andatory	Description
VCenter Management Service	String	PANVC_MGMT_SVC_NAME= VCenter Management Service Name	M, andatory	Select the VCenter Management service from the list of discovered VCenter management services drop-down.
Datacenter Name	String	PANVC_DC_NAME = Data Center Name	M, andatory	Select the datacenter name from the drop-down list.
Virtual Machine (VM) Name	String	PANVC_VM_NAME = Virtual Machine Name	M, andatory	Select the VM name.
OS Type	String	PANVC_OS_TYPE = OS Type (LINUX or WINDOWS)	M, andatory	Select the OS type (Linux or Windows) as per the VM selected
IP Address Type	String	PANVC_IP_ADDRESS_TYPE = STATIC or DYNAMIC Note: If value is provided as STATIC, then IP address, Gateway , and Subnet KV pair should also be provided. If value is provided as DYNAMIC, then IP Address, Gateway , and Subnet KV pair is not required. PANVC_IP_ADDRESS = New IP Address for the VM PANVC_GATEWAY = New Gateway for the VM PANVC_SUBNET = New Subnet for the VM	M, andatory	Select the IP Address type from the drop-down list. • Static: If Static IP Address is selected, 3 more fields will be added/displayed. 1. IP Address – New IP Address of the VM. 2. Gateway – New Gateway of the VM. 3. Subnet – New Subnet of the VM. • Dynamic
DNS Server list	String	PANVC_DNS_SERVER= DNS server name	Optional	DNS server name



The inputName	The inputType	The inputKey Name	Optional/ M, andatory	Description
DNS Suffix list	String	PANVC_DNS_SUFFIX= DNS server suffix	Optional	DNS Suffix name
DNS Domain	String	PANVC_DNS_DOMAIN= DNS Domain name	M, andatory	DNS Domain name
Computer name	String	PANVC_VM_HOSTNAME= New Hostname for the VM	M, andatory	Hostname of the VM
Workgroup	String	PANVC_WORKGROUP= Workgroup name	Optional	Workgroup name
Organizational name	String	PANVC_ORG_NAME = Organization name	M, andatory	Organizational name

Note:

While upgrading to the current version of Kyndryl RO, the existing GuestOSCustomization RALs must be dropped/deleted from the application , and a new GuestOSCustomization RAL is created/configured.

38.20.3 Output

Action fails if agent is not able to connect or execution fails at vCenter.
VM Replication with Storage Solution

38.21 Unmount Datastore from ESXi

38.21.1 Description

This RAL unmounts the datastore from an ESXi or ESXi cluster.

38.21.2 Inputs

The following is a list of inputs that are required to perform this action.

The inputName	M, andatory Field	Description
VM	Yes	Run async should be false. This means comm, and should wait until it unmounts successfully.



Datastore	Yes	Name of the datastore that needs to be unmounted.
-----------	-----	---

38.21.3 Outputs

The following are the outputs for the Unmount Datastore from an ESXi action:

- This action succeeds in unmounting the datastore if the datastore is valid , and in mounted state.
- This action fails in case of any of the following events:
 - Agent is unable to connect
 - 4. Execution fails at VCenter
 - 5. Datastore is invalid
 - 6. Datastore is in unmounted state

38.22 Mount datastore : (Enhancement for ESX Cluster)

38.22.1 Description

This RAL mounts the datastore to an ESXi or ESXi Cluster.

For cluster, it will run for number of times (equal to no. of ESX in cluster). RAL underlying commands remain unchanged.

38.22.2 Inputs:

Options	M,andatory Field	Auto drop down	Comments
VMHost/ESXCluster	Yes	Yes	Specify a host where you want to create the new datastore.
Name	Yes	Yes	Specify a name for the new datastore.
Path	Yes	No	Three options. We should provide radio buttons , and according to the selection we should execute one of the above comm, and - 1. If you want to create a local datastore, specify the file path to the directory where the virtual machine data is stored. 2. If you want to create an NFS/CIFS datastore, specify the remote path of the NFS mount point.



Options	Mandatory Field	Auto drop down	Comments
			3. If you want to create a VMFS datastore, specify the canonical name of the SCSI logical unit that will contain new VMFS datastores.
Vmfs	No	No	Indicates that you want to create a VMFS datastore.
BlockSizeMB	No	No	Specify the maximum file size of VMFS in megabytes (MB). If no value is given, the maximum file size for the current system platform is used.
Local	No	No	Indicates that you want to create a Local datastore.
Nfs	No	No	Indicates that you want to create a NFS datastore.
NfsHost	Yes	No	Specify the NFS host where you want to create the new datastore.
ReadOnly	No	No	Indicates that the access mode for the mount point is ReadOnly. The default access mode is ReadWrite.
Cifs	No	No	Indicates that you want to create a CIFS datastore.
Username	Yes	No	Specify the username you want to use for authentication with the CIFS server.
Password	Yes	No	Specify the password you want to use for authentication with the CIFS server.
			Whatif , and confirm options should be always false.

38.22.3 Comm, and

```

New-Datastore [-Server <VIServer[]>] [-VMHost/ESXCluster] <VMHost/ESXCluster []> [-Name]
<String> -Path <String> [-Vmfs] [-BlockSizeMB <Int32>] [-WhatIf] [-Confirm] [<CommonParameters>]
New-Datastore [-Server <VIServer[]>] [-VMHost] <VMHost[]> [-Name] <String> -Path <String> [-
Local] [-WhatIf] [-Confirm] [<CommonParameters>]
New-Datastore [-Server <VIServer[]>] [-VMHost] <VMHost[]> [-Name] <String> -Path <String> [-Nfs]
-NfsHost <String> [-ReadOnly] [-WhatIf] [-Confirm] [<CommonParameters>]
New-Datastore [-Server <VIServer[]>] [-VMHost] <VMHost[]> [-Name] <String> -Path <String> -
NfsHost <String> [-ReadOnly] [-Cifs] -Username <String> -Password <String> [-WhatIf] [-Confirm]
[<CommonParameters>]
    
```

38.23 Remove Hard disk from VM

This RAL will remove hard disk from the VM



38.23.1 Comm, and

Get-HardDisk -VM \$vm | Remove-HardDisk

Options	M, andatory Field	Auto drop down	Comments
VM	Yes	Yes	Run Async should be always false. That means comm, and should wait until it unmounts successfully.
Harddisk	Yes	Yes	Should be like Hard Disk1 or 2

38.24 Add Hard disk to VM

This RAL will add the hard disk to the VM depends on the disk type.

38.24.1 Inputs:

38.24.2 Comm, and

New-HardDisk [[-Persistence] <String>] [[-DiskType] <DiskType>] [-DeviceName <String>] [-Datastore <Datastore>] [-VM] <VirtualMachine[]>

New-HardDisk [[-Persistence] <String>] -DiskPath <String> [-VM] <VirtualMachine[]>

Options	M, andatory Field	Auto drop down	Comments
VM	Yes	Yes	
DiskPath	Yes		should be entered manually like "[storage1] OtherVM/OtherVM.vmd k"
DiskType	No		
DeviceName	No		
Datastore	No		

38.25 Remove VM from inventory

This RAL will remove VM from inventory

Comm, and

Remove-Inventory [-Item] <InventoryItem[]> [-RunAsync] [-WhatIf] [-Confirm] [<CommonParameters>]

Options	M, andatory Field	Auto drop down	Comments
Item	Yes	Yes	Should be Virtual Machine name



Runasync	No	No	This should be false always.
----------	----	----	------------------------------

VM Name: Should be a drop-down list once The userselect the mgmt. service.

38.26 Add VM to Inventory

This will add VM to inventory using vmx file. In case of resource pool as one of the inputs, the RAL brings VM to that resource pool.

In case of a cluster environment, add VM to first available ESX host in a cluster.

38.26.1 Inputs:

38.26.2 Comm, and

New-VM -VMFilePath \$VMXFile -VMHost \$ESXHost -Location \$VMFolder -RunAsync -ResourcePool \$ResourcePool

Options	M,andatory Field	Auto drop down	Comments
VMHost	Yes	Yes	Should be of ESX host
Location	No	No	Specify the folder if anywhere The userwants to place the VM
VMXFile	No	No	End The userhas to enter the vmx file path manually.
ResourcePool	No	No	Resource Pool Name

38.27 Power off VM

This RAL will power off the VM. It is not a graceful shutdown.

38.27.1 Comm, and

Stop-VM [-Kill] [-RunAsync] [-VM] <VirtualMachine[]> [-Server <VServer[]>] [-WhatIf] [-Confirm] [<CommonParameters>]

Options	M,andatory Field	Auto drop down	Comments
VirtualMachine	Yes	Yes	Should be Virtual Machine name
Runasync	No	No	This should be false always.

38.28 Power on VM

This RAL will power on the VM



38.28.1 Comm, and

Start-VM [-RunAsync] [-VM] <VirtualMachine[]> [-Server <VServer[]>] [-WhatIf] [-Confirm] [<CommonParameters>]

Options	M,andatory Field	Auto drop down	Comments
VirtualMachine	Yes	Yes	Should be Virtual Machine name
Runasync	No	No	This should be false always.

38.29 Create Snapshot

This RAL will create a snapshot based on the options provide.

38.29.1 Comm, and

New-Snapshot [-Name] <String> [-Description <String>] [-Memory] [-Quiesce] [-RunAsync] [-VM] <VirtualMachine[]> [-Server <VServer[]>] [-WhatIf] [-Confirm] [<CommonParameters>]

Options	M,andatory Field	Auto drop down	Comments
VM	Yes	Yes	
Name	Yes	Yes	Should accept all the special characters that Vmware accepts
Confirm	No	No	
Description	No	No	
Memory	No	No	
Quiesce	No	No	If the value is \$true , and the virtual machine is powered on, VMware Tools are used to quiesce the file system of the virtual machine. This assures that a disk snapshot represents a consistent state of the guest file systems. If the virtual machine is powered off or VMware Tools are not available, the Quiesce parameter is ignored.
RunAsync	No	No	
Server	No	No	
WhatIf	No	No	

38.30 Delete Snapshot

38.30.1 Description

This RAL will delete the snapshot of a VM provided by snapshot ID.

38.30.2 Comm, and



Remove-Snapshot [-Snapshot] <Snapshot[]> [-RemoveChildren] [-RunAsync] [-WhatIf] [-Confirm] [<CommonParameters>]

38.30.3 Inputs

The inputName	The inputType	The inputKey Name	Optional/M, andatory
Vcenter Management Service	Choose from list of discovered vcenter management service	PANVC_MGMT_SVC_NAME	M, andatory
Datacenter Name	Choose datacenter once vcenter is selected	PANVC_DC_NAME	M, andatory
Virtual Machine(VM) Name	Choose VM once datacenter is selected	PANVC_VM_NAME	M, andatory
Snapshot Id	Provide snapshot Id	PANVC_VM_SNAPSHOT_ID	M, andatory

38.31 OS customization

This RAL will customize the OS , and will be useful after VM migration or failed over to DR site.

38.31.1 Guest OS Customization

Supported OS <http://partnerweb.vmware.com/programs/guestOS/guest-os-customization-matrix.pdf>

38.31.2 Comm, and



New-OSCustomizationSpec [-OSType <String>] [-Server <VIMServer[]>] [-Name <String>] [-Type <OSCustomizationSpecType>] [-DnsServer <String[]>] [-DnsSuffix <String[]>] [-Domain <String>] [-NamingScheme <String>] [-NamingPrefix <String>] [-Description <String>] [-WhatIf] [-Confirm] [<CommonParameters>]

New-OSCustomizationSpec -OSCustomizationSpec <OSCustomizationSpec> [-Server <VIMServer[]>] [-Name <String>] [-Type <OSCustomizationSpecType>] [-WhatIf] [-Confirm] [<CommonParameters>]

New-OSCustomizationSpec -FullName <String> -OrgName <String> [-OSType <String>] [-ChangeSid] [-DeleteAccounts] [-Server <VIMServer[]>] [-Name <String>] [-Type <OSCustomizationSpecType>] [-DnsServer <String[]>] [-DnsSuffix <String[]>] [-GuiRunOnce <String[]>] [-AdminPassword <String>] [-TimeZone <String>] [-AutoLogonCount <Int32>] [-Domain <String>] [-Workgroup <String>] [-DomainCredentials <PSCredential>] [-DomainUsername <String>] [-DomainPassword <String>] [-ProductKey <String>] [-NamingScheme <String>] [-NamingPrefix <String>] [-Description <String>] [-LicenseMode <LicenseMode>] [-LicenseMaxConnections <Int32>] [-WhatIf] [-Confirm] [<CommonParameters>]

Options	Mandatory Field	Auto drop down	Comments/Description
AdminPassword	NO	NO	Specify a new OS administrator's password.
AutoLogonCount	NO	NO	Specify the number of times the virtual machine automatically logs in as administrator without prompting for The usercredentials.
ChangeSid	NO	NO	Indicates that the customization should modify the system security identifier (SID). This parameter applies only to Windows operating systems.
Confirm	NO	NO	If the value is \$true, indicates that the cmdlet asks for confirmation before running. If the value is \$false, the cmdlet runs without asking for The userconfirmation.
DeleteAccounts	NO	NO	Indicates that you want to delete all The useraccounts.
Description	NO	NO	Provide a description for the new specification.
DnsServer	NO	NO	Specify the DNS server settings.
DnsSuffix	NO	NO	Specify the DNS suffix settings.
Domain	NO	No	Specify a domain name.



Options	M,andatory Field	Auto drop down	Comments/Description
DomainCredentials	NO	No	Specify the credentials you want to use for domain authentication.
DomainPassword	NO	NO	Specify the password you want to use for domain authentication.
DomainUsername	NO	NO	Specify the username you want to use for domain authentication.
FullName	YES	NO	Specify the administrator's full name.
GuiRunOnce	NO	NO	Specify a list of commands. These commands run when a The userlogs in for the first time after the customization completes.
LicenseMaxConnections	NO	NO	Specify the maximum connections for server license mode. Use this parameter only if the -LicenseMode parameter is set to Perserver.
LicenseMode	NO	NO	Specify the license mode of the Windows 2000/2003 guest operating system. The valid values are Perseat, Perserver, , and Not specified. If Perserver is set, use the -LicenseMaxConnection parameter to define the maximum number of connections.
Name	NO	NO	Specify name for the new specification.
NamingPrefix	NO	NO	Depends on the customization naming scheme - Custom, NamingPrefix, or Prefix. If the "Custom" naming scheme is used, NamingPrefix is an optional argument that is passed to the utility for this IP address. The meaning of this field is user-defined in the script. If the "Fixed" naming scheme is used, NamingPrefix should indicates the name of the virtual machine. If the "Prefix" naming scheme is selected, NamingPrefix indicates the prefix to which a unique number is appended.
NamingScheme	NO	NO	Specify the naming scheme for the virtual machine. The following values are valid:



Options	Mandatory Field	Auto drop down	Comments/Description
			<p>Custom - Specifies that vCenter Server will launch an external application to generate the (hostname/IP). The comm, and line for this application must be specified in the server configuration file (vpxd.cfg) in the vpxd/name-ip-generator key.</p> <p>Fixed - Specifies that the name is fixed.</p> <p>Prefix - Specifies that a unique name should be generated by concatenating the base string with a number. Virtual machine names are unique across the set of hosts , and virtual machines known to the vCenter Server instance. vCenter Server tracks the network names of virtual machines as well as hosts. VMware Tools runs in a guest operating system , and reports information to vCenter Server, including the network name of the guest.</p> <p>Vm - Specifies that vCenter Server should generate a virtual machine name from a base prefix comprising the virtual machine entity name. A number is appended, if necessary, to make it unique. Virtual machine names are unique across the set of hosts , and virtual machines known to the vCenter Server instance. VMware Tools reports the names of existing virtual machines.</p>
OrgName	YES	No	Specify the name of the organization to which the administrator belongs.
OSCustomizationSpec	YES	No	Specify an OS customization specification that you want to clone.
OSType	NO	Yes	Specify the type of the operating system. The valid values are Linux , and Windows.



Options	Mandatory Field	Auto drop down	Comments/Description
ProductKey	NO	No	Specify the MS product key. If the guest OS version is earlier than Vista, this parameter is required in order to make the customization unattended. For Vista or later, the OS customization is unattended no matter if the ProductKey parameter is set.
Server	NO	No	Specify the vSphere servers on which you want to run the cmdlet. If no value is given to this parameter, the comm, and runs on the default servers. For more information about default servers, see the description of Connect-VIServer.
TimeZone	NO	Yes	Specify the name or ID of the time zone for the OS. The following time zones are available:
			000 Int'l Dateline
			001 Samoa
			002 Hawaii
			003 Alaskan
			004 Pacific
			010 Mountain (U.S. , and Canada)
			015 U.S. Mountain: Arizona
			020 Central (U.S. , and Canada)
			025 Canada Central
			030 Mexico
			033 Central America
			035 Eastern (U.S. , and Canada)
			040 U.S. Eastern: Indiana (East)
			045 S.A. Pacific
			050 Atlantic (Canada)
055 S.A. Western			
056 Pacific S.A.			
060 Newfoundl, and			
065 E. South America			
070 S.A. Eastern			
073 Greenl, and			



Options	M,andatory Field	Auto drop down	Comments/Description
			075 Mid-Atlantic
			080 Azores
			083 Cape Verde Isl, ands
			085 GMT (Greenwich Mean Time)
			090 GMT Greenwich
			095 Central Europe
			100 Central European
			105 Romance
			110 W. Europe
			113 W. Central Africa
			115 E. Europe
			120 Egypt
			125 EET (Helsinki, Riga, Tallinn)
			130 EET (Athens, Istanbul, Minsk)
			135 Israel: Jerusalem
			140 S. Africa: Harare, Pretoria
			145 Russian
			150 Arab
			155 E. Africa
			160 Iran
			165 Arabian
			170 Caucasus Pacific (U.S. , and Canada)
			175 Afghanistan
			180 Russia Yekaterinburg
			185 W. Asia
			190 India
			193 Nepal
			195 Central Asia
			200 Sri Lanka
			201 N. Central Asia
			203 Myanmar: Rangoon
			205 S.E. Asia
			207 N. Asia
			210 China
			215 Singapore



Options	Mandatory Field	Auto drop down	Comments/Description
			220 Taipei
			225 W. Australia
			227 N. Asia East
			230 Korea: Seoul
			235 Tokyo
			240 Sakha Yakutsk
			245 A.U.S. Central: Darwin
			250 Central Australia
			255 A.U.S. Eastern
			260 E. Australia
			265 Tasmania
			270 Vladivostok
			275 W. Pacific
			280 Central Pacific
			285 Fiji
			290 New Zeal, and
			300 Tonga
Type	NO	No	Specify the type of the OS customization specification. The valid values are Persistent , and NonPersistent.
WhatIf	NO	NO	Indicates that the cmdlet is run only to display the changes that would be made , and actually no objects are modified.
Workgroup	NO	No	Specify a workgroup.

38.32 List all VMHost in ESX cluster:

This RAL is an addition for cluster environment

Input: Get VMID or VM Name as input

Action:

- i. Get the ESXi Host for the VM
- ii. Get the ESXi Cluster name to which the ESXi host belongs
- iii. Get all the ESXi’s within that ESXi Cluster

Output: List of ESXi(s) in cluster, including the ESXi on which the VM resides



[vSphere PowerCLI] C:\Program Files (x86)\VMware\Infrastructure\vSphere PowerCLI> **Get-VM \$vm3 | Get-VMHost**

Name ConnectionState PowerState Id CpuUsage CpuTotalMemory Memory
Mhz Mhz UsageMB TotalMB

192.168.6.206 Connected PoweredOn...1685 278431908 58403 65526

[vSphere PowerCLI] C:\Program Files (x86)\VMware\Infrastructure\vSphere PowerCLI> **Get-VMHost | Get-Cluster**

Name HAEnabled HAFailover DrsEnabled DrsAutomationLevel
Level

PR-ESX-Cluster True 1 True Manual

[vSphere PowerCLI] C:\Program Files (x86)\VMware\Infrastructure\vSphere PowerCLI> **Get-Cluster | Get-VMHost**

Name ConnectionState PowerState Id CpuUsage CpuTotalMemory Memory
Mhz Mhz UsageMB TotalMB

192.168.6.206 Connected PoweredOn...1685 280031908 58402 65526

[vSphere PowerCLI] C:\Program Files (x86)\VMware\Infrastructure\vSphere PowerCLI>

38.32.1 Inputs

38.32.2 Comm, and

Get-VM <VM> | Get-VMHost

Options	Mandatory Field	Auto dropdown	Comments
VM	Yes	Yes	VM name is taken as input, to display list of ESX hosts in cluster on which the VM host ESX resides.



38.33 VMware Vc Host Mount Snapshot Volume

38.33.1 Description

An unresolved VMFS volume is reported when one or more device partitions of volume are detected, such copies can be created via replication or snapshots, this RAL resolves an unbound VMFS volume , and mount as VMFS datastore.

38.33.2 Input

vCenter Management Service Name - Discovered vCenter management service name

Host Name / ESX Name - ESX Name

VMFS Label - The datastore name which copied or replicated from Primary.

38.33.3 Output

Success message on Success,

Error on failure

38.33.4 Not Supported

Key Value are not supported

Dry Run Not Supported.

38.34 VM Network Customization

This RAL will customize the VM Network settings like port group , and network adapter mapping. It will be useful after VM migrated or failed over to DR site. One Network adaptor is mapped to one port group.

38.34.1 Comm, and

Get-VM <VM> | Get-NetworkAdapter | Set-NetworkAdapter -NetworkName<NetworkName>
VDPortGroup<VDPortGroup>

Options	M,andatory Field	Auto drop down	Comments
VM	Yes	Yes	VM name.
NetworkName	Yes	Yes	Network Adaptor(s) associated with the VM
VDPortGroup	Yes	Yes	Specify the port groups name(s)

38.35 VMware vC Guest OS Customization V1

38.35.1 Description

This RAL is listed as VMwarevCGuestOsCustomization under VMware vCenter category.



38.35.2 Use case Scenarios

1. VMware Customizing Linux Single Nic using Static IP address
The following is a list of inputs that are required to perform this action.

Property Name	Value
vCenter Management Service	Select the Management Service from the drop-down list.
Datacenter Name	Select datacenter from the drop-down list.
VM Name(VM)	Select the VM name from the drop-down list.
OS Type	Select LINUX from the drop-down list.
TimeZone	Select the time zone from the drop-down list.
IP Address Type	Select STATIC from the IP Address type drop-down list.
IP Address	Enter the IP 192.168.18.44
Gateway	[192.168.18.254]
Prefix	Enter the subnet range For example: 24
DNS Servers List	Enter the DNS Server/servers with comma separation. For example: 192.168.1.88, 192.168.1.110
DNS Suffix List	Enter the DNS Suffix
DNS Domain	Enter the DNS Domain
Computer Name	Enter the Computer Name.

2. **VMware Customizing Linux Multiple NICS**
The following is a list of inputs that are required to perform this action.

Property Name	Value
vCenter Management Service	Select the Management Service from the drop-down list.



Datacenter Name	Select datacenter from the drop-down list.
VM Name(VM)	Select the VM name from the drop-down list.
OS Type	Select LINUX from the drop-down list.
TimeZone	Select the time zone from the drop-down list.
IP Address Type	Select STATIC from the IP Address type drop-down list.
IP Address	Enter the IP 192.168.18.44, 192.168.18.45
Gateway	[192.168.18.254], [192.168.18.45]
Prefix	24, 24(Subnet range) The subnet range must be comma separated.
DNS Servers List	Enter the DNS Server/servers with comma separation. For example: 192.168.1.88, 192.168.1.110
DNS Suffix List	Enter the DNS Suffix
DNS Domain	Enter the DNS Domain
Computer Name	Enter the Computer Name.

3. VMware Customizing Linux Single Nic DHCP

The following is a list of inputs that are required to perform this action.

Property Name	Value
vCenter Management Service	Select the Management Service from the drop-down list.
Datacenter Name	Select datacenter from the drop-down list.
VM Name(VM)	Select the VM name from the drop-down list.
OS Type	Select LINUX from the drop-down list.



TimeZone	Select the time zone from the drop-down list.
IP Address Type	Select DHCP from the IP Address type drop-down list.
DNS Servers List	Enter the DNS Server/servers with comma separation. For example: 192.168.1.88, 192.168.1.110
DNS Suffix List	Enter the DNS Suffix
DNS Domain	Enter the DNS Domain
Computer Name	Enter the computer name.

4. VMware Customizing Windows Single NIC using Static while adding to Workgroup

The following is a list of inputs that are required to perform this action.

Property Name	Value
vCenter Management Service	Select the Management Service from the drop-down list.
Datacenter Name	Select datacenter from the drop-down list.
VM Name(VM)	Select the VM name from the drop-down list.
OS Type	Select WINDOWS from the drop-down list.
VM Administrator Password	Enter the VM Administrator Password.
TimeZone	Select the time zone from the drop-down list.
IP Address Type	Select STATIC from the IP Address type drop-down list.
IP Address	Enter the IP 192.168.18.44



Gateway	Enter the Gateway. For example: [192.168.18.254]
Prefix	Enter the subnet range For example: 24
DNS Servers List	Enter the DNS Server/servers with comma separation. For example: [192.168.1.88]
DNS Suffix List	Enter the DNS Suffix
DNS Domain	Enter the DNS Domain
Computer Name	Enter the Computer Name.
Type	Select the Type as Workgroup
Workgroup	Enter the workgroup name
Organization Name	Enter the Organization name

5. VMware Customizing Windows Multiple Nic using Static while adding to Workgroup

The following is a list of inputs that are required to perform this action.

Property Name	Value
vCenter Management Service	Select the Management Service from the drop-down list.
Datacenter Name	Select datacenter from the drop-down list.
VM Name(VM)	Select the VM name from the drop-down list.
OS Type	Select WINDOWS from the drop-down list.
VM Administrator Password	Enter the VM Administrator Password.



TimeZone	Select the time zone from the drop-down list.
IP Address Type	Select STATIC from the IP Address type drop-down list.
IP Address	Enter the IP 192.168.18.44, 192.168.18.45
Gateway	Select the Gateway that maps with the IP address [192.168.18.254], [192.168.18.254]
Prefix	24, 24(Subnet range) The subnet range must be comma separated.
DNS Servers List	Enter the DNS Server/servers with comma separation. For example: [192.168.1.88], [192.168.1.88]
DNS Suffix List	Enter the DNS Suffix
DNS Domain	Enter the DNS Domain
Computer Name	Enter the Computer Name.
Type	Enter the type as Workgroup
Workgroup	Enter the Workgroup Name
Organization Name	Enter the Organization Name

6. VMware Customizing Windows Single Nic using Static while adding to Domain
The following is a list of inputs that are required to perform this action.

Property Name	Value
vCenter Management Service	Select the Management Service from the drop-down list.



Datacenter Name	Select datacenter from the drop-down list.
VM Name(VM)	Select the VM name from the drop-down list.
OS Type	Select WINDOWS from the drop-down list.
VM Administrator Password	Enter the VM Administrator Password.
TimeZone	Select the time zone from the drop-down list.
IP Address Type	Select STATIC from the IP Address type drop-down list.
IP Address	Enter the IP 192.168.18.44
Gateway	Enter the Gateway [192.168.18.254]
Prefix	Enter the subnet range For example: 24
DNS Servers List	[192.168.1.88]
DNS Suffix List	Enter the DNS Suffix
DNS Domain	Enter the DNS Domain
Computer Name	Enter the Computer Name.
Type	Enter the type as Domain
Domain Name	Enter the Domain Name
Domain The username	Enter the Domain Username
Domain Password	Enter the Domain Password
Organization Name	Enter the Organization Name

7. VMware Customizing Windows Multiple Nic using Static while adding to Domain

The following is a list of inputs that are required to perform this action.



Property Name	Value
vCenter Management Service	Select the Management Service from the drop-down list.
Datacenter Name	Select datacenter from the drop-down list.
VM Name(VM)	Select the VM name from the drop-down list.
OS Type	Select WINDOWS from the drop-down list.
VM Administrator Password	Enter the VM Administrator Password.
TimeZone	Select the time zone from the drop-down list.
IP Address Type	Select STATIC from the IP Address type drop-down list.
IP Address	Enter the IP 192.168.18.44, 192.168.18.45
Gateway	[192.168.18.254], [192.168.18.254]
Prefix	24, 24(Subnet range) The subnet range must be comma separated.
DNS Servers List	Enter the DNS Server/servers with comma separation. For example: [192.168.1.88], [192.168.1.88]
DNS Suffix List	Enter the DNS Suffix
DNS Domain	Enter the DNS Domain
Computer Name	Enter the Computer Name.
Type	Enter the type as Domain
Domain Name	Enter the Domain Name



Domain Username	Enter the Domain Username
Domain Password	Enter the Domain Password
Organization Name	Enter the Organization Name

8. VMware Customizing Windows DHCP Single NIC while adding to Workgroup

The following is a list of inputs that are required to perform this action.

Property Name	Value
vCenter Management Service	Select the Management Service from the drop-down list.
Datacenter Name	Select datacenter from the drop-down list.
VM Name(VM)	Select the VM name from the drop-down list.
OS Type	Select WINDOWS from the drop-down list.
VM Administrator Password	Enter the VM Administrator Password.
TimeZone	Select the time zone from the drop-down list.
IP Address Type	Select DHCP from the IP Address type drop-down list.
DNS Servers List	Enter the DNS Server/servers with comma separation. For example: [192.168.1.88], [192.168.1.88]
DNS Suffix List	Enter the DNS Suffix
DNS Domain	Enter the DNS Domain
Computer Name	Enter the Computer Name.
Type	Select the type as Workgroup



Workgroup	Enter the Workgroup Name
Organization Name	Enter the Organization Name

9. VMware Customizing DHCP Single Nic while adding to Domain

The following is a list of inputs that are required to perform this action.

Property Name	Value
vCenter Management Service	Select the Management Service from the drop-down list.
Datacenter Name	Select datacenter from the drop-down list.
VM Name(VM)	Select the VM name from the drop-down list.
OS Type	Select WINDOWS from the drop-down list.
VM Administrator Password	Enter the VM Administrator Password.
TimeZone	Select the time zone from the drop-down list.
IP Address Type	Select DHCP from the IP Address type drop-down list.
DNS Servers List	Enter the DNS Server/servers with comma separation. For example: [192.168.1.88], [192.168.1.88]
DNS Suffix List	Enter the DNS Suffix
DNS Domain	Enter the DNS Domain
Computer Name	Enter the computer name.
Type	Select the type as Domain
Domain Name	Enter the Domain Name
Domain The username	Enter the Domain Username
Domain Password	Enter the Domain Password
Organization Name	Enter the Organization Name



Note:

- If domain name entered in the DNS Domain field is incorrect or not available, then the VM may get corrupt. Ensure that you enter the correct domain name.

38.35.3 Output

Action fails if agent is not able to connect or execution fails at vCenter.

38.36 VMware Mount Snapshot Volume with Resignature RAL

38.36.1 Description

This RAL is listed as *VMwareVcHostMountSnapshotVolumeWithResignature* under VMware vCenter category.

It is used to mount unresolved VMFS volumes with new signature on specified ESXi.

38.36.2 Inputs

The following is a list of inputs that are required to perform this action.

The inputName	The inputType	Key Value Pair	Optional/M, andatory	Description
Vcenter Management Service	String	PANVC_MGMT_SVC_NAME = VCenter Management Service Name	M, andatory	Select the VCenter Management service from the list of discovered VCenter management services drop-down.
Host(ESX) Name	String	PANVC_HOSTNAME = Host(ESXi) Name	M, andatory	Enter ESXi host IP.
Vmfs Label	String	PANVC_VMFS_LABEL = Vmfs Label	M, andatory	Enter VMFS label.

38.36.3 Outputs

Action fails in The following scenarios:



1. if agent is not able to connect to vCenter.
2. if execution fails at vCenter.

38.37 VMware Rename Datastore RAL

38.37.1 Description

This RAL is listed as *VMwareVcHostRenameDatastore* under VMware vCenter category.

It is used to rename the datastore created as part of mounting unresolved VMFS volumes with new signature on specified ESXi.

38.37.2 Inputs

The following is a list of inputs that are required to perform this action.

The inputName	The inputType	Key Value Pair	Optional/Mandatory	Description
Vcenter Management Service	String	PANVC_MGMT_SVC_NAME = VCenter Management Service Name	Mandatory	Select the VCenter Management service from the list of discovered VCenter management services dropdown.
Host(ESX) Name	String	PANVC_HOSTNAME = Host(ESXi) Name	Mandatory	Enter ESXi host IP.
Vmfs Label	String	PANVC_VMFS_LABEL = Vmfs Label	Mandatory	Enter VMFS label.



38.37.3 Outputs

Action fails in the following scenarios:

1. if the agent is not able to connect to vCenter.
2. if execution fails at vCenter.
3. if there are multiple datastores associated with vmfs label.

38.38 VMware Delete Datastore RAL

38.38.1 Description

This RAL is listed as *VMwareVcHostDeleteDatastore* under VMware vCenter category.

It is used to delete a datastore on specified ESXi.

38.38.2 Inputs

The following is a list of inputs that are required to perform this action.

The inputName	The inputType	Key Value Pair	Optional/Mandatory	Description
Vcenter Management Service	String	PANVC_MGMT_SVC_NAME = VCenter Management Service Name	Mandatory	Select the VCenter Management service from the list of discovered VCenter management services drop-down.
Host(ESX) Name	String	PANVC_HOSTNAME = Host(ESXi) Name	Mandatory	Enter ESXi host IP.
Vmfs Label	String	PANVC_VMFS_LABEL = Vmfs Label	Mandatory	Enter VMFS label.



38.38.3 Outputs:

Action fails in The following scenarios:

1. if agent is not able to connect to vCenter.
2. if execution fails at vCenter.
3. if there are multiple datastores with same vmfs label.

38.39 VMware Vc Map RDM To VM

Description: VMWare RAL - RDM Mount to support from product

Inputs:

UI Input	The inputKey Name	M,andatory	Description
Vcenter Management Service	Management Service Name	Yes	Management Service
Datacenter Name	DataCenterName	Yes	Data Center
Host(ESX) Name	HostName	Yes	Host IP (ex: 192.xx.xx.xxx)
Virtual Machine(VM) Name	VmName	Yes	Virtual Machine Name
LUN Disk Path	lunPathID	Yes	Lun Path ID in specific format. Ex: <code>/vmfs/devices/disks/naa.60000970000296801485533030303431</code>
Disk FileName	DiskFileName	Yes	DiskFile Name in specific file extension Ex: [datastore1] <code>rhel_zerto_vm/rhel_zerto_vm_1.vmdk</code>



CompatibilityMode	CompatibilityMode	Yes	Accepted Values are: 1. Virtual 2. Physical 3. virtualMode 4. physicalMode
DiskMode	DiskMode	Conditional	1. Leave it blank if CompatibilityMode is “ Physical ” or “ physicalMode ” 2. If CompatibilityMode is type “ Virtual ” or “ virtualMode ”, then this field is mandatory. Provided with any of the below values: <ul style="list-style-type: none"> • independent_nonpersistent • independent_persistent • nonpersistent • persistent
Sharable	Sharable	No	Checkbox (yes/no) Default value is Yes (checked)
Wait till completion	waitTillCompletion	No	Checkbox (yes/no) Default value is Yes (checked)

Output:

1. Output will be in the form of SUCCESS response from service.
2. Verify the disk attached to VM from VmWare client.

KeyValue Pairs

S.No	KEY	Description
1	PANVC_MGMT_SVC_NAME	Management Service Name
2	PANVC_DC_NAME	Data Center Name
3	PANVC_HOSTNAME	Host Name
4	PANVC_VM_NAME	VM Name



5	PANVC_LUN_PATHID	LunPath ID
6	PANVC_RDM_DISK_FILENAME	DiskFile Name
7	PANVC_COMPATIBILITY_MODE	Compatibility Mode (Virtual/Physical)
8	PANVC_DISK_MODE	<p>1. Leave it blank if CompatibilityMode is “Physical” or “physicalMode”</p> <p>2. If CompatibilityMode is type “Virtual” or “virtualMode”, then this filed is m, andatory. Provided with any of the below values:</p> <ul style="list-style-type: none"> • independent_nonpersistent • independent_persistent • nonpersistent • persistent
9	PANVC_RDM_SHARABLE	Sharable (Boolean)
10	PANVC_WAIT_TILL_COMPLETION	WaitTillCompletion (Boolean)

Example Inputs:

PANVC_MGMT_SVC_NAME - RdmMgmt

PANVC_DC_NAME - Actifio_PRDataCenter

PANVC_HOSTNAME - 192.168.6.208

PANVC_VM_NAME - rhel_zerto_vm

PANVC_LUN_PATHID - /vmfs/devices/disks/naa.60000970000296801485533030303431

PANVC_RDM_DISK_FILENAME - [datastore1] rhel_zerto_vm/rhel_zerto_vm_2.vmdk

PANVC_COMPATIBILITY_MODE - virtualMode

PANVC_DISK_MODE - nonpersistent

PANVC_RDM_SHARABLE s - Yes

PANVC_WAIT_TILL_COMPLETION – Yes



38.40 VMware Vc Host Storage Rescan RAL

Description

This RAL is listed as *VMwareVcHostStorageRescan* under VMware vCenter category.

It is used to rescan storage on specified ESXi.

Inputs

The following is a list of inputs that are required to perform this action.

The inputName	The inputType	Key Value Pair	Optional/M, mandatory	Description
Vcenter Management Service	String	PANVC_MGMT_SVC_NAME = VCenter Management Service Name	M, mandatory	Select the VCenter Management service from the list of discovered VCenter management services drop-down.
Host(ESXi) Name	String	PANVC_HOSTNAME = Host(ESXi) Name	M, mandatory	Enter ESXi host IP.

Outputs:

Action fails in The following scenarios:

1. If agent is not able to connect to vCenter.
2. If execution fails at vCenter.

38.41 VMware Execute Guest OS Command

Description

This action executes guest OS comm, and on the Virtual Machine (VM).

Inputs

The following is a list of inputs that are required to perform this action.



The inputName	The inputType	Key Name	Optional/ M, andatory	Description
Vcenter Management Service	String	PANVC_MGMT_SVC_NAME	M, andatory	Select the VCenter Management service from the list of discovered VCenter management services.
Datacenter Name	String	PANVC_DC_NAME	M, andatory	Select the datacenter name.
Virtual Machine(VM) Name	String	PANVC_VM_NAME	M, andatory	Select VM.
Cred Name	String	PANVC_GUESTOS_CREDNAME	M, andatory	Select group credential name.
Component Name	String	PANVC_GUESTOS_COMPONENTNAME	Mandatory	Enter the discovered component name to choose the component credentials.
Guest OS Comm, and	String	PANVC_GUESTOS_COMM, AND	M, andatory	Enter guest OS comm, and.
Execution Wait Time	String	PANVC_GUESTOS_WAITTIME	Optional	Enter the wait time.
Success Pattern	String	PANVC_GUESTOS_COMM, AND_SUCCESSPATTERN_STRING	Optional	Enter the success pattern string.
Failure Pattern	String	PANVC_GUESTOS_COMM, AND_FAILUREPATTERN_STRING	Optional	Enter the failure pattern string.
Enable Dryrun	Boolean		Optional	Check box to enable Tcl Dryrun.



