Site Protection and Recovery

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VMware Validated Design 4.1

VMware Validated Design for Software-Defined Data Center 4.1

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About VMware Validated Design Site Protection and Recovery

VMware Validated Design Site Protection and Recovery provides step-by-step instructions about performing disaster recovery of VMware management components in the software-defined data center (SDDC).

You use VMware Site Recovery Manager and VMware vSphere Replication to perform site protection and recovery of the Cloud Management Platform that consists of vRealize Automation with embedded vRealize Orchestrator, and vRealize Business, and of the vRealize Operations Manager analytics cluster.

The documentation covers both failover to the recovery region and failback to the protected region.

Intended Audience

The *VMware Validated Design Site Protection and Recovery* documentation is intended for cloud architects, infrastructure administrators, cloud administrators and cloud operators who are familiar with and want to use VMware software to deploy in a short time and manage an SDDC that meets the requirements for capacity, scalability, backup and restore, and disaster recovery.

Required VMware Software

The *VMware Validated Design Site Protection and Recovery* documentation is compliant and validated with certain product versions. See *VMware Validated Design Release Notes* for more information about supported product versions.

Verifying the SDDC Operational State

After you failover or failback the components of the Cloud Management Platform or vRealize Operations Manager, verify if they are operating according to design objectives. For more information, see the *VMware Validated Design Operational Verification* documentation.

Failover and Failback Checklist for the SDDC Management Applications 1

Use a checklist to verify that you have satisfied all the requirements to initiate disaster recovery and planned migration of the SDDC management applications and complete the configuration of these applications.

Table 1-1. Checklist for Failover and Failback in a Validated SDDC

Checklist	Tasks
Activation and Assessment	Verify that the disaster failover or failback is really required. For example, an application failure might not be a cause to perform a failover or failback, while an extended region outage is a valid cause. Also, consider business continuity events such as planned building maintenance or the possibility of a hurricane.
Approval	Submit required documentation for approval to the following roles: ■ IT management ■ Business users ■ CTO

Activation Logistics	■ Ensure that all required facilities and personnel are available to start and complete the disaster recovery process.
	■ Verify that Site Recovery Manager is available in the recovery region.
	■ Verify the replication status of the applications.
	■ Verify the state of the NSX Edge in the recovery region.
	  ■ Are the NSX Edges available?
	  ■ Are the IP addresses for VXLAN backed networks correct?
	  ■ Is load balancer on the NSX Edge configured according to the design?
	  ■ Is the firewall on the NSX Edge correctly configured according to the design?

Table 1-1. Checklist for Failover and Failback in a Validated SDDC (Continued)

Checklist	Tasks

Communication, Initiation and Failover or Failback Validation	■ In the case of a planned migration,
	  ■ Notify the users of the outage.
	  ■ At the scheduled time initiate the failover or failback process.
	■ In the case of a disaster recovery failover or failback, notify all stakeholders before you initiate the failover or failback process.
	■ Test the application availability after the completion of failover or failback.
	■ Notify all stakeholders of completed failover or failback.

Configuration After Failover or Failback	In the case of disaster recovery failover or failback, perform the following configuration: ■ Update the backup jobs to include the applications that are now running in Region B. For information about the configured backup jobs, see the *VMware Validated Design Backup and Restore* documentation. ■ Configure the NSX Controllers and the UDLR Control VM to forward events to vRealize Log Insight in the recovery region. ■ Redirect the log data from the failed over or failed back applications to vRealize Log Insight in the recovery region. ■ Complete a post-recovery assessment. For example, note which items worked and which did not work, and identify places for improvement that you can incorporate back in the recovery plan.

Prerequisites for SDDC Failover or Failback

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For faultless failover or failback to the recovery region, verify that your environment satisfies the requirements for an SDDC configuration that is capable of failover or failback.