Dryrun Tcl path	String	PANVC_GUESTOS_ COMM, AND_TCL_PATH	Optional	Enter tcl file path.
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Note:

- User can select either Cred Name or Component Name to choose the credentials.
- If the user selects Cred Name, then Group credential is mandatory and you can configure it through UI navigation **Discover > Credentials**, which is the user name and password of Virtual Machine.
- The user can provide multiple success or failure patterns by using '#&&#' as delimiter, for example, Success#&&#Running.
- Dryrun is recommended if there is a need to validate the inputs.

Outputs

Action fails if agent is not able to connect or execution fails at vCenter.

DryRun

To perform Dryrun tcl:

- Click the Enable Dryrun checkbox on the RAL UI.
- Provide the valid tcl Path in the Comm, and Path text field.
- Ensure to place the tcl file in the specified location on the sitecontroller.
- Tcl file should contain the text “DRM_DRY_RUN_SUPPORTED” in order to represent the tcl is executing in dryrun mode.
 - o Ex: ### !DRM_DRY_RUN_SUPPORTED! ####
- Ensure to return the tcl execution result is assigned to key “DRY_RUN_TCL_STATUS”
 - o Ex: setKeyValue "DRY_RUN_TCL_STATUS" "SUCCESS"





39 VMware SRM

39.1 VMwareSRMCleanup

Description

This RAL will perform VMware SRM clean-up operation for VMware SRM A recovery Plan.

Inputs:

It requires DR SRM Server IP , and Credential.

Key-Value:

DR_SRM_AGENT_IP

Output:

DR DRILL Cleanup State.

If Operation started successfully - It displays the following status for DRILL operation:

A recovery Plan: CLEANUP operation completed

If failed to execute operation - It displays the following error:

Failed to execute A recovery plan: <A recovery Plan Name> CLEANUP operation , and stateerror summary.

Dry Run

Dry Run Verification	Comm, and executed on backend	Output
Checks if the SRM Recover Plan is in valid state to cleanup or not.	VMware SRM API	<p>Success: A recovery Plan is in a valid state to perform the CLEANUP operation.</p> <p>Warning: Recover Plan operation is not permitted.</p> <p>(OR)</p> <p>Failed to execute the operation. Check the logs.</p>



39.2 VMwareSRMCleanupPGstateValidate

Description:

This RAL will validate VMware SRM Protection Group state from VMware SRM DR side for SRM CLEANUP_TEST SRM Operation.

Inputs:

It requires DR VMware SRM Server IP , and SRM Credential, VMware SRM A recovery plan name.

Key-Value:

DR_SRM_AGENT_IP,SRM_A RECOVERY_PLAN

Output:

It displays error if SRM Protection Group is not in valid state at DR side, otherwise it displays the success message.

The following error is displayed:

Protection Group in A recovery Plan: <A recovery Plan Name> is not in the expected state for CLEANUP , and provide SRM Protection Group detail.

The following success message is displayed:

Protection Groups validation completed. All Protection Groups are in expected state.

Dry Run

Dry Run Verification	Comm, and executed on backend	Output
Checks if the SRM Protection Group is in valid state to perform cleanup or not.	VMware SRM API	<p>Success: Protection Groups validation completed. All Protection Groups are in the expected state</p> <p>ERROR:</p> <ol style="list-style-type: none"> 1. A recovery Plan is not in the expected state for the CLEANUP operation. (OR) 2. Failed to execute operation. Check the logs for further detail



39.3 VMwareSRMCleanupRPstateValidate

Description:

This RAL will validate VMware SRM A recovery Plan state at VMware SRM DR side for CLEANUP operation

Inputs:

It requires DR VMware SRM Server IP , and the Credential, , and VMware SRM A recovery plan Name.

Key-Value:

DR_SRM_AGENT_IP,SRM_A RECOVERY_PLAN

Output:

It displays error if SRM A recovery Plan is not in valid state at DR side, otherwise it returns success.

The following error message is displayed:

A recovery plan: <RP Name> current state is not in the expected mode for CLEANUP operation , and provides the detail.

If validation is a success, the following success message is displayed:

A recovery plan " <RP Name> current state - <RP State>, pre-validation completed"

If A recovery Plan is in Ready State, it displays the following message:

A recovery plan " <RP Name> state already in expected mode: READY"

Dry Run

Dry Run Verification	Comm, and Executed on backend	Output
Validates A recovery plan status to perform cleanup operation.	VMware SRM API	On Success: A recovery Plan: state is in expected mode for cleanup operation On Error 1- A recovery Plan - state is not in expected mode for cleanup operation. On Error 2: Unable to get pre-validation status for A recovery Plan.

39.4 VMwareSRMDRvrastatus



Description

This RAL will validate the Replication service status on DR VRA component , and display the status.

Input:

It runs on DR VRA component Name as setup in VMwareSRMPRVRAstatus as next RAL component action.

Key-Value:

No key value

Output:

If success:

Output:

Validated Target_VRA_STATE : Active

If fails:

ERROR : Target_VRA_STATE : Inactive

Dry Run

Dry Run Verification	Comm, and Executed on backend	Output
Checks VRA status on the DR side	systemctl is-active hms.service	On Success - VRA component is up , and running. On Failure - VRA component is not in a valid state/not running

39.5 VMwareSRMdrReprotect

Description

This RAL will perform VMware SRM Reprotect operation for VMware SRM A recovery Plan to DR site

Inputs:

It requires DR SRM Server IP , and Credential, A recovery Plan Name

Key-Value:

DR_SRM_AGENT_IP,SRM_A RECOVERY_PLAN

Output:



If Operation started successfully - It provides status for DRILL operation after completion:

A recovery Plan: REPROTECT operation completed

If failed to execute operation - It throws error:

A recovery plan current state is not in the expected mode for REPROTECT operation,

<stateError Summary>

Dry Run

Dry Run Verification	Comm, and executed on backend	Output
This RAL checks VMware SRM Reprotect operation PG state for A recovery Plan to DR site.	VMware SRM API	<p>Success: Protection Groups validation completed. All PGs are in expected state for REPROTECT operation.</p> <p>Warning: Protection Group in A recovery Plan: It is not in the expected state for REPROTECT operation.</p> <p>Error: Failed to execute operation. Check the logs for further detail</p>

39.6 VMwareSRMFailover

Description

This RAL will perform VMware SRM Failover operation for VMware SRM A recovery Plan to DR site.

Inputs:

It requires DR SRM Server IP , and Credential, A recovery Plan Name.

Key Value:

DR_SRM_AGENT_IP,SRM_A RECOVERY_PLAN

Output:

DR DRILL FAILOVER Operation

If Operation started successfully, it displays the following error message:

A recovery Plan: FAILOVER operation completed

If failed to execute operation, it displays the following error message:

Failed to perform A recovery plan: <RP Name> FAILOVER operation <stateERROR summary>.



39.7 VMwareSRMFallback

Description

This RAL will perform VMware SRM FALLBACK operation for VMware SRM A recovery Plan to Primary site (assuming Primary site is recovered , and is running as previous state).

Inputs:

It requires PR SRM Server IP , and Credential, A recovery Plan Name.

Key Value:

PR_SRM_AGENT_IP,SRM_A RECOVERY_PLAN

Output:

DR DRILL FAILBACK Operation

If the operation started successfully, it displays the following status for DRILL operation after completion of the operation:

A recovery Plan: FAILBACK: DR DRILL operation completed on SITE - <SRMServer IP> , and Starting Reprotecting at Production Site

If failed to execute the operation, it displays the following error message:

Failed to execute A recovery plan: <RP Name>FALLBACK operation. <stateError Summary>

Dry Run

Dry Run Verification	Comm, and Executed on backend	Output
Checks a recovery plan status to perform fall back operation	VMware SRM API	On Success- A recovery Plan: FAILBACK operation completed on PRIMARY SITE. On ERROR1- ERROR: Failed to execute A recovery plan: On ERROR 2 - ERROR: Failed to execute operation. Check the logs for further detail.

39.8 VMwareSRMFallbackPGstateValidate

Description

This RAL validate SRM PG state for A recovery plan FALLBACK operation.

Inputs:

It requires DR VMware SRM Server IP , and the Credential, VMware SRM A recovery Plan Name.



Key-Value:

DR_SRM_AGENT_IP,SRM_A RECOVERY_PLAN

Output:

It displays the following error message:

- Protection Groups validation completed. All PGs are in expected state for <RP Name> FALLBACK operation

It displays the following message if Validation is a success:

- Protection Groups validation completed. All PGs are in expected state for FALLBACK operation.

Dry Run

Dry Run Verification	Comm, and Executed on backend	Output
Checks Protection group status to perform fall back operation	VMware SRM API	On Success- Protection Groups validation completed. All PGs are in expected state for FALLBACK operation. On Error- Protection Group in A recovery Plan is not in the expected state for FALLBACK operation

39.9 VMwareSRMFallbackRPstateValidate

Description

This RAL will validate VMware SRM A recovery Plan state from VMware SRM PR side for FALLBACK Operation

Inputs:

It requires Primary VMware SRM Server IP , and the Credential, VMware SRM A recovery plan Name

Key-Value:

PR_SRM_AGENT_IP,SRM_A RECOVERY_PLAN

Output:

The following message displays:

If validation fails, the following error message displays:

- A recovery plan current state is not in the expected mode for FALLBACK operation , and State<Error Summary>



If validation succeeds, the following message displays:

- A recovery plan <RP Name> current state - <RP State>, prevalidation completed

If A recovery Plan state is in FAILED_OVER state on primary site, it displays message as

- A recovery plan <RP Name> state already in FAILED_OVER state.

If A recovery plan is in NEEDS_FAILOVER state to the primary site during FALLBACK operation. It displays the message as

- Warning: A recovery Plan <RP Name> is in Partially recovered state. Few related SRM Protection Group is in Recovered state for A recovery Plan.

Dry Run

Dry Run Verification	Comm, and Executed on backend	Output
Checks a recovery plan status to perform fall back operation	VMware SRM API	On Success: A recovery plan is in expected mode for FALLBACK operation at Primary Site On Error1: A recovery plan current state is not in the expected mode for FALLBACK operation On Error2: Failed to execute operation. Check the logs for further detail

39.10 VMwareSRMFailoverPGstateValidate

Description

This RAL will validate VMware SRM Protection Group state from VMware SRM DR side for SRM Failover SRM Operation.

Inputs:

It requires DR VMware SRM Server IP , and the Credential, VMware SRM A recovery Plan Name.

Key Value:

DR_SRM_AGENT_IP,SRM_A RECOVERY_PLAN

Output:

It returns error if SRM Protection Group is not in valid state at DR side.

The following error message is displayed:



Protection Group in A recovery Plan: <RP Name> is not in the expected state for FAILOVER operation , and State<ERROR SUMMARY>

Otherwise, the following success message is displayed:

Protection Groups validation completed. All PGs are in expected state for FAILOVER operation

39.11 VMwareSRMFailoverRPstateValidate

Description

This RAL will validate VMware SRM A recovery Plan state from VMware SRM DR side for SRM FAILOVER SRM Operation.

Inputs:

It requires DR VMware SRM Server IP , and the Credential, VMware SRM A recovery plan Name

Key Value

DR_SRM_AGENT_IP,SRM_A RECOVERY_PLAN

Output:

It displays the following error message if SRM A recovery Plan is not in valid state at DR side:

A recovery plan current state is not in the expected mode for FAILOVER operation , and state<ERROR SUMMARY>

Error Summary:

The following errors are displayed:

1. If A recovery plan is in Running state, the following error message is displayed:

A recovery Plan <RP Name> is in progress. It cannot rerun. Please verify SRM Infrastructure for detail.

2. If A recovery plan is in ERROR state, it displays the following error message:

A recovery Plan <RP Name> is in ERROR state. The protection Group might be in use by other A recovery plan. Please verify SRM Infrastructure.

3. If A recovery Plan is not in Ready state, it displays the following error message:

A recovery Plan <RP Name> is not ready for failover.

Success:

If validation is a success, it returns the following message:

- A recovery plan <RP Name> current state - <RP State>, prevalidation completed

If A recovery Plan state is in FAILED_OVER state, the following message is displayed:

- A recovery plan <RP Name> state already in FAILED_OVER state.



If A recovery plan is in NEEDS_FAILOVER state. It displays the following message:

- A recovery Plan <RP Name> is in Partially recovered state. Few related SRM Protection Group is in Recovered state for A recovery Plan.

39.12 VMwareSRMInputValidation

Description

This RAL will validate the provided INPUTS to the workflow

Inputs:

Primary , and DR SRM Server IP, SRM A recovery Plan Name, PR , and DR SRM server Credential

Key-Value:

DR_SRM_AGENT_IP,PR_SRM_AGENT_IP,SRM_A RECOVERY_PLAN,MODE_NAME

Output:

If provided inputs are provided, the validation is completed , and shows message as

- SRM A recovery plan DR DRILL required inputs are checked , and passed

If any inputs are missed or not provided, it will throw an error with information as

- ERROR: Required inputs are invalid. Please recheck , and provide the m, andatory the inputparameter to run operation: SRM_SERVER_PR_IP, SRM_SERVER_DR_IP, A RECOVERY_PLANNAME, SRM Credential.

Dry Run

Dry Run Verification	Comm, and executed on backend	Output
Pre-Check - This RAL basically validates required inputs.	VMWare SRM API	<p>Success:</p> <p>Success: PR_SRM_AGENT_IP:<PR_SRM_AGENT_IP>, DR_SRM_AGENT_IP:<DR_SRM_AGENT_IP> , SRM_A RECOVERY_PLAN:<SRM_A RECOVERY_PLAN></p> <p>Error:</p> <p>Error: Required the inputkeys are not configured</p>

39.13 VMwareSRMPGdrState

Description

This RAL will show the SRM PG state for the A recovery Plan from SRM DR Site.



Inputs:

It requires DR VMware SRM Server IP , and the Credential, VMware SRM A recovery Plan Name.

Key-Value:

DR_SRM_AGENT_IP,SRM_A RECOVERY_PLAN

Output:

The following message displays:

Primary Site: PG Status in A recovery Plan: <RP Name>
<PG State summary>

Dry Run

Dry Run Verification	Comm, and executed on backend	Output
Gets Protection group state of DR	VMware SRM API getProtectionState	Success: Display PG Status in A recovery Plan. Error: Failed to get PG state.

39.14 VMwareSRMPGPrimaryState

Description

This RAL displays the SRM PG state for the A recovery Plan from SRM Primary Site.

Inputs:

It requires Primary VMware SRM Server IP , and the Credential, VMware SRM A recovery Plan Name.

Key-Value:

PR_SRM_AGENT_IP,SRM_A RECOVERY_PLAN

Output:

The following message displays:

Primary Site: PG Status in A recovery Plan: <RP Name>
<PG State summary>



Dry Run

Dry Run Verification	Comm, and Executed on backend	Output
Checks PG status on PR side	VMware SRM API	<p>On Success - Display the PG status.</p> <p>On Failure: Failed to execute operation with an error message</p>

39.15 VMwareSRMprimaryReprotect

Description

This RAL will perform VMware SRM Reprotect operation for VMware SRM A recovery Plan to PR site

Inputs:

It requires PR SRM Server IP , and Credential, A recovery Plan Name

Key-Value:

PR_SRM_AGENT_IP,SRM_A RECOVERY_PLAN

Output:

If Operation started successfully - It provides status for DRILL operation after completion:

A recovery Plan: REPROTECT operation completed

If failed to execute operation - It throws error:

A recovery plan current state is not in the expected mode for REPROTECT operation, <stateError Summary>

Dry Run

Dry Run Verification	Comm, and executed on backend	Output
<p>Pre-Check -</p> <p>This RAL basically checks the a recovery plan current state is valid or not for the Reprotect operation.</p>	VMWare SRM API	<p>Success: A recovery plan current state is in the expected mode for reprotect operation.</p> <p>Warning: A recovery plan current state is not in the</p>



		expected mode for reprotect operation. Error: Failed to execute operation. Check the logs for further details.
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39.16 VMwareSRMPRvrastatus

Description

This RAL will validate the Replication service status on Primary VRA component , and display the status.

Also, it will assign the next RAL action as dr vra component Name.

Input:

It runs on Primary VRA component Name as setup in VMwareSRMVRAcomp as next RAL component action.

Key-Value:

No key value

Output:

If success:

Output: Validated PRIMARY_VRA_STATE : Active

If fails:

ERROR : Primary VRA Status : Inactive

Dry Run



Dry Run Verification	Comm, and Executed on backend	Output
Checks VRA status on the PR side	systemctl is-active hms.service	On Success - VRA component is up , and running. On Failure - VRA component is not in a valid state/not running

39.17 VMwareSRMReprotect

This RAL will perform VMware SRM Reprotect operation for VMware SRM A recovery Plan to DR site (Assuming Primary site is recovered , and is running as previous state)

Inputs:

It requires DR SRM Server IP , and Credential, A recovery Plan Name

Key-Value:

DR_SRM_AGENT_IP,SRM_A RECOVERY_PLAN

Output:

If Operation started successfully - It provides status for DRILL operation after completion:

A recovery Plan: REPROTECT operation completed

If failed to execute operation - It throws error:

A recovery plan current state is not in the expected mode for REPROTECT operation, <stateError Summary>

Dry Run

Dry Run Verification	Comm, and executed on backend	Output
Pre-Check - This RAL basically checks the a recovery plan current state is valid or not for the Reprotect operation.	VMWare SRM API	Success: A recovery plan current state is in the expected mode for reprotect operation. Warning: A recovery Plan <RP Name> is in <Current State> state, REPROTECT is not allowed.



		<p>Error: Failed to execute operation. Check the logs for further details.</p>
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39.18 VMwareSRMReprotectPGstatePRvalidate

Description

This RAL will validate VMware SRM Protection Group state from VMware SRM PR side for SRM REPROTECT Operation

Inputs:

It requires PR VMware SRM Server IP , and the Credential, VMware SRM A recovery Plan Name

Key-Value:

PR_SRM_AGENT_IP,SRM_A RECOVERY_PLAN

Output:

It returns error if SRM Protection Group is not in valid state at PR side as

Protection Group in A recovery Plan: <RP Name> is not in the expected state for REPROTECT , and States

<PROTECTION GROUP STATE detail>

else, it returns success as

Protection Groups validation completed. All PGs are in expected state for REPROTECT operation.

Dry Run

Dry Run Verification	Comm, and executed on backend	Output
<p>Pre-Check -</p> <p>This RAL basically checks the protection group current state is valid or not for the Reprotect operation.</p>	<p>VMWare SRM API</p>	<p>Success: Protection groups validation completed. All PGs are in the expected state for reprotect operation.</p> <p>Warning: Protection group in A recovery plan: <planName> is not in the expected state for REPROTECT. Reason: <reason>.</p> <p>Error: Failed to execute operation. Check the logs for further details.</p>



39.19 VMwareSRMReprotectPGstateValidate

Description

This RAL will validate VMware SRM Protection Group state from VMware SRM DR side for SRM REPROTECT Operation

Inputs:

It requires DR VMware SRM Server IP , and the Credential, VMware SRM A recovery Plan Name

Key-Value:

DR_SRM_AGENT_IP,SRM_A RECOVERY_PLAN

Output:

It returns error if SRM Protection Group is not in valid state at PR side as

Protection Group in A recovery Plan: <RP Name> is not in the expected state for REPROTECT , and States

<PROTECTION GROUP STATE detail>

else, it returns success as

Protection Groups validation completed. All PGs are in expected state for REPROTECT operation

Dry Run

Dry Run Verification	Comm, and executed on backend	Output
This RAL will check VMware SRM Protection Group state from VMware SRM DR side for SRM REPROTECT Operation.	VMware SRM API	<p>Success: Protection Groups validation completed. All PGs are in expected state for REPROTECT operation</p> <p>Error</p> <p>1: ERROR: Failed to execute operation. Check the logs for further detail.</p> <p>2: Protection Group in A recovery Plan: A recovery Plan is not in the expected state for CLEANUP operation.</p>

39.20 VMwareSRMReprotectRPstatePRvalidate

Description

This RAL will validate VMware SRM A recovery Plan state at VMware SRM PR side for REPROTECT operation



Inputs:

It requires PR VMware SRM Server IP , and the Credential, VMware SRM A recovery plan Name

Key-Value:

PR_SRM_AGENT_IP,SRM_A RECOVERY_PLAN

Output:

It returns error if SRM A recovery Plan is not in valid state at PR side as

A recovery plan: <RP Name> current state is not in the expected mode for REPROTECT operation , and provides the ERROR summary.

Error Summary:

1. If A recovery plan is in Running State, the error message:

A recovery Plan <RP Name> is in progress. It cannot rerun. Please verify SRM Infrastructure , and retry.

2. If A recovery plan state return ERROR state, it throws error message as

A recovery Plan <RP Name> is in ERROR state. The protection Group might be in use by other A recovery plan. Please verify SRM Infrastructure , and retry.

3. If A recovery Plan is not in FAILED_OVER state, it will throw an error as

A recovery Plan <RP Name> is not ready for REPROTECT.

Success:

if validation success, it returns Message as

- A recovery plan <RP Name> current state - <RP State>, prevalidation completed

Else If A recovery Plan is in PROTECTING State, it displays message as

- A recovery plan <RP Name> state already: PROTECTING

Else if A recovery Plan is in NEEDS_REPROTECT State, it displays message as

- A recovery Plan <RP Name> is in Partially Protect state. Few related SRM Protection Group is in PROTECTING state for A recovery Plan.

Dry Run

Dry Run Verification	Comm, and executed on backend	Output
<p>Pre-Check -</p> <p>This RAL basically checks the a recovery plan current state is valid or not for the Reprotect operation.</p>	<p>VMWare SRM API</p>	<p>Success: Protection groups validation completed. A recovery plan: <planName> current state is in the expected state for REPROTECT operation.</p> <p>Warning: A recovery plan: <planName> current state is not in</p>



		<p>the expected state for REPROTECT operation. Reason: <reason>.</p> <p>Error: Failed to execute operation. Check the logs for further details.</p>
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39.21 VMwareSRMReprotectRPstateValidate

Description

This RAL will validate VMware SRM A recovery Plan state at VMware SRM DR side for REPROTECT operation

Inputs:

It requires DR VMware SRM Server IP , and the Credential, VMware SRM A recovery plan Name

Key-Value:

DR_SRM_AGENT_IP,SRM_A RECOVERY_PLAN

Output:

It returns error if SRM A recovery Plan is not in valid state at DR side as

A recovery plan: <RP Name> current state is not in the expected mode for REPROTECT operation , and provides the ERROR summary.

Error Summary:

1. If A recovery plan is in Running State, the error message:

A recovery Plan <RP Name> is in progress. It cannot rerun. Please verify SRM Infrastructure , and retry.

2. If A recovery plan state return ERROR state, it throws error message as

A recovery Plan <RP Name> is in ERROR state. The protection Group might be in use by other A recovery plan. Please verify SRM Infrastructure , and retry.

3. If A recovery Plan is not in FAILED_OVER state, it will throw an error as

A recovery Plan <RP Name> is not ready for REPROTECT.

Success:

if validation success, it returns Message as

- A recovery plan <RP Name> current state - <RP State>, pre-validation completed

Else If A recovery Plan is in PROTECTING State, it displays message as

- A recovery plan <RP Name> state already: PROTECTING



Else if A recovery Plan is in NEEDS_REPROTECT State, it displays message as

- A recovery Plan <RP Name> is in Partially Protect state. Few related SRM Protection Group is in PROTECTING state for A recovery Plan.

Dry Run

Dry Run Verification	Comm, and executed on backend	Output
Checks if the SRM Recover Plan is in Reprotect mode or not	VMware SRM API a recoveryPlanGetInfo	Success: Display as mode is REPROTECT. Error 1: A recovery plan is not in the expected mode for REPROTECT operation at DR site. Warning: A recovery Plan State is not ready for REPROTECT.

39.22 VMwareSRMRPstateDR

Description

This RAL will show the SRM A recovery Plan state from SRM DR Site

Inputs:

It requires DR VMware SRM Server IP , and the Credential, VMware SRM A recovery Plan Name

Key-Value:

DR_SRM_AGENT_IP,SRM_A RECOVERY_PLAN

Output:

DR Site: A recovery Plan status: <RP status>

Dry Run

Dry Run Verification	Comm, and executed on backend	Output
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Gets A recovery Plan state of DR	VMware SRM API a recoveryPlanGetInfo	Success: Display A recovery plan status. Error: Unable to get A recoveryPlan Status.
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39.23 VMwareSRMRPstatePrimary

Description

This RAL will show the SRM A recovery Plan state from SRM Primary Site

Inputs:

It requires Primary VMware SRM Server IP , and the Credential, VMware SRM A recovery Plan Name

Key-Value:

PR_SRM_AGENT_IP,SRM_A RECOVERY_PLAN

Output:

Primary Site: A recovery Plan status: <RP status>

Dry Run

Dry Run Verification	Comm, and executed on backend	Output
Pre-Check - This RAL basically checks the A recovery plan status.	VMWare SRM API	Success: <Plan Name> A recovery plan status: <A recovery Plan Status> Error: A recovery plan status: Unable to get a recovery plan status



39.24 VMwareSRMRPvmstateDR

Description

This RAL shows VM (related A recovery Plan) state (power on / off) from DR vCenter

Inputs:

DR vCenter IP, VMName (AG > RGs) , and Related DR Datacenter Name, DR vCenter Credential, A recovery Plan Name

Key-Value:

SRM_A RECOVERY_PLAN,DR_VM_NAME

Output:

The following message displays:

- If A recovery Plan related VMs powerstate is POWERED ON, it displays the following message:
 - A recovery Plan: <RP Name> : All related VMs are up
- If A recovery Plan related VMs powerstate is POWERED OFF, it displays either of the following error message:
 - A recovery Plan: <RP Name> - Rest all related VMs are up except the below servers: <StatePOWERED OFF SERVER DETAIL>
 - A recovery Plan: <RP Name>: No related VMs are up
- If VM Names are not identified for RAL, it displays the following error message:
 - A recovery Plan: <RP Name>: No related VM Names are found

Dry Run

Dry Run Verification	Comm, and executed on backend	Output
This RAL checks VM (related A recovery Plan) state (power on / off) from DR vCenter.	VMware SRM API	<p>Success: All associated VMs are up.</p> <p>WARNING</p> <p>1: Rest all associated VMs are up except this.</p> <p>2: Associated totalvmcount VMs are down.</p> <p>3: No associated VM Names are found.</p>



39.25 VMwareSRMRPvmstatePrimary

Description

This RAL shows VM (related A recovery Plan) state (power on / off) from DR vCenter

Inputs:

PR vCenter IP, VMName

(AG > RGs) , and Related PR Datacenter Name, Primary vCenter Credential, A recovery Plan Name

Key-Value:

SRM_A RECOVERY_PLAN,PR_DC_NAME,PR_VM_NAME

Output:

If A recovery Plan related to VMs powerstate is POWERED ON, it displays the following message:

- A recovery Plan: <RP Name> : All related VMs are up

Error: The following error message displays:

If A recovery Plan related to VMs powerstate is POWERED OFF, it displays either of the following error message:

- A recovery Plan: <RP Name> - Rest all related VMs are up except the below servers:
<StatePOWERED OFF SERVER DETAIL>

Or

- A recovery Plan: <RP Name>: No related VMs are up

If VM Names are not identified for RAL, it throws an error as

- A recovery Plan: <RP Name>: No related VM Names are found

39.26 VMwareSRMstateDR

Description

This RAL will validate , and shows SRM Server DR connectivity state

Inputs:

DR SRM server IP , and SRM Credential

Key-Value:

DR_SRM_AGENT_IP

Outputs:

If SRM server is connected successfully, it shows the success state as

- SRM Site: <DR SRM server IP> HOST Connected

If there are any errors:



- a. If SRM server is not reachable
 - SRM SITE: <SRM SERVER> host is not accessible or down.
- b. If credential is incorrect, it throws an error

Dry Run

Dry Run Verification	Comm, and executed on backend	Output
Pre-Check - This RAL basically checks the connectivity from RO SC to the SRM server.	VMWare SRM API	Success: Able to connect to the SRM server from RO Site Controller <IP Address>. Error: Failed to connect/validate the connectivity to the SRM server from RO Site controller <IP Address>

39.27 VMwareSRMstatePrimary

Description

This RAL will validate , and shows SRM Server Primary connectivity state

Inputs:

Primary SRM server IP , and SRM Credential

Key-Value:

PR_SRM_AGENT_IP

Outputs:

If SRM server is connected successfully, it shows the success state as

- SRM Site: <Primary SRM server IP> HOST Connected

If there are any errors:



- a. If SRM server is not reachable
 - SRM SITE: <DR SRM SERVER> host is not accessible or down.
- b. If credential is incorrect, it throws an error

Dry Run

Dry Run Verification	Comm, and executed on backend	Output
Pre-Check - This RAL basically checks the connectivity from RO SC to the SRM server.	VMWare SRM API	Success: Able to connect to the SRM server from RO Site Controller <IP Address>. Error: Failed to connect/validate the connectivity to the SRM server from RO Site controller <IP Address>

39.28 VMwareSRMSwitchback

This RAL will perform VMware SRM SWITCHBACK operation for VMware SRM A recovery Plan to PR site

Inputs:

It requires PR SRM Server IP , and Credential, A recovery Plan Name

Key-Value:

PR_SRM_AGENT_IP,SRM_A RECOVERY_PLAN

Output:

If Operation started successfully – it displays

A recovery Plan: SWITCHBACK operation completed, Starting REPROTECT at Primary Site

If failed to execute operation - It throws error:

Failed to perform A recovery plan: <RP Name> SWITCHBACK operation <stateERROR summary>

Dry Run

VMwareSRMSwitchbackRPstateValidate dry run script is being used here to validate if the A recovery Plan is in FAILOVER mode to perform Switchback. Please refer the VMwareSRMSwitchbackRPstateValidate dryrun help page for the comm, and , and output.



39.29 VMwareSRMSwitchbackPGstateValidate

Description

This RAL will validate VMware SRM Protection Group state from VMware SRM PR side for SWITCHBACK Operation

Inputs:

It requires PR VMware SRM Server IP , and the Credential, VMware SRM A recovery Plan Name

Key-Value:

PR_SRM_AGENT_IP,SRM_A RECOVERY_PLAN

Output:

It returns error if SRM Protection Group is not in valid state at DR side as

Protection Group in RP: <RP Name>is not in the expected mode , and States <SRM PG state detail>

else, it returns success as

Protection Groups validation completed. All PGs are in expected state for <RP Name>

Dry Run

Dry Run Verification	Comm, and executed on backend	Output
Pre-Check - This RAL validates the PG state , and against the FAILOVER , and displays the output.	VMWare SRM API	Success: PG state to perform failover is valid. ERROR: 1. PG state to perform failover is not in a valid state. (OR) 2. ERROR: Failed to execute operation. Check the logs for further detail.

39.30 VMwareSRMSwitchbackRPstateValidate

Description

This RAL will validate VMware SRM A recovery Plan state from VMware SRM PR side for SWITCHBACK operation

Inputs:

It requires PR VMware SRM Server IP , and the Credential, VMware SRM A recovery Plan Name



Key-Value:

PR_SRM_AGENT_IP,SRM_A RECOVERY_PLAN

Output:

It returns error if SRM A recovery Plan is not in valid state at PR side as

A recovery plan current state is not in the expected mode for FAILOVER operation , and state<ERROR SUMMARY>

Error Summary:

1. If A recovery plan is in Running State, the error message:

A recovery Plan <RP Name> is in progress. It cannot rerun. Please verify SRM Infrastructure for detail.

2. If A recovery plan state return ERROR state, it throws error message as

A recovery Plan <RP Name> is in ERROR state. The protection Group might be in use by other A recovery plan. Please verify SRM Infrastructure.

3. If A recovery Plan is not in Ready state, it will throw an error as

A recovery Plan <RP Name> is not ready for failover.

Success:

if validation success, it returns Message as

- A recovery plan <RP Name> current state - <RP State>, pre-validation completed

If A recovery Plan state is in FAILED_OVER state

- A recovery plan <RP Name> state already in FAILED_OVER state.

If A recovery plan is in NEEDS_FAILOVER state. It displays the message as

- Warning: A recovery Plan <RP Name> is in Partially recovered state. Few related SRM Protection Group is in Recovered state for A recovery Plan.

Dry Run

Dry Run Verification	Comm, and executed on backend	Output
Checks if the A recovery Plan is in FAILOVER mode to perform Switchback.	VMware SRM API	<p>Success: A recovery Plan is in the expected state for SWITCHBACK operation.</p> <p>ERROR:</p> <ol style="list-style-type: none"> 1. A recovery Plan is not in the expected state for SWITCHBACK operation. (OR)



		2. Failed to execute operation. Check the logs for further detail
--	--	--

39.31 VMwareSRMSwitchover

Description

This RAL will perform Switchover operation for VMware SRM A recovery Plan to DR site

Inputs:

It requires DR SRM Server IP , and Credential, A recovery Plan Name

Key-Value:

DR_SRM_AGENT_IP, SRM_A RECOVERY_PLAN

Output:

DR DRILL FAILOVER Operation

If Operation started successfully – it displays

A recovery Plan: Switchover operation completed

If failed to execute operation - It throws error:

Failed to perform A recovery plan: <RP Name> SWITCHOVER operation <stateERROR summary>

Dry Run

Dry Run Verification	Comm, and executed on backend	Output
Checks if the SRM Recover Plan is in valid state to perform switchover.	VMware SRM API a recoveryPlanGetInfo	Success: A recovery Plan is in a valid state to perform the Switchover operation. Mode is Failover Error: Will fail to perform Switchover operation on A recovery plan



39.32 VMwareSRMSwitchoverPGstateValidate

Description

This RAL will validate VMware SRM Protection Group state from VMware SRM DR side for switchover operation

Inputs:

It requires DR VMware SRM Server IP , and the Credential, VMware SRM A recovery Plan Name

Key-Value:

DR_SRM_AGENT_IP,SRM_A RECOVERY_PLAN

Output:

It returns error if SRM Protection Group is not in valid state at DR side as

Protection Group in A recovery Plan: <RP Name> is not in the expected state for FAILOVER operation , and States

<ERROR SUMMARY>

else, it returns success as

Protection Groups validation completed. All PGs are in expected state for Switchover operation

Dry Run

Dry Run Verification	Comm, and Executed on backend	Output
Validates the PG state against the FAILOVER , and displays the output	VMware SRM API	On Success - PG State to perform Failover is valid. On Failure - PG State to perform Failover is not in a valid state.



39.33 VMwareSRMSwitchoverRPstateValidate

Description

This RAL will validate VMware SRM A recovery Plan state from VMware SRM DR side for SWITCHOVER Operation

Inputs:

It requires DR VMware SRM Server IP , and the Credential, VMware SRM A recovery plan Name

Key-Value:

DR_SRM_AGENT_IP,SRM_A RECOVERY_PLAN

Output:

It returns error if SRM A recovery Plan is not in valid state at DR side as

A recovery plan current state is not in the expected mode for FAILOVER operation , and state<ERROR SUMMARY>

Error Summary:

1. If A recovery plan is in Running State, the error message:

A recovery Plan <RP Name> is in progress. It cannot rerun. Please verify SRM Infrastructure for detail.

2. If A recovery plan state return ERROR state, it throws error message as

A recovery Plan <RP Name> is in ERROR state. The protection Group might be in use by other A recovery plan. Please verify SRM Infrastructure.

3. If A recovery Plan is not in Ready state, it will throw an error as

A recovery Plan <RP Name> is not ready for failover.

Success:

if validation success, it returns Message as

- A recovery plan <RP Name> current state - <RP State>, pre-validation completed

If A recovery Plan state is in FAILED_OVER state

- A recovery plan <RP Name> state already in FAILED_OVER state.

If A recovery plan is in NEEDS_FAILOVER state. It displays the message as

- Warning: A recovery Plan <RP Name> is in Partially recovered state. Few related SRM Protection Group is in Recovered state for A recovery Plan.

Dry Run

Dry Run Verification	Comm, and executed on backend	Output
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<p>Pre-Check -</p> <p>This RAL validates the RP state , and against the FAILOVER , and displays the output.</p>	<p>VMWare SRM API</p>	<p>Success: <Plan Name> A recovery plan state to perform failover is valid</p> <p>ERROR:</p> <ol style="list-style-type: none"> 1. <Plan Name> A recovery plan state to perform failover is not in a valid state. (OR) 2. ERROR: Failed to execute operation. Check the logs for further detail.
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39.34 VMwareSRMTest

Description

This RAL will perform TEST operation for VMware SRM A recovery Plan to DR site

Inputs:

It requires DR SRM Server IP , and Credential, A recovery Plan Name

Key-Value:

DR_SRM_AGENT_IP,SRM_A RECOVERY_PLAN

Output:

DR DRILL FAILOVER Operation

If Operation started successfully – it displays

A recovery Plan: TEST operation completed

If failed to execute operation - It throws error:

Failed to perform A recovery plan: <RP Name> TEST operation <stateERROR summary>

Dry Run

Dry Run Verification	Comm, and executed on backend	Output
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<p>This RAL checks VMware SRM A recovery Plan status to perform TEST operation.</p>	<p>VMware SRM API</p>	<p>Success: validation completed. All PGs are in expected state for Test Operation.</p> <p>Warning: It is not in the expected state for Test operation.</p> <p>Error: Failed to execute operation. Check the logs for further detail.</p>
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39.35 VMwareSRMTestPGstateValidate

Description

This RAL will validate VMware SRM Protection Group state from VMware SRM DR side for SRM TEST Operation

Inputs:

It requires DR VMware SRM Server IP , and the Credential, VMware SRM A recovery Plan Name

Key-Value:

DR_SRM_AGENT_IP,SRM_A RECOVERY_PLAN

Output:

It returns error if SRM Protection Group is not in valid state at DR side as

Protection Group in A recovery Plan: <RP Name> is not in the expected state for TEST operation , and States

<ERROR SUMMARY>

else, it returns success as

Protection Groups validation completed. All PGs are in expected state for TEST operation.

Dry Run



Dry Run Verification	Comm, and executed on backend	Output
This RAL checks VMware SRM Protection group state to perform TEST operation.	VMware SRM API	<p>Success: Protection Groups validation completed. All PGs are in expected state for TEST operation.</p> <p>ERROR:</p> <p>Error1: A recovery plan current state is not in the expected mode for TEST operation</p> <p>Error2: Failed to execute operation. Check the logs for further detail.</p>

39.36 VMwareSRMTestRPstateValidate

Description

This RAL will validate VMware SRM A recovery Plan state from VMware SRM DR side for TEST Operation

Inputs:

It requires DR VMware SRM Server IP , and the Credential, VMware SRM A recovery Plan Name

Key-Value:

DR_SRM_AGENT_IP,SRM_A RECOVERY_PLAN

Output:

It returns error if SRM A recovery Plan is not in valid state at DR side as

A recovery plan current state is not in the expected mode for FAILOVER operation , and state<ERROR SUMMARY>

Error Summary:

1. If A recovery plan is in Running State, the error message:

A recovery Plan <RP Name> is in progress. It cannot rerun. Please verify SRM Infrastructure for detail.

2. If A recovery plan state return ERROR state, it throws error message as

A recovery Plan <RP Name> is in ERROR state. The protection Group might be in use by other A recovery plan. Please verify SRM Infrastructure.



3. If A recovery Plan is not in Ready state, it will throw an error as

A recovery Plan <RP Name> is not ready for failover.

Success:

if validation success, it returns Message as

- A recovery plan <RP Name> current state - <RP State>, pre-validation completed

If A recovery Plan state is in FAILED_OVER state

- A recovery plan <RP Name> state already in FAILED_OVER state.

If A recovery plan is in NEEDS_FAILOVER state. It displays the message as

- Warning: A recovery Plan <RP Name> is in Partially recovered state. Few related SRM Protection Group is in Recovered state for A recovery Plan.

Dry Run

Dry Run Verification	Comm, and executed on backend	Output
This RAL checks VMware SRM A recovery Plan status to perform TEST operation.	VMware SRM API	<p>Success: DR site: All RP are in expected state for TEST operation.</p> <p>Warning: PG in A recovery Plan: It is not in the expected state for Test operation.</p> <p>Error: Failed to execute operation. Check the logs for further detail.</p>

39.37 VMwareSRMversionCheck

Description

This RAL will validate VMware SRM version for Primary , and DR Server (Check Interop list for version supported)

Inputs:



Primary , and DR server IP, Primary , and DR server credential

Key-Value:

PR_SRM_AGENT_IP,DR_SRM_AGENT_IP

Output:

If validation is success, it displays message as

- SRM version validation completed.
- <Primary SRM Server IP> - <Installed SRM_version>
- <DR SRM Server IP> - <Installed SRM_version>

If validation is failed, it throws error as

- ERROR - SRM installed version is found as lower than 6.0 , and not valid for this SRM DRILL workflow
- <Primary SRM Server IP> - <Installed SRM_version>
- <DR SRM Server IP> - <Installed SRM_version>

Dry Run

Dry Run Verification	Comm, and executed on backend	Output
Checks if the SRM version is supported.	VMware SRM API	<p>Success: VMware SRM version is supported , and displays the pr , and dr SRM version.</p> <p>Error:</p> <ol style="list-style-type: none"> 1. Failed to get the SRM version. Check the logs for further detail. (OR) 2. VMware SRM installed version is not supported.

39.38 VMwareSRMVRAcomp

Description

This RAL is written to get VRA (vSphere Replication Appliance) component Name as related vCenter that is - 1vCenter:1VRA.

Input:

Primary vCenter , and DR vCenter as the inputfrom vCenter management host

Key-Value:



No key value

Output:

It calls JAVA method to get VRA Component Name related with respective vCenter.

It assigns the next RAL action component as Primary VRA component Name , and assigns global variable

(setargs) with name drvracompName

Dry Run

Dry Run Verification	Comm, and Executed on backend	Output
Checks PR , and DR VRA component Name		On Success: Display the PR , and DR VRA Component Name.

39.39 GetVMEsxiComponent

No information available for this RAL.

39.40 GetVRScomponentforVMfromESXI

No information is available for this RAL.

39.41 GetVRSstatus

No information is available for this RAL.



40 Virtual Application A recovery

40.1 Trigger BCO

40.1.1 Description:

This action triggers the Business Continuity Operation. TriggerBCO RAL is enhanced to work with Application group (AG). TriggerBCO RAL will change the Continuity state of all the A recovery Groups (RG) which are part of an Application Group. When the Continuity state change is set using TriggerBCO RAL , and executed at AG level, all the subsequent RG continuity state will change accordingly.

Note: TriggerBCO RAL is part of all the BCO , and Drill workflows.

40.1.2 Inputs

The following is a list of inputs that are required to perform this action.

UI Input	The inputKey Name	Description
Application Group / A recovery Group Name	Not Applicable	Select the Application Group / A recovery Group Name from the drop-down list.
Select the trigger	Not Applicable	Select the trigger to be performed on the selected Application Group / A recovery Group from the drop-down list.

40.1.3 Outputs

Trigger BCO action does not return any value.

40.1.4 Error Codes

Error Code	Description
PAN-SBCM-3502	Operation is under execution or is already executed.

40.1.5 Pre-checks for Change Continuity State

- Component, Dataset, Protection Scheme, Application , and A recovery Group are created.
- Group is in Manage mode.



41 Workflow

41.1 Assignment Operation

Assign - Assigns the value of one key to another key.

Description:

This action supports assigning multiple parameters. This action can be used to assign the value of a The userdefined parameter/ system generated parameter to another parameter. This will assign the value of the right oper, and to the left oper, and only once. Further change in the value of the right oper, and is not reflected in the left oper, and.

Both the participants (left oper, and , and right oper, and) of the assignments should be parameters. Literals , and constants are not permissible.

Any number of oper, ands-pairs can be added to a list of Added Expressions.

Note:

On executing the **Dry Run** for this operation, the **Assignment Operation** action is also executed.

Inputs:

UI Input	The inputKey Name	Description
Parameter Name of Left Oper, and in assignment	PANSVR_EXPR_LEFT_OPER, AND	Enter the key name of the left oper, and in assignment. This field is m, andatory.
Parameter Name of Right Oper, and in assignment	PANSVR_EXPR_RIGHT_OPER, AND	Enter the key name of the right oper, and in assignment. This field is m, andatory.
Parameter Name of the Added Expressions in assignment	PANSVR_EXPR_OPER, AND	Adds the assigned keys PANSVR_EXPR_LEFT_OPER, AND , and PANSVR_EXPR_RIGHT_OPER, AND into a list.

Outputs:

Assignment Operation returns a **String** value that contains the old value , and new value of all the Left oper, ands in the Added Expressions' list.

Error Codes:



None

41.1.1.1 Prechecks

- Left oper, and the input is provided.
- Right oper, and the input is provided.
- Left , and Right oper, and inputs are provided using Key Values.
- Left , and Right oper, and inputs have no space.

41.2 Compare Operation

Compare - Compares the value of one key with another key.

Description

This action can be used to compare The userdefined/system generated parameters. This compares the value of the right oper, and with the left oper, and.

Both the participants (left oper, and , and right oper, and) in comparison should be parameters. Literals , and constants are not permissible.

Left oper, and , and right oper, and can contain a string, an integer, or a date. Default value is 'string'. They must have the same data type.

Logical operations of '=' (EQUALS), '!=' (NOT EQUALS), '<' (LESS THAN), '<=' (LESS THAN OR EQUALS), '>' (GREATER THAN) , and '>=' (GREATER THAN OR EQUALS) are supported.

Inputs:

UI Input	The inputKey Name	Description
Parameter Name of Left Oper, and in comparison	PANSVR_EXPR_LEFT_OPER, AND	Enter the key name of the left oper, and in assignment. This field is m, andatory.
Parameter Name of Right Oper, and in comparison	PANSVR_EXPR_RIGHT_OPER, AND	Enter the key name of the right oper, and in assignment. This field is m, andatory.
Operator	PANSVR_EXPR_OPER, AND	Select the operator from the drop-down list. Available operators are: ==, !=, <, <=, >, >= .



UI Input	The inputKey Name	Description
		This field is mandatory.
Datatype	PANSVR_EXPR_DATATYPE	Select the data type from the drop-down list. Available data types are: string , int , and date . This field is optional.

Outputs:

Output Name	Output Key Name	Description
Parameter Name of Left Oper, and in assignment	PANSVR_EXPR_LEFT_OPER, AND	The output of this action will be a boolean value - 'true' or 'false' based.

Error Codes:

None

Note:

- XML/HTML/URL uses '<' , and '>' as part of specifications , and it has to be mapped to '<' , and '>,' respectively.
- Logical expression evaluating to 'FALSE' will set the action result as 'FAILURE'.
- The date should be in MM-dd-yyyy HH:mm:ss format.

41.2.1.1 Prechecks

- Left oper, and the inputs provided.
- Right oper, and the inputs provided.
- Left , and Right oper, and inputs are provided using Key Values.
- Operator is selected.
- Datatype is selected.
- Left , and Right oper, and inputs have no space.

41.3 Custom Action

Custom - Executes the comm, and or script on the specified server.

Description:



This action allows you configure a comm, and or script (scripts like TCL/ Shell) to be executed on a specified server. If you select TCL, Kyndryl Resiliency Orchestration will internally take care of the TCL environment to run the TCL script.

Inputs:

To enter the Inputs in the Customs page:

1. From Workflow Editor, double click the Custom Action. A Custom page appears.
2. Select the Action properties tab, , and enter the contents as mentioned in the table below.

UI Input	The inputKey Name	Description
Server/ Machine Name	CUSTOM_ACTION_COMPONENT_NAME CUSTOM_ACTION_COMPONENT_TYPE	<p>Select server (or) machine from the drop-down list box.</p> <p>OR</p> <p>Add the following in the Key Value pairs.</p> <ul style="list-style-type: none"> ▪ If CUSTOM_ACTION_COMPONENT_TYPE is DYNAMIC then CUSTOM_ACTION_COMPONENT_NAME should be either Production Server or DR Server ▪ If CUSTOM_ACTION_COMPONENT_TYPE is STATIC then CUSTOM_ACTION_COMPONENT_NAME should be any discovered component name. <p>Note:</p> <p>You can execute comm, and/ script on your configured Primary or Remote server. If you always need to execute comm, and/ script on your current Production Server select Production Server. Select DR Server, if you need your comm, and/ script to execute always on your current DR server.</p>
Type of Custom Action	Not Applicable	<p>Select the type of custom action you want to configure.</p> <ul style="list-style-type: none"> ▪ Comm, and ▪ Script ▪ Kyndryl Resiliency Orchestration Integration TCL script - If selected component/ server is remotely managed, this script runs on Agent node.



UI Input	The inputKey Name	Description
Enable Sudo <ul style="list-style-type: none"> ▪ Sudo Username 	Not Applicable	Enable the Sudo checkbox to give the provision to execute a comm, and or script as another user. Enter the Target Username . Note: <ul style="list-style-type: none"> ▪ Sudo does not support the following: <ul style="list-style-type: none"> ▪ accessing a file with the Password protection. ▪ TCL script execution. ▪ Sudo supports only for UNIX environment. ▪ Sudo feature is not supported for internal commands like CD, MKDIR etc.
Execute the comm, and from path	Not Applicable	This field is optional. Enter the folder path where the comm, and is to be executed. Note: <ul style="list-style-type: none"> ▪ This field is applicable only for Comm, and type option. ▪ This feature is not supported on Windows Remote Agent. ▪ If field is not specified, default directory will be {EAMSROOT}. ▪ This field should be OS specific. Example: In UNIX OS: /root , and in Windows OS: E:\
Comm, and/Script to be executed with absolute path	Not Applicable	Enter the comm, and/ script to be executed.
View Script	Not Applicable	On selection of Script option in the Custom type field, this button is available. Click this button to view the contents of the scripts which is entered in Comm, and/ Script to be executed with absolute path field.



UI Input	The inputKey Name	Description
Log file path for custom script	Not Applicable	<p>Enter the log file path.</p> <p>The user can provide the absolute path of the log file generated from custom scripts, system logs or event logs. The same log file can be tailed using tail log link in Workflow Recent Execution page.</p> <p>Note:</p> <ul style="list-style-type: none"> ▪ To use Tail log functionality, TAIL library must be installed in Unix/ Windows OS. ▪ Tail log feature of custom RAL will work only if component is selected from Action properties , and not through KV pair.
Server where Comm, and/ script should be located	Not Applicable	The value is fetched by the system automatically, which shows the name of the server/ component where script is located.
Timeout (Sec)	Not Applicable	<p>Enter the execution wait time in seconds.</p> <p>The value '0' in this field defines indefinite wait. This is true for both Dry run , and Actual execution.</p>
<p>Enable Dry Run</p> <ul style="list-style-type: none"> ▪ Dry run execution type ▪ Dry run comm, and/comm, and path 	Not Applicable	<p>Select the Dry run option to pre-check the connectivity, privileges , and absolute path before the actual execution.</p> <p>Click on any option: Comm, and, Script or Resiliency Orchestration integration TCL script.</p> <p>Enter the comm, and/path to run the script.</p>

Outputs:

Custom action does not return any value.

Error Codes:

None.

Note:

- If path or file name or arguments consists space, then provide the same within the double quote.
 - Example for path , and file name: **"/opt/test folder/script file.sh"**
 - Example for path , and file name with arguments: **"/opt/test folder/script file.sh" "arg 1" "arg 2"**



- DR Server is not available after Failover. So the users are advised not to select **DR Server** in the **Server/Machine Name** field for any custom action executed after Failover.
- In HPUX, and AIX: For Script, and the Dry run to work, append **#!/bin/ksh** or **#!/bin/sh** as the first line of the script.

Sudo Pre-Requisite:

- Sudo utility should be installed on the server, and the environment should be present in bash profile file.
- Comment/ remove **Defaults requiretty** in /etc/sudoers for Linux.
- For performing the Sudo operations, do the following steps based on the requirement:

Comm, and	Examples
To execute the file: ADD: ../../Filename.sh	SudoThe userALL = (Owner) NOPASSWD: /home/ali/keepitup.sh ##
To view the file contents: ADD: /bin/cat ../../Filename.sh	SudoThe userALL = (Owner) NOPASSWD: /bin/cat /home/ali/keepitup.sh ##
To fetch the permissions (Dry Run): ADD: /bin/ls -ld ../../Filename.sh	SudoThe userALL = (Owner) NOPASSWD: /usr/bin/ls -ld /home/ali/keepitup.sh ##

The above example states that, the users should log into the Kyndryl Resiliency Orchestration Server as **SudoThe user**, and try to access /home/ali/keepitup.sh impersonating as **Owner**, however without the password being asked by adding **NOPASSWD** while appending.

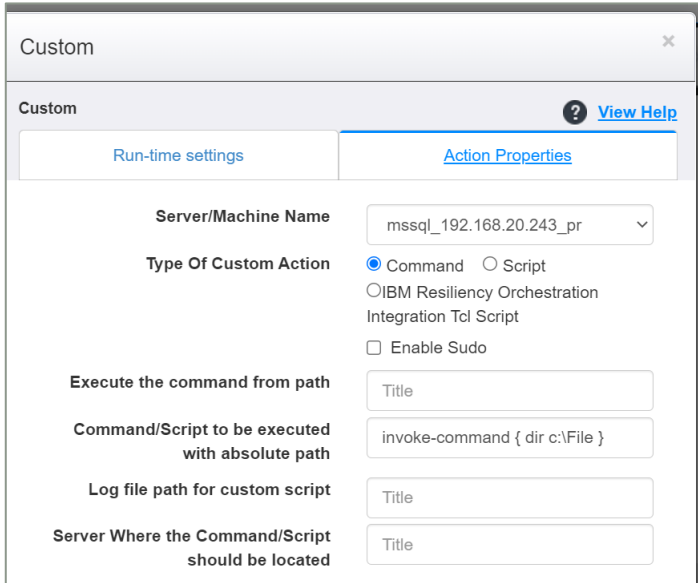
- For comm, and dry run, also add the following line in /etc/sudoers file for each sudo user:
SudoThe userALL=(root) NOPASSWD:ALL

Note:

PowerShell commands usage on Custom RAL, and Start Process RAL:

- From RO V8.3, and above, use the following syntax for PowerShell commands
- To use PowerShell comm, and c1 in the RAL, use the syntax: Invoke-Comm, and { c1 }

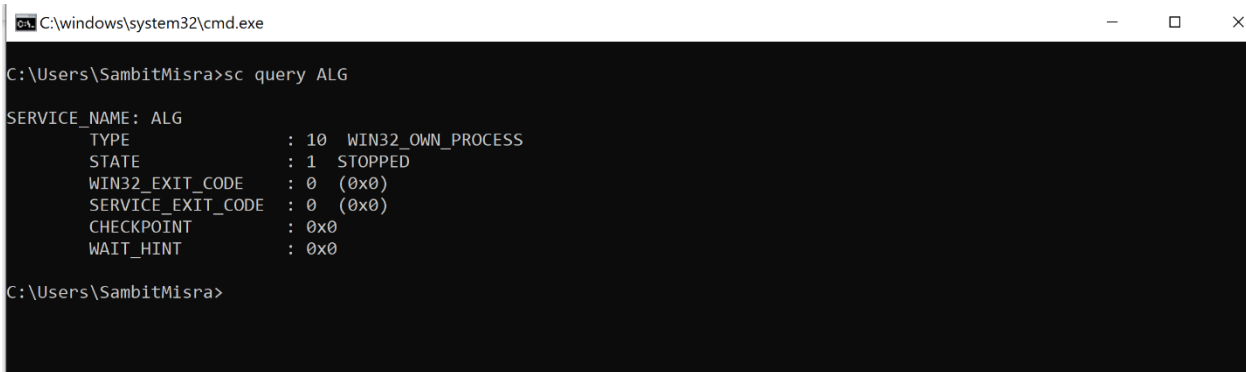
For example:



To execute “dir c:\” in the RAL, use the syntax –

Invoke-Comm, and { CMD.exe /c dir c:\ },

Similarly, if you want to run a query use the syntax – “sc query ALG” as shown in the image below:



Going forward, from ROV8.3 , and above, instead of the earlier comm, and, use – Invoke-Comm, and { CMD.exe /c sc query ALG }



```
Windows PowerShell
PS C:\Users\SambitMisra> Invoke-Command { CMD.exe /c sc query ALG }

SERVICE_NAME: ALG
        TYPE               : 10  WIN32_OWN_PROCESS
        STATE                : 1   STOPPED
        WIN32_EXIT_CODE       : 0   (0x0)
        SERVICE_EXIT_CODE   : 0   (0x0)
        CHECKPOINT           : 0x0
        WAIT_HINT            : 0x0
PS C:\Users\SambitMisra>
```

Note –

- For some commands, it may work as “dir c:\”
- We perform messaging for some commands in RO, but that does not ensure all remote commands. Going forward RO supports only PowerShell remote comm, and in custom/process RAL.
- Ensure to use commands starting with Invoke-Comm, and { cmd xyz }.

Why this change

Until recently the comm, and execution was done locally, which means whatever comm, and we want to execute as part of custom/process RAL we copy the comm, and to the remote system i.e the endpoint (PR/DR), execute it , and bring the response back. This whole operation is time-consuming , and affects RAL execution time.

Now we move to execute commands remotely, which means whatever comm, and we want to perform at the endpoint will be executed in the Site Controller. So, the execution becomes faster. Now we can execute RALs in a few seconds, but we must use only PowerShell remote cmd.

Important – If earlier the RAL was executing “dir c:\”, now we must convert this comm, and to PS remote comm, and-line Invoke-Comm, and { CMD.exe /c dir c:\ }

41.3.1 Dry Run

Dry run is an independent script that enforces rules, custom made by the user against the script that does Dry run in general. Currently, custom action runs three types of scripts – bat files, sh files , and Kyndryl Resiliency Orchestration integration Tcl scripts. Dry run feature is available for all three types of scripts.



For Resiliency Orchestration integration Tcl scripts, these scripts need to implement special methods that allows the framework to know that these scripts have implemented the dry-run feature , and thus they can be invoked in dry run mode. To achieve this, there is a requirement to develop template tcl scripts , and guide, so that these scripts can be developed in st, andard way.

For sh/bat files, pre-check script would be separate script. There should be some naming convention for the separate script for prechecks. For example: If script name is getArchiveLog.bat, then pre-check script name should be getArchiveLog_Precheck.bat.

Presence of this script is considered as support of dry run feature for that action , and it is invoked when dry run is called or during workflow execution.

Custom action dry run also need to pre-check that the configured script exists.

<p>41.3.2 Prechecks for Comm, and</p>	<ul style="list-style-type: none"> ▪ Connection with the given machine. ▪ Comm, and to be executed. ▪ The comm, and is located on the chosen component.
<p>41.3.3 Prechecks for Script</p>	<ul style="list-style-type: none"> ▪ Connection with the given machine. ▪ The userprivileges to run the script on the machine. ▪ Script to be executed with absolute path. ▪ The script is located on the chosen component.
<p>41.3.4 Prechecks for Resiliency Orchestration Integration TCL Script</p>	<ul style="list-style-type: none"> ▪ The userprivileges to run the script on the machine. ▪ Script to be executed with absolute path. ▪ If the selected component is managed remotely, then the Kyndryl Resiliency Orchestration Integration Tcl script should be located on Agent Node.



Note:

When the same TCL file is used to execute Dry run , and the actual execution, 'EXECUTE_DRY_RUN_MODE' key should be used in the TCL script. The block (code) that has 'EXECUTE_DRY_RUN_MODE' = 'TRUE' will be executed for Dry run , and the rest ('EXECUTE_DRY_RUN_MODE' = 'FALSE') will be executed for the actual execution.

41.4 Test Exercise Operation

Test Exercise Operation - starts/ stops a test exercise workflow.

Description :

This action can be used to start/ stop a Test exercise from another workflow. The start operation works in two modes- **Blocking** , and **Non-Blocking**. In blocking mode, the action returns after the specified Test exercise has completed its execution. In non-blocking mode, the action returns immediately after the specified Test exercise is started. The stop operation works in two modes - **Graceful** or **Forceful** mode. In graceful mode, the action stops the specified Test exercise only after the currently executing actions of the Test exercise is completed. In forceful mode, the specified Test exercise is aborted immediately.

Inputs:

UI Input	The inputKey Name	Description
Group Name	PANSVR_WORKFLOW_GROUP	Select the group name from the drop-down list. This field is m, andatory.
Test Name	PANSVR_WORKFLOW_NAME	Select the test exercise name from the drop-down list. This field is m, andatory.
Operation this action performs	PANSVR_WORKFLOW_OPERATION	Select an operation to perform. The available options are: <ul style="list-style-type: none"> ▪ Start execution of the selected Test , and wait for it to complete before continuing execution of this workflow. ▪ Start execution of the selected Test , and



		<p>continue to execute this workflow.</p> <ul style="list-style-type: none">▪ Abort the selected Test.▪ Stop the selected Test only after the current executing action in the selected Business Process completes.
--	--	---

Outputs:

None

Note:

- The test exercise should be existent at run-time.
- The test exercise should be running to stop the execution.
- The test exercise should not be running to start the execution.
- The output of the executed test exercise will be available under the triggered test exercise.

41.4.1 Prechecks

- The test exercise is available at run-time.
- The test exercise is running to stop the execution.
- The test exercise is not running to start the execution.

41.5 BPI Operation

BPI Operation - starts/ stops a BPI workflow.

Description:

This action can be used to start/stop a BPI workflow from another workflow. The start operation works in two modes - **Blocking** , and **Non-Blocking**. In blocking mode, the action returns after the specified BPI workflow has completed its execution. In non-blocking mode, the action returns immediately after the specified BPI is started. The stop operation works in two modes - **Graceful** or **Forceful** mode. In graceful mode, the action stops the specified BPI only after the currently executing actions of the BPI is completed. In forceful mode, the specified BPI is aborted immediately.

Inputs:



UI Input	The inputKey Name	Description
Group Name	PANSVR_WORKFLOW_GROUP	Select the group name from the drop-down list. This field is m, andatory.
Business Process Name	PANSVR_WORKFLOW_NAME	Select an business process name from the drop-down list. This field is m, andatory.
Operation this action performs	PANSVR_WORKFLOW_OPERATION	Select an operation to perform. The available options are: <ul style="list-style-type: none"> ▪ Start execution of the selected Business Process , and wait for it to complete before continuing execution of this workflow. ▪ Start execution of the selected Business Process , and continue to execute this workflow. ▪ Abort the selected Business Process. ▪ Stop the selected Business Process only after the current executing action in the selected Business Process completes.

Outputs:

None

Note

- The BPI workflow should be existent at run-time.
- The workflow should be running to stop the execution.
- The workflow should not be running to start the execution.
- The output of the executed BPI will be available under the triggered BPI workflow.

41.5.1 Prechecks

- A group should exist.
- BPI workflow is available for BPI operation.



- BPI workflow is running to perform stop operation.
- BPI workflow is not running to start the execution.
- File/Folders has sufficient permissions to execute the BPI.

41.6 Find Pattern

Fine Pattern - Checks whether a particular pattern is available in the specified string.

Description:

This action checks whether a particular pattern is available in the specified string. This can be used to parse the output of the execution of a comm, and/script , and verify whether the comm, and/script started the application successfully or not.

Inputs:

UI Input	The inputKey Name	Description
Component Name	Not Applicable	Select the component from the drop-down list.
Pattern to search	PANOS_SEARCH_PATTERN	Enter the pattern to search in the content. This field is m, andatory.
Content	PANOS_SEARCH_CONTENT	Enter the path to content where you want to search for the pattern. This field is m, andatory.

Outputs:

Output Name	Output Key Name	Description
Pattern Found	PANOS_SEARCH_CONTENT_RESULT	The output of this action will be a boolean value - 'true' or 'false' based. True if the pattern is found, else false

Error Codes:



Error Code	Description
PAN-CGEN-0002	Invalid component name.

41.6.1 Prechecks

- Values are configured.

41.7 Group Lock

Group Lock - Creates lock on Group.

Description:

This action creates lock on Group. If one group wants to lock to perform certain actions, first the group acquires a lock. After completing the actions, the group releases the lock.

Inputs:

UI Input	The inputKey Name	Description
Dont use lock	Not Applicable	Select this option if you do not want to use the lock. This field is m, andatory.
Acquire lock	Not Applicable	Select this option to acquire a lock. This field is m, andatory.
Release lock	Not Applicable	Select this option to release the lock. This field is m, andatory.

Outputs:

Group Lock action does not return any value.

Error Codes:

None

41.8 Group Site Health Check RAL

This is added in Workflow category, this is used to show the status of the group (active, inactive , and degraded) based on Primary or Secondary site.

41.9 Listing Action



Listing - Lists the configured procedure in step by step , and one at a time.

Description:

This action lists the configured procedure in step by step , and one at a time.The usercan provide the key whose value will be substituted during execution.

For example, ‘Server Boot up’ is procedure containing various ‘steps’ to be done sequentially. During execution, each ‘step’ is shown on the window , and waits for The userinput. Upon successful completion of the step, the next step will be shown . This activity is carried out for all the steps in the listing action.

Inputs:

UI Input	The inputKey Name	Description
Procedure Name	Not Applicable	Enter the procedure name. The procedure should be configured before adding in the listing.
Title	Not Applicable	Enter the title for every step. For better underst, anding you are advised to enter the Group name while configuring the action.
Description	Not Applicable	Enter more information for every step.

Outputs:

Listing action does not return any value.

Error Codes:

None

Prechecks

None

41.10 Rescan Disk

The Rescan RAL action is a Windows O.S. action that scans all attached disks for disk configuration changes. Rescanning disks can take several minutes, depending on the number of hardware devices installed.



41.11 Notification Action

Description:

This action notifies a group of users in the Notification list , and/or Email list by sending emails.

Inputs:

UI Input	The inputKey Name	Description
Select Notification List	Not Applicable	<p>The user can select multiple notification list for whom the message has to be sent.</p> <p>If no notification lists are configured in the Kyndryl Resiliency Orchestration system then "No Notification List available for selection" will be shown. In such case, the user has to configure "Send Email to" to whom the message has to be sent.</p>
Send Email to	PANSRV_NOTIFY_EMAIL_IDS	<p>Enter the email address of the notification recipient.</p> <p>Max. of 2048 chars are allowed. The user cannot type beyond 2048 chars.</p> <p>You can provide multiple email-ids separated by comma. The email-ids should be in the form of abc@xyz.com.</p> <p>To receive notifications as SMS, specify Mobile Email Id in the Email field. It is recommended to keep the message short when specifying Mobile Email Id.</p>
Subject to be sent	Not Applicable	<p>Enter the subject for the notification.</p> <p>The default subject is "Kyndryl Resiliency Orchestration Notification".</p> <p>The subject should be alpha-numeric characters without single quotes ('), double quotes (") , and escape character sequence.</p> <p>Max. of 255 chars are allowed. The user cannot type beyond 255 chars.</p> <p>This field is mandatory.</p>



Message to be sent	Not Applicable	Enter the message for the notification. Max of 2048 chars are allowed. The message should be alphanumeric characters without single quotes ('), double quotes (") , and escape character sequence. This field is mandatory.

Outputs:

Notification action does not return any value.

Error Codes:

None

Note:

"Atleast Notification List or Email should be configured" message will be displayed to the user if atleast one of them is not configured.

41.11.1 Prechecks

- Email server is configured with proper values.
- Notification List is created , and user(s) assigned to it.
- Valid email id is created.
- Email server connection.

41.12 Trigger BCO

Description:

This action triggers the Business Continuity Operation.

Inputs:

UI Input	The inputKey Name	Description
----------	-------------------	-------------



Group Name	Not Applicable	Select the Group Name from the drop-down list.
Select the trigger	Not Applicable	Select the trigger to be performed on the selected Group, from the drop-down list.

Outputs:

Trigger BCO action does not return any value.

Error Codes:

Error Code	Description
PAN-SBCM-3502	Operation is under execution or is already executed.

41.12.1 Prechecks for Initiate NormalFullCopy

- Login credentials.
- Database credentials.
- The userprivileges to start the NormalFullCopy.
- The userpermission to access the folder.
- Files , and folders are created in PR/ DR.
- PR/DR database modes.
- Group is in Manage mode.

41.12.2 Prechecks for Stop NormalFullCopy

- Login credentials.
- Database credentials.
- The userprivileges to stop the NormalFullCopy.
- The userpermission to access the folder.
- Files , and folders are created in PR/ DR.
- PR/ DR database modes.
- Group is in Manage mode.
- NormalFullCopy is running.

41.12.3 Prechecks for Initiate NormalCopy



- Login credentials.
- Database credentials.
- The userprivileges to start the NormalCopy.
- The userpermission to access the folder.
- Files , and folders are created in PR/ DR.
- PR/ DR database modes.
- Component, Dataset , and Protection Scheme are created , and all are in Active state.
- Group is in Manage mode.
- NormalFullCopy is completed , and continuity state is Normal Inactive.

41.12.4 Prechecks for Stop NormalCopy

- Login credentials.
- Database credentials.
- The userprivileges to stop the NormalCopy.
- The userpermission to access the folder.
- Files , and folders are created in PR/ DR.
- PR/ DR database modes.
- Component, Dataset , and Protection Scheme are created , and all are in Active state.
- Group is in Manage mode.
- NormalFullCopy is completed , and continuity state is Normal Inactive.
- NormalCopy is running.

41.12.5 Prechecks for Initiate Failover

- Login credentials.
- Database credentials.
- The userprivileges to start Failover.
- The userpermission to access the folder.
- Files , and folders are created in PR/ DR.
- PR/ DR database modes.
- Component, Dataset , and Protection Scheme are created , and all are in Active state.
- Group is in Manage mode , and continuity state is Normal Inactive.



41.12.6 Prechecks for Stop Failover

- Login credentials.
- Database credentials.
- The userprivileges to stop Failover.
- The userpermission to access the folder.
- Files , and folders are created in PR/DR.
- PR/ DR database modes.
- Component, Dataset , and Protection Scheme are created , and all are in Active state.
- Group is in Manage mode , and continuity state is Normal Inactive.
- Failover is running.

41.12.7 Prechecks for Initiate Fallback

- Login credentials.
- Database credentials.
- The userprivileges to start Fallback.
- The userpermission to access the folder.
- Files , and folders are created in PR/ DR.
- PR/ DR database modes.
- Component, Dataset , and Protection Scheme are created , and all are in Active state.
- Group is in Manage mode.
- Failover operation is completed , and continuity state is Failover Active.

41.12.8 Prechecks for Stop Fallback

- Login credentials.
- Database credentials.
- The userprivileges to stop Fallback.
- The userpermission to access the folder.
- Files , and folders are created in PR/DR.
- PR/ DR database modes.
- Component, Dataset , and Protection Scheme are created , and all are in Active state.
- Group is in Manage mode.



- Failover operation is completed , and continuity state is Failover Active.
- Fallback is running.

41.12.9 Prechecks for Initiate FallbackResync

- Login credentials.
- Database credentials.
- The userprivileges to start FallbackResync.
- The userpermission to access the folder.
- Files , and folders are created in PR/ DR.
- PR/ DR database modes.
- Component, Dataset , and Protection Scheme are created , and all are in Active state.
- Group is in Manage mode.
- Fallback operation is completed , and continuity state is Fallback Active.

41.12.10 Prechecks for Stop FallbackResync

- Login credentials.
- Database credentials.
- The userprivileges to stop FallbackResync.
- The userpermission to access the folder.
- Files , and folders are created in PR/ DR.
- PR/ DR database modes.
- Component, Dataset , and Protection Scheme are created , and all are in Active state.
- Group is in Manage mode.
- Fallback operation is completed , and continuity state is Fallback Active.
- FallbackResync is running.

41.12.11 Prechecks for Change Continuity State

- Component, Dataset, Protection Scheme , and A recovery Group are created.
- Group is in Manage mode.

41.12.12 Prechecks for Resume Continuity Operation

- Login credentials.
- Database credentials.



- The userprivileges to start/ stop NormalCopy , and ReverseNormalCopy.
- The userpermission to access the folder.
- Files , and folders are created in PR/ DR.
- PR/ DR database modes.
- Component, Dataset , and Protection Scheme are created , and all are in Active state.
- Group is in Manage mode.
- Continuity state is Normal Inactive.
- NormalCopy/ ReverseNormalCopy is in suspended mode.

41.12.13 Prechecks for Move to Maintenance Mode

- Component, Dataset, Protection Scheme , and A recovery Group are created.
- Group is in Manage mode.

41.12.14 Prechecks for Move to Manage Mode

- Component, Dataset, Protection Scheme , and A recovery Group are created.
- Group is in Maintenance mode.

41.12.15 Prechecks for Initiate ReverseNormalCopy

- Login credentials.
- Database credentials.
- The userprivileges to start ReverseNormalCopy.
- The userpermission to access the folder.
- Files , and folders are created in PR/ DR.
- PR/ DR database modes.
- Component, Dataset , and Protection Scheme are created , and all are in Active state.
- Group is in Manage mode.
- Switchover is completed , and continuity state is Switchover Inactive.

41.12.16 Prechecks for Stop ReverseNormalCopy

- Login credentials.
- Database credentials.
- The userprivileges to stop ReverseNormalCopy.
- The userpermission to access the folder.



- Files , and folders are created in PR/ DR.
- PR/ DR database modes.
- Component, Dataset , and Protection Scheme are created , and all are in Active state.
- Group is in Manage mode.
- Switchover is completed , and continuity state is Switchover Inactive.
- ReverseNormalCopy is running.

41.13 Expect RAL

Description:

Currently DR process/drills involve logging into router/switch , and run commands to change configuration which is generally menu driven , and/or interactive. Interactive operations can be automated with this RAL where inputs are required to continue step by step.

Inputs:

UI Input	Description
Server/Machine Name	Select the server to spawn from the list of host Servers discovered. The user can choose "Production Server" or "DR Server" for dynamic selection of the host.
Spawn	<p>Either ssh or command can be selected. These options are explained below.</p> <p>1. SSH : Select this option to ssh to a device (like router or switch or another server). Upon selection the following inputs will be provided.</p> <ul style="list-style-type: none"> ▪ Timeout ▪ Device/ Server ▪ UserName ▪ Password <p>2. Script/ Comm, and : Select this option to execute a command/ script (like ftp etc). Upon selection the following inputs will be provided.</p> <ul style="list-style-type: none"> ▪ Timeout ▪ Command <p>Note: The Timeout field is M, andatory , and the Port field is m, andatory if type is ssh.</p>



UI Input	Description
Expect/Send	<p>If expect/ send options are already configured then the user can</p> <ul style="list-style-type: none"> ▪ add/ insert by clicking on icon. ▪ delete by clicking on icon. <p>The following options will be shown during add/insert of expect/ send steps.</p> <p>a. Expect: When expect radio button is chosen, the user will be able to provide the text to expect.</p> <p>b. Send: When send radio button is chosen, the user will be able to provide the text to send. If the text needs to be encrypted, then select "encrypt send" checkbox.</p>

Note:

- The Server/Machine being selected should be a Unix machine , and not Windows machine.
- Certain commands (eg. ftp) do not work when configured for **command/ script** execution.

41.13.1 Prechecks for SSH

- Login/ comm, and details are not mandatory.
- Port 22 is assigned for ssh on target.
- Login credentials for SSH.
- For the last step, **exit** comm, and is added or not.

41.13.2 Prechecks for Script/ Comm, and

- Comm, and passed is available on the selected Agent_Node or host (Example: Telnet client is not installed in RHEL 6, by default).
- Port 23 is assigned for comm, and on target.
- Login/ comm, and details are not mandatory.
- Verify Login Credentials given from the added the input from expect/send to see whether we are able to login or not.
- For the last step, **exit** comm, and is added or not.

41.14 Mount Volume

Description

This action mounts the volume given in mount path at the mount point.

Inputs



The inputName	Description	The inputKey Name	Optional/ M, andatory
Component Name	Select the component name from the drop-down list.	Production or DR Server	M, andatory
Mount Path	If mounting a volume not belonging to the protection object then the usershould provide the mount path with IP address or he can provide the same in key MOUNT_PATH. If volume to mount belongs to the protection object, leave this parameter blank , and the "LUN/Qtree Path" parameter of the protection object is used. If this parameter is also not set, the mount path is constructed from the "Volume Name" parameter using the format "/vol/<Volume Name>".	MOUNT_PATH	Optional
Mount Point	The server directory where the mount path Lun has to be mounted.	MOUNT_POINT	M, andatory

Outputs

This action returns key values that can be used by later actions.

Output Name	Output Key Name	Description
Mount Point	MOUNT_POINT	The server directory where the volume has being mounted.

41.15 Unmount Volume

Description

This action unmounts the volume given in mount path at the mount point.