Table 2-1. Failover or Failback Prerequisites

Prerequisite	Value
Compute	The compute infrastructure in the recovery region must mirror the compute infrastructure in the protected region.
Storage	■ The storage configuration and capacity in the recovery region must mirror the storage configuration and capacity in the protected region. ■ Shared datastore space on the management pod with enough capacity must be available for all VMs of vRealize Automation and vRealize Operations Manager.
External services	Provide the following services in the recovery region. See *External Service Dependencies* from the *Planning and Preparation* documentation. ■ Active Directory ■ DNS ■ NTP ■ SMTP ■ Syslog
Virtual infrastructure	■ ESXi, vCenter Server and NSX for vSphere mirrored in the protected region ■ Site Recovery Manager and vSphere Replication deployed in both regions and paired ■ NSX Edge devices for North-South routing deployed and configured in both regions ■ Universal distributed logical router deployed and configured ■ NSX load balancer deployed and configured in both regions

Failover of the SDDC Management Applications 3

Configure and perform failover of the management applications in the SDDC from the protected region, Region A, to the recovery region, Region B. Faling over these applications keeps the SDDC operational.

You fail over the following management components:

- Analytics cluster of vRealize Operations Manager

  The remote collector nodes of vRealize Operations Manager are not failed over. You deploy a separate pair of remote collectors in each region in the application virtual network that is dedicated to the region.

- Primary components of vRealize Automation with embedded vReaize Orchestrator and vRealize Business

  The vSphere Proxy Agents of vRealize Automation and the vRealize Business data collector are not failed over. You deploy a separate pair of agents and collector in each region in an application isolated network.

Table 3-1. SDDC Management Components That Are Failed Over

Management Component		Failed Over or Failed Back
vRealize Operations Manager	Analytics nodes	X
	Remote collectors	
Cloud Management Platform	vRealize Automation Appliance	X
	IaaS Components	X
	Microsoft SQL Server	X
	vSphere Proxy Agents	
	vRealize Business server	X
	vRealize data collectors	

1 Configure Failover of Management Applications on page 12

Prepare the management applications in the SDDC for failover or planned migration. Replicate application-specific virtual machines by using vSphere Replication and create recovery plans for these virtual machines by using Site Recovery Manager.

2 Test the Failover of Management Applications on page 27

Test the recovery plan for the management applications in the SDDC to identify potential problems during a future failover.

3 Perform Planned Migration of Management Applications on page 29

After you have successfully configured and tested failover of the management applications, you can start a migration process from Region A to Region B. Planned migration of the SDDC management components helps you keep the SDDC operational, for example, when you upgrade the hardware or change the network configuration in Region A.

4 Perform Disaster Recovery of Management Applications on page 31

Prepare networking in Region B and perform failover of Realize Automation, vRealize Orchestrator, vRealize Business, and vRealize Operations Manager to Region B if Region A becomes unavailable in the event of a disaster or if you plan a graceful migration.

5 Post-Failover Configuration of Management Applications on page 40

After failover of the cloud management platform and vRealize Operations Manager, you must perform certain tasks to ensure that applications perform as expected.

Configure Failover of Management Applications

Prepare the management applications in the SDDC for failover or planned migration. Replicate application-specific virtual machines by using vSphere Replication and create recovery plans for these virtual machines by using Site Recovery Manager.

- Configure Failover of vRealize Operations Manager on page 12

  Prepare vRealize Operations Manager for failover by replicating the virtual machines of the analytics cluster and creating a recovery plan for them in Site Recovery Manager.

- Configure Failover of the Cloud Management Platform on page 18

  Prepare vRealize Automation, and vRealize Business for failover. Replicate the virtual machines of the primary vRealize Automation components, and of vRealize Business Server. Create a recovery plan for them in Site Recovery Manager.

Configure Failover of vRealize Operations Manager

Prepare vRealize Operations Manager for failover by replicating the virtual machines of the analytics cluster and creating a recovery plan for them in Site Recovery Manager.

Procedure

1 Replicate the Analytics VMs of vRealize Operations Manager on page 13

Configure the replication of the virtual machines that participate in the analytics cluster of the vRealize Operations Manager to support failover of vRealize Operations Manager to Region B. Replica virtual machines become active upon failover. After you configure the replication, you create a protection group to protect the replicated virtual machines together.

2 Create a Protection Group for vRealize Operations Manager on page 15

After you configure replication for the analytics virtual machines of vRealize Operations Manager, include the virtual machines in a protection group so that Site Recovery Manager protects them together.

3 Create a Recovery Plan for vRealize Operations Manager on page 16

After you create a protection group for the virtual machines of the vRealize Operations Manager analytics cluster, create a recovery plan. You then use this plan to run commands on Site Recovery Manager and the analytics virtual machines, and configure dependencies between the virtual machines.