Inputs

The inputName	Description	The inputKey Name	Optional/ M, andatory
Component Name	Select the component name from the drop-down list.	PR or DR Server	M, andatory
Mount Point	The server directory from where the mount path volume has to be unmounted.	MOUNT_POINT	M, andatory



Outputs: There are no output keys for this action.

41.16 Mount Clone Volume

Description

This action mounts the volume given in clone mount path at the mount point.

Inputs

The inputName	Description	The inputKey Name	Optional/ M, andatory
Component Name	Select the component name from the drop-down list.	Production or DR Server	M, andatory
Mount Path	The usershould provide the clone mount path with IP address. He can provide the same in key CLONE_MOUNT_PATH.	CLONE_MOUNT_PATH	Optional
Mount Point	The server directory where the mount path has to be mounted.	MOUNT_POINT	M, andatory

Outputs: There are no output keys for this action.

41.17 Unmount Clone Volume

Description

This action unmounts the volume given in clone mount path at the mount point.

Inputs

The inputName	Description	The inputKey Name	Optional/ M, andatory
Component Name	Select the component name from the drop-down list.	Production or DR Server	M, andatory



Mount Path	The server directory from where the mount path volume has to be un mounted.	MOUNT_PATH	M, andatory
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Outputs

There are no output keys for this action.

41.18 Get Volume Size

Description

This action identifies the size of the volume.

Inputs

The inputName	Description	The inputKey Name	Optional/ M, andatory
Component Name	Select the component name from the drop-down list.	Production or DR Server	M, andatory
Volume Path	The path in which the volume is configured	VOLUME_PATH	M, andatory

Outputs

This action returns the size of the volume.

Output Name	Output Key Name	Description
Volume Path	VOLUME_PATH	The size of the volume.

41.19 Trigger Site Level Drill

Description: This RAL triggers a drill of multiple groups of one site in a sequence.

Inputs

The inputName	Description	Key Values
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A recovery Group Names	A recovery Group Names separated by comma (,)	RG_NAMES
Drill Name	The name of the drill, for example, Switchover or Switchback, which The userneeds to trigger.	DRILL_NAME

Outputs: The following are outputs for this action:

- a. On success, it displays Successfully Triggered <Drill name> for the groups - <Group Names>
- b. On failure, it displays Failed to trigger <Drill name> for the groups , and the reasonTrigger Site Level FO

Description

This RAL triggers a drill of multiple groups of one site in a sequence.

Inputs

The inputName	Description	Key Values
A recovery Group Names	A recovery Group Names separated by comma (,)	RG_NAMES

Outputs

The following are outputs for this action:

- a. On success, the action displays Successfully Triggered Failover for the groups - <Group Names>
- b. On failure, the action displays Failed to trigger Failover for the groups , and the reason



42 Zerto

42.1 ZertoFOwithoutCommit

Description: This RAL executes Zerto Failover without commit

The inputParameters	Output
VPG Name	No output. Operation success or failure message.
VPG_ID	IF success : Failover without commit on the VPG is executed.
ZERTO_SESSION_ID	IF failure : Failover without commit on the VPG is not done , and relevant message is shown.

42.2 ZertoFOCommitOrRollback

Description: This RAL executes Zerto Failover commit or Failover rollback operation.

The inputParameters	Output
VPG Name	No output. Operation success or failure message.
VPG_ID	IF success : Based on the Key Value for ZERTO_COMMIT_ROLLBACK the Failover commit with reverse sync or Failover rollback on the VPG is performed.
ZERTO_SESSION_ID	
ZERTO_COMMIT_ROLLBACK	IF failure : Failover commit with reverse sync or Failover rollback on the VPG is not done , and relevant message is shown.

About the key value ZERTO_COMMIT_ROLLBACK:

- ZERTO_COMMIT_ROLLBACK is the Key to get the runtime value for FO Commit or FO Rollback that needs to be entered manually during the workflow execution.
- If the value is 'commit' then Zerto Failover Commit will be executed.
- If the value is 'rollback' then Zerto Failover Rollback will be executed.



42.3 Zerto Change A recovery Host

Description: This RAL is used to change the A recovery Host available in VCenter. When the correct Host IP address is provided, the Host is changed to the provided IP address for VM a recovery.

The inputName	The inputType	Key Value Pair	Optional/M, andatory	Description
Protection Scheme	Dynamic	ZERTO_OPERATION_ON_VALUE_TYPE=DYNAMIC ZERTO_OPERATION_ON_SERVICE= Production Protection Scheme or DR Protection scheme	M, andatory	Select Production Protection Scheme / DR Protection Scheme
	Static	ZERTO_OPERATION_ON_VALUE_TYPE=STATIC ZERTO_OPERATION_ON_SERVICE=<Discovered Protection Scheme Name>	M, andatory	Select from the list of Protection Scheme of Type Zerto Virtual Protection Group which is associated with the group or provide the Protection scheme name.
Host	Dynamic	EXPANSION_HOST_IP = <IP Address>	M, andatory	Provide the IP address in the box.
	Static	EXPANSION_HOST_IP = <IP Address>	M, andatory	Provide the IP address in the box.

Output: This RAL does not have any output.

42.4 Zerto Failover Test Stop

Description: This RAL can be used to clean up the Failover test.



The inputName	The inputType	Key Value Pair	Optional/M, andatory	Description
Protection Scheme	Dynamic	ZERTO_OPERATION_ON_VALUE_TYPE=DYNAMIC ZERTO_OPERATION_ON_SERVICE= Production Protection Scheme or DR Protection scheme	M, andatory	Select Production Protection Scheme / DR Protection Scheme
	Static	ZERTO_OPERATION_ON_VALUE_TYPE=STATIC ZERTO_OPERATION_ON_SERVICE=<Discovered Protection Scheme Name>	M, andatory	Select from the list of Protection Scheme of Type Zerto Virtual Protection Group which is associated with the group or provide the Protection scheme name.

Output: This RAL does not have any output.

Precheck:

- a. Precheck for the Configuration.
- b. Whether VPG exist.
- c. Verifying whether VPG is in proper status to execute the RAL.

42.5 Zerto Check VPG Status

Description: This RAL is used to check the VPG status , and substatus.

The inputName	The inputType	Key Value Pair	Optional/M, andatory	Description
Protection Scheme	Dynamic	ZERTO_OPERATION_ON_VALUE_TYPE=DYNAMIC ZERTO_OPERATION_ON_SERVICE= Production	M, andatory	Select Production Protection Scheme / DR Protection Scheme



		Protection Scheme or DR Protection scheme		
	Static	ZERTO_OPERATION_ON_VIRTUAL_MACHINE_TYPE=STATIC ZERTO_OPERATION_ON_SERVICE=<Discovered Protection Scheme Name>	M, andatory	Select from the list of Protection Scheme of Type Zerto Virtual Protection Group which is associated with the group or provide the Protection scheme name.
Status	Dynamic	VPG_STATUS=<Status>	M, andatory	Status of the VPG. Select the Status from the Drop down list.
	Static	VPG_STATUS=<Status>	M, andatory	Provide the status in KV.
Sub status	Dynamic	VPG_SUBSTATUS=<Sub status>	M, andatory	Sub status of the VPG. Select the Sub status from the drop down list.
	Static	VPG_SUBSTATUS=<Sub status>	M, andatory	Provide the status in KV.

Note - Refer VM Protection with Zerto solution guide for the list of status , and sub status.

Output: If the provided/selected status , and sub status matches the current status of VPG, the RAL will be executed successfully. Otherwise, the RAL will fail with message “Status did not match”.

Precheck:

- a. Precheck for the configuration
- b. Whether VPG exists

42.6 Zerto Failover

Description: This RAL is used to perform Failover.



The inputName	The inputType	Key Value Pair	Optional/M, andatory	Description
Protection Scheme	Dynamic	ZERTO_OPERATION_ON_VALUE_TYPE=DYNAMIC ZERTO_OPERATION_ON_SERVICE= Production Protection Scheme or DR Protection scheme	M, andatory	Select Production Protection Scheme / DR Protection Scheme
	Static	ZERTO_OPERATION_ON_VALUE_TYPE=STATIC ZERTO_OPERATION_ON_SERVICE=<Discovered Protection Scheme Name>	M, andatory	Select from the list of Protection Scheme of Type Zerto Virtual Protection Group which is associated with the group or provide the Protection scheme name.

Output: This RAL does not have any output.



42.7 Zerto Failover Test

Description: This RAL is used to trigger the Failover test.

The inputName	The inputType	Key Value Pair	Optional/M, andatory	Description
Protection Scheme	Dynamic	ZERTO_OPERATION_ON_VALUE_TYPE=DYNAMIC ZERTO_OPERATION_ON_SERVICE= Production Protection Scheme or DR Protection scheme	M, andatory	Select Production Protection Scheme / DR Protection Scheme
	Static	ZERTO_OPERATION_ON_VALUE_TYPE=STATIC ZERTO_OPERATION_ON_SERVICE=<Discovered Protection Scheme Name>	M, andatory	Select from the list of Protection Scheme of Type Zerto Virtual Protection Group which is associated with the group or provide the Protection scheme name.

Output: This RAL does not have any output.

42.8 Zerto Role Switch

Description: This RAL can be used in the Switchover , and Switchback workflow.

The inputName	The inputType	Key Value Pair	Optional/M, andatory	Description
Protection Scheme	Dynamic	ZERTO_OPERATION_ON_VALUE_TYPE=DYNAMIC ZERTO_OPERATION_ON_SERVICE= Production Protection Scheme or DR Protection scheme	M, andatory	Select Production Protection Scheme / DR Protection Scheme



	Static	ZERTO_OPERATION_ON_VM VALUE_TYPE=STATIC ZERTO_OPERATION_ON_SERVICE=<Discovered Protection Scheme Name>	M, mandatory	Select from the list of Protection Scheme of Type Zerto Virtual Protection Group which is associated with the group or provide the Protection scheme name.
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Output: This RAL does not have any output.

Prerequisites: The following are prerequisites for Role Switch RAL (SO/SB) as per Zerto recommendation:

1. **Vmware** guest tools should be running in the VMs which are configured in VPG.
2. If Guest tools are not running in the VM, shutdown the VM manually before execution of Zerto Role Switch RAL.

42.9 Zerto Log On

Description: This RAL is used to login to the Zerto console. It is a custom RAL which uses ZertoLogOn.tcl file.

Input	VPG Name	Values are fetched from Protection scheme. Mostly VPG Name
Output	Session id	ZERTO_SESSION_ID

42.10 Zerto Log Off

Description: This RAL is used to log off from the Zerto console. It is a custom RAL which uses ZertoLogOff.tcl file.

Input	VPG Name	Values are fetched from Protection scheme. Mostly VPG Name
Output	None	N/A

42.11 Zerto Launch New VRA



Description: This RAL is used to install , and launch a new VRA in the Zerto console. It is a custom RAL which uses ZertoLaunchNewVRA.tcl file.

Inputs:

The inputName	Key Value Pair	Optional/M, andatory	Description
Expansion Host Required	EXPANSION_HOST_REQ	M, andatory	Should Failover be done on Expansion Host or not (Yes/No)
Site Name	SITE_NAME	M, andatory	ESX host site name where The userwant to launch VRA.
Datastore Name	DATASTORE_NAME	M, andatory	Datastore name where The userwants to launch VRA
Network Name	NETWORK_NAME	M, andatory	Network Name
Group Name	GROUP_NAME	Optional	ESX groups name (typically it will default)
Host Name/Expansion Host IP	HOST_NAME/EXPANSION_HOST_IP	M, andatory	ESX IP address or host name
Host Root Password	HOST_ROOT_PWD	Optional	ESX host root password
Memory	MEMORY_IN_GB	Optional	Memory for VRA in GB
VRA IP Address	VRA_IP	M, andatory	IP address which is free to assign to VRA
VRA IP Config	VRA_IP_CONFIG	M, andatory	IP Configuration (Static/Dynamic)
Default Gateway	DEFAULT_GATEWAY	M, andatory	Default gateway for the network



Subnet Mask	SUBNET_MASK	M, andatory	Subnet Mask
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Outputs - If new VRA is successfully launched, a message is displayed as - "Successfully launched new VRA on <host IP address>. VRA IP is <VRA IP address>".

Note - If VRA launch fails, an error message is thrown , and an option to retry is provided. Please click on retry to try the action again.

42.12 Zerto Delete VRA

Description: This RAL is used to uninstall , and delete the VRA from the Zerto console. It is a custom RAL which uses ZertoDeleteVRA.tcl file.

Input	VRA IP Address	VRA_IP
Output	Zerto task id	ZERTO_TASK_ID



43 Tripwire

For all the Actifio , and Tripwire RALs, the timeout value has to be changed based on the current load on Actifio , and Tripwire. The default timeout value is 1800 seconds.

43.1 ActifioSourceSideValidation

Description: Validates the sourcesky Actifio appliance for the given VM.

Inputs Parameters	Output
NONE	If success: ActifioSourceSide Validation was successful. If Failure: Throws appropriate failure ErrorMessage onto UI.

43.2 ActifioTargetSideValidation

Description: Validates the sourcesky Actifio appliance for the given VM.

Inputs Parameters	Output
NONE	If success: ActifioSourceSide validation was successful. If Failure: Throws appropriate failure ErrorMessage onto the UI.

43.3 ActifioMount

Mounts the selected snapshot on the given ESXi host.

CASE 1: Mount VM disks to existing host

The inputparameters:

TARGETHOST – Host onto which the application is being failed over.

Output:

Success:

Mount job Job_XXXX successful. Source VMName: Source VMName,
mounting to existing host: targethost

Failure:

Mount job Job_XXXX failed with message: errorMessage



43.4 ActifioUnmount

Unmounts the selected Actifio image from the ESXi host.

CASE 1: UnMount VM disks to existing host

CASE 2: UnMount VM disks to new VM

The inputparameters:

UNMOUNTIMAGENAME– Image that needs to be unmounted

Output:

Success:

Unmount job Job_XXXX successful on image Image_xxxx

Failure:

Unmount job Job_XXXX failed with message: errorMessage

43.5 GetDatacenterVMname

Description: Get the Unique VM name.

Inputs Parameters	Output
VMName , DataCenterName	If success: Unique Datceneter_VMname is VMName_DataCenterName. If Failure: Throws UniqueVMName failed with message:errormessage.

43.6 TripwireReadPropertyfile

Description: Read the property file , and get the ScannerVM Name , and Tripwire Manager Name.

Inputs Parameters	Output
"UNIQUEVMNAME"	If success: Both Scanner VM , and TE found in property file for VM. If Failure: Both Scanner VM , and TE Manager not found in property file.

43.7 TripwireGetScannervmNodeID

Description:Get the ScannerVM ID from Tripwire manager.

Inputs Parameters	Output
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TripwireIP,ScannerVM	If success: \$Nodename for ID is \$nodeid. If Failure: \$Nodename is not Valid Nodename , Kindly check the nodename.
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43.8 TripwireSubstituteMountPoints

Description: Substitute the Mount points into Linux rule template , and create the temp txt file with UniqueVMName.

Inputs Parameters	Output
ScannerVM, UniqueVMName, mountpoint	If success: Rule file \$Twconfigpath/\$uniquevmname.txt has been created with actual mount points using generic template file. If Failure: Unable to fetch the mount points from path \$mountpoint from scannervm \$scannervmname . Please check if volumes are mounted properly or not.

43.9 TripwireCheckRule

Description:Check whether rule exists or not in Tripwire manager.

Inputs Paramenter	Output
TripwireIP,UniqueVMName	If success: Tripwire Rule \$UniqueVMName exists. If Failure: Tripwire Rule \$UniqueVMName doesnot exists.

43.10 TripwireRuleCreate

Description: Create the Tripwire Rule using the Substitute mount point temp file.

Inputs Parameters	Output
TripwireIP, UniqueVMName	If success: Successfully created rule ID: \$ruleid". If Failure: Failed to create rule \$cmd with message:errormessage.

43.11 TripwireAddRuleid

Description: Add the ruleid into Tripwire Rule txt file.

Inputs Parameters	Output
TripwireIP, UniqueVMName, RuleID	If success: Tripwire Rule file has been updated with \$ruleid.



	If Failure: Couldnot update Tripwire Rule file with \$ruleid.
--	---

43.12 TripwireUpdateRule

Description: Substitute the Mount points into Linux rule template , and create the temp txt file with UniqueVMName.

Inputs Parameters	Output
TripwireIP,RuleID	If success: Successfully Updated rule ID: \$ruleid". If Failure: Failed to Updated rule \$cmd with message:errormessage.

43.13 TripwireRuleLink

Description: This ral’s will be linked the Unlink rule Group to KyndryIRORULEGROUP.

Inputs Parameters	Output
TripwireIP, RuleID, GroupName	If success: RuleID \$ruleid has been linked Sucessfully to KyndryIRORULEGROUP. If Failure: RuleID \$ruleid has not been linked Sucessfully to KyndryIRORULEGROUP.

43.14 TripwireCheckFirstScan

Description: Check whether baseline happens or not.

Inputs Parameters	Output
TripwireIP, RuleID	If success: First scan has not happened. Need to do create baseline all element. If Failure: RuleID \$ruleid has not been linked Sucessfully to KyndryIRORULEGROUP.

43.15 TripwireCreateBaselineallelement

Description: This ral’s will be Create the baseline version for the Mounted VM all elements in Tripwire Manager.

Inputs Parameters	Output
TripwireIP, NodeID,RuleID	If success: Baseline created successfully output is \$BaselineID. If Failure: Failed to create baseline output with message:errormessage.



43.16 TripwireCreateBaselinenelement

Description: This ral’s will be Create the baseline version for the Mounted VM new elements in Tripwire Manager.

Inputs Parameters	Output
TripwireIP, NodeID,RuleID	<p>If success: Baseline for new elements created successfully output is \$BaselineID.</p> <p>If Failure: Failed to create baseline for new elements output with message:error message.</p>

43.17 TripwireBaselineStatus

Description: This ral’s will be Validates the baseline Creation Status in Tripwire Manager.

Inputs Parameters	Output
TripwireIP, BaselineID	<p>If success: Baseline with id \$BaselineID has been created , and status is Completed.</p> <p>If Failure:Baseline with id \$ BaselineID was not created , and status is Failed with message:errormessage.</p>

43.18 TripwireBaselineCheck

Description: During a version check, Tripwire Enterprise compares the current state of a monitored object against the object's most recently recorded state to see if there are any changes.

Inputs Parameters	Output
TripwireIP, NodeID,RuleID	<p>If success: Baseline check process completed successfully output is \$BaselineID.</p> <p>If Failure:Failed to Create check process for latest version to baseline with message:errormessage.</p>

43.19 TripwireGenerateAnomalyReport

Description: Generate the anomaly report if there are any changes from latest version to baseline Version.



Inputs Parameters	Output
TripwireIP ,RuleID	If success: Changes for Latest version to Baseline Version \$reportdetails. If Failure:latest Version , and Baseline Version is Same with message:errormessage.

43.20 TripwireRasieEvent

Description: Ral will be raise the Event in Kyndryl RO Event Page

The inputparameters: Twreport,Tweids.

Inputs Parameters	Output
TripwireIP ,RuleID	If success: Anomallies has been detected in snapshot \$PanSvrSnapshotID. If Failure: No anomallies detected snapshot \$PanSvrSnapshotID is good.



43.21 TripwirePromoteBaseline

Description: If The user accept the changes reflected in the latest change version of a report, can promote the change version to the baseline.

Inputs Parameters	Output
TripwireIP,Tweids	If success: PromoteBaseline sucessfully output is \$jsonstring.

43.22 TripwireGeteventdetails

Description: This ral’s will Get the event details for Accept or reject the Tripwire related changes for user. It gets the file modified, EIDS , and snapshot related details.

Inputs Parameters	Output
	If success: Successfully able to get the Tripwire event related details. Failure:Failed to get Tripwire event related details

43.23 TripwireCheckMountpointExists

Description: This ral’s will check if the given unique mount point is free on ScannerVM.

Inputs Parameters	Output
Mountpoint	If success: Tripwire mount point in not in use. Run Actifio mount RAL. Failure: Tripwire mount point exists , and in use. Can’t Mount. Please cleanup or unmount before running Actifio Mount.



43.24 TripwireCheckMountpointExists

Description: This ral’s will set the ScannerVM Component to run the substitute mount point ral.

Inputs Parameters	Output
ScannerVM IP	If success: ScannerVM component has been set. Failure: Unable to set the ScannerVM component.

43.25 TripwireUpdateSnapshotStatusAsFailed

Description: This ral’s will update the snapshot as verification failed.

Inputs Parameters	Output
Snapshot ID	If success: Successfully update snapshot status as verification failed.. Failure: Unable to update snapshot status as verification failed.

43.26 TripwireGetDatacenterVMname

Description: Get the Unique VM name.

Inputs Parameters	Output
VMName , DataCenterName	If success: Unique Datceneter_VMname is VMName_DataCenterName. If Failure: Throws UniqueVMName failed with message:errormessage.

43.27 TripwireGetTEManager

This RAL reads the property file for Tripwire , and gets Tripwire manager associated to SCANNER SYSTEM

The inputparameters: NONE



Output: TE_MANAGER, SCANNERVM

Success:

Set component name to TE_MANAGER

Failure:

TE Manager not found for Oracle Scanner host

43.28 TripwireSetManagerComponent

Set the Tripwire Manager Component

The inputparameters:

KEY_NAME: TE_MANAGER

Output: NONE

Success:

Tripwire read property file completed successfully.

Failure:

ERROR: failure ErrorMessage

43.29 TripwireGetManagerip

Get the Tripwire Manager IP

The inputparameters: NONE

Output:

Success:

Tripwire manage ip has been set to TRIPWIREIP

Failure:

Throws failure ErrorMessage on UI

TRIPWIREIP which represents the Tripwire manager IP.

43.30 TripwireGetScannerNodeID

Get the Scanner ID from Tripwire manager

The inputparameters: TripwireIP,ScannerVM

Output: SCANNERNODEID

Success:



<Nodename> for ID is SCANNERNODEID

Failure:

<Nodename> is not Valid Nodename , Kindly check the nodename

43.31 TripwireGetOracleDBHost

Get the Oracle DB Host from CR

The inputparameters:None

Output:

Success:

set component name to <CR_ORACLE_HOST(SCANNER NODE)>

Failure:

Throws appropriate failure ErrorMessage onto UI

43.32 TripwireGetOraDBHostip

Get the Oracle DB Host IP Address

The inputparameters: NONE

Output:

PRORAHOSTIP – it represents CR SITE ORACLE host (Tripwire agent installed) IP.

Success:

Target Oracle host ip has been found

Failure:

Throws appropriate failure ErrorMessage onto UI

43.33 TripwireCheckDatabaseNode

Check DatabaseNode Exist or Not

The inputparameters: TRIPWIREIP, PRORAHOSTIP

PRORAHOSTIP – it represents CR SITE ORACLE host (Tripwire agent installed) IP.

TRIPWIREIP – it represents the Tripwire manager IP.

Success:

Tripwire DBNODE <DBNODENAME> exists

Failure:

Tripwire DBNODE <DBNODENAME> does not exist



43.34 TripwireSubstituteName

Substitute the DBNODENAME into Oracle rule template , and create the temp txt file with DBNODENAME

The inputparameters: DBNODENAME

Output:

Success:

Rule file <Twconfigpath>/<DBNODENAME>.txt has been created with actual Name using generic template file

Failure:

Unable to create the Generic Template file with DBNODENAME

43.35 TripwireCheckOracleDBRule

Check whether rule exists or not in Tripwire manager

The inputparameters: TripwireIP, DBNODENAME

Output:

Success:

Tripwire Rule < DBNODENAME > exists

Failure:

Tripwire Rule < DBNODENAME > does not exist

43.36 TripwireOracleAddRuleid

Add the ruleid into Tripwire Oracle Rule txt file

The inputparameters: TripwireIP, DBNODENAME, RuleID

Output:

Success:

Tripwire Rule file has been updated with RULEID

Failure:

Could not update Tripwire Rule file with RULEID

43.37 TripwireOracleRuleUpdate

Substitute the Name into Oracle rule template , and create the temp txt file with DBNODENAME

The inputparameters: TripwireIP, RuleID

Output:

Success:



Successfully Updated rule ID: <RULEID> "

Failure:

Failed to Updated rule with message:errormessage

43.38 TripwireOracleRaiseEvent

This RAL raises the Event in Kyndryl Resiliency Orchestration Event page.

The inputparameters: Twreport,Tweids

Output:

Success:

Anomalies has been detected in snapshot <SNAPSHOT_ID>

Failure:

No anomalies detected snapshot <SNAPSHOT_ID> is good.

43.39 TripwireOracleRuleCreate

This RAL creates the Tripwire Oracle Rule using the Substitute Name temp file

The inputparameters: TripwireIP, DBNODENAME

Output:

Success:

Successfully created rule ID: <RULEID> "

Failure:

Failed to create rule with message:ERRORMESSAGE

43.40 TripwireCreateDBServerNode

This RAL creates the Database Server Node

The inputparameters: TRIPWIREIP, PRORAHOSTIP, SCANNERNODEID

PRORAHOSTIP – it represents CR SITE ORACLE host (Tripwire agent installed) IP.

TRIPWIREIP – it represents the Tripwire manager IP.

SCANNERNODEID: It represents SCANNER Node ID for CR ORACLE HOST discovered in Tripwire manager.

Output: NodeID



Success:

Created Database Node successfully.

Failure:

Failed to Create Database Node

43.41 TripwireWindowsAddRuleid

Add the ruleid into Tripwire Rule txt file for WIN

The inputparameters: TripwireIP, UniqueVMName, RuleID

Output:

Success:

Tripwire Rule file has been updated with \$ruleid-WIN

Failure:

Couldnot update Tripwire Rule file with \$ruleid-WIN

43.42 TripwireWindowsAddRegistryRuleid

Add the ruleid into Tripwire Rule txt file for REG

The inputparameters: TripwireIP, UniqueVMName, RuleID

Output:

Success:

Tripwire Rule file has been updated with \$ruleid-REG

Failure:

Could not update Tripwire Rule file with \$ruleid-REG

43.43 TripwireWindowsCreateBaselineallelement

This RAL creates the baseline version for the Mounted VM all elements in Tripwire Manager

The inputparameters: TripwireIP, NodeID,RuleID

Output:

Success:

Baseline created sucessfully output is \$BaselineID

Failure:

Failed to create baseline output with message:errormessage

43.44 TripwireWindowsCreateBaselinenelement



This RAL creates the baseline version for the Mounted VM new elements in Tripwire Manager

The inputparameters: TripwireIP, NodeID,RuleID

Output:

Success:

Baseline for new elements created successfully output is \$BaselineID

Failure:

Failed to create baseline for new elements output with message:errormessage

43.45 TripwireWindowsRegistryUpdateRule

Substitute the Mount points into Windows rule template , and create the temp txt file with UniqueVMName

The inputparameters: TripwireIP,RuleID

Output:

Success:

Successfully Updated rule ID: \$ruleid-REG"

Failure:

Failed to Updated rule \$cmd with message:errormessage

43.46 TripwireWindowsUpdateRule

Substitute the Mount points into Windows rule template , and create the temp txt file with UniqueVMName

The inputparameters: TripwireIP,RuleID

Output:

Success:

Successfully Updated rule ID: \$ruleid-WIN"

Failure:

Failed to Updated rule \$cmd with message:errormessage

43.47 TripwireWindowsRuleLink

This RAL will be linked the Unlink rule Group to KyndryIRORULEGROUP

The inputparameters: TripwireIP, RuleID-WIN, GroupName

Output:

Success:

RuleID \$ruleid-WIN has been linked Sucessfully to KyndryIRORULEGROUP



Failure:

RuleID \$ruleid-WIN has not been linked Successfully to KyndryIRORULEGROUP

43.48 TripwireWindowsRegistryRuleLink

This RAL will be linked the Unlink rule Group to KyndryIRORULEGROUP

The inputparameters: TripwireIP, RuleID-REG, GroupName

Output:

Success:

RuleID \$ruleid-REG has been linked Successfully to KyndryIRORULEGROUP

Failure:

RuleID \$ruleid-REG has not been linked Successfully to KyndryIRORULEGROUP

43.49 TripwireWindowsSubstitutemountpointsReg

Substitute the Mount points into Windows rule template , and create the temp txt file with UniqueVMName-Reg.txt

The inputparameters: ScannerVM, UniqueVMName, mountpoint

Output:

Success:

Rule file \$Twconfigpath\\$uniquevmname-Reg.txt has been created with actual mount points using generic template file

Failure:

Unable to fetch the mount points from path \$mountpoint from Scanner VM \$scannervmname . Please check if volumes are mounted properly or not

43.50 TripwireWindowsSubstitutemountpointsWin

Substitute the Mount points into Windows rule template , and create the temp txt file with UniqueVMName-Win.txt

The inputparameters: ScannerVM, UniqueVMName, mountpoint

Output:

Success:

Rule file \$Twconfigpath\\$uniquevmname-Win.txt has been created with actual mount points using generic template file

Failure:



Unable to fetch the mount points from path \$mountpoint from Scanner VM \$scannervmname .
Please check if volumes are mounted properly or not

43.51 TripwireWindowsRegistryKeyLoad

TripwireLoadRegistry Substitutes the following registry in Windows Scanner VM.

<VMName>-SOFTWARE

<VMName>-SYSTEM

The inputparameters: ScannerVM, UniqueVMName, mountpoint

Output:

Success:

"Successfully executed. CmdOut= \$CmdOut"

Failure: Failed to execute. Error is \$CmdOut"

43.52 TripwireWindowsUnloadRegistryKey

TripwireUnLoadRegistry removes the following registry in Windows Scanner VM.

<VMName>-SOFTWARE

<VMName>-SYSTEM

The inputparameters: ScannerVM, UniqueVMName, mountpoint

Output:

Success:

"Successfully executed. CmdOut= \$CmdOut"

Failure: Failed to execute. Error is \$CmdOut

43.53 TripwireAccessFolderCreation

Used to create the Windows OS Drive Partition access folder

The inputparameters: Unique VM Name

Output:

Success:

Windows Access Folder Creation successfully \$TARGETDIR

Failure:

Failed to Create Access Folder with message:errormessage



43.54 TripwireMountAccesspath

Create the Mounted OS Drive partition Access path to Target Directory

The inputparameters: \$OSLetter \$Accesspath

Output:

Success:

Accesspath Successfully mounted: \$Access

Failure:

Failed to mount access path. Error is \$CmdOut

43.55 TripwireUnmountAccesspath

Unmount the partition access path of mounted OS Drive

The inputparameters: \$OSLetter \$Accesspath1

Output:

Success:

Accesspath Successfully unmounted: \$Access

Failure:

Failed to mount access path. Error is \$CmdOut

43.56 TripwireUpdateSnapshotStatusAsNotVerified

Set the snapshot status as Not verified in AG Replication

The inputparameters: \$snapshotid

Output:

Success:

Snapshot status for \$snapshotid has been set to not verified

Failure:

Failed to set the snapshot status. Error is \$CmdOut

43.57 TripwireUpdateSnapshotStatusAsVerified

Set the snapshot status as verified in AG Replication



The inputparameters: \$snapshotid

Output:

Success:

Snapshot status for \$snapshotid has been set to verified

Failure:

Failed to set the snapshot status. Error is \$CmdOut

43.58 TripwireWindowsBaselineCheck

During a version check, Tripwire Enterprise compares the current state of a monitored object against the object's most recently recorded state to see if there are any changes

The inputparameters: TripwireIP, NodeID,RuleID

Output:

Success:

Baseline check process completed successfully output is \$BaselineID

Failure:

Failed to Create check process for latest version to baseline with message:errormessage

43.59 TripwireWindowsCheckFirstScan

Check whether baseline happened or not

The inputparameters: TripwireIP, RuleID

Output:

Success:

First scan has not happend. Need to do create baseline all element

Failure:

First scan has happend. Need to call createbaseline new element

43.60 TripwireWindowsCheckGlobalVariable

Check whether Tripwire Windows Global Variable exists or not in Tripwire manager

The inputparameters: TripwireIP,UniqueVMName

Output:



Success:

Tripwire Global Variable \$UniqueVMName exists

Failure:

Tripwire Global Variable \$UniqueVMName doesnot exists

43.61 TripwireWindowsCheckRuleExists

Check whether rule exits or not in Tripwire manager

The inputparameters: TripwireIP,UniqueVMName-WIN

Output:

Success:

Windows Tripwire Rule \$UniqueVMName-WIN exists

Failure:

Windows Tripwire Rule \$UniqueVMName-WIN doesnot exists

43.62 TripwireWindowsCreateGlobalVariable

Create the Windows Global variable in Tripwire manager

The inputparameters:: \$Tripwire_VM

Output: \$Tripwire_VM-SYSTEMROOT, \$Tripwire_VM-SYSTEMDRIVE, \$Tripwire_VM-SYSTEM32DIR

Success:

Successfully created Global rule for Unique VM : \$Tripwire_VM

Failure:

latest Version , and Baseline Version is Same with message:errormessage

43.63 TripwireWindowsGenerateAnomalyReport

Generate the anomaly report if there are any changes from latest version to baseline Version

The inputparameters: TripwireIP ,RuleID

Output:

Success:

Changes for Latest version to Baseline Version \$reportdetails

Failure:

latest Version , and Baseline Version is Same with message:errormessage



43.64 TripwireWindowsGetMountPointDetails

Get the mounted VM's OS drive letter

The inputparameters: Job_ID

Output:

Success:

Successfully mounted disk on drive: \$drivePath

Failure:

Failed to execute. Error is \$CmdOut

43.65 TripwireWindowsMakeDiskOnline

Make the mounted VM disk offline state to online state

The inputparameters: UniqueVMName

Output:

Success:

Successfully disks are Online

Failure:

Failed to execute. Error is \$CmdOut

43.66 TripwireWindowsRegistryCheckRuleExists

Check whether rule exists or not in Tripwire manager

The inputparameters: TripwireIP,UniqueVMName-REG

Output:

Success:

Windows Tripwire Rule \$UniqueVMName-REG exists

Failure:

Windows Tripwire Rule \$UniqueVMName-REG doesnot exists

43.67 TripwireWindowsRegistryRuleCreate

Create the Windows registry Tripwire Rule using the Globalvariable temp file



The inputparameters: TripwireIP, UniqueVMName-reg

Output:

Success:

Successfully created rule ID: \$ruleid"

Failure:

Failed to create rule \$cmd with message:errormessage

43.68 TripwireWindowsRuleCreate

Create the Windows Critical Tripwire Rule using the Globalvariable temp file

The inputparameters: TripwireIP, UniqueVMName-win

Output:

Success:

Successfully created rule ID: \$ruleid"

Failure:

Failed to create rule \$cmd with message:errormessage



44 Kyndryl Block Replicator

44.1 Create Linked Clone of Virtual Machine

Description

This action creates a linked clone of a Virtual machine.

Input

The inputName	The inputType	Optional/ M, andatory	Description
vCenter Label	String	M, andatory	The inputGroup credential label
vCenter User	String	M, andatory	The inputvCenter The userName
Snapshot Name	String	M, andatory	The inputthe Snapshot name.
VM Name	String	M, andatory	The inputthe VM name
Clone VM Name	String	M, andatory	The inputthe Clone VM name
Windows Script Path	String	M, andatory	The inputthe Windows script path where the vCenter scripts reside
Custom action component Name	String	M, andatory	The inputthe component where the action has to be executed
Custom action component type	String	M, andatory	The inputthe Component type
ESXi host	String	M, andatory	The inputthe ESXi host name.

Output

Action fails if agent is not able to connect or execution fails at vCenter.

44.2 Normal Full Copy



Description

This action will initiate IBR MG full refresh.

Input

The inputName	The inputType	Optional/ M, andatory	Description
Domain Name	String	M, andatory	The inputIBR domain name
NICRA Name	String	M, andatory	The inputNICRA server Name
Mobility group name	String	M, andatory	The inputMobility group name

Output

Action fails if agent is not able to connect.

44.3 Delete Virtual Machine

Description

This action deletes a Virtual machine , and its files from datastore in vCenter.

Input

The inputName	The inputType	Optional/ M, andatory	Description
vCenter Label	String	M, andatory	The inputGroup credential label
vCenter User	String	M, andatory	The inputvCenter The userName
ESXi host	String	M, andatory	The inputthe ESXi host name.
VM Name	String	M, andatory	The inputthe VM name
Custom action component Name	String	M, andatory	The inputthe component where the action has to be executed



Custom action component type	String	M, mandatory	The input the Component type
Windows Script Path	String	M, mandatory	The input the Windows script path where the vCenter scripts reside

Output

Action fails if agent is not able to connect or execution fails at vCenter.



44.4 List , and Capture VMDK info of Virtual Machine

Description

This action lists , and captures the VMDK information of a Virtual machine.

Input

The inputName	The inputType	Optional/ M, andatory	Description
vCenter Label	String	M, andatory	The inputGroup credential label
vCenter User	String	M, andatory	The inputvCenter The userName
VM Name	String	M, andatory	The inputthe VM name
Windows Script Path	String	M, andatory	The inputthe Windows script path where the vCenter scripts reside
Custom action component Name	String	M, andatory	The inputthe component where the action has to be executed
Custom action component type	String	M, andatory	The inputthe Component type
ESXi host	String	M, andatory	The inputthe ESXi host name.

Output

Action fails if agent is not able to connect or execution fails at vCenter.

44.5 Network Port Group Validate

Description

This action will validate the availability of a vCenter network port group.

Input



The inputName	The inputType	Optional/ M, andatory	Description
vCenter Label	String	M, andatory	The inputGroup credential label
vCenter User	String	M, andatory	The inputvCenter The userName
Port group name	String	M, andatory	The inputthe vCenter Port group name
Windows Script Path	String	M, andatory	The inputthe Windows script path where the vCenter scripts reside
ESXi host	String	M, andatory	The inputthe ESXi host name.
Custom action component Name	String	M, andatory	The inputthe component where the action has to be executed
Custom action component type	String	M, andatory	The inputthe Component type

Output

Action fails if agent is not able to connect or execution fails at vCenter.

44.6 vMotion Enable

Description

This action will enable vMotion feature on a vCenter Vritual Machine.

Input

The inputName	The inputType	Optional/ M, andatory	Description
vCenter Label	String	M, andatory	The inputGroup credential label



vCenter User	String	M, andatory	The inputvCenter The userName
VM more ID	String	M, andatory	The inputthe vCenter VM more ID
Custom action component Name	String	M, andatory	The inputthe component where the action has to be executed
ESXi host	String	M, andatory	The inputthe ESXi host name.
Custom action component type	String	M, andatory	The inputthe Component type

Output

Action fails if agent is not able to connect.

44.7 vMotion Disable

Description

This action will disable vMotion feature on a vCenter Virtual Machine.