4 Customize the Recovery Plan for vRealize Operations Manager on page 17

After you create the recovery plan for the vRealize Operations Manager failover, configure the startup priority and the startup and shutdown options for the virtual machines of the analytics cluster. The master node must start first after failover

5 Duplicate the Anti-Affinity Rules for vRealize Operations Manager in Region B on page 18

VM anti-affinity rules do not persist across regions during recovery using Site Recovery Manager. You must duplicate the anti-affinity rules for the analytics virtual machines in Region B so that the rules still apply after failover of vRealize Operations Manager.

Replicate the Analytics VMs of vRealize Operations Manager

Configure the replication of the virtual machines that participate in the analytics cluster of the vRealize Operations Manager to support failover of vRealize Operations Manager to Region B. Replica virtual machines become active upon failover. After you configure the replication, you create a protection group to protect the replicated virtual machines together.

Procedure

1 Log in to the Management vCenter Server by using the vSphere Web Client.

a Open a Web browser and go to `https://sfo01m01vc01.sfo01.rainpole.local/vsphere-client`.

b Log in using the following credentials.

Setting	Value
User name	administrator@vsphere.local
Password	*vsphere_admin_password*

2 From the **Home** menu of the vSphere Web Client, select **VMs and Templates**.

3 Navigate to the `sfo01-m01fd-vrops` VM folder.

Object	Value
vCenter Server	sfo01m01vc01.sfo01.rainpole.local
Data center	sfo01-m01dc
Folder	sfo01-m01fd-vrops

4 On the sfo01-m01fd-vrops page, click the **VMs** tab, click **Virtual Machines** and select the virtual machines of the analytics cluster.

Name	Role
vrops01svr01a	Master node
vrops01svr01b	Master replica node
vrops01svr01c	Data node 1

5 Right-click the VM selection, and select **All vSphere Replication Actions > Configure Replication**.

6 Click **Yes** in the dialog box about performing replication for all objects.

The Configure Replication for 3 Virtual Machines wizard opens.

7 On the Validation page of the Configuration Replication dialog box, wait until the validation completes and click **Next.**

8 On the Replication type page, select **Replicate to a vCenter Server** and click **Next**.

9 On the Target site page, select the **lax01m01vc01.lax01.rainpole.local** vCenter Server in Region B and click **Next**.

10 On the Replication server page, select **Auto-assign vSphere Replication server** and click **Next**.

If the environment contains several replications servers, selecting this option makes use of any of these replication servers.

11 On the Target location page, set the location on the vSAN datastore in Region B to store replicated VM files.

a Click the **Edit for all** link.

b In the Select Target Location dialog box, from the datastore list in the upper part of the dialog box, select the **lax01-m01-vsan01** datastore as the datastore for replicated files.

c In the Select a target location pane, select the **lax01-m01-vsan01** root folder underneath, and click **OK**.

vSphere Replication will create a folder in the root datastore folder for each vRealize Operations Manager VM.

d Back on the Target Location page, click **Next**.

12 On the Replication options page, select only the **Enable network compression for VR data** check box, and click **Next**.

Important

- Do not enable guest OS quiescing because some of the vRealize Operations Manager databases do not support quiescing. Quiescing might result in a cluster failure because virtual disks remain in frozen state for too long.
- Compression requires extra resources. Do not enable it if the hosts are over-utilized.

13 On the Recovery settings page, enter the following settings and click **Next**.

Setting		Value
Recovery Point Objective (RPO)		15 minutes
Point in time instances	Enable	Selected
	Keep **3** instances per day for the last **1** days	

14 On the Ready to complete page, review the configuration and click **Finish.**

15 (Optional) Monitor the replication progress.

a From the **Home** menu, select **Hosts and Clusters**.

b Click the **sfo01m01vc01.sfo01.rainpole.local** vCenter Server object and click the **Monitor** tab.

c On the **Monitor** tab, click the **vSphere Replication** tab and select **Outgoing Replications** to see details about the replication of the analytics nodes of vRealize Operations Manager from this site.

Create a Protection Group for vRealize Operations Manager

After you configure replication for the analytics virtual machines of vRealize Operations Manager, include the virtual machines in a protection group so that Site Recovery Manager protects them together.

Procedure

1 Log in to the Management vCenter Server by using the vSphere Web Client.

   a Open a Web browser and go to **`https://sfo01m01vc01.sfo01.rainpole.local/vsphere-client`**.

   b Log in using the following credentials.

Setting	Value
User name	administrator@vsphere.local
Password	*vsphere_admin_password*

2 From the **Home** menu of the vSphere Web Client, select **Site Recovery**.

3 On the Site Recovery home page, click **Sites** and select the **sfo01m01vc01.sfo01.rainpole.local** protected site.

4 If the Log In Site dialog box appears, re-authenticate by using the **`svc-srm@rainpole.local`** user name and the ***`svc-srm_password`*** password.

   Re-authentication is required if the network connection between Region A and Region B has been interrupted after the last successful authentication.

5 On the **Related Objects** tab, click the **Protection Groups** tab and click **Create Protection Group**.

   The Create Protection Group wizard appears.

6 On the Name and location page, configure the following settings and click **Next**.

Setting	Value
Name	SDDC Operations Management PG
Description	vROps Cluster Protection Group
Site pair	sfo01m01vc01.sfo01.rainpole.local - lax01m01vc01.lax01.rainpole.local

7 On the Protection group type page, configure the following settings and click **Next**.

Setting	Value
Direction of protection	sfo01m01vc01.sfo01.rainpole.local -> lax01m01vc01.lax01.rainpole.local
Protection group type	Individual VMs

8 On the Virtual machines page, select the analytics virtual machines from the list of machines replicated by using vSphere Replication and click **Next**.

   - vrops01svr01a
   - vrops01svr01b
   - vrops01svr01c

9 On the Ready to complete page, review the protection group settings and click **Finish**.

The `SDDC Operations Management PG` protection group appears in the list of protection groups in Site Recovery Manager. You use it to assign a recovery plan all analytics virtual machines together.

Create a Recovery Plan for vRealize Operations Manager

After you create a protection group for the virtual machines of the vRealize Operations Manager analytics cluster, create a recovery plan. You then use this plan to run commands on Site Recovery Manager and the analytics virtual machines, and configure dependencies between the virtual machines.

Procedure

1 Log in to the Management vCenter Server by using the vSphere Web Client.

   a Open a Web browser and go to `https://sfo01m01vc01.sfo01.rainpole.local/vsphere-client`.

   b Log in using the following credentials.

Setting	Value
User name	administrator@vsphere.local
Password	*vsphere_admin_password*

2 From the **Home** menu of the vSphere Web Client, select **Site Recovery**

3 On the Site Recovery home page, click **Sites** and select **sfo01m01vc01.sfo01.rainpole.local**.

4 On the **Related Objects** tab, click the **Recovery Plans** tab and click the **Create Recovery Plan** icon.

   The Create Recovery Plan wizard appears.

5 On the Name and location page, configure the following settings and click **Next**.

Property	Value
Name	SDDC Operations Management RP
Description	Recovery Plan for vROps Cluster
Site pair	sfo01m01vc01.sfo01.rainpole.local - lax01m01vc01.lax01.rainpole.local

6 On the Recovery Site page, select **lax01m01vc01.lax01.rainpole.local** as the recovery site and click **Next**.

7 On the Protection groups page, select the protection group for the recovery plan and click **Next**.

Protection Group Option	Value
Group type	VM protection groups
Protection group	SDDC Operations Management PG

8 On the Test networks page, leave the default values and click **Next**.

   The default option is to automatically create an isolated network.

9 On the Ready to complete page, click **Finish**.

The `SDDC Operations Management RP` recovery plan appears in the list of the recovery plans available in Site Recovery Manager.

Customize the Recovery Plan for vRealize Operations Manager

After you create the recovery plan for the vRealize Operations Manager failover, configure the startup priority and the startup and shutdown options for the virtual machines of the analytics cluster. The master node must start first after failover

Procedure

1 Log in to the Management vCenter Server by using the vSphere Web Client.

   a Open a Web browser and go to **`https://sfo01m01vc01.sfo01.rainpole.local/vsphere-client`**.

   b Log in using the following credentials.

Setting	Value
User name	administrator@vsphere.local
Password	*vsphere_admin_password*

2 From the **Home** menu of the vSphere Web Client, select **Site Recovery**.

3 On the Site Recovery home page, click **Sites** and double-click the **sfo01m01vc01.sfo01.rainpole.local** protected site.

4 On the **Related Objects** tab, click the **Recovery Plans** tab and click the **SDDC Operations Management RP** recovery plan.