Input

The inputName	The inputType	Optional/ M, andatory	Description
vCenter Label	String	M, andatory	The inputGroup credential label
vCenter User	String	M, andatory	The inputvCenter The userName
VM more ID	String	M, andatory	The inputthe vCenter VM more ID
Custom action component Name	String	M, andatory	The inputthe component where the action has to be executed



ESXi host	String	M, andatory	The inputthe ESXi host name.
Custom action component type	String	M, andatory	The inputthe Component type

Output

Action fails if agent is not able to connect.

44.8 IBRClearLRT

This RAL clears the LRT (Low Resolution Tracking) of a specified IBR Mobility Group.

Input: Discovered Kyndryl BR Primary Protection scheme

Output: Success or Failure message

44.9 IBRRecover

This RAL will create a lock on the IBR Mobility group , and allow usage of Target VMDK/Disk for testing or a recovery.

Input: Discovered Kyndryl BR Primary Protection scheme

Output: Success or Failure message

44.10 IBRStopMobilityGroup

This RAL stops the IBR Mobility Group.

Input: Discovered Kyndryl BR Primary Protection scheme

Output: Success or Failure message

44.11 IBRKillRefresh

This RAL will kill the Refresh operation of the replication pairs in a mobility group.

Input: Discovered Kyndryl BR Primary Protection scheme



Output: Success or Failure message

44.12 IBRFailover

This RAL will initiate , and perform failover of IBR mobility group.

Input: Discovered Kyndryl BR Primary Protection scheme

Output: Success or Failure message

44.13 IBRStartReplication

This RAL will initiate the replication on a specified IBR mobility group.

Input: Discovered Kyndryl BR Primary Protection scheme

Output: Success or Failure message

44.14 IBRFullRefresh

This RAL will start Full refresh/sync operation on a specified IBR mobility group.

Input: Discovered Kyndryl BR Primary Protection scheme

Output: Success or Failure message

44.15 IBREnableCheckPoint

This RAL will enable CheckPoint mode on a specified IBR mobility group.

Input: Discovered Kyndryl BR Primary Protection scheme

Output: Success or Failure message

44.16 IBRDisableCheckPoint

This RAL will disable CheckPoint mode on a specified IBR mobility group.

Input: Discovered Kyndryl BR Primary Protection scheme



Output: Success or Failure message

44.17 IBRLaunchRefresh

This RAL will start refresh operation on a specified IBR mobility group.

Input: Discovered Kyndryl BR Primary Protection scheme

Output: Success or Failure message

44.18 IBRWaitforSync

This RAL will wait for the initial replication sync to complete before allowing next RAL/operation to be started for a specified IBR mobility group.

Input: Discovered Kyndryl BR Primary Protection scheme

Output: Success or Failure message

44.19 IBRCheckReplicationStatus

This RAL will check , and report the replication status of a specified IBR mobility group.

Input: Discovered Kyndryl BR Primary Protection scheme

Output: Success or Failure message

44.20 IBRKillPrimaryDeamon

This RAL will kill/stop the Primary mirror deamon of a specified IBR mobility group.

Input: Discovered Kyndryl BR Primary Protection scheme

Output: Success or Failure message

44.21 IBRLaunchPMD

This RAL will start the Primary mirror deamon of a specified IBR mobility group.



Input: Discovered Kyndryl BR Primary Protection scheme

Output: Success or Failure message

44.22 IBRWaitforDatalagZero

This RAL will wait for the replication datalag of a replication pair to become ZERO before allowing next RAL/Operation for a specified IBR mobility group.

Input: Discovered Kyndryl BR Primary Protection scheme

Output: Success or Failure message

44.23 IBRClearHRT

This RAL will clear the HRT (High resolution tracking) of a specified IBR mobility group.

Input: Discovered Kyndryl BR Primary Protection scheme

Output: Success or Failure message

44.24 IBRStopReplication

This RAL will stop replication of a specified IBR mobility group.

Input: Discovered Kyndryl BR Primary Protection scheme

Output: Success or Failure message

44.25 IBRClearBAB

This RAL will clear the BAB (Big Asynchronous Buffer) of a specified IBR mobility group.

Input: Discovered Kyndryl BR Primary Protection scheme

Output: Success or Failure message

44.26 IBRKillRemoteDaemons



This RAL will kill/stop the remote mirror daemon of a specified IBR mobility group.

Input: Discovered Kyndryl BR Primary Protection scheme

Output: Success or Failure message

44.27 IBRFailoverPrecheck

This RAL will do a precheck for Failover readiness of a specified IBR mobility group.

Input: Discovered Kyndryl BR Primary Protection scheme

Output: Success or Failure message

44.28 IBRStartMobilityGroup

This RAL will start a specified IBR mobility group.

Input: Discovered Kyndryl BR Primary Protection scheme

Output: Success or Failure message

44.29 IBRChangeGrpStateToNormal

This RAL will change the status to Normal of a specified IBR mobility group.

Input: Discovered Kyndryl BR Primary Protection scheme

Output: Success or Failure message

44.30 Dtc Reco:

Description:

Dtc Reco RAL will pause the replication until the tasks like FO, FOTE, SO, SB gets finished. This RAL will also wait until the replicated disk gets consistent pending data from journals.

The inputParameters:

Domain name,DRStagingAppliancelP,group number

Output Parameters:

Once the RAL is success, The usercan use the replicated disks.



If there are more journal files to flush the disk.RAL will fail , and display that there are still 'x' number of journals.

Prerequisite:NA

44.31 Dtc Reco Delete:

Description:

RMD Reco delete RAL will continue the replication from where it gets paused.
The usershould run the RMD Reco delete RAL once he is finished the task

The inputParameters:

Domain name,DRStagingApplianceIP,group number

Output Parameters:

RMD Reco delete RAL will continue the replication from where it gets paused.
RAL will fail If there are any workflows like FO, FOTE, SO, SB is in progress or if there are any connectivity issues between DMC , and nicra

Prerequisite:NA





45 BLOCKREPLICATOR-V2

45.1 Ibrreplicationstatus

Description: This RAL checks the replication status

The inputParameters	Output
domainName, prNICRA, drNICRA	If success: Checks the replication status successfully. If Failure: Fails to check the replication status.

45.2 EnableIBRCheckpoint

Description: This RAL enables the IBR checkpoint on DMC.

The inputParameters	Output
1.domainName 2.GroupName 3.serverName	If success: Enables the IBR checkpoint on DMC successfully. If Failure: Fails to enable the IBR checkpoint on DMC.

45.3 DisableIBRCheckpoint

Description: This RAL will disable IBR checkpoint on DMC , and enable replication back on DMC.

The inputParameters	Output
1.domainName 2.serverName 3.groupName	If success: Disables IBR checkpoint on DMC , and enable replication back on DMC successfully. If Failure: Fails to disable IBR checkpoint on DMC , and enable replication back on DMC.

45.4

TDMF List Devices , and Create Replication Pair

Description: This RAL is used for creating replication pair. This RAL checks if the pr disk size is equal to dr disk size. Set the DMC path in PATH system variable as a pre-requisite.



The inputParameters	Output
<ol style="list-style-type: none"> 1. PRhdiskinfo 2. DRhdiskinfo 3. DMC Domain Name 4. PRStagingApplianceIP 5. DRLPARIP 	Outkey - replicationPairs If Success: If the pr disk size is equal to dr disk size. If Failure: If the pr disk size is not equal to dr disk size.

45.5 TDMF Create Mobility Group

Description: This RAL creates a new mobility group. Set the DMC path in PATH system variable as a pre-requisite.

The inputParameters	Output
<ol style="list-style-type: none"> 1. Block Replicator 2. DMC Domain Name 3. Primary Server Name/IP 4. Staging Application Name/IP 5. Mobility Group Name 6. Journal Path 7. Pstore Path 8. Time Out(in secs) 	If success: A new mobility group is created. If Failure: Does not create mobility groups.

45.6 TDMF Wait For Normal Replication Status

Description: This RAL will wait until replication mode is Normal , and Status is Connected for a maximum time 300s. Set the DMC path in PATH system variable as a pre-requisite.

The inputParameters	Output
<ol style="list-style-type: none"> 1. DMC domain name 2. Server name/IP 3. Mobility group number 	If Success: This RAL waits until the replication mode is Normal. If Failure: This RAL does not wait until the replication mode is Normal.

45.7 TDMF Verify Passthru Mode Accumulate Status



Description: This RAL is used after complete refresh. Replication mode is either Passthru/Tracking , and status is Accumulate for a maximum time 300s. Set the DMC path in PATH system variable as a pre-requisite.

The inputParameters	Output
<ol style="list-style-type: none"> 1. DMC domain name 2. Server name/IP 3. Mobility group number 	<p>If Success: This RAL is used to verify the pass-through mode.</p> <p>If Failure: This RAL does not verify the pass-through mode.</p>

45.8 TDMF Start Mobility Group

Description: This RAL starts the mobility group. Set the DMC path in PATH system variable as a pre-requisite.

The inputParameters	Output
<ol style="list-style-type: none"> 1. DMC domain name 2. Server name/IP 3. Mobility group number 	<p>If Success: This RAL starts the mobility group.</p> <p>If Failure: This RAL does not start the mobility group.</p>

45.9 TDMF Delete Mobility Group

Description: This RAL deletes the mobility group. Set the DMC path in PATH system variable as a pre-requisite.

The inputParameters	Output
<ol style="list-style-type: none"> 1. DMC domain name 2. Server name/IP 3. Mobility group number 	<p>If Success: This RAL deletes the mobility group.</p> <p>If Failure: This RAL does not delete the mobility group.</p>

45.10 TDMF Full Refresh

Description: This RAL enables to perform complete refresh of the mobility group after it is created , and started. Set the DMC path in PATH system variable as a pre-requisite.



The inputParameters	Output
<ol style="list-style-type: none"> 1. DMC domain name 2. Server name/IP 3. Mobility group number 	<p>If Success: This RAL enables to perform complete refresh.</p> <p>If Failure: This RAL does not perform complete refresh.</p>

45.11 TDMF Smart Refresh

Description: This RAL enables to perform smart refresh of the mobility group after it is created , and started. Set the DMC path in PATH system variable as a pre-requisite.

The inputParameters	Output
<ol style="list-style-type: none"> 1. DMC domain name 2. Server name/IP 3. Mobility group number 	<p>If Success: This RAL enables to perform smart refresh.</p> <p>If Failure: This RAL does not perform smart refresh.</p>

45.12 TDMF Capture VM Disk Info

Description: This RAL captures VM Disk information. Set the DMC path in PATH system variable as a pre-requisite.

The inputParameters	Output
<ol style="list-style-type: none"> 1. Block Replicator 2. DMC Domain Name (domainName) 3. Server Name/IP (serverName) 4. Mobility Group Number 	<p>If Success: Fetch , and display the number of disk , and space available in GB for each disk.</p> <p>If Failure: Does not fetch , and display the number of disk , and space available in GB for each disk.</p>



45.13 TDMF Get Mobility Groups

Description: This RAL fetches the number of mobility groups. Set the DMC path in PATH system variable as a pre-requisite.

The inputParameters	Output
1.Block Replicator 2. DMC Domain Name 3. Server Name/IP	If success: The RAL fetches the number of mobility groups. If Failure: Does not display the number of mobility groups.

45.14 TDMF List Server Status

Description: This RAL lists the server status. Set the DMC path in PATH system variable as a pre-requisite.

The inputParameters	Output
1. DMC Domain Name 2. Primary Server Name/IP 3. Destination Server name	If success: This RAL displays the Name, IP Address, status (online /offline), , and OS Type of all the servers. If Failure: Does not display the details.

45.15 Setup Replication Pair

Description: This RAL sets up the replication pair. Set the DMC path in PATH system variable as a pre-requisite.

The inputParameters	Output
1.Block Replicator 2. DMC Domain Name 3. Primary Server Name/IP	If success: The replication pair is added to given mobility group. If Failure: The replication pair is not added to mobility group.



4. Mobility Group Number	
5. Replication Pairs	

45.16 TDMFfailover

Description: This RAL triggers TDMF Failover. Set the DMC path in PATH system variable as a pre-requisite.

The inputParameters	Output
1. DMC domain name	If success: Triggers TDMF Failover.
2. ServerName/IP	If Failure: Fails to trigger TDMF Failover.
3. GroupName	

45.17 TDMF Recover

Description: This RAL will create a lock on the IBR Mobility group , and allow usage of Target VMDK/Disk for testing or a recovery. Set the DMC path in PATH system variable as a pre-requisite.

The inputParameters	Output
1.Block Replicator	If success: recovers mobility group.
2. DMC Domain Name (domainName)	If Failure: Fails to recover mobility group.
3. Server Name/IP (serverName)	
4. Mobility Group Number	



45.18 StopTDMFAgentOnLPAR

Description: This RAL is used to stop the TDMF agents running on the LPAR

It runs the commands to stop the TDMF agents running on the selected AIX LPAR component. Set the DMC path in PATH system variable as a pre-requisite.

Inputs parameters	Output
DRLPARIP or PRLPARIP	If success: Stops the TDMF agents If failure: Fails to stop the TDMF agents.

45.19 StartTDMFAgentOnLPAR

Description: This RAL is used to start the TDMF agents running on the LPAR. It runs the commands to start the TDMF agents running on the selected AIX LPAR component. Set the DMC path in PATH system variable as a pre-requisite.

Inputs parameters	Output
DRLPARIP or PRLPARIP	If success: The RAL Start the TDMF agents. If failure: The RAL Fails to start the TDMF agents, displays error message.

45.20 SetIPToTDMFAgent

Description: This RAL is used to set a new IP to TDMF agent on the LPAR. It runs the commands to set , and verify the new IP to the TDMF agent on the selected AIX LPAR component. Set the DMC path in PATH system variable as a pre-requisite.



Inputs parameters	Output
DRLPARIP or PRLPARIP	<p>If success: The RAL sets a new IP to the TDMF agent</p> <p>If failure: The RAL fails to set the IP to the TDMF agent, displays error message.</p>

45.21 CreateVGLVFromPstore

Description: This RAL enables to create VGLV from Pstore. Set the DMC path in PATH system variable as a pre-requisite.

Inputs parameters	Output
DRLPARIP or PRLPARIP	<p>If success: The RAL creates VG , and LV from the new PStore disk , and pstoreDir will be set as the outkv.</p> <p>If failure: The RAL fails to create VG , and LV from the new PStore disk , and pstoreDir will not be set, displays error message.</p>

Pre-requisite: Kyndryl Power Systems AIX LPAR Production instance must have one disk (size – 2GB) added on production VM, required for Pstore (RBR) purpose in either JFS or JFS2 file system.



46 AIXWithTDMF RALs

46.1 RenameTempMGConfigFile

Description: This RAL is used to rename the temporary PR to DR mobility group config file to its original name on the LPAR.

It runs the commands to rename the temporary PR to DR mobility group config file on the selected AIX LPAR component

Inputs parameters	Output
1) DRLPARIP or PRLPARIP 2) MG_ConfigFile 3) MG_TempConfigFile	If success: Rename the temporary config file temp_p<Mobility_Group>.cfg to p<Mobility_Group>.cfg file. If failure: Fails to rename the temporary config file.

46.2 RenameMGConfigFile

Description: This RAL is used to rename the PR to DR mobility group config file to a temporary name on the LPAR. It runs the commands to rename the PR to DR mobility group config file on the selected AIX LPAR component.

Inputs parameters	Output
1) DRLPARIP or PRLPARIP 2) Mobility_Group	If success: Rename the file p<Mobility_Group>.cfg to temp_p<Mobility_Group>.cfg file , and The following out keys are set: <ul style="list-style-type: none"> • MG_ConfigFile • MG_TempConfigFile If failure: Fails to rename the config file , and out keys are not set.

Note: For repeatable RALs for the dynamic values is valid for PR or DR servers defined during group creation. For PR SAVM , and DR SAVM the RALs need to be manually updated.



46.3 GetLPARDetails

Description: This RAL fetches the LPAR details. This is run on the HMC Management Service.

Inputs	Output
Management Service, LPAR ID Keys - MANAGEMENT_SERVICE, LPARUUID	StdOut: <pre>{ "PARTITION_TYPE": "OS400", "PARTITION_NAME": "CE_TEAM_ENG_2", "MAX_PROCESSING_UNITS": "1", "MIN_PROCESSING_UNITS": "0.1", "CURRENT_HAS_DEDICATED_PROCESSORS": "false", "PARTITION_MEM_CONFIG_MIN_MEMORY": "8192", "HARDWARE_PAGE_TABLE_RATIO": "6", "OPERATING_SYSTEM_VERSION": "Unknown", "DESIRED_PROCESSING_UNITS": "0.1", "HAS_DEDICATED_PROCESSOR": "false", "PARTITION_ID": "11", "DESIRED_VIRTUAL_PROCESSOR": "1", "PARTITION_MEM_CONFIG_DESIRED_MEMORY": "8192", "PARTITION_STATE": "not activated", "MIN_VIRTUAL_PROCESSOR": "1", "PARTITION_MEM_CONFIG_MAX_MEMORY": "16384", "UNCAPPED_WEIGHT": "128", "SHARED_PROCESSOR_POOL_ID": "0", "SHARING_MODE": "uncapped", "MAX_VIRTUAL_PROCESSOR": "2", "ResourceMonitoringIPAddress": "192.168.7.172" }</pre> OutKeys : {"LPARIP": "192.168.7.172"}

46.4 validateLPARStatus

Description : This RAL validates the LPAR status. This is run on the HMC Management Service.

Inputs	Output
Management Service LPAR ID	When Lpar is Started- <pre>{ "ResponseBody": "LPAR partition state is activated" }</pre>



Keys - MANAGEMENT_SERVICE, LPARUUID	When Lpar is not started – {"ResponseBody":"LPAR partition state is not activated"}
---	--

46.5 StartLPAR

Description: This RAL helps to start the LPAR.

Inputs	Output
mgmt service , and LPARUUID Keys - LPARUUID, MANAGEMENT_SERVICE	JOB_ID

46.6 CheckJobStatus

Inputs	Output
JOB_ID (The input comes from the StartLPAR RAL/ShutdownLPAR RAL Keys - JOB_ID, MANAGEMENT_SERVICE	Success: {"STATUS":"COMPLETED_OK", "RESPONSE_BODY":"LPAR started successfully"} : {"STATUS":"COMPLETED_OK", "RESPONSE_BODY":"LPAR shutdown successfully"} Failure: {"STATUS":"COMPLETED_WITH_ERROR", "RESPONSE_BODY":"LPAR could not be started"} {"STATUS":"COMPLETED_WITH_ERROR", "RESPONSE_BODY":"LPAR could not be Powered Off"}

Note:



If LPAR is already started then the RAL will go to Awaiting input. When the user tries to start LPAR again.

If the LPAR is already shutdown then the PAL will go to Awaiting input. When the user tries to shut down the LPAR again.

46.7 ShutdownLPAR

Description: This RAL shutsdown the LPAR.

Inputs	Output
mgmt service LPARUUID	JOB_ID

46.8 CreateNetworkAdapterOnLPAR

Description: This RAL creates network adapter on LPAR.

Inputs	Output
LPARUUID(this key comes from CreateLPAR RAL), VirtualNetworkPortVLANID, ManagedSystemUUID, VirtualSwitchUUID(These key come from Discovery page)	PortVLANID,VirtualSlotNumber,LocalPartitionID,AtomID, AssociatedVirtualSwitch, VirtualSwitchID, VirtualNetworks

46.9 CreatePstoreDisk

Description: This RAL creates Pstore disk.

Inputs	Output



VIOSUUID, VolumeGroupUUID, DRLPARNAME(this key comes from CreateLPAR RAL)	CreatePstoreDisk_STATUS, PstoreDiskName
---	--

46.10 CreateVirtualDataDisk

Description: This RAL creates a virtual data disk.

Inputs	Output
VIOSUUID, VolumeGroupUUID, DiskNames, DisksCapacity	CreateVirtualDataDisk_STATUS DiskNames DisksUniqueID

46.11 DeleteLPAR

Description: This RAL deletes LPAR.

Keys - LPARUUID, MANAGEMENT_SERVICE	Success - {"RESPONSE_BODY": "LPAR is Deleted Successfully"} Failure- {"RESPONSE_BODY": "LPAR is NOT Deleted"}
---	--

46.12 DeletePstoreDisk

Description: This RAL deletes the Pstore disk.



Inputs	Output
Keys- VIOUUID, VolumeGroupUUID,PstoreDiskName(This the inputkey will be passed from CreatePstoreDisk RAL)	DeletePstoreDisk_STATUS

46.13 PRDiskUniqueIdentifier

Description: This RAL runs on the PR AIX LPAR by getting the UDID value for the disks from group KV, 'PRDisksUniqueID' , and compares to match with the UDID values from the output. The pre-requisite is getting the UDID (Unique device identifier) value for the attached disks , and assigning to the Group Key PRDisksUniqueID (comma separated in case of multiple values).

Inputs parameters	Output
Keys- lspv -u	PRhdiskinfo

46.14 DRDiskUniqueIdentifier

Description: This RAL runs on the DR AIX LPAR by getting the UDID value for the disks from group KV, 'DRDisksUniqueID' , and compares to match with the UDID values from the output. The pre-requisite is getting the UDID (Unique device identifier) value for the attached disks , and assigning to the Group Key DRDisksUniqueID (comma separated in case of multiple values).

Inputs parameters	Output
Keys- lspv -u	DRhdiskinfo

46.15 DetachDisk

Description: DetachDisk RAL detaches the disk by having valid disk name assigned to the inputkey 'DRDISKNAME'. This RAL also detaches multiple disks by having comma separated valid disk names assigned to the inputkey 'DRDISKNAME'.



Inputs	Output
DRVIOSUUID, DRDISKNAME	None

46.16 GetInstanceStatus

Description: Provides the status of the Cloud Instance created.

The user can use this RAL to monitor whether the instance is successfully created or failed.

The user has to retry on failure on using this RAL.

Error Message Displayed- Current instance state is not valid: \$current_status

Inputs	Output
In KV- PVM_INSTANCE_ID	Out KV- CURRENT_STATUS

46.17 GetDetachVolumeStatus

Description: Provides the status of the Volume disk to be detached.

The user can use this RAL to monitor whether the Volume Disk is successfully detached or failed.

The user has to retry on failure on using this RAL.

Error Message Displayed- Current instance state is not valid: \$current_status



Inputs	Output
DRVIOSUUID, DRDISKNAME	None



47 OpenShift

47.1 CreateNamespace

Description: This RAL is used to createNamespace on remote site.

The inputParameters	Output
No specific the inputparameter.	If success: Namespace creation successful on remote site. If Failure: Failed to delete Namespace with message:errormessage

47.2 CreateStatefullResources

Description: This RAL is used to create Stateful Resources on remote site.

The inputParameters	Output
No specific the inputparameter.	If success:Stateful resources creation successful on remote site. If Failure: Failed to create Stateful resources with message:errormessage

47.3 DeleteNamespace

Description: This RAL is used to delete Namespace on DR site.

The inputParameters	Output
No specific the inputparameter.	If success:Namespace deletion successful on remote site. If Failure: Failed to delete Namespace with message:errormessage

47.4 CreateConfigMaps

Description: This RAL is used to create ConfigMaps on DR site.

The inputParameters	Output
No specific the inputparameter.	If success:ConfigMaps creation successful on remote site. If Failure: Failed to create ConfigMaps with message:errormessage



47.5 CreateSecrets

Description: This RAL is used to create CreateSecrets on DR site.

The inputParameters	Output
No specific the inputparameter.	If success:CreateSecrets creation successful on remote site. If Failure: Failed to create CreateSecrets with message:errormessage

47.6 CreateServices

Description: This RAL is used to create CreateServices on DR site.

The inputParameters	Output
No specific the inputparameter.	If success:CreateServices creation successful on remote site.. If Failure: Failed to create CreateServices with message:errormessage

47.7 DisableServiceForSwitchOver

Description: This RAL will disable the stateless services on primary site.

The inputParameters	Output
No specific the inputparameter.	If success: It will give the IP address of the primary site where stateless services is disabled. If Failure: Fails to disable the stateless services on the primary site.

47.8 CreateStatelessResources

Description: This RAL will creates the all stateless resources of the given namespaces on the remote site.

The inputParameters	Output
No specific the inputparameter.	If success: The RAL is executed successfully. If Failure: Fails to create stateless resources.

47.9 EnableStatelessServicesForSwitchBack



Description: This RAL will enables the stateless services on the primary site.

The inputParameters	Output
No specific the inputparameter.	If success: It shows the IP address where the stateless services have been enabled. If Failure: Fails to enable stateless services for switchback.

47.10 DeleteStateLessServicesOnDR

Description: This RAL deletes the stateless resources on the remote site.

The inputParameters	Output
No specific the inputparameter.	If success: It shows the IP address where the stateless services have been deleted. If Failure: Fails to delete stateless services for on the remote site.

47.11 CreatePVCs

Description: This RAL is used to create CreatePVCs on DR site.

The inputParameters	Output
No specific the inputparameter.	If success:CreatePVCs creation successful on remote site. If Failure: Failed to create CreatePVCs with message:errormessage

47.12 VeleroNamespaceFO

Description: This Ral is used to perform Failover for a specific namespace.

The inputParameters	Output
schedule name in kV	If success: Failover for the specific namespace is successful. If Failure: Failover for the specific namespace fails.

47.13 VeleroNamespaceFOTE

Description: This Ral is used to perform Failover Test Exercise for a specific namespace.



The inputParameters	Output
schedule name in kV	If success: Failover Test Exercise for the specific namespace is successful. If Failure: Failover Test Exercise for the specific namespace fails.

47.14 VeleroClusterFO

Description: This Ral is used to perform failover for a cluster.

The inputParameters	Output
schedule name in kV	If success: Failover for the cluster is successful. If Failure: Failover for the cluster fails.

47.15 VeleroClusterFOTE

Description: This Ral is used to perform Failover Test Exercise for a cluster.

The inputParameters	Output
schedule name in kV	If success: Failover Test Exercise for the cluster is successful. If Failure: Failover Test Exercise for the cluster fails.

47.16 VeleroFOTECleanup

Description: This Ral is used to perform cleanup operations for FOTE.

The inputParameters	Output
schedule name in kV	If success: Clean-up operations for FOTE is successful. If Failure: Clean-up operations for FOTE fails.

47.17 ChangeBkpStragLnAccessMode2RWrite_OnDR



Description: This RAL is used to change Backup Storage Location access mode to read , and write on DR.

The inputParameters	Output
Multiple the inputparameters required, which will be populated by code at runtime	If Success: Change Backup Storage Location access mode to read , and write on DR is successful. If Failure: Change Backup Storage Location access mode to read , and write on DR is successful.

47.18 CreateFBSchedule

Description: This RAL creates a fb schedule on the DR.

The inputParameters	Output
Multiple the inputparameters required, which will be populated by code at runtime	If Success: Creates a fb schedule on the DR is successful. If Failure: Creates a fb schedule on the DR is successful.

47.19 MonitorFBBackups

Description: This RAL monitors the backups of the FB schedule for the given time intervals in openshift.properties file.

The inputParameters	Output
Multiple the inputparameters required, which will be populated by code at runtime	If Success: If all the backups completed in the given time the RAL proceed as success else it will fail.. If Failure: If all the backups is not completed in the given time the RAL fails.

47.20 TriggerRestoreOfFBBackups



Description: This RAL triggers restoration process of backups created by the CreateFBSchedule in the InitiateFallBackBackup WF

The inputParameters	Output
Multiple the inputparameters required, which will be populated by code at runtime	<p>If Success: The restoration process is successful.</p> <p>If Failure: The restoration process is unsuccessful.</p>

47.21 MonitorFBRestores

Description: This RAL monitors the restoration process.

The inputParameters	Output
Multiple the inputparameters required, which will be populated by code at runtime	<p>If Success: The monitoring of the restoration process is successful.</p> <p>If Failure: The monitoring of the restoration process is unsuccessful..</p>

47.22 Listing

Description: This RAL asks The userto validate the PR after restoring the backups.

The inputParameters	Output
Multiple the inputparameters required, which will be populated by code at runtime	<p>If Success: The userprompting is successful.</p> <p>If Failure: The RAL fails to prompt the user.</p>

47.23 DeleteFBSchedule

Description: This RAL deletes the schedule created by CreateFBSchedule on the DR

The inputParameters	Output
Multiple the inputparameters required, which will be populated by code at runtime	<p>If Success: The deletion of the schedule created by CreateFBSchedule on the DRg is successful.</p> <p>If Failure: The deletion of the schedule created by CreateFBSchedule on the DRg is unsuccessful.</p>



47.24 DeleteBackupsOfFBSchedule_OnPR

Description: This RAL deletes the backups of FB schedule from PR to clean up

The inputParameters	Output
Multiple the inputparameters required, which will be populated by code at runtime	<p>If Success: The deletion of the backups of FB schedule from PR to clean up is successful.</p> <p>If Failure: The deletion of the backups of FB schedule from PR to clean up is unsuccessful.</p>

47.25 DeleteBackupsOfSchedule_OnPR

Description: This RAL deletes the backups created by PR schedule before FO

The inputParameters	Output
Multiple the inputparameters required, which will be populated by code at runtime	<p>If Success: The deletion of the backups created by PR schedule before FO is successful.</p> <p>If Failure: The deletion of the backups created by PR schedule before FO is unsuccessful.</p>

47.26 DeleteNamespace_FB

Description: This RAL deletes the namespace or application on the DR

The inputParameters	Output
Multiple the inputparameters required, which will be populated by code at runtime	<p>If Success: The deletion of the namespace or application on the DR is successful.</p> <p>If Failure: The deletion of the namespace or application on the DR is unsuccessful.</p>

47.27 DeletePVsOfNamespace_OnDR

Description: This RAL deletes PVs of the application

The inputParameters	Output
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Multiple the inputparameters required, which will be populated by code at runtime	If Success: The deletion of PVs of the application is successful. If Failure: The deletion of PVs of the application is unsuccessful.
---	--

47.28 CreateVeleroScheduleRAL

Description: This RAL creates a new Schedule on PR.

The inputParameters	Output
Multiple the inputparameters required, which will be populated by code at runtime	If Success: The creation of a new Schedule on PR is successful. If Failure: The creation of a new Schedule on PR is unsuccessful.

47.29 CheckDRClusterStatus

Description: It checks for the existence of DR cluster

The inputParameters	Output
Multiple the inputparameters required, which will be populated by code at runtime	If Success: Successfully checks the DR cluster. If Failure: Fails to check the DR cluster.

47.30 IsOADPServerUPOnDR

Description: Check whether OADP is available or not.

The inputParameters	Output
Multiple the inputparameters required, which will be populated by code at runtime	If Success: Successfully checks whether OADP is available or not. .



	If Failure: Fails to Check whether OADP is available or not. .
--	---

47.31 IsPRFOTENamespaceNotExistOnDR

Description: Checks if PR FOTE namespace exists or not

The inputParameters	Output
Multiple the inputparameters required, which will be populated by code at runtime	If Success: Successfully Checks if PR FOTE namespace exists or not. .If Failure: Fails, if PR FOTE namespace exists. .

47.32 TriggerVeleroNamespaceFOTE

Description: Triggers restoration of backups for FOTE.

The inputParameters	Output
Multiple the inputparameters required, which will be populated by code at runtime	If Success: Successfully Triggers restoration of backups for FOTE.. .If Failure: Fails to Trigger restoration of backups for FOTE. .

47.33 MonitorVeleroNamespaceFOTE

Description: Monitors the above process.

The inputParameters	Output
Multiple the inputparameters required, which will be populated by code at runtime	If Success: Successfully monitors the TriggerVeleroNamespaceFOTE process.. .



	.If Failure: Fails to monitor the TriggerVeleroNamespaceFOTE process...
--	---

47.34 Listing FOTE

Description: Prompt The userto validate FOTE namespace.

The inputParameters	Output
Multiple the inputparameters required, which will be populated by code at runtime	If Success: Successfully prompts The userto validate FOTE namespace . .If Failure: Fails to prompts The userto validate FOTE namespace. .

47.35 VeleroFOTECleanup

Description: This Ral is used to perform cleanup operations for FOTE.

The inputParameters	Output
schedule name in kV	If success: Clean-up operations for FOTE is successful. If Failure: Clean-up operations for FOTE fails.

47.36 IsFONamespaceNotExistOnDR

Description: This RAL is used to check if FO namespace exists or not.

The inputParameters	Output
Multiple the inputparameters required, which will be populated by code at runtime	If Success: Successfully check if FO namespace exists or not.



	If Failure: Fails to check if FO namespace exists or not.
--	---

47.37 TriggerVeleroNamespaceFO

Description: This RAL is used to trigger Namespace FO for restoration.

The inputParameters	Output
Multiple the inputparameters required, which will be populated by code at runtime	<p>If Success: Successfully to triggers Namespace FO for restoration..</p> <p>If Failure: Fails to trigger Namespace FO for restoration.</p>

47.38 MonitorVeleroNamespaceFO

Description: This RAL monitors restoration process.

The inputParameters	Output
Multiple the inputparameters required, which will be populated by code at runtime	<p>If Success: Successfully monitors the restoration process..</p> <p>If Failure: Fails to monitor the restoration process..</p>

47.39 Update Workflow KV

Description: This RAL Updating workflow KV with necessary values.

The inputParameters	Output
NAMESPACE	<p>Generates migrationSchedule (migrationScheduleStr) name which is a hash of namespace , and constant word 'migrationschedule'.</p> <p>Also, sets values for kubeConfigPath as /opt/ro/config</p>

47.40 Check If Namespace Exists on DR



Description: This RAL checks If Namespace Exists on DR .

The inputParameters	Output
NAMESPACE	This RAL fails in case the given namespace doesn't exist on the DR.

47.41 Check If Cluster Is Available

Description: This RAL checks if cluster is available on PR.

The inputParameters	Output
NAMESPACE	This RAL fails in case the given cluster does not exist on PR.

47.42 Suspend Migration

Description: This RAL will stop the replication on PR.

The inputParameters	Output
NAMESPACE	If successful: Replication is successfully suspended. If Failure: Replication suspension is unsuccessful.

47.43 Activate Migration

Description: This RAL will enable the migration to create required resource on DR.

The inputParameters	Output
NAMESPACE	If successful: Migration is successfully enabled. If Failure: Migration is not enabled.

47.44 Check If Resources Active

Description: This RAL will get no of deployments, services, , and pods of resource count on DR , and Compare it with PR count.



The inputParameters	Output
NAMESPACE	If successful: Resource check comparison between PR , and DR is successful. If Failure: Resource check comparison between PR , and DR fails.

47.45 Stop

Description: This RAL is used to connect failure path of preceding RALs.

The inputParameters	Output
N/A	If successful: Connection of failure path of preceding RALs is successful. If Failure: Connection of failure path of preceding RALs fails.



48 RHV

48.1 CreateFoVMWithBlankTemplate

Description: This RAL creates an FO VM with Blank temple.

The inputParameters	Output
1.DR_Dis_ClusterName, 2.DR_Disc_VMThreads, 3.DR_Dis_VMCPUCoRE, 4.DR_Dis_CPUProfileId, 5.DR_Dis_VMMemory, 6. DR_Dis_VMSockets, 7. DR_Dis_VM_MAX_Memory,	If success: Creates an FO VM with Blank temple successfully. If Failure: Fails to creates an FO VM with Blank temple

48.2 AddNicToDummyVmWithVnicProfile

Description: This RAL adds Nic to Temporary VM With Vnic profile.

The inputParameters	Output
1.[DR_Dis_VnicProfileIds] 2.TempFOTEVM_ID 3. [UI_TempFOTEVnic]	If success: Adds Nic to temporary FOTEVM with Vnic profile. If Failure: Fails to Add Nic to temporary FOTEVM with Vnic profile

48.3 CheckReplicatusStatus

Description: This RAL checks Replication Status Of vm From PR to DR

The inputParameters	Output
1.ServerName 2.GroupName 3.MobilityGroup.	If success: Checks Replication status , and returns OK if replication is fine. If Failure: Fails to check Replication status.

48.4 EnableBRCheckpoint

Description: This RAL takes checkpoint ON DMC.

The inputParameters	Output
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1.ServerName 2.GroupName 3.MobilityGroup	If success: Disables Replication on DMC. If Failure: Failed Disable Replication on DMC.
--	--

48.5 DisableTDMFAgentOnReplicatedOsDisk

Description: This RAL disables TDMF on Replicated OS Disk

The inputParameters	Output
MobilityGroup Number	If success: Disables TDMF on Replicated Os disk. If Failure: Fails to Disable TDMF on Replicated Os disk.

48.6 DetachDiskFromSA

Description: This RAL detaches OS , and data disk from staging appliance

The inputParameters	Output
1. SA_Dis_VM_ID 2.[SA_UI_Disk_IDS]	If success: Detaches disk from staging appliance. If Failure: Fails to detach disk from staging appliance.

48.7 AttachOSDiskToTempFOTEVM

Description: This RAL attaches OS Disk to tempfotevm

The inputParameters	Output
1 1. TempFOTEVM_ID 2.DR_UI OSDisk_ID.	If success: Attaches OS Disk to tempfotevm. If Failure: Fails to attach OS Disk to tempfotevm.

48.8 AttachDataDiskToTempFOTEVM



Description: This RAL will attach DATA Disk to tempfotevm

The inputParameters	Output
1. TempFOTEVM_ID 2.[DR_UI_DATADisk_IDS]	If success: Attaches Data Disk to tempfotevm. If Failure: Fails to attach Data Disk to tempfotevm.

48.9 CloneTempFOTEVmToFOTEVM

Description: This RAL will clone tempfotevm to FOTE VM

The inputParameters	Output
1. TempFOTEVM_ID 2. DR_UI_FOTE_VM	If success: Clones tempfotevm to FOTE VM. If Failure: Fails to clone tempfotevm to FOTE VM.

48.10 DetachDiskFromTempFOTEVM

Description: This RAL will Detach disk from tempfote VM

The inputParameters	Output
1.TempFOTEVM_ID 2. [SA_UI_Disk_IDS]	If success: Detaches the Disk from tempfotevm. If Failure: Fails to Detach Disk from tempfotevm.

48.11 AttachDiskToSA

Description: This RAL will Attach Disk Back to SA

The inputParameters	Output
1.[SA_UI_Disk_IDS] 2.SA_Dis_VM_ID	If success: Attaches Disk Back to SA If Failure: Fails to attach Disk Back to SA.



48.12 DisableIBRCheckPoint

Description: This RAL will enable replication back on DMC

The inputParameters	Output
1.ServerName 2.GroupName 3.MobilityGroup	If success: Enables Replication Back on DMC. If Failure: Fails to enable Replication Back on DMC.

48.13 DeleteTempFOTEVM

Description: This RAL will delete tempfotevm

The inputParameters	Output
TempFOTEVM_ID	If success: Deletes tempfotevm. If Failure: Fails delete tempfotevm.