5 Change the startup priority of the virtual machine of the master node.

   a On the recovery plan page, click the **Monitor** tab and click the **Recovery Steps** tab.

   b Under Power on priority 3 VMs, right-click **vrops01svr01a** and select **All Priority Actions > 1 > (Highest)**.

   c In the Change Priority dialog box, click **Yes** to confirm.

6 Configure startup and shutdown options for the master node.

   a On the SDDC Operations Management RP page, right-click **vrops01svr01a** and select **Configure Recovery**.

   b In the VM Recovery Properties dialog box, expand **Shutdown Actions** and increase **Shutdown guest OS before power off** to **`10 minutes`**.

   c Expand **Startup Actions**, increase the timeout to **`10 minutes`**, and click **OK**.

7 Repeat Step 5 and Step 6 for the other virtual machines of the analytics cluster.

Virtual Machine	Startup Priority Order	Update Timeout Values
vrops01svr01b	2	No
vrops01svr01c	3	Yes

Duplicate the Anti-Affinity Rules for vRealize Operations Manager in Region B

VM anti-affinity rules do not persist across regions during recovery using Site Recovery Manager. You must duplicate the anti-affinity rules for the analytics virtual machines in Region B so that the rules still apply after failover of vRealize Operations Manager.

Procedure

1 Log in to vCenter Server by using the vSphere Web Client.

a Open a Web browser and go to **`https://lax01m01vc01.lax01.rainpole.local/vsphere-client`**.

b Log in using the following credentials.

Setting	Value
User name	administrator@vsphere.local
Password	*vsphere_admin_password*

2 In the Navigator, click **Hosts and Clusters** and navigate to the lax01m01vc01.lax01.rainpole.local vCenter Server object.

3 Expand the **lax01m01vc01.lax01.rainpole.local > lax01-m01dc** tree and click **lax01-m01-mgmt01**.

4 Click the **Configure** tab, and under Configuration, select **VM/Host Rules**.

5 In the VM/Host Rules list, click **Add** to create a virtual machine anti-affinity rule.

6 In the Create VM/Host Rule dialog box, add a new anti-affinity rule for the virtual machines of the master and master replica nodes, and click **OK**.

Setting	Value
Name	anti-affinity-rule-vropsm
Enable Rule	Selected
Type	Separate Virtual Machines
Members	■ vrops01svr01a ■ vrops01svr01b ■ vrops01svr01c

Configure Failover of the Cloud Management Platform

Prepare vRealize Automation, and vRealize Business for failover. Replicate the virtual machines of the primary vRealize Automation components, and of vRealize Business Server. Create a recovery plan for them in Site Recovery Manager.

Procedure

1 Replicate the Primary VMs of vRealize Automation and vRealize Business on page 19

Enable replication of the virtual machines that build up the primary functionality of the Cloud Management Platform to support failover to Region B. Replica virtual machines become active upon failover. After you configure the replication, you create a protection group to protect the replicated virtual machines together.

2 Create a Protection Group for the Cloud Management Platform on page 21

After you configure replication for the Cloud Management Platform VMs, configure a dedicated protection group so that Site Recovery Manager protects them together.

3 Create a Recovery Plan for the Cloud Management Platform on page 22

After you create a protection group for the cloud management platform VMs, create a recovery plan. You use this plan to configure dependencies between the virtual machines.

4 Customize the Recovery Plan for the Cloud Management Platform on page 23

After you create the recovery plan for the Cloud Management Platform VMs, configure startup priority.

5 Duplicate the Anti-Affinity Rules for vRealize Automation from Region A in Region B on page 24

VM anti-affinity rules do not persist across regions during recovery using Site Recovery Manager. In Region B, you must duplicate the anti-affinity rules for the components of the Cloud Management Platform that are failed over from Region A so that the rules apply after failover.

6 Create VM Groups to Define the Startup Order of the Cloud Management Platform in Region B on page 25

Use VM groups in vSphere HA to define the startup order of the virtual machines of the Cloud Management Platform after they are failed over to Region B.

Replicate the Primary VMs of vRealize Automation and vRealize Business

Enable replication of the virtual machines that build up the primary functionality of the Cloud Management Platform to support failover to Region B. Replica virtual machines become active upon failover. After you configure the replication, you create a protection group to protect the replicated virtual machines together.

Procedure

1 Log in to the Management vCenter Server by using the vSphere Web Client.

a Open a Web browser and go to **`https://sfo01m01vc01.sfo01.rainpole.local/vsphere-client`**.

b Log in using the following credentials.

Setting	Value
User name	administrator@vsphere.local
Password	*vsphere_admin_password*

2 From the **Home** menu of the vSphere Web Client, click **VMs and Templates**.

3 Navigate to the `sfo01-m01fd-vra` VM folder.

Object	Value
vCenter Server	sfo01m01vc01.sfo01.rainpole.local
Data center	sfo01-m01dc
Folder	sfo01-m01fd-vra

4 On the sfo01-m01fd-vra page, click the **VMs** tab, click **Virtual Machines**, and select the virtual machines of vRealize Automation and vRealize Business Server.

vRealize Automation Component	VM Name
IaaS Manager Service and DEM Orchestrator	vra01ims01a.rainpole.local
IaaS Manager Service and DEM Orchestrator	vra01ims01b.rainpole.local
IaaS Web Server	vra01iws01a.rainpole.local
IaaS Web Server	vra01iws01b.rainpole.local
Microsoft SQL Server	vra01mssql01.rainpole.local
vRealize Automation Appliance	vra01svr01a.rainpole.local

vRealize Automation Component	VM Name
vRealize Automation Appliance	vra01svr01b.rainpole.local
vRealize Automation DEM Worker	vra01dem01a.rainpole.local
vRealize Automation DEM Worker	vra01dem01b.rainpole.local
vRealize Business Server	vrb01svr01.rainpole.local

5 Right-click the VM selection, and select **All vSphere Replication Actions > Configure Replication**.

6 Click **Yes** in the dialog box about performing replication for all objects.

The Configure Replication for 10 Virtual Machines wizard opens.

7 On the Validation page, wait until the process completes successfully and click **Next**.

8 On the Replication type page, select **Replicate to a vCenter Server** and click **Next**.

9 On the Target site page, select the **lax01m01vc01.lax01.rainpole.local** vCenter Server in Region B and click **Next**.

10 On the Replication server page, select **Auto-assign vSphere Replication server** and click **Next**.

If the environment contains several replications servers, selecting this option makes use of any of these replication servers.

11 On the Target location page, set the location on the vSAN datastore in Region B to store replicated VM files.

a Click the **Edit for all** link.

b In the Select Target Location dialog box, from the datastore list in the upper part of the dialog box, select **lax01-m01-vsan01** as the datastore for replicated files.

c In the Select a target location pane, select **lax01-m01-vsan01** to select the root folder of the datastore and click **OK**.

vSphere Replication will create a folder in the root datastore folder for each Cloud Management VM.

d On the Target Location page, click **Next**.

12 On the Replication options page, select only the **Enable network compression for VR data** check box and click **Next**.

Important

- Do not enable guest OS quiescing because some of the vRealize Automation and vRealize Orchestrator database do not support quiescing. Quiescing might result in a cluster failure because virtual disks remain in frozen state for too long.
- Compression requires extra resources. Do not enable it if the hosts are over-utilized.

13 On the Recovery settings page, enter the following settings and click **Next**.

Setting		Value
Recovery Point Objective (RPO)		15 minutes
Point in time instances	Enable	Selected
	Keep **3** instances per day for the last **1** days	

14 On the Ready to complete page, review the configuration and click **Finish**.

Replication configuration for the virtual machines from the cloud management platform starts.

15 (Optional) Monitor the replication progress.

a From the **Home** menu of the vSphere Web Client, select **Hosts and Clusters**.

b Click the **sfo01m01vc01.sfo01.rainpole.local** vCenter Server object and click the **Monitor** tab.

c On the **Monitor** tab, click the **vSphere Replication** tab, and select **Outgoing Replications** to see details about the replication of the virtual machines of the Cloud Management Platform from this site.

Create a Protection Group for the Cloud Management Platform

After you configure replication for the Cloud Management Platform VMs, configure a dedicated protection group so that Site Recovery Manager protects them together.

Procedure

1 Log in to the Management vCenter Server by using the vSphere Web Client.

a Open a Web browser and go to **`https://sfo01m01vc01.sfo01.rainpole.local/vsphere-client`**.

b Log in using the following credentials.

Setting	Value
User name	administrator@vsphere.local
Password	*vsphere_admin_password*

2 From the **Home** menu of the vSphere Web Client, select **Site Recovery**.

3 On the Site Recovery home page, click **Sites** and select the **sfo01m01vc01.sfo01.rainpole.local** protected site.

4 If the Log In Site dialog box appears, re-authenticate by using the **`svc-srm@rainpole.local`** user name and the ***`svc-srm_password`*** password.