48.14 StartFOTEVM

Description: This RAL will start FOTE VM

The inputParameters	Output
DR_UI_FOTE_VM	If success: Starts FOTE Vm. If Failure: Fails to start FOTE Vm.

48.15 StopFOTEVM

Description: This RAL will Stop FOTE VM

The inputParameters	Output
DR_UI_FOTE_VM	If success: Stops FOTE Vm. If Failure: Fails to stop FOTE Vm.



48.16 AddNicFoVmWithVnicProfile

Description: This RAL adds NIC FO with Vnic Profile

The inputParameters	Output
FOVM_ID DR_Dis_VnicProfileIds	If success: Adds NIC FO with Vnic Profile. If Failure: Fails to adds NIC FO with Vnic Profile

48.17 CreateTempFoteVMWithBlankTemplat

Description: This RAL creates temp FOTE VM with blank template.

The inputParameters	Output
DR_Dis_ClusterName DR_Dis_VMMemory" DR_Dis_VMCPUCoRE DR_Dis_CPUProfileId DR_Dis_VMSockets DR_Disc_VMThreads DR_Dis_VM_MAX_Memory DR_Dis_Server_Type	If success: Creates temp FOTE VM with blank template. If Failure: Fails to create temp FOTE VM with blank template

48.18 StartFOVM

Description: This RAL starts FO VM.

The inputParameters	Output
DR_UI_FOTE_VM	If success: Starts FO VM successfully. If Failure: Fails to starts FO VM.

48.19 CloudInitAddStaticIpVM

Description: This RAL adds static IP to the VM.



The inputParameters	Output
DR_nic DR_IPaddress DR_Netmask DR_gateway DR_Dns DR_searchdomain DR_UI_FOTE_VM	If success: Adds static IP to the VM successfully. If Failure: Fails to add static IP to the VM.

48.20 AddNicToTempFoteVmWithVnicProfile

Description: This RAL adds Nic To Temp FOTE VM With Vnic Profile.

The inputParameters	Output
empFOTEVM_ID DR_Dis_VnicProfileIds	If success: Adds Nic To Temp FOTE VM With Vnic Profile successfully. If Failure: Fails to add Nic To Temp FOTE VM With Vnic Profile.

48.21 SelectOs, andDataDisks

Description: This RAL selects Os , and Data Disks.

The inputParameters	Output
SA_Dis_VM_NAME SA_UI_Disk_IDS DISK_NAMES	If success: Select Os , and Data Disks successfully. If Failure: Fails to selects Os , and Data Disks.

48.22 DetachDiskFromFOVM

Description: This RAL detaches disk from the FO VM.

The inputParameters	Output
FOVM_ID SA_UI_Disk_IDS	If success: Detaches disk from the FO VM successfully. If Failure: Fails to detaches disk from the FO VM..

48.23 DeleteFOVM

Description: This RAL deletes the FO VM.

The inputParameters	Output
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DR_UI_FOTE_VM	If success: Deletes the FO VM successfully. If Failure: Fails to delete the FO VM..
---------------	--

48.24 DeleteFOVM

Description: This RAL deletes the FO VM.

The inputParameters	Output
DR_UI_FOTE_VM	If success: Deletes the FO VM successfully. If Failure: Fails to delete the FO VM..

48.25 AddStaticIpFOTEVMCloudInit

Description: This RAL adds static IP to FOTE VM.

The inputParameters	Output
DR_nic DR_IPaddress" DR_Netmask DR_gateway DR_Dns DR_searchdomain DR_UI_FOTE_VM	If success: Adds static IP to FOTE VM. successfully. If Failure: Fails to add static IP to FOTE VM.

48.26 StopFOVM

Description: This RAL stops the FO VM.

The inputParameters	Output
DR_UI_FOTE_VM	If success: Stops the FO VM. successfully. If Failure: Fails to stop the FO VM.

48.27 AttachOSDISKFOVM

Description: This RAL attaches OS disk to VM.

The inputParameters	Output
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FOVM_ID DR_UI_DATADisk_IDS DR_UI_DATADISK_INTERFACE	If success: Attaches OS disk to VM. successfully. If Failure: Fails to attach OS disk to VM
---	--

48.28 AttachDataDiskFOVM

Description: This RAL attaches the Data DISK TO FO VM.

The inputParameters	Output
PR_Dis_VM_ID	If success: Attaches the Data DISK to FO VM.. successfully. If Failure: Fails to attach the Data DISK to FO VM.

48.29 SelectOsDisk

Description: This RAL selects OS Disk.

The inputParameters	Output
SA_Dis_VM_NAM	If success: Selects OS Disk. successfully. If Failure: Fails select OS Disk..

48.30 SelectDataDisks

Description: This RAL selects Data Disk.

The inputParameters	Output
SA_Dis_VM_NAME DR_UI_DATADisk_IDS DISK_NAMES	If success: Selects OS Disk. successfully. If Failure: Fails select OS Disk..

48.31 DeleteFOTEVM

Description: This RAL will Delete FOTE Vm

The inputParameters	Output
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DR_UI_FOTE_VM

If success: Deletes FOTE Vm.

If Failure: Fails to delete FOTE Vm



49 AIX

49.1 ClonedDisksIDVerify

Description: This RAL checks for the disk clone task ID completion , and return the cloned disks ID details.

The inputParameters	Output
CLONED_DISK_TASK_ID	CLONED_DISK_ID If success: Provides the % completion of the task ID , and returns cloned disk/s ID/s. If Failure: Shows the % completion details , and relevant failure message.

49.2 CreateVmWithIP

Description: This RAL Creates PVM instance with AIX image (multiple NICs , and Static IP supported).

The inputParameters	Output
PR_DIS_VM_NAME	PVM_INSTANCE_ID
PR_DIS_MEMORY	If success: Creates PVM instance.
PR_DIS_PROC_TYPE	If Failure: Fails to create PVM.
PR_DIS_PROC_NUMBER	
DR_DIS_IMAGE_ID	
DR_DIS_STORAGE_TYPE	
DR_NetworkInfo	

49.3 CloneReplicatedDisksOs

Description: This RAL clones Replicated OS disks on SA

The inputParameters	Output
---------------------	--------



DR_OS_VOLUME_ID	<p>If success: Clones Replicated OS disks on SA successfully.</p> <p>If Failure: Fails to clone Replicated OS disks on SA.</p>
-----------------	--

49.4 CloneReplicatedDisksData

Description: This RAL clones Replicated DATA disks on SA

The inputParameters	Output
DR_DATA_VOLUME_ID	<p>If success: Clones Replicated DATA disks on SA successfully.</p> <p>If Failure: Fails to clone Replicated DATA disks on SA.</p>

49.5 MakeClonedOsdiskBootable

Description: This RAL makes cloned os disk bootable

The inputParameters	Output
clone_osdisk_id	<p>If success: Makes cloned os disk bootable.</p> <p>If Failure: Fails to make cloned os disk bootable.</p>

49.6 CreateVmWithAIXImage

Description: This RAL Creates FOTE VM with AIX image

The inputParameters	Output
PR_DIS_VM_NAME PR_DIS_MEMORY PR_DIS_PROC_TYPE PR_DIS_IMAGE_ID PR_DIS_NETWORK_ID DR_DIS_STORAGE_TYPE	<p>If success: Creates FOTE VM with AIX image successfully.</p> <p>If Failure: Fails to create FOTE VM with AIX image.</p>

49.7 StopVmAIX

Description: This RAL stops AIX VM

The inputParameters	Output
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PVM_INSTANCE_ID	If success: Stops AIX VM successfully. If Failure: Fails to stop AIX VM.
-----------------	---

49.8 GetAIXImageRootVolumeInformation

Description: This RAL Gets Root disk ID information when FOTE VM boots up with AIX image

The inputParameters	Output
PVM_INSTANCE_ID,	If success: Gets Root disk ID information when FOTE VM boots up with AIX image. If Failure: Fails to get Root disk ID information when FOTE VM boots up with AIX image.

49.9 AttachClonedDatadisk

Description: This RAL Attaches cloned data disk to FOE VM

The inputParameters	Output
PVM_INSTANCE_ID, CLONED_DATADISK_ID	If success: Attaches the cloned data disk to FOE VM successfully. If Failure: Fails to attach the cloned data disk to FOE VM.

49.10 CreateHelperDiskOneGB

Description: This RAL Creates one Helper Disk of 1 GB.

The inputParameters	Output
PR_DIS_VM_NAME, DR_DIS_STORAGE_TYPE	If success: Creates one Helper Disk of 1 GB successfully. If Failure: Fails to create one Helper Disk of 1 GB.

49.11 AttachHeperDiskAixVm

Description: This RAL attaches Helper Disk to FOTE VM.

The inputParameters	Output
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No specific the inputparameter.

If success: Attaches Helper Disk to FOTE VM successfully.

If Failure: Fails to attach Helper Disk to FOTE VM.



49.12 MakeHelperDiskBootable

Description: This RAL makes Helper Disk bootable.

The inputParameters	Output
"PVM_INSTANCE_ID,	If success: Makes Helper Disk bootable.
HELPER_DISK_ID	If Failure: Fails to make Helper Disk bootable.
"	

49.13 SetBootHelperDisk

Description: This RAL Sets Boots the Helper Disk inside FOTE VM.

The inputParameters	Output
PVM_INSTANCE_ID,	If success: Boots the Helper Disk inside FOTE
HELPER_DISK_ID	VM successfully.
	If Failure: Fails to boot the Helper Disk inside
	FOTE VM.

49.14 DetachRootDiskAIXImageFromVM

Description: This RAL Detaches root disk from AIX VM.

The inputParameters	Output
PVM_INSTANCE_ID,	If success: Detaches root disk from AIX VM.
ORIGINAL_ROOT_DISK_ID	If Failure: Fails to detach root disk from AIX
	VM.

49.15 DeleteRootDiskAIXImage

Description: This RAL deletes Root disks Detaches from AIX VM.

The inputParameters	Output
No specific the inputparameter.	If success: Deletes Root disks Detaches from
	AIX VM successfully.
	If Failure: Fails to delet Root disks Detaches
	from AIX VM.

49.16 AttachClonedOSdisk

Description: This RAL attaches cloned OS disk to FOTE VM.



The inputParameters	Output
PVM_INSTANCE_ID, CLONED_OSDISK_ID	If success: Attaches cloned OS disk to FOTE VM. If Failure: Fails to attach cloned OS disk to FOTE VM.

49.17 SetBootClonedOsDisk

Description: This Ral set Boots cloned OS disk.

The inputParameters	Output
PVM_INSTANCE_ID, CLONED_OSDISK_ID	If success: Set Boots cloned OS disk successfully. If Failure: Fails to set Boot cloned OS disk.

49.18 DetachHelperDisk

Description: This RAL detaches Helper Disk.

The inputParameters	Output
HELPER_DISK_ID	If success: Detaches Helper Disk successfully. If Failure: Fails to detach Helper Disk.

49.19 StartVmAIX

Description: This RAL starts AIX VM.

The inputParameters	Output
PVM_INSTANCE_ID	If success: Starts AIX VM successfully. If Failure: Fails to start AIX VM.



49.20 GetAIXVmDetails

Description: This RAL fetches IP information of AIX VM.

The inputParameters	Output
PVM_INSTANCE_ID	If success: Fetches IP information of AIX VM successfully. If Failure: Fails to fetch IP information of AIX VM.

49.21 DeleteAIXVm

Description: This RAL deletes AIX VM.

The inputParameters	Output
PVM_INSTANCE_ID	If success: Deletes AIX VM successfully. If Failure: Fails to delete AIX VM.

49.22 DeleteClonedDataDisk

Description: This RAL deletes Cloned data Disk.

The inputParameters	Output
CLONED_DATADISK_ID,	If success: Deletes Cloned data Disk successfully. If Failure: Fails to delete Cloned data Disk.



49.23 DeleteHelperDisk

Description: This RAL deletes Helper Disk.

The inputParameters	Output
HELPER_DISK_ID	If success: Deletes Helper Disk successfully. If Failure: Fails to delete Helper Disk.

49.24 CloneReplicatedDataDisks

Description: This RAL clones replicated data disks.

The inputParameters	Output
DR_DATA_VOLUME_ID PR_DIS_VM_NAME	If success: Clones replicated data disks successfully. If Failure: Fails to clone replicated data disks

49.25 AttachHelperDiskAIXVM

Description: This RAL attaches the helper disk AIX VM.

The inputParameters	Output
PVM_INSTANCE_ID HELPER_DISK_ID	If success: Attaches the helper disk AIX VM successfully. If Failure: Fails to attach the helper disk AIX VM

49.26 GetVolumeFromVM

Description: This RAL lists Volume details of VM

The inputParameters	Output
P_VM_INSTANCE	If success: List Volume details of VM successfully. If Failure: Fails to list Volume details of VM



49.27 CloneReplicatedOSDisks

Description: CloneReplicatedOSDisks

The inputParameters	Output
DR_OS_VOLUME_ID PR_DIS_VM_NAME	If success: CloneReplicatedOSDisks successfully. If Failure: Fails to CloneReplicatedOSDisks

49.28 CloneReplicatedOSDisksv2

Description: Create a volume clone for specified OS Disk volumes (version 2).

The inputParameters	Output
DR_OS_VOLUME_ID PR_DIS_VM_NAME	CLONED_DISK_TASK_ID :: ID of a long running PowerVC clone task ERROR :: Disk not cloned

49.27 CloneReplicatedDataDisksv2

Description: Create a volume clone of specified replicated Data Disk volumes (version 2).

The inputParameters	Output
DR_OS_VOLUME_ID PR_DIS_VM_NAME	OUT KVs - CLONED_DISK_ID CLONED_DISK_TASK_ID :: ID of a long running PowerVC clone task ERROR :: Disk not cloned

49.28 GetClonedDiskTask

Description: Get the status of a volume clone request for the specified clone task ID.



The inputParameters	Output
IN KVs - CLONED_DISK_TASK_ID I)CLONED_DISK_TASK_ID :: Volumes Clone Task ID	OUT KVs - CLONED_DISK_ID I)CLONED_DISK_ID :: ID of the new cloned volume. ERROR :: Disk not found.



50 Azure

50.1 Check Role to be Primary

Description: This RAL checks whether given server is in primary role or not.

Rest URL:

[https://management.azure.com/subscriptions/\\$subscriptionId\\$/resourceGroups/\\$ResourceGroupName\\$/providers/Microsoft.Sql/servers/\\$SQLServerName\\$/databases/\\$DBName\\$/replicationLinks/\\$PRRepLinkID\\$?api-version=2014-04-01](https://management.azure.com/subscriptions/$subscriptionId$/resourceGroups/$ResourceGroupName$/providers/Microsoft.Sql/servers/$SQLServerName$/databases/$DBName$/replicationLinks/$PRRepLinkID$?api-version=2014-04-01)

Inputs: These are the inputkeys required with the valid values for execution:
subscriptionId, ResourceGroupName, SQLServerName, DBName, PRRepLinkID

RAL Input	The inputKey Name	Description
subscriptionId	subscriptionId	Subscription ID This field is M, andatory
ResourceGroupName	ResourceGroupName	Resource Group Name This field is M, andatory
SQLServerName	SQLServerName	SQL Server Name This field is M, andatory
DBName	DBName	DB Name This field is M, andatory
PRRepLinkID	PRRepLinkID	PR Replication Link ID This field is M, andatory
api-version	NA	api-version is configured to a value '2014-04-01' by default

Outputs:



RAL will be success if the given server is in Primary Role. If role is other than primary, RAL execution will fail saying success condition is not met.

Error Codes:

Error Code	Description
204	Bad request

Pre-checks

- Azure Management service is available/active.

50.2 Check Role to be Secondary

Description: This RAL checks whether given server is in Secondary role or not.

Rest URL:

[https://management.azure.com/subscriptions/\\$subscriptionId\\$/resourceGroups/\\$ResourceGroupName\\$/providers/Microsoft.Sql/servers/\\$SQLServerName\\$/databases/\\$DBName\\$/replicationLinks/\\$DRRepLinkID\\$?api-version=2014-04-01](https://management.azure.com/subscriptions/$subscriptionId$/resourceGroups/$ResourceGroupName$/providers/Microsoft.Sql/servers/$SQLServerName$/databases/$DBName$/replicationLinks/$DRRepLinkID$?api-version=2014-04-01)

Inputs: These are the inputkeys required with the valid values for execution: subscriptionId, ResourceGroupName, SQLServerName, DBName, DRRepLinkID

RAL Input	The inputKey Name	Description
subscriptionId	subscriptionId	Subscription ID This field is M, andatory
ResourceGroupName	ResourceGroupName	Resource Group Name This field is M, andatory
SQLServerName	SQLServerName	SQL Server Name This field is M, andatory
DBName	DBName	DB Name This field is M, andatory



DRRepLinkID	DRRepLinkID	PR Replication Link ID This field is M, andatory
api-version	NA	api-version is configured to a value '2014-04-01' by default

Outputs:

RAL will be success if the given server is in Secondary Role. If role is other than Secondary, RAL execution will fail saying success condition is not met.

Error Codes:

Error Code	Description
204	Bad request

Pre-checks

- Azure Management service is available/active.

50.3 CheckReplicationInSync

Description: This RAL checks for the replication completion percentage , and set the success status if the replication is 100% complete.

Inputs: These are the inputkeys required with the valid values for execution: subscriptionId, ResourceGroupName, SQLServerName, DBName, PRRepLinkID

RAL Input	The inputKey Name	Description
subscriptionId	subscriptionId	Subscription ID This field is M, andatory
ResourceGroupName	ResourceGroupName	ResourceGroupName This field is M, andatory



SQLServerName	SQLServerName	SQLServerName This field is M, andatory
DBName	DBName	DBName This field is M, andatory
PRRepLinkID	PRRepLinkID	PRRepLinkID This field is M, andatory
api-version	NA	api-version is configured to a value '2014-04-01' by default

Outputs:

Upon the successful execution it sets the RAL execution status to 'Succeeded', otherwise the status will be set to 'Failed'.

Error Codes:

Error Code	Description
204	Bad request

Pre-checks

- Azure Management service is available/active.

50.4 AzureSQLSwitchOver

Description:



This RAL triggers the execution of SwitchOver without any dataloss.

Inputs: These are the inputkeys required with the valid values for execution: subscriptionId, ResourceGroupName, SQLServerName, DBName, DRRepLinkID

RAL Input	The inputKey Name	Description
subscriptionId	subscriptionId	Subscription ID This field is M, andatory
ResourceGroupName	ResourceGroupName	ResourceGroupName This field is M, andatory
SQLServerName	SQLServerName	SQLServerName This field is M, andatory
DBName	DBName	DBName This field is M, andatory
DRRepLinkID	DRRepLinkID	DRRepLinkID This field is M, andatory
api-version	NA	api-version is configured to a value '2014-04-01' by default

Outputs:

Upon the successful execution it generates the dummy output key 'currentFOStatus' with the value 'Succeeded', otherwise the value will be empty

Limitation

This RAL will always be executed on DR , and it takes all the inputkeys specific to DR.

Error Codes:



Error Code	Description
204	Bad request

Pre-checks

- Azure Management service is available/active.
- Replication is in sync at 100 percent complete.
- Role of secondary server is secondary.

50.5 AzureSQLFailOver

Description:

This RAL triggers the execution of FailOver with dataloss.

Inputs: These are the inputkeys required with the valid values for execution

subscriptionId, ResourceGroupName, SQLServerName, DBName, DRRepLinkID

RAL Input	The inputKey Name	Description
subscriptionId	subscriptionId	Subscription ID This field is M, andatory
ResourceGroupName	ResourceGroupName	ResourceGroupName This field is M, andatory
SQLServerName	SQLServerName	SQLServerName This field is M, andatory
DBName	DBName	DBName This field is M, andatory
DRRepLinkID	DRRepLinkID	DRRepLinkID This field is M, andatory



api-version	NA	api-version is configured to a value '2014-04-01' by default
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Outputs:

Upon the successful execution it generates the dummy output key 'currentFOStatus' with the value 'Succeeded', otherwise the value will be empty

Limitation

This RAL will always be executed on DR , and it takes all the inputkeys specific to DR.

Error Codes:

Error Code	Description
204	Bad request

Pre-checks

- Azure Management service is available/active.

50.6 ListStagingApplianceDiskDetails

Description: This RAL lists Staging Appliance Disk Details

The inputParameters	Output
Subscriptions, Rgs SA_vms	If success: Lists Staging Appliance Disk Details successfully. If Failure: Fails to list Staging Appliance Disk Details.

50.7 CreateVM

Description: This RAL lists creates VM in selected resource group

The inputParameters	Output
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Subscriptions, Rgs VM_NAME	If success: Creates VM in selected resource group successfully. If Failure: Fails creates VM in selected resource group.
----------------------------------	---

50.8 CreateDiskFromSnapshot

Description: This RAL creates disk from snapshot

The inputParameters	Output
Subscriptions, Rgs Locations, SNAPSHOT_NAME	If success: Creates disk from snapshot successfully. If Failure: Fails to create disk from snapshot.

50.9 PowerOffVm

Description: This RAL powers off the VM

The inputParameters	Output
Subscriptions, Rgs	If success: powers off the VM successfully. If Failure: Fails to power off the VM.

50.10 DeleteNetworkInterface

Description: This RAL deletes Network Interface

The inputParameters	Output
Subscriptions, Rgs dr_network_nic_name	If success: Deletes Network Interface successfully. If Failure: Fails to deletes Network Interface.

50.11 DeleteAzureFoteVm

Description: This RAL deletes FOTE VM.

The inputParameters	Output
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Subscriptions, Rgs	If success Deletes FOTE VM successfully. If Failure: Fails to deletes FOTE VM.
-----------------------	---

50.12 WaitForDiskCreationToComplete

Description: This RAL waits for disk creation to complete

The inputParameters	Output
Subscriptions, Rgs	If success Waits for disk creation to complete successfully. If Failure: Fails to wait for disk creation to complete.

50.13 ListVmDiskDetails

Description: This RAL lists VM Disk Details

The inputParameters	Output
Subscriptions, Rgs vms	If success Lists VM Disk Details successfully. If Failure: Fails to List VM Disk Details.

50.14 CheckStatusForVM

Description: This RAL checks for given VM status match

The inputParameters	Output
Subscriptions, Rgs VM_NAME, VM_STATUS	If success: checks for given VM status match successfully. If Failure: Fails checks for given VM status match.



50.15 DeleteDisk

Description: This RAL deletes the disk.

The inputParameters	Output
Subscriptions, Rgs DISK_NAME,	If success: Deletes the disk successfully. If Failure: Fails to delete the disk.

50.16 CreateTargetDisk

Description: This RAL creates Disk at selected site.

The inputParameters	Output
Subscriptions, Rgs DISK_NAME, DISK_SIZE locations STORAGE_ACCOUNT_TYPE	If success: Attaches Data Disks To Staging Appliance successfully. If Failure: Fails to attach Data Disks To Staging Appliance.

50.17 CreateNetworkInterface

Description: This RAL creates Network Interface

The inputParameters	Output
Subscriptions, Rgs dr_network_nic_name	If success: Creates Network Interface successfully. If Failure: Fails to create Network Interface.

50.18 CreateSnapshotOfDisk

Description: This RAL creates Snapshot from Disk

The inputParameters	Output
Subscriptions, Rgs DR_DISK_NAME locations SNAPSHOT_NAME	If success: Creates Snapshot from Disk successfully. If Failure: Fails to create Snapshot from Disk.

50.19 DeleteDiskSnapshot

Description: This RAL deletes Snapshot of Disk



The inputParameters	Output
Subscriptions, Rgs SNAPSHOT_NAME	If success: Deletes Snapshot of Disk successfully. If Failure: Fails to delete Snapshot of Disk.

50.20 DeleteDiskSnapshot

Description: This RAL deletes Snapshot of Disk

The inputParameters	Output
Subscriptions, Rgs SNAPSHOT_NAME	If success: Deletes Snapshot of Disk. If Failure: Fails to delete Snapshot of Disk.

50.21 WaitForSnapshotCreationToComplete

Description: This RAL waits for snapshot creation to complete

The inputParameters	Output
Subscriptions, Rgs SNAPSHOT_NAME	If success: Waits for snapshot creation to complete successfully. If Failure: Fails to wait for snapshot creation to complete.

50.22 AttachNsgToVmNic

Description: This RAL attaches NSG to VMNIC

The inputParameters	Output
Subscriptions, Rgs DR_NS_G_NAME Vnets Subnets locations	If success: Attaches NSG to VMNIC successfully. If Failure: Fails to NSG to VMNIC.

50.23 ASR Check Replication Status

Description – This ASR RAL checks the Azure SR Replication Status for a protected VM. If the replication is not Normal we will consider it as a failure.



URL - GET

[https://management.azure.com/Subscriptions/{subscriptionId}/resourceGroups/{resourceGroupName}/providers/Microsoft.A
recoveryServices/vaults/{resourceName}/replicationFabrics/{fabricName}/replicationProtectionCo
ntainers/{protectionContainerName}/replicationProtectedItems/{replicatedProtectedItemName}?a
pi-version=2018-07-10](https://management.azure.com/Subscriptions/{subscriptionId}/resourceGroups/{resourceGroupName}/providers/Microsoft.A
recoveryServices/vaults/{resourceName}/replicationFabrics/{fabricName}/replicationProtectionCo
ntainers/{protectionContainerName}/replicationProtectedItems/{replicatedProtectedItemName}?a
pi-version=2018-07-10)

Inputs	The inputKey Values	Output Key Values
ProtectionContainerName, ReplicationProtectedItem, ReplicatedProtectedItemName, SubscriptionID, A recoveryPlan, FabricName resourceGroupName, ResourceName, MANAGEMENT_SERVICE	ProtectionContainerName, ReplicationProtectedItem, ReplicatedProtectedItemName, SubscriptionID, A recoveryPlan, FabricName resourceGroupName, ResourceName, MANAGEMENT_SERVICE	replicationHealth

50.24 ASR Check Failover Health

Description – This ASR RAL checks the Failover Health of a A recovery plan. If the failover health of a protected VM is not normal we will consider it as failure.

URL - GET

[https://management.azure.com/Subscriptions/{subscriptionId}/resourceGroups/{resourceGroupName}/providers/Microsoft.A
recoveryServices/vaults/{resourceName}/replicationFabrics/{fabricName}/replicationP
rotectionContainers/{protectionContainerName}/replicationProtectedItems/{replicated
ProtectedItemName}?api-version=2018-07-10](https://management.azure.com/Subscriptions/{subscriptionId}/resourceGroups/{resourceGroupName}/providers/Microsoft.A
recoveryServices/vaults/{resourceName}/replicationFabrics/{fabricName}/replicationP
rotectionContainers/{protectionContainerName}/replicationProtectedItems/{replicated
ProtectedItemName}?api-version=2018-07-10)

Inputs	The inputKey Values	Output Key Values
ProtectionContainerName, ReplicationProtectedItem, ReplicatedProtectedItemName, SubscriptionID, A recoveryPlan, FabricName	ProtectionContainerName, ReplicationProtectedItem, ReplicatedProtectedItemName, SubscriptionID, A recoveryPlan, FabricName	failoverHealth



resourceGroupName, ResourceName, MANAGEMENT_SERVICE	resourceGroupName, ResourceName, MANAGEMENT_SERVICE	
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50.25 ASR Validate operations

Description – This ASR RAL will check if the current operations is allowed or not based on the ASR State. If the operations provided under EXP_OPERATION key is not listed under allowed operations will consider it as a failure.

URL - GET

<https://management.azure.com/Subscriptions/{subscriptionId}/resourceGroups/{resourceGroupName}/providers/Microsoft.A/recoveryServices/vaults/{resourceName}/replicationFabrics/{fabricName}/replicationProtectionContainers/{protectionContainerName}/replicationProtectedItems/{replicatedProtectedItemName}?api-version=2018-07-10>

Inputs	The inputKey Values	Output Key Values
ProtectionContainerName, ReplicationProtectedItem, ReplicatedProtectedItemName, SubscriptionID, A recoveryPlan, FabricName resourceGroupName, ResourceName, EXP_OPERATION, MANAGEMENT_SERVICE	ProtectionContainerName, ReplicationProtectedItem, ReplicatedProtectedItemName, SubscriptionID, A recoveryPlan, FabricName resourceGroupName, ResourceName, EXP_OPERATION, MANAGEMENT_SERVICE	allowedOperations

50.26 ASR Failover Test

Description – This RAL will execute Failover Test operation for a a recovery plan. It is considered as successful when the respective job ID is success.

URL - POST

<https://management.azure.com/Subscriptions/{subscriptionId}/resourceGroups/{resou>



<https://management.azure.com/Subscriptions/{subscriptionId}/resourceGroups/{resourceGroupName}/providers/Microsoft.A/recoveryServices/vaults/{resourceName}/replicationA/recoveryPlans/{a/recoveryPlanName}/testFailover?api-version=2018-07-10>

Inputs	The inputKey Values	Output Key Values
SubscriptionID, A recoveryPlan, ResourceName, failoverNetwork, instanceType, MANAGEMENT_SERVICE	SubscriptionID, A recoveryPlan, ResourceName, failoverNetwork, instanceType, MANAGEMENT_SERVICE	N/A

50.27 ASR Failover Test Cleanup

Description – This RAL will execute Failover Test cleanup operation for a a recovery plan. It is considered as successful when the respective job ID is success.

URL - POST

<https://management.azure.com/Subscriptions/{subscriptionId}/resourceGroups/{resourceGroupName}/providers/Microsoft.A/recoveryServices/vaults/{resourceName}/replicationA/recoveryPlans/{a/recoveryPlanName}/testFailoverCleanup?api-version=2018-07-10>

Inputs	The inputKey Values	Output Key Values
SubscriptionID, A recoveryPlan, resourceGroupName, ResourceName, MANAGEMENT_SERVICE	SubscriptionID, A recoveryPlan, resourceGroupName, ResourceName, MANAGEMENT_SERVICE	N/A

50.28 ASR Trigger Failover

Description – This RAL will trigger Failover operation for the respective a recovery plan. It is considered as successful when the respective job ID is success.



URL - POST

<https://management.azure.com/Subscriptions/{subscriptionId}/resourceGroups/{resourceGroupName}/providers/Microsoft.A recoveryServices/vaults/{resourceName}/replicationA recoveryPlans/{a recoveryPlanName}/unplannedFailover?api-version=2018-07-10>

Inputs	The inputKey Values	Output Key Values
SubscriptionID, A recoveryPlan, resourceGroupName, ResourceName, InstanceType, MANAGEMENT_SERVICE	SubscriptionID, A recoveryPlan, resourceGroupName, ResourceName, InstanceType, MANAGEMENT_SERVICE	N/A

50.29 ASR Commit Failover

Description – This RAL will commit failover after execute Failover operation. It is considered as successful when the respective job ID is success.

URL - POST

<https://management.azure.com/Subscriptions/{subscriptionId}/resourceGroups/{resourceGroupName}/providers/Microsoft.A recoveryServices/vaults/{resourceName}/replicationA recoveryPlans/{a recoveryPlanName}/failoverCommit?api-version=2018-07-10>

Inputs	The inputKey Values	Output Key Values
SubscriptionID, A recoveryPlan, resourceGroupName, ResourceName, MANAGEMENT_SERVICE	SubscriptionID, A recoveryPlan, resourceGroupName, ResourceName, MANAGEMENT_SERVICE	N/A



50.30 DeleteDetachedDisks

Description – This RAL will delete the disks that are already detached.

The inputParameters	Output
TARGET_SUBSCRIPTION_ID TARGET_RSG_NAME DISKS_ATTACHED_ON_SCANNER	

50.31 Azure_GetVMDetails

Description – Get VM details.

The inputParameters	Output
SUBSCRIPTION_ID RSG_NAME AZURE_VM_NAME	VM_DETAILS_JSON

50.32 Azure_DetachVMDisks

Description – Detach the VM disks from the scanner component.

The inputParameters	Output
SUBSCRIPTION_ID RSG_NAME AZURE_VM_NAME DETACH_DISKS_PAYLOAD	VM_DETAILS

50.33 Azure_VerifyVMDeletion

Description: Verify if recovered VM got deleted successfully.

The inputParameters	Output
SUBSCRIPTION_ID RSG_NAME AZURE_VM_NAME	VM_DETAILS_JSON



51 HyperV RALs

51.1 HyperV-getStatus

This RAL gets the Replication status of the Hyper-V.

Key Value	Description
HYPERV_IP	Hyper-V IP address (where the Operations is performed)
HYPERVCREDS	Group Credentials

Success : Hyper-V Status : Active

Failure : Hyper-V status : Inactive

51.2 HyperV-Resume-VMReplication-Confirm

This RAL resumes the Hyper-V Replication , and confirms the same.

Key Value	Description
HYPERV_IP	Hyper-V IP address (where the Operations is performed)
HYPERVCREDS	Group Credentials
VM_NAME	VM Name

Output : Resumed the replication successfully : Replicating

Failure : Resume failed with error : \$CmdOut

51.3 HyperV-Start-VMFailover-Confirm

This RAL starts the VM in Failover mode.

Key Value	Description
-----------	-------------



HYPERV_IP	Hyper-V IP address (where the Operations is performed)
HYPERVCREDS	Group Credentials
VM_NAME	VM Name

Output : VM \$vmname Failover started successfully : FailedOverWaitingCompletion

Failure : VM \$vmname failover failed with error \$CmdOut

51.4 HyperV-Start-VMFailover-Prepare

This RAL starts the VM in Failover prepared.

Key Value	Description
HYPERV_IP	Hyper-V IP address (where the Operations is performed)
HYPERVCREDS	Group Credentials
VM_NAME	VM Name

Output : VM \$vmname Failover started successfully : PreparedForFailover

Failure : VM \$vmname failover failed with error \$CmdOut

51.5 HyperV-StartVM

This RAL starts the VM.

Key Value	Description
HYPERV_IP	Hyper-V IP address (where the Operations is performed)
HYPERVCREDS	Group Credentials
VM_NAME	VM Name

Output :VM \$vmname Started successfully : Running

Failure :VM \$vmname failed to start with error \$CmdOut



51.6 HyperV-StartVM-FailoverTest

This RAL starts the VM in Failover test mode.

Key Value	Description
HYPERV_IP	Hyper-V IP address (where the Operations is performed)
HYPERVCREDS	Group Credentials
VM_NAME	VM Name

Output :VM \$vmname started successfully in Failover Test mode : Off

Failure :VM \$vmname failed to start in Failover Test mode with error : \$CmdOut

51.7 HyperV-Stop-VMReplication-Confirm

This RAL stops the VM replication , and confirms the same.

Key Value	Description
HYPERV_IP	Hyper-V IP address (where the Operations is performed)
HYPERVCREDS	Group Credentials
VM_NAME	VM Name

Output :VM \$vmname replication stopped successfully : FailedOverWaitingCompletion

Failure :VM \$vmname replication failed to stop with error \$CmdOut

51.8 HyperV-StopVM

This RAL stops the VM.

Key Value	Description
-----------	-------------



HYPERV_IP	Hyper-V IP address (where the Operations is performed)
HYPERVCREDS	Group Credentials
VM_NAME	VM Name

Output :VM \$vmname stopped successfully : Off

Failure :\$vmname failed to stop VM with error \$CmdOut

51.9 HyperV-StopVM-FailoverTest

This RAL stops the VM in Failover Test mode.

Key Value	Description
HYPERV_IP	Hyper-V IP address (where the Operations is performed)
HYPERVCREDS	Group Credentials
VM_NAME	VM Name

Output :Failover Test VM \$vmname stopped successfully : Off

Failure :Failover Test VM \$vmname failed to stop with error : \$CmdOut

51.10 HyperV-Suspend-VMReplication-Confirm

This RAL suspends the VM replication.

Key Value	Description
HYPERV_IP	Hyper-V IP address (where the Operations is performed)
HYPERVCREDS	Group Credentials
VM_NAME	VM Name

Output :VM \$vmname replication Suspended successfully : Suspended

Failure :VM \$vmname replication failed to suspend with error : \$CmdOut



51.11 HyperV-VMReplication-Health

This RAL verifies the VM replication Health.

Key Value	Description
HYPERV_IP	Hyper-V IP address (where the Operations is performed)
HYPERVCREDS	Group Credentials
VM_NAME	VM Name

Output :Successfully executed - Replication Health is : Normal

Failure :Replication Health Failed with error \$CmdOut

51.12 HyperV-VMReplication-Info

This RAL captures the replication information.

Key Value	Description
HYPERV_IP	Hyper-V IP address (where the Operations is performed)
HYPERVCREDS	Group Credentials

Output :N/A

Failure :N/A

51.13 HyperV-VMReplication-Mode

This RAL verifies the replication mode.

Key Value	Description
-----------	-------------



HYPERV_IP	Hyper-V IP address (where the Operations is performed)
HYPERVCREDS	Group Credentials
VM_NAME	VM Name

Output :Successfully executed - Replication Mode is : Primary

Failure :Replication Mode Failed with error \$CmdOut

51.14 HyperV-VMReplication-RPO

This RAL sets the RPO details on the monitoring page.

Key Value	Description
HYPERV_IP	Hyper-V IP address (where the Operations is performed)
HYPERVCREDS	Group Credentials

Output :N/A

Failure :N/A

51.15 HyperV-VMReplication-Set-VMFailover-Reverse-Confirm

This RAL starts the VM replication in reverse , and confirms the same.

Key Value	Description
HYPERV_IP	Hyper-V IP address (where the Operations is performed)
HYPERVCREDS	Group Credentials
VM_NAME	VM Name

Output :Reverse replication for the VM \$vmname is set successfully : Replicating

Failure :Reverse replication for the VM \$vmname failed with error \$CmdOut



51.16 HyperV-VMReplication-State

This RAL verifies the replication state.

Key Value	Description
HYPERV_IP	Hyper-V IP address (where the Operations is performed)
HYPERVCREDS	Group Credentials
VM_NAME	VM Name

Output :Successfully executed - Replication state is : Replicating

Failure :Failed to get the VM \$vmname state with error : \$CmdOut



52 Veeam

52.1 Veeam_PhysicalToVMDKForSelectedSnapshot

Description: This RAL performs the conversion of Physical disk to VMDK for selected Snapshot , and stores the VMDK on ESXi host server in VCetner. This conversion happens using Veeam Backup & Replication software.