Re-authentication is required if the network connection between Region A and Region B has been interrupted after the last successful authentication.

5 On the **Related Objects** tab, click the **Protection Groups** tab and click **Create Protection Group**.

The Create Protection Group wizard appears.

6 On the Name and location page, configure the following settings and click **Next**.

Setting	Value
Name	SDDC Cloud Management PG
Description	Cloud Management Protection Group
Site pair	sfo01m01vc01.sfo01.rainpole.local - lax01m01vc01.lax01.rainpole.local

7 On the Protection group type page, configure the following settings and click **Next**.

Setting	Value
Direction of protection	sfo01m01vc01.sfo01.rainpole.local -> lax01m01vc01.lax01.rainpole.local
Protection group type	Individual VMs (vSphere Replication)

8 On the Virtual machines page, select the virtual machines of vRealize Automation and the vRealize Business Server from the list of virtual machines replicated by using vSphere Replication, and click **Next**.

VM Name
vra01ims01a.rainpole.local
vra01ims01b.rainpole.local
vra01iws01a.rainpole.local
vra01iws01b.rainpole.local
vra01mssql01.rainpole.local
vra01svr01a.rainpole.local
vra01svr01b.rainpole.local
vra01dem01a.rainpole.local
vra01dem01b.rainpole.local
vra01bus01.rainpole.local

9 On the Ready to complete page, review the protection group settings and click **Finish**.

The `SDDC Cloud Management PG` protection group appears in the list of protection groups for Site Recovery Manager.

Create a Recovery Plan for the Cloud Management Platform

After you create a protection group for the cloud management platform VMs, create a recovery plan. You use this plan to configure dependencies between the virtual machines.

Procedure

1 Log in to the Management vCenter Server by using the vSphere Web Client.

a Open a Web browser and go to **`https://sfo01m01vc01.sfo01.rainpole.local/vsphere-client`**.

b Log in using the following credentials.

Setting	Value
User name	administrator@vsphere.local
Password	*vsphere_admin_password*

2 From the **Home** menu of the vSphere Web Client, select **Site Recovery**.

3 On the Site Recovery home page, click **Sites** and select **sfo01m01vc01.sfo01.rainpole.local**.

4 On the **Related Objects** tab, click the **Recovery Plans** tab and click the **Create Recovery Plan** icon.

The Create Recovery Plan wizard appears.

5 On the Name and location page, configure the following settings and click **Next**.

Property	Value
Name	SDDC Cloud Management RP
Description	Recovery Plan for Cloud Management
Site pair	sfo01m01vc01.sfo01.rainpole.local - lax01m01vc01.lax01.rainpole.local

6 On the Recovery Site page, select **lax01m01vc01.lax01.rainpole.local** as the recovery site and click **Next**.

7 On the Protection groups page, select the protection group for the recovery plan and click **Next**.

Protection Group Option	Value
Group type	VM protection groups
Protection group	SDDC Cloud Management PG

8 On the Test networks page, leave the default values and click **Next**.

The default option is to automatically create an isolated network.

9 On the Ready to complete page, click **Finish**.

The `SDDC Cloud Management RP` recovery plan appears in the list of the recovery plans available in Site Recovery Manager.

Customize the Recovery Plan for the Cloud Management Platform

After you create the recovery plan for the Cloud Management Platform VMs, configure startup priority.

Procedure

1 Log in to the Management vCenter Server by using the vSphere Web Client.

a Open a Web browser and go to **`https://sfo01m01vc01.sfo01.rainpole.local/vsphere-client`**.

b Log in using the following credentials.

Setting	Value
User name	administrator@vsphere.local
Password	*vsphere_admin_password*

2 From the **Home** menu of the vSphere Web Client, select **Site Recovery**.

3 On the Site Recovery home page, click **Sites** and double-click the **sfo01m01vc01.sfo01.rainpole.local** protected site.

4 On the **Related Objects** tab, click the **Recovery Plans** tab and click the **SDDC Cloud Management RP** recovery plan.