Inputs:

The inputParameters (These are the inputkeys required with the valid values for execution)	The inputKey name	Description
BACKUP_JOB_NAME	BACKUP_JOB_NAME	BACKUP_JOB_NAME This is Veeam back job name. This field is m, andatory.
PROTECTED_PHYSICAL_HOSTNAME	PROTECTED_PHYSICAL_HOSTNAME	PROTECTED_PHYSICAL_HOSTNAME This is hostname of protected physical server. This field is m, andatory.
ESXI_HOSTNAME	ESXI_HOSTNAME	ESXI_HOSTNAME This is ESXi hostname. This filed is m, andatory.
DATASTORE_NAME	DATASTORE_NAME	DATASTORE_NAME This is data store name. This field is m, andatory.
DATASTORE_FOLDER_NAME	DATASTORE_FOLDER_NAME	DATASTORE_FOLDER_NAME This is datastore folder name. This field is m, andatory.
SNAPSHOT_CREATION_TIME	SNAPSHOT_CREATION_TIME	SNAPSHOT_CREATION_TIME This is Snapshot creation time (in String). This field is m, andatory.



Outputs:

Upon successful execution, protected physical server is converted to VMDK by Veeam software based on selected snapshot creation time , and they are pushed in data store folder in ESXI host on target VCenter environment. It will generate the Veeam physical job session id for conversion process.

Limitation:

This RAL will always be executed on CR.

Error Types:

Error Type	Description
timeout	Timeout error from RAL in case, the conversion takes more than the configured time.
error	Any Exception in converting Physical disks to VMDK.

Pre-checks:

- VCenter Management service should be active.

Prerequisite:

- This RAL needs the conversion PowerShell script to be available in C:/ drive on Veeam server.

52.2 Veeam_PhysicalToVMDK



Description: This RAL performs the conversion of Physical disk to VMDK , and stores the VMDK on ESXi host server in VCetner. This conversion happens using Veeam Backup & Replication software.

Inputs:

The inputParameters (These are the inputkeys required with the valid values for execution)	The inputKey name	Description
BACKUP_JOB_NAME	BACKUP_JOB_NAME	BACKUP_JOB_NAME This is Veeam back job name. This field is m, andatory.
PROTECTED_PHYSICAL_HOST NAME	PROTECTED_PHYSICAL_HOST NAME	PROTECTED_PHYSICAL_HOST NAME This is hostname of protected physical server. This field is m, andatory.
ESXI_HOSTNAME	ESXI_HOSTNAME	ESXI_HOSTNAME This is ESXi hostname. This filed is m, andatory.
DATASTORE_NAME	DATASTORE_NAME	DATASTORE_NAME This is data store name. This field is m, andatory.
DATASTORE_FOLDER_NAME	DATASTORE_FOLDER_NAME	DATASTORE_FOLDER_NAME This is datastore folder name. This field is m, andatory.

Outputs:

Upon successful execution, protected physical server is converted to VMDK by Veeam software , and they are pushed in data store folder in ESXI host on target VCenter environment. It will generate the Veeam physical job session id for conversion process.



Limitation:

This RAL will always be executed on CR.

Error Types:

Error Type	Description
timeout	Timeout error from RAL in case, the conversion takes more than the configured time.
error	Any Exception in converting Physical disks to VMDK.

Pre-checks:

- VCenter Management service should be active.

Prerequisite:

- This RAL needs the conversion PowerShell script to be available in C:/ drive on Veeam server.

52.3 GetBackupJobDetails

Description: This RAL fetches the BackupJobId to be used by other RALS.

The inputParameters	Output
\$VEEAM_VM_NAMES\$	If successful: Fetches the BackupJobID successfully. If Failure: Fails to fetch the BackupJobID.



52.4 ExecuteMountOnESXHost

Description: This RAL executes , and output the result in K:V format.

The inputParameters	Output
\$BACKUP_JOB_ID\$ \$VEEAM_VM_NAME\$ \$ESXHOST_IP\$ \$SNAPSHOT_INDEX\$	This ral executes , and print output in K:V format. Property MountState says whether its monuted or not.

52.5 DeletelntantVM, andDatastore

Description: This RAL delete the mounted VM , and cleanup the datastore.

The inputParameters	Output
\$VM_NAME_IVMR\$	This ral executes , and deletes the VM , and cleanup the datastore.

52.6 Veam_Executelistsnapshot

Description: This RAL executes , and list the available snapshot corresponding to the VM.

The inputParameters	Output
\$DR_VM_NAME\$	This ral executes list the available snapshot of the corresponding VM.

52.7 GetDatalagDetails



Description: This RAL executes , and calculate the replication details datalag.

The inputParameters	Output
\$BACKUP_JOB_NAME\$	This ral executes , and calculates the replication details datalag.

52.8 Veeam A recovery

Description: This RAL executes , and output the result in K:V format.

The inputParameters	Output
\$BACKUP_JOB_ID\$ \$VEEAM_VM_NAME\$ \$ESXHOST_IP\$ \$SNAPSHOT_INDEX\$	This ral executes , and print output in K:V format. Property MountState says whether its monuted or not.

52.9 Veeam Get Backup Data

Description: This RAL executes , and list the available snapshot corresponding to the VM.

The inputParameters	Output
\$DR_VM_NAME\$	This ral executes list the available snapshot of the corresponding VM.

52.10 Get Veeam Datalag Details

Description: This RAL executes , and calculate the replication details datalag.



The inputParameters	Output
\$BACKUP_JOB_NAME\$	This RAL executes , and calculates the replication details datalag.

52.11 VmwareChangePortgroupsMapping

Description: This RAL modifies the port group(s) names to desired port group(s). As the same port groups are not ideally available on the recovery site, this feature helps in giving network access to the recovered VM.

This RAL executes, and calculate the replication details datalag.

The inputParameters	Output
PANVC_MGMT_SVC_NAME	Management service name
PANVC_DC_NAME	Data cluster name
PANVC_VM_NAME	VM name
PANVC_PORTGROUP_NAME	Port group name
PANVC_AVAILABLE_PGS_NAME	Port group name to update



53 Portworx

53.1 CheckIfFOTENamespaceExists

Description: Checks whether new namespace created on DR environment for FOTE as part of FOTE drill.

The inputParameters	Output
Namespace name selected for a recovery.	<p>If successful: Returns FOTE namespace object in JSON format , and Proceeds for resource check..</p> <p>If Failure: Returns error message, "Resource doesn't exist" , and deletes the ApplicationClone created.</p>

53.2 DeleteApplicationClone

Description: Deletes the application clone object on DR environment as part of FOTE drill.

The inputParameters	Output
Namespace name created as part of FOTE drill.	<p>If successful: ApplicationClone object will be deleted.</p> <p>If Failure: The user will be prompted for manual deletion of ApplicationClone object.</p>

53.3 CreateApplicationClone

Description: The CreateApplicationClone RAL creates application clone object on DR Cluster.

The inputParameters	Output
The source namespace selected for a recovery.	<p>If successful: ApplicationClone for the given source namespace will be created on DR.</p> <p>If Failure: Further steps will be skipped to end stop RAL.</p>



53.4 eleteNamespace

Description: Deletes namespace on DR environment for FOTE as part of FOTE drill.

The inputParameters	Output
Namespace name selected for a recovery.	<p>If successful: Returns namespace name which is deleted , and Proceeds for DeleteApplicationClone.</p> <p>If Failure: Proceeds to Listing RAL called "DeleteNamespaceManually" where The userneeds to go , and delete namespace manually , and after deletion of namespace successfully it proceed for DeleteApplicationClone.</p>

53.5 CheckIfApplicationCloneExists

Description: Checks whether new ApplicationClone created or not on DR environment for FOTE as part of FOTE drill.

The inputParameters	Output
Namespace name selected for a recovery.	<p>If successful: Returns FOTE namespace object in JSON format , and Proceeds to check for fote namespace.</p> <p>If Failure: Workflow execution stops.</p>

53.6 Check Application Status

Description: Checks if pods are up , and running.

The inputParameters	Output
.	<p>If successful: Proceeds to delete namespace.</p> <p>If Failure: Fails to delete namespace.</p>



53.7 Delete Namespace Manually

Description: Prompts The userto delete namespace manually in case of failure.

The inputParameters	Output
	If successful: Proceeds to delete ApplicationClone. If Failure: Fails to delete ApplicationClone.

53.8 Delete ApplicationClone Manually

Description: Prompts The userto delete ApplicationClone manually in case of failure.

The inputParameters	Output
	If successful: Workflow execution Completes. If Failure: Workflow execution fails to complete.

53.9 Suspend Migration Manually

Description: The usershould Suspend Migration Manually in case of failure.

The inputParameters	Output
	If successful: Proceeds to delete namespace. If Failure: Fails to delete namespace.

53.10 Revert NameSpace In KV

Description: This RAL reverts back the Namespace in KV.

The inputParameters	Output
	If successful: Workflow is executed successfully.



	If Failure: Fails to execute the workflow.
--	--

53.11 UpdateSVCList

Description: Applies all modified load balancer service list on to the DR cluster. This RAL is used for Portworx FOTE workflow.

The inputParameters	Output
Namespace (fote) svcsToBeApplied filtered svc json (loaded from GetServicesByType , and processed by UpdateLBSvcJson RAL)	If successful: return st, andard SSH response with exit code 0. If Failure: return st, andard SSH response with non-zero exit code.

53.12 GetServicesByType

Description: Returns list of services which of type Load Balancer.

The inputParameters	Output
Namespace	If successful: return json list of svc’s of type Load Balancer. If Failure: return st, andard SSH response with non-zero exit code.

53.13 SkipUpdateIfNotExist

Description: Performs conditional check to determine if UpdateSVCList should be skipped or executed. If updateLBSvcJson RAL returns no services of Load Balancer then UpdateSVCList execution is skipped.

The inputParameters	Output
svcsToBeApplied	If successful: If the condition is met, UpdateSVCList will be executed If Failure: UpdateSVCList will not be executed



53.14 UpdateLBSvcJson

Description: Modifies the Load Balancer service json. NodePort is be removed. Nullifies Hostname , and clusterIp. A prefix 'fote' is added to namespace.

The inputParameters	Output
svcsToBeApplied	If successful: svcsToBeApplied will contain the list of modified svc's If Failure: Will proceed to end

53.15 CheckIfApplicationCloneSuccess

Description: Check if application clone status is success. Success of application clone is determined through custom logic. If any of the resources is in failed (other than services) status, then the overall applicationclone status is considered as failed.

The inputParameters	Output
Namespace (fote)	If successful: return st, andard SSH response with exit code 0. If Failure: return st, andard SSh response with non-zero exit code.



54 CloudEndure

54.1 GetMachineld

Description: This RAL fetches the machine ID to be used by other RALS.

The inputParameters	Output
\$MACHINENAME\$ Based on \$MACHINENAME\$ we need to figure out json key id as \$MACHINEID\$ \$AGId\$	If successful: Fetches the machine ID successfully. If Failure: Fails to fetch the machine ID.

54.2 GetBlueprintId

Description: This RAL fetches the blueprint ID to be used by other RALS..

The inputParameters	Output
\$AGId\$ \$MACHINEID\$ Based on \$MACHINEID\$ we need to figure out \$BLUEPRINTID\$	If successful: Fetches the blueprint ID successfully. If Failure: Fails to fetch the blueprint ID.

54.3 StopDataReplication

Description: This RAL stops the data replication.

The inputParameters	Output
\$AGId\$ \$MACHINEID\$	If successful: Stops the data replication successfully. If Failure: Fails to stop the data replication.

54.4 SetFallbackSettings

Description: This RAL configures the fallback settings for reverse replication.

The inputParameters	Output
---------------------	--------



AWS_FB_REPLICATORSECURITYGROUPIDS	If successful: Configures the fallback settings successfully.
AWS_FB_REPLICATOR_SUBNETID	
AWS_FB_REPLICATOR_USEPRIVATEIP	If Failure: Fails to set the fallback settings.
AWS_FB_REPLICATOR_DISABLEPUBLICIP	

54.5 StartDataReplication

Description: This RAL initiates the reverse data replication.

The inputParameters	Output
\$AGId\$	If successful: Starts the data replication successfully. If Failure: Fails to start the data replication.
\$MACHINEID\$	

54.6 WaitForReplicationCompletion

Description: This RAL ensures that replication process is completed before the next RAL is triggered.

The inputParameters	Output
\$AGId\$	If successful: Monitors the replication status successfully. If Failure: Fails to monitor the replication status replication.
\$MACHINEID\$	

54.7 SetBlueprintOfMachineAWSFB

Description: This RAL sets the blueprint of the machine AWS FB.

The inputParameters	Output
\$ AWS_FB_SUBNETIDS	If successful: Sets the blueprint of the machine AWS FB successfully.
AWS_FB_SECURITYGROUPIDS	
AWS_FB_IAMROLE	If Failure: Fails to set the blueprint of the machine AWS FB.



AWS_FB_PRIVATEIPS	
AWS_FB_PLACEMENTGROUP	
AWS_FB_PUBLICIPACTION	
AWS_FB_STATICIPACTION	
AWS_FB_PRIVATEIPACTION	
AWS_FB_DISKS	
AWS_FB_TAGS	
AWS_FB_STATICIP	

54.8 GetBlueprintOfMachine

Description: This RAL fetches the blueprint of the remote machine.

The inputParameters	Output
\$ AGId BLUEPRINTID	If successful: Fetches the blueprint of the machine successfully. If Failure: Fails to get the blueprint of the machine.

54.9 LaunchTargetVmWithLatestPIT

Description: This RAL launches the target VM with the latest PIT.

The inputParameters	Output
MACHINEID AGId	If successful: Launches the target VM with the latest PIT successfully. If Failure: Fails to launch the target VM with the latest PIT.

54.10 LaunchTargetVmWithPIT



Description: This RAL launches the target VM with PIT.

The inputParameters	Output
AGId	If successful: Launches the target VM with the PIT successfully. If Failure: Fails to launch the target VM with the PIT.
MACHINEID	
POINTSINTIMEID	
POINT_IN_TIME_REQUIRED=YES	

54.11 WaitForTargetVmLaunchOnAws

Description: This RAL waits for the target VM to be launched before triggering the next RAL.

The inputParameters	Output
RETRY ON FAILURE : WAIT FOR REPLIC ID IS TO BE GENERATED IN JSON	If successful: Monitors the launch progress of the target VM successfully. If Failure: Fails to Monitor the launch progress of the target VM.

54.12 GetAwsVmInformation

Description: This RAL fetches the AWS VM information.

The inputParameters	Output
AGId	If successful: Fetches the AWS VM information successfully. If Failure: Fails to Fetch the AWS VM information.
REPLICAID	

54.13 PointInTimeRequirement



Description: This RAL check if point in time is required or not for FOTE.

The inputParameters	Output
POINT_IN_TIME_REQUIRED	NA

54.14 LaunchTargetVmWithPIT

Description: This RAL launches target VM with PIT value.

The inputParameters	Output
AGId	If successful: Launches target VM with PIT value successfully.
MACHINEID	
POINTSINTIMEID	If Failure: Fails to launch target VM with PIT value.
POINT_IN_TIME_REQUIRED=YES	

54.15 FailoverVMWithLatestPIT

Description: This RAL fails over the VM with the latest PIT value.

The inputParameters	Output
MACHINEID	If successful: fails over the VM with the latest PIT value successfully.
AGId	
POINT_IN_TIME_REQUIRED=NO	If Failure: Fails to fail over the VM with the latest PIT value.

54.16 FailoverVmWithPIT

Description: This RAL fails over the VM with the selected PIT value.

The inputParameters	Output
AGId	If successful: Fails over the VM with the selected PIT value successfully.
MACHINEID	
POINTSINTIMEID	If Failure: Fails to fail over the VM with the selected PIT value.
POINT_IN_TIME_REQUIRED=YES	



54.17 VerifyApplication

Description: This RAL waits for the application verification before performing clean-up operation.

The inputParameters	Output
The userInput	NA

54.18 CleanupAWSReplicaVM

Description: This RAL performs the clean-up operation.

The inputParameters	Output
AGId REPLICAID	If successful: fails over the VM with the selected PIT value successfully. If Failure: Fails to fail over the VM with the selected PIT value.

54.19 FailoverVMOOnAWSWithLatestPIT

Description: This RAL Recovers VMS on AWS with Latest PIT

Inputs:

The inputParameters (These are the inputkeys required with the valid values for execution)	The inputKey name	Description
AGId	AGId	AGId This is PROJECT ID of cloudundure Project



MACHINEID	MACHINEID	MACHINEID This is Machineid of VM in cloudendure
-----------	-----------	---

Outputs:

Upon successful execution, recover the VM on target AWS Region. It will generate the job ID with outkey name CLOUDENDURE_JOBID for a recovery process for further verification.

Error Codes:

Error Code	Description
500	Internal Server Error
503	Server busy
400	Bad Request
401	Invalid token
404	Not Found
405	Method not allowed
406	Invalid Accept type
415	Unsupported Media Type

54.20 LaunchTargetVmOnAWSWithPIT

Description: This RAL Launches VMS on AWS with Selected PIT Value

Inputs:

The inputParameters (These are the inputkeys required with the valid values for execution)	The inputKey name	Description
AGId	AGId	AGId



		This is PROJECT ID of cloudendure Project
MACHINEID	MACHINEID	MACHINEID This is Machineid of VM in cloudendure
POINTSINTIMEID	POINTSINTIMEID	This is PIT TIME Selected to Recover VM

Outputs:

Upon successful execution, recover the VM on target AWS Region. It will generate the job ID with outkey name CLOUDENDURE_JOBID for a recovery process for further verification.

Error Codes:

Error Code	Description
500	Internal Server Error
503	Server busy
400	Bad Request
401	Invalid token
404	Not Found
405	Method not allowed
406	Invalid Accept type
415	Unsupported Media Type

54.21 FailoverVMonAWSWithPIT

Description: This RAL Recovers VMS on AWS with Selected PIT Value

Inputs:



The inputParameters (These are the inputkeys required with the valid values for execution)	The inputKey name	Description
AGId	AGId	AGId This is PROJECT ID of cloudendure Project
MACHINEID	MACHINEID	MACHINEID This is Machineid of VM in cloudendure
POINTSINTIMEID	POINTSINTIMEID	This is PIT TIME Selected to Recover VM.

Outputs:

Upon successful execution, recover the VM on target AWS Region. It will generate the job ID with outkey name CLOUDENDURE_JOBID for a recovery process for further verification.

Error Codes:

Error Code	Description
500	Internal Server Error
503	Server busy
400	Bad Request
401	Invalid token
404	Not Found
405	Method not allowed
406	Invalid Accept type
415	Unsupported Media Type

54.22 LaunchTargetVmOnAWSWithLatestPIT

Description: This RAL Launches VMS on AWS with Latest PIT



Inputs:

The inputParameters (These are the inputkeys required with the valid values for execution)	The inputKey name	Description
AGId	AGId	AGId This is PROJECT ID of cloudendure Project
MACHINEID	MACHINEID	MACHINEID This is Machineid of VM in cloudendure

Outputs:

Upon successful execution, recover the VM on target AWS Region. It will generate the job ID with outkey name CLOUDENDURE_JOBID for a recovery process for further verification.

Error Codes:

Error Code	Description
500	Internal Server Error
503	Server busy
400	Bad Request
401	Invalid token
404	Not Found
405	Method not allowed
406	Invalid Accept type
415	Unsupported Media Type

54.23 CleanUpReplicaVMOOnAWS

Description: This RAL cleans up VMS on AWS



Inputs:

The inputParameters (These are the inputkeys required with the valid values for execution)	The inputKey name	Description
AGId	AGId	AGId This is PROJECT ID of cloudendure Project
REPLICAID	REPLICAID	REPLICAID This is ReplicaId of VM in AWS

Outputs:

Upon successful execution, recover the VM on target AWS Region. It will generate the job ID with outkey name CLOUDENDURE_JOBID for a recovery process for further verification.

Error Codes:

Error Code	Description
500	Internal Server Error
503	Server busy
400	Bad Request
401	Invalid token
404	Not Found
405	Method not allowed
406	Invalid Accept type
415	Unsupported Media Type



54.24 WaitForCloudEndureJobCompletion

Description: This RAL Pols cloudendure jobid , and returns status whether job completed or not

Inputs:

The inputParameters (These are the inputkeys required with the valid values for execution)	The inputKey name	Description
AGId	AGId	AGId This is PROJECT ID of cloudendure Project
CLOUDENDURE_JOBID	CLOUDENDURE_JOBID	CLOUDENDURE_JOBID This is JOB ID returned by earlier RAL

Outputs:

Upon successful execution of the above ral, it returns the logs as CLOUDENDURE_JOBLOG which shows the progression of JOB.

Error Codes:

Error Code	Description
500	Internal Server Error
503	Server busy
400	Bad Request
401	Invalid token
404	Not Found
405	Method not allowed
406	Invalid Accept type
415	Unsupported Media Type



55 VMware RP

55.1 RP4VMDeleteTestCopy

Description: This RAL will delete the test copy created for the Test failover. which in turn deletes the test VM's created for given CG.

The inputParameters	API Used	Output
All inputs will be fetched from RecoverPoint for VMs protection schema.	DELETE https://{plugin-server}/api/v1/groups/{groupRep}/copies/{copyId}/test-copy	If successful:Delete Test Copy completed Successfully. On Failure – Unable to delete Test Copy.

55.2 RP4VMFailover

Description: This RAL will Failover the CG from primary site to DR site.

The inputParameters	API Used	Output
All inputs will be fetched from RecoverPoint for VMs protection schema.	POST https://{plugin-server}/api/v1/groups/{groupRep}/copies/{copyId}/failover	If successful: Failover of CG <<cg_name>> completed Successfully. On Failure – Unable to complete the failover. Check the RP4VM console for more errors.

55.3 RP4VMgetCGId

Description: This RAL will fetch the consistency group id which will be used in later RALs of a workflow.

The inputParameters	Output
All inputs will be fetched from RecoverPoint for VMs protection schema.	If successful: Failover of CG <<cg_name>> completed Successfully.



	On Failure – Unable to complete the failover. Check the RP4VM console for more errors.
--	--

55.4 RP4VMGetCopyid

Description: This RAL will fetch the local or remote copy id for the given CG name, which can be used for Test failover , and Failover.

The inputParameters	API Used	Output
All inputs will be fetched from RecoverPoint for VMs protection schema.	API Used - GET https://{plugin-server}/api/v1/groups/{groupRep}/copies	If successful: Copy ID is published as RP4VMCOPYID key value. Pair. On Failure: Unable to fetch the copy id for the given CG name.

55.5 RP4VMRepStatus

Description: This RAL will fetch the replication status from the returned output.

The inputParameters	Output
All inputs will be fetched from RecoverPoint for VMs protection schema.	If successful: Replication Status is Active On Failure: Replication Status is Inactive.

55.6 RP4VMTestCopy

Description: This RAL will run the test copy comm, and , and creates the test VM's for given CG , and copy id.

The inputParameters	API Used	Output



All inputs will be fetched from RecoverPoint for VMs protection schema.	POST https://{plugin-server}/api/v1/groups/{groupRep}/copies/{copyId}/test-copy	If successful: Failover Test VM's has been created for the CG <<cg_name>>. On Failure: Unable to create failover test VM's for the given CG <<cg_name>>.
---	---	---

55.1 RP4VMGetRPAs

Description: This RAL retrieves all managed RecoverPoint for VMs systems.

The inputParameters	API Used	Output
All inputs will be fetched from RecoverPoint for VMs protection schema.	GET https://{plugin-server}/api/v1/rp-systems	On Success – rpsystemid – Unique identifier representing a specific RecoverPoint for VMs system. On Failure – Failed to get SystemId. Check the Kyndryl RO logs for more information.

55.1 RP4VMRecoverProduction

Description: This RAL will Recover Production using existing copies.

The inputParameters	API Used	Output
Input: All inputs will be fetched from RecoverPoint for VMs protection schema.	PUT https://{plugin-server}/api/v1/groups/{groupRep}/copies/{copyId}/recover-production	On Success – Failover of CG <<cg_name>> completed Successfully. On Failure – Unable to complete the failover. Check the RP4VM console for more errors.



55.1 RP4VMGetrpclusters

Description: This RAL retrieves all managed vRPA clusters that are discovered.

The inputParameters	API Used	Output
All inputs will be fetched from RecoverPoint for VMs protection schema..	API Used – GET https://{plugin-server}/api/v1/rp-clusters	On Success – rpSystemId – Unique identified of the RecoverPoint for VMs systems that this cluster belongs to. On Failure – No Cluster found with <cluster_name>. Check the RP4VM console for more errors.

55.1 RP4VMValidateGrpSets

Description: This RAL validates for the existence of GroupSet provided in the RecoverPoint for VMs protection schema..

The inputParameters	API Used	Output
All inputs will be fetched from RecoverPoint for VMs protection schema. ..	GET https://{plugin-server}/api/v1/group-sets	On Success – Group Set name of the protection group set. On Failure - GroupSet Validation Failed

55.1 RP4VMGrpSetTestCopy

Description: This RAL will run the test copy comm, and , and creates the test VM’s for given GroupSet...

The inputParameters	API Used	Output
All inputs will be fetched from RecoverPoint for VMs protection schema. ..	https://{plugin-server}/api/v1/group-sets/{groupSetRep}/test-copy	On Success – Failover Test VM’s has been created for the GroupSet <<groupset_name>>. On Failure – Unable to create failover test VM’s for the given GroupSet <<groupset_name>>.



55.1 RP4VMGrpSetDeleteTestCopy

Description: This RAL will delete the test copy created for the Test failover. which in turn deletes the test VM’s created for given GroupSet....

The inputParameters	API Used	Output
All inputs will be fetched from RecoverPoint for VMs protection schema. ..	DELETE https://{plugin-server}/api/v1/group-sets/{groupSetRep}/test-copy	On Success – Delete Test Copy completed Successfully. On Failure – Unable to delete Test Copy.

55.1 RP4VMGrpSetFailover

Description: This RAL will Failover the GroupSet from primary site to DR site.

The inputParameters	API Used	Output
All inputs will be fetched from RecoverPoint for VMs protection schema..	POST https://{plugin-server}/api/v1/group-sets/{groupSetRep}/failover	On Success – Failover of GroupSet <<groupset_name>> completed Successfully. On Failure – Unable to complete the failover of GroupSet. Check the RP4VM console for more errors



56 HuaweiOceanStor

56.1 HuaweiPauseHyperMetroReplication

Description: This RAL will stop the replication on the Hyper Metro Consistency Group.

Inputs:

UI Input	The inputKey Name	Description
Storage Array IP Address	StorageArrayIPAddress	This field will be fetched from Huawei Storage protection schema.
Port	Port	This field will be fetched from Huawei Storage protection schema.
Credentials Label	CredentialsLabel	This field will be fetched from Huawei Storage protection schema.
Device Id	DeviceId	This field will be fetched from Huawei Storage protection schema.
HyperMetro Consistency Group Id	HyperMetroConsistencyGroupId	This field will be fetched from Huawei Storage protection schema.
Priority Station Type	PRIORITYSTATIONTYPE	The value will be set to '1', and passed with the PUT request.

Outputs: Huawei Pause Hyper Metro replication action does not return any value. If the execution fails, then the error code, and the error description will be displayed in the UI.

Error Codes:

Error Code	Description
Code = 0	Huawei Pause Hyper Metro replication action is successful
Code != 0	Huawei Pause Hyper Metro replication action is failed



56.2 HuaweiUnPauseHyperMetroReplication

Description: This RAL will start the replication on the Hyper Metro Consistency Group.

Inputs:

UI Input	The inputKey Name	Description
Storage Array IP Address	StorageArrayIPAddress	This field will be fetched from Huawei Storage protection schema.
Port	Port	This field will be fetched from Huawei Storage protection schema.
Credentials Label	CredentialsLabel	This field will be fetched from Huawei Storage protection schema.
Device Id	DeviceId	This field will be fetched from Huawei Storage protection schema.
HyperMetro Consistency Group Id	HyperMetroConsistencyGroupId	This field will be fetched from Huawei Storage protection schema.

Outputs: Huawei Pause Hyper Metro replication action does not return any value. If the Api fails, then the error code , and the error description will be displayed in the UI.

Error Codes:

Error Code	Description
Code = 0	Huawei Pause Hyper Metro replication action is successful
Code != 0	Huawei Pause Hyper Metro replication action is failed



56.3 SwitchOverToDR

Description:

This RAL is used to perform primary_secondary switchover for remote replication consistency groups. The below API will be called with HTTP PUT to execute the RAL , and the Consistency group ID will be sent in HTTP Request body as ID.

[https://\\$ip:\\$port/deviceManager/rest/\\${deviceId}/SWITCH_GROUP_ROLE](https://$ip:$port/deviceManager/rest/${deviceId}/SWITCH_GROUP_ROLE)

Inputs:

UI Input	The inputKey Name	Description
IP	StorageArrayIPAddress	Storage Array IP Address
Port	Port	Port Number
CredLabel	credLabel	Credentials Label where it contains username , and password to obtain the iBase Token
DeviceId	DeviceId	Device Id
Consistency Group	HyperMetroConsistencyGroupId	Remote replication consistency group ID.

Outputs:

The output will be in the form of below JSON with error code 0

Response:

```
{
"data": {},
"error": {
```



```
"code": 0,
"description": "0"
}
}
```

56.4 EnableProtectionToPR

Description:

This RAL is used to enable secondary resource protection for a consistency group of remote replications. Enabling secondary resource protection for a consistency group of remote replications.

Inputs:

UI Input	The inputKey Name	Description
IP	StorageArrayIPAddress	Storage Array IP Address
Port	Port	Port Number
CredLabel	credLabel	Credentials Label where it contains username , and password to obtain the iBase Token
DeviceId	DeviceId	Device Id
Consistency Group	HyperMetroConsistencyGroupId	Remote replication consistency group ID.
SECRESACCESS	SECRESACCESS	Read/write setting for a secondary LUN, used to set enabling write protection for the secondary LUN. The value is described as follows: 2: read-only

Outputs:



The output will be displayed with the error code , and description. The 0 (zero) error code indicates Successful execution, , and any non-zero error code indicates failure of RAL execution.

56.5 SplitReplicationFromPR

Description: This RAL is used to split a remote replication consistency group.

Inputs:

UI Input	The inputKey Name	Description
IP	StorageArrayIPAddress	Storage Array IP Address
Port	Port	Port Number
CredLabel	credLabel	Credentials Label where it contains username , and password to obtain the iBase Token
DeviceId	DeviceId	Device Id
Consistency Group	HyperMetroConsistencyGroupId	Remote replication consistency group ID.

Outputs:

The output will be displayed with the error code , and description. The 0 (zero) error code indicates Successful execution , and any non-zero error code indicates failure of RAL execution.

56.6 SyncReplicationUpdatedToPR

Description: This RAL is used to synchronize remote replication consistency groups.

Inputs:



UI Input	The inputKey Name	Description
IP	StorageArrayIPAddress	Storage Array IP Address
Port	Port	Port Number
CredLabel	credLabel	Credentials Label where it contains username , and password to obtain the iBase Token
DeviceId	DeviceId	Device Id
Consistency Group	HyperMetroConsistencyGroupId	Remote replication consistency group ID.

Outputs:

The output will be displayed with the error code , and description. The 0 (zero) error code indicates Successful execution, , and any non-zero error code indicates failure of RAL execution.

56.7 HuaweiPrecheck

Description:

This RAL is used for performing a precheck check the RUNNINGSTATUS is split , and ISDATASYNC is true.

Inputs:

UI Input	The inputKey Name	Description
IP	StorageArrayIPAddress	Storage Array IP Address
Port	Port	Port Number
CredLabel	credLabel	Credentials Label where it contains username , and



		password to obtain the iBase Token
DeviceId	DeviceId	Device Id
Consistency Group	HyperMetroConsistencyGroupId	Remote replication consistency group ID.

Outputs:

RAL passes if RUNNINGSTATUS is split , and ISDATASYNC is true, otherwise RAL fails with the error.

56.8 HuaweiReplicationLUNReadOnly

Description: This RAL is used to make PR LUN readable only.

Inputs:

UI Input	The inputKey Name	Description
IP	StorageArrayIPAddress	Storage Array IP Address
Port	Port	Port Number
CredLabel	credLabel	Credentials Label where it contains username , and password to obtain the iBase Token
DeviceId	DeviceId	Device Id
Consistency Group	ConsistencyGroupId	Remote replication consistency group ID.

Outputs:



The output will be displayed with the error code , and description.

The 0 (zero) error code indicates Successful execution, , and any non-zero error code indicates failure of RAL execution.

56.9 HuaweiReplicationLUNReadWrite

Description: This RAL is used to make DR LUN in a DR Star configuration readable , and writable.

Inputs:

UI Input	The inputKey Name	Description
IP	StorageArrayIPAddress	Storage Array IP Address
Port	Port	Port Number
CredLabel	credLabel	Credentials Label where it contains username , and password to obtain the iBase Token
DeviceId	DeviceId	Device Id
DR Star Id	DR Star Id	DR Star Trios ID for the 3 site Huawei OceanStor replication

Outputs:

The output will be displayed with the error code , and description. The 0 (zero) error code indicates Successful execution , and any non-zero error code indicates failure of RAL execution.

56.10 HuaweiLUNMapping

Description: This RAL is used to map the LUNs to the hosts on the Huawei Storage.



Inputs:

UI Input	The inputKey Name	Description
IP	StorageArrayIPAddress	Storage Array IP Address
Port	Port	Port Number
CredLabel	credLabel	Credentials Label where it contains username , and password to obtain the iBase Token
HostGroupId	hostGroupId	Host Group Id
LunGroupId	lunGroupId	LUN Group Id
PortGroupId	portGroupId	Port Group Id

Outputs:

The output will be displayed with the error code , and description. The 0 (zero) error code indicates Successful execution , and any non-zero error code indicates failure of RAL execution.

56.11 HuaweiOceanStorCreateSnapshot

Description: This RAL is used to take snapshot for the corresponding Consistency Group.



Inputs:

UI Input	The inputKey Name	Description
IP	StorageArrayIPAddress	Storage Array IP Address
Port	Port	Port Number
CredLabel	credLabel	Credentials Label where it contains username , and password to obtain the iBase Token
DeviceId	DeviceId	Device Id
Consistency Group	ConsistencyGroupId	Remote replication consistency group ID
Description	description	Description for Snapshot, if any.
Name	name	Autogenerated with combination of CG ID , and current time stamp.
ParentId	parentId	Parent ID

Outputs:

The output will be displayed with the autogenerated combination of CG ID , and current time stamp , and any non-zero error code indicates failure of RAL execution.

56.12 HuaweiReplicationNormalStatus

Description: This RAL is used to check the running status of the CG to be Normal.

Inputs:



UI Input	The inputKey Name	Description
IP	StorageArrayIPAddress	Storage Array IP Address
Port	Port	Port Number
CredLabel	credLabel	Credentials Label where it contains username , and password to obtain the iBase Token
DeviceId	DeviceId	Device Id
Consistency Group	ConsistencyGroupId	Remote replication consistency group ID.

Outputs:

The output will be displayed with the error code , and description. The 0 (zero) error code indicates Successful execution , and any non-zero error code indicates failure of RAL execution.

56.13 HuaweiHyperMetroReplicationNormalStatus

HuaweiHyperMetroReplicationNormalStatus - This RAL is used to check the running status of the HyperMetro CG to be Normal.

Description: This RAL is used to check the running status of the HyperMetro CG to be Normal.

UI Input	The inputKey Name	Description
IP	StorageArrayIPAddress	Storage Array IP Address
Port	Port	Port Number



CredLabel	credLabel	Credentials Label where it contains username , and password to obtain the iBase Token
DeviceId	DeviceId	Device Id
HyperMetroConsistencyGroupId	HyperMetroConsistencyGroupI d	Remote replication Hypermetro consistency group ID.

Inputs:

Outputs:

The output will be displayed with the error code , and description. The 0 (zero) error code indicates Successful execution , and any non-zero error code indicates failure of RAL execution.

56.14 56.14 HuaweiHyperMetroReplicationPausedStatus

HuaweiHyperMetroReplicationPausedStatus - This RAL is used to check the running status of the HyperMetro CG to be Paused.

Description: This RAL is used to check the running status of the HyperMetro CG to be Paused.

UI Input	The inputKey Name	Description
IP	StorageArrayIPAddress	Storage Array IP Address
Port	Port	Port Number
CredLabel	credLabel	Credentials Label where it contains username , and



		password to obtain the iBase Token
DeviceId	DeviceId	Device Id
HyperMetroConsistency GroupId	HyperMetroConsistency GroupId	Remote replication Hypermetro consistency group ID.

Inputs:

Outputs:

The output will be displayed with the error code , and description. The 0 (zero) error code indicates Successful execution , and any non-zero error code indicates failure of RAL execution.

56.15 56.15 HuaweiResumeHyperMetroReplication

HuaweiResumeHyperMetroReplication- This RAL is used to resume a remote replication HyperMetro CGs.

Description: This RAL is used to resume a remote replication HyperMetro CGs.

UI Input	The inputKey Name	Description
IP	StorageArrayIPAddress	Storage Array IP Address
Port	Port	Port Number
CredLabel	credLabel	Credentials Label where it contains username , and password to obtain the iBase Token



DeviceId	DeviceId	Device Id
HyperMetroConsistency GroupId	HyperMetroConsistency GroupId	Remote replication Hypermetro consistency group ID.

Inputs:

Outputs:

The output will be displayed with the error code , and description. The 0 (zero) error code indicates Successful execution , and any non-zero error code indicates failure of RAL execution.



57 Nutanix

57.1 FetchProtectedAvailabilityZoneURL

Description

This RAL is listed as FetchProtectedAvailabilityZoneURL under Nutanix category.

It is used to fetch protected availability zone UUID for a Particular A recovery Plan.

Inputs

The following is a list of inputs that are required to perform this action.

The inputName	The inputType	Key Value Pair	Optional/M, andatory	Description
Nutanix PR Management service	String	PANVC_MGMT_SVC_NAME = Nutanix PR Management service	M, andatory	It will be auto populated Y RPD Framework
A RECOVERY_PLAN_UUID	String	A RECOVERY_PLAN_UUID = A RECOVERY_PLAN_UUID	M, andatory	It will be auto populated from Groups Key value pairs

Outputs

RAL Gives OUT KEYS as “PROTECTED_AVAILABILITY_ZONE_URL” with ID as ID of Protected availability Zone under A recovery Plan.

57.2 FetchA recoveryAvailabilityZoneURL

Description

This RAL is listed as FetchA recoveryAvailabilityZoneURL under VMware Nutanix category.

It is used to fetch a recovery availability zone UUID for a Particular A recovery Plan.

Inputs

The following is a list of inputs that are required to perform this action.



The inputName	The inputType	Key Value Pair	Optional/ M, andatory	Description
Nutanix DR Management service	String	PANVC_MGMT_SVC_NAME = Nutanix DR Management service	M, andatory	It will be auto populated Y RPD Framework
A RECOVERY_PLAN_UUID	String	A RECOVERY_PLAN_UUID = A RECOVERY_PLAN_UUID	M, andatory	It will be auto populated from Groups Key value pairs

Outputs:

Action fails in The following scenarios:

RAL Gives OUT KEYS as “A RECOVERY_AVAILABILITY_ZONE_URL” with ID as ID of A recovery availability Zone under A recovery Plan

57.3 FetchA recoveryPlanJobUUID

Description

This RAL is listed as FetchA recoveryPlanJobUUID under Nutanix category.

This RAL Fetches A recovery Plan Job UUID of particular A recovery Plan.

The inputName	The inputType	Key Value Pair	Optional/ M, andatory	Description
Nutanix DR Management service	String	PANVC_MGMT_SVC_NAME = Nutanix DR Management service	M, andatory	It will be auto populated By RPD Frmework



TASK_UUID	String	TASK_UUID = TASK_UUID	M, andatory	Will be autopopulated from FetchA recoveryPlanJobUUID RAL
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Outputs:

This RAL will provide A RECOVERY_PLAN_JOB_UUID as outkeys.

57.4 LaunchFOTEVM

Description

This RAL is listed as LaunchFOTEVM under Nutanix category.

It is used to Launch Test VMS on Nutanix DR.

Inputs

The following is a list of inputs that are required to perform this action.

The inputName	The inputType	Key Value Pair	Optional/ M, andatory	Description
Nutanix DR Management service	String	PANVC_MGMT_SVC_NAME = Nutanix DR Management service	M, andatory	It will be autopopulated YRPD Framework
A RECOVERY_PLAN_UUID	String	A RECOVERY_PLAN_UUID = A RECOVERY_PLAN_UUID	M, andatory	It will be autopopulated from Groups Key value pairs
A RECOVERY_PLAN_NAME	String	A RECOVERY_PLAN_NAME= A	M, andatory	It will be autopopulated from Groups



		RECOVERY_PLA N_NAME		Key value pairs
A RECOVERY_AVAILABL ITY_ZONE_URL	String	A RECOVERY_AVA ILABILITY_ZONE _URL= A RECOVERY_AVA IL	M, andatory	It will be autopopulated from FetchA recoveryAvail abilityZone
PROTECTED_AVAILAB LITY_ZONE_URL	String	ABLITY_ZONE_U RL PROTECTED_AV AILABILITY_ZON E_URL= PROTECTED_AV AILABILITY_ZON E_URL	M, andatory	URL RALIt will be autopopulated from FetchProtected AvailabilityZo neURL RAL

Outputs:

This RAL launches FOTE VM on Nutanix DR with TASK_UUID as out keys.

57.5 CleanupFOTEVM

Description

This RAL is listed as CleanupFOTEVM under Nutanix category.

This RAL cleans up FOTE VM.



The inputName	The inputType	Key Value Pair	Optional/ M, andatory	Description
Nutanix DR Management service	String	PANVC_MGMT_SVC_NAME = Nutanix DR Management service	M, andatory	It will be auto populated By RPD Framework
A RECOVERY_PLAN_JOB_UUID	String	A RECOVERY_PLAN_JOB_UUID = A RECOVERY_PLAN_JOB_UUID	M, andatory	Will be auto populated from LaunchFOTEVM RAL

Outputs:

This RAL will cleanup FOTE VM , and gives FOTE_TASK_UUID as outkeys.

57.6 WaitForCompletion

Description

This RAL is listed as WaitForCompletion under Nutanix category.

It waits for completion of FOTE for a Particular A recovery Plan

The inputName	The inputType	Key Value Pair	Optional/ M, andatory	Description
Nutanix DR Management service	String	PANVC_MGMT_SVC_NAME = Nutanix DR Management service	M, andatory	It will be auto populated By RPD Framework



TASK_UUID	String	TASK_UUID = TASK_UUID	M, andatory	It will be auto populated from LaunchFOTEVM RAL
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Outputs:

This RAL will Wait for FOTE to complete , and gives A RECOVERY_PLAN_JOB_STATUS , and A RECOVERY_PLAN_JOB_PERCENT_COMPLETION as outkeys

57.7 WaitForCleanupCompletion

Description

This RAL is listed as WaitForCleanupCompletion under Nutanix category.

This RAL waits for cleanup operation

The inputName	The input Type	Key Value Pair	Optional/ M, andatory	Description
Nutanix DR Management service	String	PANVC_MGMT_SVC_NAME = Nutanix DR Management service	M, andatory	It will be auto populated By RPD Framework
FOTE_TASK_UUID	String	FOTE_TASK_UUID = FOTE_TASK_UUID	M, andatory	Will be auto populated from WaitForCleanupCompletion RAL

Outputs:



This RAL will wait for cleanup of FOTE VMS from Nutanix DR , and gives A RECOVERY_PLAN_JOB_CLEANUP_STATUS , and A RECOVERY_PLAN_JOB_CLEANUP_PERCENT_COMPLETION as outkeys

57.8 FetchA recoveryAvailabilityZoneURL

Description

This RAL is listed as FetchA recoveryAvailabilityZoneURL under VMware Nutanix category.

It is used to fetch a recovery availability zone UUID for a Particular A recovery Plan.

Inputs

The following is a list of inputs that are required to perform this action.

The inputName	The inputType	Key Value Pair	Optional/Mandatory	Description
Nutanix DR Management service	String	PANVC_MGMT_SVC_NAME = Nutanix DR Management service	Mandatory	It will be auto populated by RPD Framework
A RECOVERY_PLAN_UUID	String	A RECOVERY_PLAN_UUID = A RECOVERY_PLAN_UUID	Mandatory	Will be autopopulated from



				Groups Key value pairs
--	--	--	--	------------------------

Outputs:

Action fails in The following scenarios:

RAL Gives OUT KEYS as “A RECOVERY_AVAILABILITY_ZONE_URL” with ID as ID of A recovery availability Zone under A recovery Plan.

57.9 FailOver

Description

This RAL is listed as FailOver under Nutanix category.

It is used to VMS on Nutanix DR in case of PR Prism Central has failed

Inputs

The following is a list of inputs that are required to perform this action.

The inputName	The inputType	Key Value Pair	Optional/ Mandatory	Description
Nutanix DR Management service	String	PANVC_MGMT_SVC_NAME = Nutanix DR Management service	Mandatory	It will be auto populated Y RPD Frmework



A RECOVERY_PLAN_UUID	String	A RECOVERY_PLAN_UUID = A RECOVERY_PLAN_UUID	M, andatory	Will be autopopulated from Groups Key value pairs
A RECOVERY_PLAN_NAME	String	A RECOVERY_PLAN_NAME= A RECOVERY_PLAN_NAME	M, andatory	Will be autopopulated from Groups Key value pairs
A RECOVERY_AVAILABLITY_ZONE_URL	String	A RECOVERY_AVAILABLITY_ZONE_URL= A RECOVERY_AVAILABLITY_ZONE_URL	M, andatory	Will be autopopulated from FetchA recoveryAvailability ZoneURL RAL
PROTECTED_AVAILABLITY_ZONE_UUID	String	PROTECTED_AVAILABLITY_ZONE_UUID	M, andatory	Will be autopopulated from AD2C RAL

Outputs:

This RAL launches FOTE VM on Nutanix DR with TASK_UUID as out keys.

57.10 WaitForFailoverCompletion

Description

This RAL is listed as WaitForCompletion under Nutanix category. It waits for completion of FOTE for a Particular A recovery Plan

The inputName	The inputType	Key Value Pair	Optional / M, andatory	Description
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Nutanix DR Management service	String	PANVC_MGMT_SVC_NAME = Nutanix DR Management service	M, mandatory	It will be auto populated By RPD Framework
FAILOVER_TASK_UUID	String	FAILOVER_TASK_UUID = FAILOVER_TASK_UUID	M, mandatory	Will be autopopulated from FailOver RAL

Outputs:

This RAL will Wait for FAILOVER to complete , and gives A RECOVERY_PLAN_JOB_FAILOVER_STATUS , and A RECOVERY_PLAN_JOB_FAILOVER_PERCENT_COMPLETIONas outkeys



58 Commvault

58.1 Get ClientId from Client Name

Description: Takes client name as the input& returns the client id.

The inputParameters	Output
Client Name	If successful: Returns the client id. If Failure: Workflow execution stops.

58.2 Get Backup Job Details for the Client

Description: Takes client id as the input& fetches the job details.

The inputParameters	Output
ClientId	If successful: Fetches the job details using client id. If Failure: Workflow execution stops.

58.3 Create the A recovery Task

Description: Takes the inputof client, sub-client, backupset name & instance name details along with start & end time for destination as DR VM Name. It creates the a recovery task & returns the jobId.

This jobId we have to poll to check if a recovery status.

The inputParameters	Output
ClientName, SubclientName, BackupSetName, InstanceName, StartTime, EndTime, DR_VM_NAME	If successful: Create the a recovery task & returns the job id. If Failure: Workflow execution stops.

58.4 A recovery Job Poll



Description: Takes jobId as the input to check a recovery status for Failed/Killed/Completed.

The inputParameters	Output
jobId is the input required to poll the status of it.	If successful: Poll the job status every 30 sec. If Failure: Workflow execution stops.



59 EMCUnity

59.1 EMCUnityFailover

Description: This RAL does Failover to DR site in EMC Unity at storage level without sync.

REST Url: https://\$ipAddress:\$port/api/instances/replicationSession/\$sessionId/action/failover.

REST Body: {"sync": "false"}

Inputs: These are the inputkeys required with the valid values for execution.

Input	Description
EMCUnityStorageArrayIPAddress	EMC Unity storage array IP address This field is M, andatory.
EMCUnityPort	EMC Unity storage array port number This field is M, andatory
EMCUnityCredentialsLabel	Credential object created for EMC Unity storage array credentials. This field is M, andatory
EMCUnityReplicationSessionId	EMCUnity Replication Session Id This field is M, andatory

Outputs:

RAL will be success if Failover to DR is done successfully. RAL will fail if any error during failover.

59.2 ExecuteRESTAPI

ExecuteRESTAPI is a generic RAL to execute any REST API operation with added intelligence. Below are the fields that needs to be configured as part of RAL configuration.



1. Configuration -

Field	M, andatory	Description	Example	RAL Keys
Site controller Name/IP	Yes	Site controller Name or IP Address on which the REST API call should execute.	152.224.56.44	siteControllerName
API Type	Yes	Name of the Web Service	Hypergate	apiType
Credential label	Yes	Credential Label name where username , and password will be configured under Discover → Groups Credentials on RO UI. If the web service has a never expired Token, then the end-The user will enter their token under the password field , and username should be 'NA'	HypergateCreds	credentialLabel
API URL	Yes	Complete REST API URL. * If the URL needs to be embedded a return value of previous REST API operation dynamically, the user has to mention that field as 'RETVAl'	https://152.224.56.44/api/v1/dr-instances/mynewwm	apiURL
API Method	Yes	The method that is acceptable by the above URL	GET/POST/PATCH/PUT/DELETE	apiMethod
The inputPayload	*NA	The input payload that needs to be part of the REST call. The input can be in JSON format or a JSON file with a complete path. High likely PUT/POST/PATCH API method requires this field to be configured. To configure the input payload values dynamically, please refer to section 6 below.	JSON format as the input – {'requested_by': 'drm@ibm.com', 'cdir': 'SDM', 'site': 'WDC', 'servers': [{'hostname': 'sdmrp2app'}, {'hostname': 'sdmrp2db'}], 'taskid': '6adad78867', 'task_status': 'SUCCESS' } JSON file as the input - /usr/rouser/sample.json	inputPayload
Field to Fetch	Yes	The field that needs to be extracted from the API response. If the end-The user wants to fetch multiple values from a JSON, configure this field separated by a comma (,) Also, it will assign the values to a unique key in the below format. If there are multiple, it will set multiple keys. RO-<Configured Field to fetch> = <Value from JSON>	task_status For multi values to fetch – name,id,task_status	fieldToFetch



Is Multi Value	Yes	Configure it as true or false to support extracting multiple values from a field containing a JSON array , and concatenating them into a multivalued field. Mark is true if the return JSON is an Array	false	isMultiValue
Success Return Value	*NA	Expected success pattern for the above field. We Support Multiple Success , and Failure conditions (Values to be given with comma separations) If the return value matches this field, then we will return success. If not, we treat it as failed.	SUCCESS	successReturnValue
Failure Return Value	*NA	Expected failure pattern for the above field. We support Multiple Failure conditions (Values to be given in Comma separations)If the return value matches this field, then we will return success. If not, we treat it as failed.	FAILED	failureReturnValue
		This is to configure a custom header field for an API if any. Separate it by comma (,) if you have multiple custom headers	X-HGT-REST-CLIENT: true	CUSTOM_HEADER

Library

- *If the field is not mandatory, update the field as 'NA'
- Configuring RETVAL – If the user has two REST API operations in a workflow from which the first operation output is required as the input for the following REST API operation dynamically, we need to mention the input field as 'RETVAL' in the second operation.

For Example – If the user wants to execute a Failover operation that returns the requestID, the requestID is needed to track the status in the following operation. We need to configure API URLs in the below format

Op-1: API URL - <https://152.224.56.44/api/v1/dr/failover> which returns the requestID, RETVAL key will be set with requestID.

Op-2: API URL –, where RETVAL will be replaced by requestID from the above operation.

- If the RAL configuration for one single operation is done on both UI, and Keys, the precedence will be given to the UI configuration.
- Precedence over UI if both UI, and keys are configured.
- We can Configure multiple Success, and Failure conditions for the returned Value

For Example – If the user wants the Success Condition as Success1 or Success2 or Success3, However, the Failure Condition is Failure1

Then in Success Return Value specify – Success1, Success2, Success3

Then in Failure Return Value specifies – Failure1

This will check for the Success pattern in the output, and Consider success if Either of the three configured Success Values is available in the Output.

2. Advantages

- It is very simple to configure, and reliable.
- It utilizes a curl framework, and is intelligent enough to identify whether the REST operation is successful or not, and captures appropriate messages returned by the REST client.
- It has the intelligence to get the session ID, and utilize it to perform further operations in a workflow.
- It is intelligent enough to fetch the job id, and go in recurrence mode until the job status is completed.
- It can identify whether an operation is successful, or failure based on the job status.

3. Dry Run:

Will validate the

- connectivity to the Web server based on the API URL
- RO Agent connectivity
- Key Values configured or not.
- API methods
- Prints the fields that are configured for an operation.
-

4. Known Limitations –

- REST URL execution will use curl with option -k which allows connections to SSL sites without certs.
- Only JSON input/output REST APIs are supported.
- Execute API RAL & Dryrun execution throws null pointer error if we provide invalid Site controller in RAL properties.



5. Integrating a custom API Type –

On-field, if the end-user wants to integrate a REST API Type that is not out of the box, first understand the login API, and fetch the Authorization header field. Then go to \$EAMROOT/agents on Site Controller, edit file apiType.txt, and add the custom API Type in a newline as mentioned below.

```
<APIType>,<API Authorization Field>:SESTOKEN
```

6. Substituting values in The inputPayload dynamically –

If the end-user wants to substitute the values for fields in the inputJSON configured under the inputPayload Field in UI, he/she needs to configure the value in JSON as RO-<keyName>.

For Example – If the user wants to execute a Failover operation that requires the “id” & “state” values needs to be configured dynamically, first, he needs to configure operation-1 which fetches the values of “ID” & “state” which will be used to substitute in the inputpayload of operation -2 as shown below.

Op-1: API URL – <https://155.224.56.44/api/v1/vms/SRVR1234> which will give you the ‘id’ & ‘state’ values from the returned JSON.

Op-2: API URL - <https://152.224.56.44/api/v1/dr/failover> configure the inputpayload in the UI as shown below, which will be replaced by the values fetched from the above operation dynamically.

```
{ "id": "RO-id", "state": "RO-state" }
```

Let’s assume from the operation-1 if the returned values are id = 1234, state =up, then the inputpayload in the operation -2 will be dynamically changed as { “id”: “1234”, “state”: “up” }, and will execute the configured API accordingly.

7. Supported return JSON outputs , and respective fields to configure –

Example-1: Fetching a value from a simple JSON. From the below example, if an end-user wants to fetch the field ‘name’, configure **fieldToFetch** of above RAL as ‘DBname’, and isMultiValue as “False”

```
{
  "DBname":
  "MyDB", "spfile":
  /home/spfile,
  "isSyncEnabled":
  true
}
```

Result: Returned value will be MyDB

Example – 2: Fetching a value from a nested JSON – From the below example, if the end-user wants to fetch ‘salary’, configure **fieldToFetch** as ‘employee. salary’, and to Fetch ‘LastName’, configure ‘fieldToFetch’ as ‘HyperGate.DB.SID’, and isMultiValue as “False”



{

59.3 EMCUnityLogin

Description

This RAL is listed as EMCUnityLogin under EMCUnity category.

This RAL is used to generate base64 encryption token based on the credentials created under Group > Credentials page.

Inputs

It will fetch the input from the configured protection scheme to generate base64 encryption token.

Outputs:

It creates encryption token, which will be used to login to EMC Unity UI. This RAL action fails in The following scenario:

1. If protection schema is not active.

59.4 EMCUnityGetCSRFToken

Description: This RAL gets the CSRF token , and set the token as a custom header to be used for any POST call in the subsequent REST API .

Rest URL:

https://\$ipAddress:\$port/api/types/replicationSession/instances

Inputs: These are the inputkeys required with the valid values for execution.



The inputParameters (These are the inputkeys required with the valid values for execution)	The inputKey name	Description
EMCUnityStorageArrayIPAddress	ipAddress	EMC Unity storage array IP address. This field is M, andatory
EMCUnityPort	port	EMC Unity storage array port number This field is M, andatory
EMCUnityCredentialsLabel	credLabel	Credential object created for EMC Unity storage array credentials. This field is M, andatory

Outputs:

RAL will be success if the CSRF token is found , and the output Key Value of CUSTOM_HEADER : EMC-CSRF-TOKEN:\$csrftoken will be set.

Error Codes: Error Code - NA

Pre-checks: EMC unity storage array protection schema is active.



60 DB2HADR

60.1 CheckHADRConnectivityStatus

Description: This RAL helps for getting HADR Connect Status using DB2 HADR comm, and.

Comm, and: `exec db2pd -HADR -db $dbname`

Inputs: These are the inputkeys required with the valid values for execution. These the inputkeys will be fetched from Protection schema details.

The inputParameters (These are the inputkeys required with the valid values for execution)	The inputKey name	Description
DB2 Instance Name	db2inst	DB2 Instance name This field is M, andatory
DB2 Database Name	dbname	DB name This field is M, andatory

Outputs: RAL will be success if the comm, and execution returns HADR_CONNECT_STATUS as “CONNECTED”

60.2 Check HADR Role on Primary

Description: This RAL helps for getting HADR Role on Primary server using DB2 HADR comm, and.

Comm, and: `exec db2pd -HADR -db $dbname`

Inputs: These are the inputkeys required with the valid values for execution. These the inputkeys will be fetched from Protection schema details.

The inputParameters (These are the inputkeys required with the valid values for execution)	The inputKey name	Description
DB2 Instance Name	db2inst	DB2 Instance name This field is M, andatory



DB2 Database Name	dbname	DB name
		This field is M, andatory

Outputs:

RAL will be success if the comm, and execution returns HADR_ROLE as “PRIMARY”

Pre-checks:

- DB2 HADR protection schema is active.

60.3 CheckHADRRoleonSecondary

Description: This RAL helps for getting HADR Role on Secondary server using DB2 HADR comm, and.

Comm, and: exec db2pd -HADR -db \$dbname

Inputs: These are the inputkeys required with the valid values for execution. These the inputkeys will be fetched from Protection schema details.

The inputParameters (These are the inputkeys required with the valid values for execution)	The inputKey name	Description
DB2 Instance Name	db2inst	DB2 Instance name This field is M, andatory
DB2 Database Name	dbname	DB name This field is M, andatory

Outputs:

RAL will be success if the comm, and execution returns HADR_ROLE as “ST, ANDBY”

Pre-checks:

- DB2 HADR protection schema is active.



60.4 CheckHADRState

Description: This RAL helps for getting HADR Replication status using DB2 HADR comm, and.

Comm, and:

```
exec db2pd -HADR -db $dbname
```

Inputs: These are the inputkeys required with the valid values for execution. These the inputkeys will be fetched from Protection schema details.

The inputParameters (These are the inputkeys required with the valid values for execution)	The inputKey name	Description
DB2 Instance Name	db2inst	DB2 Instance name This field is M, andatory
DB2 Database Name	dbname	DB name This field is M, andatory

Outputs:

RAL will be success if the comm, and execution returns HADR_STATE as “PEER”

Pre-checks:

- DB2 HADR protection schema is active.

60.5 HADRTakeOver

Description: This RAL performs the DB2 HADR take over to achieve Switchover / Switchback using DB2 HADR comm, and.

Comm, and:

```
exec db2 takeover hadr on db $dbname
```



Inputs: These are the inputkeys required with the valid values for execution. These the inputkeys will be fetched from Protection schema details.

The inputParameters (These are the inputkeys required with the valid values for execution)	The inputKey name	Description
DB2 Instance Name	db2inst	DB2 Instance name This field is M, andatory
DB2 Database Name	dbname	DB name This field is M, andatory

Outputs:

RAL will be success if the comm, and executes successfully without any error.

Pre-checks:

- DB2 HADR protection schema is active.

60.6 VerifyHADRSyncState

Description: This RAL helps for verifying HADR Sync State using DB2 HADR comm, and.

Comm, and: exec db2pd -HADR -db \$dbname

Inputs: These are the inputkeys required with the valid values for execution. These the inputkeys will be fetched from Protection schema details.

The inputParameters (These are the inputkeys required with the valid values for execution)	The inputKey name	Description
DB2 Instance Name	db2inst	DB2 Instance name This field is M, andatory
DB2 Database Name	dbname	DB name



		This field is M, andatory
--	--	---------------------------

Outputs:

RAL will be success if the comm, and execution returns HADR_LOG_GAP(bytes) as "0"

Pre-checks:

- DB2 HADR protection schema is active.

60.7 DB2HADRFailOver

Description: This RAL performs the DB2 HADR take over by force to achieve Failover using DB2 HADR comm, and.

Comm, and: exec db2 takeover hadr on db \$dbname by force

Inputs: These are the inputkeys required with the valid values for execution.

The inputParameters (These are the inputkeys required with the valid values for execution)	The inputKey name	Description
DB2 Instance Name	db2inst	DB2 Instance name This field is M, andatory
DB2 Database Name	dbname	DB name This field is M, andatory

Outputs:

RAL will be success if the comm, and execution returns successful takeover output.

Error Codes:

Error Code	Description
NA	



Pre-checks:

- DB2 HADR protection schema is active.



61 VeritasNetbackup

68.1 VeritasNetbackup_DeleteInstantVM

Description: This RAL will delete the Instant VM on EXSI host server for Veritas Netbackup Solution after the Anomaly scan is completed.

Inputs: This is the inputkey required with the valid values for execution of this RAL.

The inputParameters	The inputKey name	Description
VM_MOUNT_ID	VM_MOUNT_ID	VM_MOUNT_ID This is VM mount id. This field is M, andatory. Ex: aa2718c7-871c-4cd3-9e4a-641a2b5bb0ba

Outputs:

Upon the successful execution, the RAL will delete the VM on VCenter on VMware EXSI host server.

NOTE: There is no content for this REST API response. It will return status code as 204 (204 - No Content).

Error Codes:

Error Code	Description
4014	Invalid instant access mount id.



Pre-checks:

- Netbackup Management service , and Anomaly detection Management service should be active.

68.2 VeritasNetbackup_GetBackupData

Description: This RAL will capture all the snapshot details for the specified window , and sets the backup details required for monitoring for Veritas Netbackup Solution.

Inputs: Inputs: These are the inputkeys required with the valid values for execution - snapshotWindow, VM_NAME

The inputParameters (These are the inputkeys required with the valid values for execution)	The inputKey name	Description
snapshotWindow	snapshotWindow	snapshotWindow The formatted date to get the snapshots. This field is M, andatory.
VM_NAME	DR_VM_NAME	DR_VM_NAME This is the VM which is having the backup snapshots. This field is M, andatory.

Outputs:

Upon the successful execution it will capture the available snapshots details for the specified window , and VM name. It will get the available snapshot lists on successful execution , and an error on failure.

Limitation - This RAL will always be executed on CR, , and it takes all the inputkeys specific to CR.



Error Codes:

Error Code	Description
401	Unauthorized Error
500	Internal Server Error

Pre-checks:

- Netbackup Management service is available/active.

68.3 VeritasNetbackupInstantMount

Description: This RAL do Instant data store level Mounting on EXSI host server for Veritas Netbackup Solution.

Inputs:

The inputParameters (These are the inputkeys required with the valid values for execution)	The inputKey name	Description
BACKUP_ID	BACKUP_ID	BACKUP ID This is VM snapshot id. This field is M, andatory.



The inputParameters (These are the inputkeys required with the valid values for execution)	The inputKey name	Description
VCENTER_IP	VCENTER_IP	VCENTER IP This is VCenter Management IP. This field is Mandatory.
ESXIHOST_IP	ESXIHOST_IP	ESXIHOST IP This is VMware ESXI host IP. This field is Mandatory.
VM_NAME	VM_NAME	VM NAME This is the VM which we are going to restore. This field is Mandatory.

Outputs:

Upon the successful execution It mount the datastore on VCenter on VMware EXSI host server. It will give mount id on successful execution & an error on failure.

Limitation:

This RAL will always be executed on CR.

Error Codes:

Error Code	Description
500	Internal Server Error

Pre-checks:

- VCenter Management service, Anomaly Detection Management service , and Netbackup Management Service should be active.



Privilege Required:

- This RAL needs write access on VCenter , and ESXI host to mount the data store.

68.4 VeritasNetbackupVerifyInstantMount

Description:

This RAL verifies the Instant data store level Mounting done on EXSI host server for Veritas Netbackup Solution.

Inputs:

The inputParameters (These are the inputkeys required with the valid values for execution)	The inputKey name	Description
INSTANT_MOUNTED_VM_ID	INSTANT_MOUNTED_VM_ID	INSTANT_MOUNTED_VM_ID This is Mount Id returned from the Instant Mount RAL

Outputs:

Upon successful execution, it returns the success response with the mount id. This confirms the mounted happened successfully. It will give error if there is an error in instant mounting , and mounting has not happened.

Limitation: This RAL will always be executed on CR, , and it takes all the inputkeys specific to CR.

Error Codes:



Error Code	Description
404	Not Found

Pre-checks:

- VCenter Management service, Anomaly Detection Management service , and Netbackup Management Service should be active.

Privilege Required:

- This RAL needs read access on VCenter, and ESXI host to mount the data store.

68.5 VerifyDeleteInstantMount

Description: This RAL will verify the Instant VM on EXSI host server is deleted for Veritas Netbackup Solution after the Anomaly scan is completed.

Inputs: This is the inputkey required with the valid values for execution of this RAL.

The inputParameters	The inputKey name	Description
VM_MOUNT_ID	VM_MOUNT_ID	VM_MOUNT_ID This is VM mount id. This field is M, andatory. Ex: aa2718c7-871c-4cd3-9e4a-641a2b5bb0ba

Outputs:



Upon the successful execution, the RAL will verify whether the VM is deleted on VCenter of VMware ESXi host server.

Status Code for this REST API response is 404 (404 – Not Found) for success scenario i.e; when there is no VM found on the ESXi host Server.

Error Codes:

Error Code	Description
4014	Invalid instant access mount id.

Pre-checks:

- Netbackup Management service , and Anomaly detection Management service should be active.

61.6 VeritasNetbackupFullVMA recovery

Description: This RAL performs the Full VM A recovery on ESXi host server for Veritas Netbackup Solution.

Inputs:

The inputParameters (These are the inputkeys required with the valid values for execution)	The inputKey name	Description
PANSVR_SNAPSHOT_ID	PANSVR_SNAPSHOT_ID	PANSVR_SNAPSHOT_ID



The inputParameters (These are the inputkeys required with the valid values for execution)	The inputKey name	Description
		This is VM snapshot id. This field is M, andatory.
DR_VM_NAME	DR_VM_NAME	DR_VM_NAME This is the VM name which we are going to restore. This field is M, andatory.
VCENTER_IP	VCENTER_IP	VCENTER_IP This is VCenter Management IP. This field is M, andatory.
PANVC_HOSTNAME	PANVC_HOSTNAME	PANVC_HOSTNAME This is VMware ESXi host name. This field is M, andatory.
PANVC_DC_NAME	PANVC_DC_NAME	PANVC_DC_NAME This is VMware VCenter datacenter name. This field is M, andatory.
PANVC_CLUSTERNAME	PANVC_CLUSTERNAME	PANVC_CLUSTERNAME This is VMware VCenter cluster name. This field is M, andatory.
PANVC_RESOURCE_POOL_NAME	PANVC_RESOURCE_POOL_NAME	PANVC_RESOURCE_POOL_NAME This is VMware VCenter resource pool name. This field is M, andatory.
PANVC_DATASTORE	PANVC_DATASTORE	PANVC_DATASTORE This is VMware VCenter datastore name where VM will be restored. This field is M, andatory.



Outputs:

Upon successful execution, recover the VM on target VCenter environment. It will generate the job ID for a recovery process for further verification.

Limitation:

This RAL will always be executed on CR.

Error Codes:

Error Code	Description
500	Internal Server Error
503	Server busy
400	Bad Request
401	Invalid token
404	Not Found
405	Method not allowed
406	Invalid Accept type
415	Unsupported Media Type

Pre-checks:

- VCenter Management service , and Netbackup Management Service should be active.

Privilege Required:

- This RAL needs write access on VCenter , and ESXI host to recover the VM.



61.7 VerifyFullA recovery

Description: This RAL will verify the Full A recovery VM on EXSI host server for Veritas Netbackup Solution after the Full VM A recovery is completed.

Inputs: Below is the inputkey required with the valid values for execution of this RAL.

The inputParameters	The inputKey name	Description
VM_JOB_ID	VM_JOB_ID	VM_JOB_ID This is VM job id. This field is Mandatory. Ex: 1237

Outputs:

Upon the successful execution, the RAL will verify the state of the VM on VCenter on VMware EXSI host server.

NOTE: The will validate based on the **state** as "**DONE**" from the API response JSON to confirm the Full VM A recovery was success.

Ex: "state": "DONE"

Error Codes:

Error Code	Description



9401	The OData filter criteria is invalid.
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Pre-checks:

- Snapshot selected from the available list of snapshots in CR.
- A recovery vCenter has been discovered , and is available.
- Full VM A recovery is completed , and in "ACTIVE" state.

61.8 InstantMountWithoutNetworkCard

Description: This RAL does the Instant data store level Mounting without NetworkCard on EXSI host server for Veritas Netbackup Solution.

Inputs:

The inputParameters (These are the inputkeys required with the valid values for execution)	The inputKey name	Description
BACKUP_ID	BACKUP_ID	BACKUP ID This is VM snapshot id. This field is M, andatory.
VCENTER_IP	VCENTER_IP	VCENTER IP This is VCenter Management IP. This field is M, andatory.
ESXIHOST_IP	ESXIHOST_IP	ESXIHOST IP This is VMware ESXI host IP. This field is M, andatory.
VM_NAME	VM_NAME	VM NAME This is the VM which we are going to restore. This field is M, andatory.



PANVC_DC_NAME	PANVC_DC_NAME	DATA CENTER NAME This is the DataCenter Name of CR.
PANVC_CLUSTERNAME	PANVC_CLUSTERNAME	CLUSTER NAME This is the Cluster Name of CR.
PANVC_RESOURCE_POOL_NAME	PANVC_RESOURCE_POOL_NAME	RESOURCE POOL NAME This is Resource pool Name where to recover the VM.

Outputs:

Upon the successful execution It mount the datastore on VCenter on VMware EXSI host server. It will generate mount id on successful execution. Else an error message will be displayed on failure.

Limitation:

This RAL will always be executed on CR.

Error Codes:

Error Code	Description
500	Internal Server Error

Pre-checks:

- VCenter Management service, Anomaly Detection Management service , and Netbackup Management Service should be active.



Privilege Required:

This RAL needs write access on VCenter , and ESXI host to mount the data store.

61.9 VerifyDeleteInstantMount_V3

Description: This RAL will verify if the instant VM on EXSI host server is deleted for Veritas Netbackup Solution.

Inputs: This is the inputkey required with the valid values for execution of this RAL.

The inputParameters	The inputKey name	Description
VM_MOUNT_ID	VM_MOUNT_ID	VM_MOUNT_ID This is VM mount id. This field is M, andatory. Ex: aa2718c7-871c-4cd3-9e4a-641a2b5bb0ba

Outputs:

Upon successful execution, the RAL will verify whether the VM is deleted on VCenter of VMware EXSI host server.

Status Code for this REST API response is 404 (404 – Not Found) for success scenario i.e; when there is no VM found on the EXSI host Server.

Error Codes: Observe the error code 4014 is part of the response body.

Error Code	Description
4014	Invalid instant access mount id.



Pre-checks:

- Netbackup Management service, and Anomaly detection Management service should be active.

**61.10FullIA
recoveryWithoutNetworkCard**

Description: This RAL will restore/recover the Fullcopy of VM without Network Card on EXSI host server for Veritas Netbackup Solution.

- It will restore the full copy of VM for the PR solution.
- It will recover the full copy of VM for the CR Solution.

Inputs: Below is the inputkey required with the valid values for execution of this RAL.

The inputNAME	The inputKey name	Optional/ M, andatory	Description
SNAPSHOT ID	PANSVR_SNAPSHOT_ID	M, andatory	This is VM snapshot id.
VM NAME	DR_VM_NAME	M, andatory	This is the VM which we are going to restore.
VCENTER IP	VCENTER_IP	M, andatory	This is the vCenter IP of the corresponding environment (PR/CR)
HOST NAME	PANVC_HOSTNAME	M, andatory	This is the HOST Name.



DataCenter Name	PANVC_DC_NAME	M, mandatory	This is the DataCenter Name.
Cluster Name	PANVC_CLUSTERNAME	M, mandatory	This is the Cluster Name.
RESOURCE POOL NAME	PANVC_RESOURCE_POOL_NAME	M, mandatory	This is Resource pool Name where to recover the VM.
DATASTORE	PANVC_DATASTORE	M, mandatory	This is DataStore Name.
PowerOnAfter A recovery	powerOnAfterA recovery	Optional	This is a Boolean value to select true/false, whether to Power on. after the a recovery process.
OverwriteExistingVM	overwriteExistingVm	Optional	This is a Boolean value. Select true/false from dropdown in UI. This value is to overwrite the copy on the same VM or to create a new copy based on the option selected.

Outputs:

Upon the successful execution, the RAL will overwrite/create a VM on VCenter without NetworkCard option on VMware EXSI host server.

NOTE: Upon the successful execution of this RAL, it will create a VM on VCenter on VMware EXSI host server. It will generate VM mount id on successful execution. Else an error message will be displayed on failure.



Error Codes:

Error Code	Description
404	Not found. The specified client or backup image was not found.
500	Internal Server Error

Pre-checks:

- Snapshot selected from the available list of snapshots in CR.
- A recovery vCenter has been discovered , and is available.



62 IBMPCloud

62.1 ClonedDisksVerifyPercentComplete

Description: This RAL checks for the disk clone task ID percent completion , and return the cloned disks ID, percent complete details.

The inputParameters	Output
CLONED_DISK_TASK_ID	<p>CLONED_DISK_ID, PercentComplete</p> <p>If success: Provides the % completion of the task ID , and returns cloned disk/s ID/s.</p> <p>If Failure: Shows the % completion details , and relevant failure message.</p>

The inputParameters	The inputKey name	Description
VM_JOB_ID	VM_JOB_ID	<p>VM_JOB_ID</p> <p>This is VM job id. This field is M,andatory.</p> <p>Ex: 1237</p>

Outputs:

Upon the successful execution, the RAL will verify the state of the VM on VCenter on VMware EXSI host server.



NOTE: The will validate based on the state as “DONE” from the API response JSON to confirm the Full VM A recovery was success.

For example: "state": "DONE"

Error Codes:

Error Code	Description
9401	The OData filter criteria is invalid.

Pre-checks:

- Snapshot selected from the available list of snapshots in CR.
- A recovery vCenter has been discovered , and is available.
- Full VM A recovery is completed , and in “ACTIVE” state.



63 VeritasNetbackuponAzure

63.1 VerifyFullRecory_V2

Description: VerifyFullA recovery_V2 VM.

The inputParameters	Output
VM_JOB_ID	STATE STATUS

63.2 Azure_GetAssetIdFromAssetName

Description: This RAL gets azure asset id from asset name.

The inputParameters	Output
VM_NAME SOURCE_RSG_NAME	ASSET_ID

63.3 Azure_GetA recoveryPointDetails

Description: This RAL gets a recovery point details for azure workload.



The inputParameters	Output
ASSET_ID	BACKUP_DETAILS_OUTPUT
	PR_TIMESTAMP
	TIMESTAMP_FORMAT
	OUTPUT_TIMESTAMP_FORMAT
	REPLICATION_STATUS
	REPLICATION_DETAILS_DATA_LAG
	REPLICATION_DETAILS_DATA_LAG_UNIT
	REPLICATION_DETAILS_EXIT_STATUS
	REPLICATION_DETAILS_OUTPUT
	REPLICATION_DETAILS_OUTPUT_TYPE

63.4 Azure_FullVMA recovery

Description: This RAL triggers full vm a recovery from selected snapshot.

The inputParameters	Output
PANSVR_SNAPSHOT_ID	VM_JOB_ID
DR_VM_NAME	
COPY_NUMBER	
TARGET_SUBNET_ID	
DESTINATION_CONFIG_ID	
DESTINATION_PATH	
VM_DISK_JSON	

63.5 Azure_GetSloldFromProtectionPolicyName

Description: Get Service level Objective ID from Policy Name.



The inputParameters	Output
PROTECTION_POLICY_NAME	SLO_ID

63.6 Azure_GetSelectionIdFromAssetName

Description: Get Selection id from Assent name.

The inputParameters	Output
VM_NAME SOURCE_RSG_NAME	SELECTION_ID

63.7 Azure_TriggerManualBackup

Description: Trigger Backup.

The inputParameters	Output
SELECTION_ID SLO_ID	VM_JOB_ID

63.8 PreA recoveryCheck

Description: Pre Check before attempting full VM a recovery.

The inputParameters	Output
PANSVR_SNAPSHOT_ID DR_VM_NAME COPY_NUMBER TARGET_SUBNET_ID DESTINATION_CONFIG_ID DESTINATION_PATH VM_DISK_JSON	

63.9 VerifyJobCompletion

Description: Verify Full VM A recovery NBU Job Completion.



.The inputParameters	Output
VM_JOB_ID	STATE STATUS

63.10 AzuregetDestinationConfigId

Description: Gets destination config ID.

.The inputParameters	Output
DESTINATION_CONFIG_NAME	DESTINATION_CONFIG_ID