5 On the SDDC Cloud Management RP page, click the **Releated Objects** tab and click **Virtual Machines**.

6 Change the priority of the vra01mssql01.rainpole.local VM.

a On the **Virtual Machines** tab, right-click **vra01mssql01.rainpole.local** and select **All Priority Actions > 1 (Highest)**.

b In the Change Priority dialog box, click **Yes** to confirm.

7 Repeat the previous step to reconfigure the priorities of the following VMs.

VM Name	Priority
vra01svr01a.rainpole.local	2
vra01svr01b.rainpole.local	2
vra01iws01a.rainpole.local	3
vra01iws01b.rainpole.local	3
vra01ims01a.rainpole.local	4
vra01ims01b.rainpole.local	4
vra01dem01a.rainpole.local	5

VM Name	Priority
vra01dem01b.rainpole.local	5
vrb01svr01.rainpole.local	5

8 Configure dependencies between the virtual machines that have the IaaS Web Server role and additional startup delay for the second IaaS Web Server.

   a Right-click the **vra01iws01b.rainpole.local** virtual machine in the recovery plan and select **Configure Recovery**.

   b In the VM Recovery Properties dialog box, expand the **VM Dependencies** section and click **Configure**.

   c Select **vra01iws01a.rainpole.local** and click **OK**.

   d In the VM Recovery Properties dialog box, expand the **Startup Action** section, and under **Additional Delay**, set **Delay** to 5 minutes.

   e Click **OK**.

9 Repeat the step on the vra01ims01b.rainpole.local virtual machine to configure dependencies and additional startup delay after failover for the IaaS Manager Service.

Setting	Value
VM name	vra01ims01b.rainpole.local
VM dependencies	vra01ims01a.rainpole.local
Additional delay	**5** minutes

Duplicate the Anti-Affinity Rules for vRealize Automation from Region A in Region B

VM anti-affinity rules do not persist across regions during recovery using Site Recovery Manager. In Region B, you must duplicate the anti-affinity rules for the components of the Cloud Management Platform that are failed over from Region A so that the rules apply after failover.

Table 3-2. Anti-Affinity Rules for the Cloud Management Platform

Name	Type	Members
anti-affinity-rule-vra-svr	Separate Virtual Machines	vra01svr01a.rainpole.local, vra01svr01b.rainpole.local
anti-affinity-rule-vra-dem	Separate Virtual Machines	vra01dem01a.rainpole.local, vra01dem01b.rainpole.local
anti-affinity-rule-vra-ims	Separate Virtual Machines	vra01ims01a.rainpole.local, vra01ims01b.rainpole.local
anti-affinity-rule-vra-iws	Separate Virtual Machines	vra01iws01a.rainpole.local, vra01iws01b.rainpole.local

Procedure

1 Log in to the Management vCenter Server by using the vSphere Web Client.

   a Open a Web browser and go to `https://lax01m01vc01.lax01.rainpole.local/vsphere-client`.

   b Log in using the following credentials.

Setting	Value
User name	administrator@vsphere.local
Password	*vsphere_admin_password*

2 In the Navigator, click **Hosts and Clusters** and navigate to the lax01m01vc01.lax01.rainpole.local vCenter Server object.

3 Expand the **lax01m01vc01.lax01.rainpole.local > lax01-m01dc** tree and click **lax01-m01-mgmt01**.

4 Click the **Configure** tab, and under Configuration, select **VM/Host Rules**.

5 Under VM/Host Rules, click **Add** to create a virtual machine anti-affinity rule.

6 In the Create VM/Host Rule dialog box, add the first rule for the vRealize Automation Appliances, click **OK**, and click **OK**.

Setting	Value
Name	anti-affinity-rule-vra-svr
Enable rule	Selected
Type	Separate Virtual Machines
Members	■ vra01svr01a.rainpole.local ■ vra01svr01b.rainpole.local

7 Repeat the procedure to configure the remaining anti-affinity rules.

Create VM Groups to Define the Startup Order of the Cloud Management Platform in Region B

Use VM groups in vSphere HA to define the startup order of the virtual machines of the Cloud Management Platform after they are failed over to Region B.

Procedure

1 Log in to the Management vCenter Server by using the vSphere Web Client.

   a Open a Web browser and go to `https://sfo01m01vc01.sfo01.rainpole.local/vsphere-client`.

   b Log in using the following credentials.

Setting	Value
User name	administrator@vsphere.local
Password	*vsphere_admin_password*

2 In the Navigator, select **Host and Clusters** and expand the **lax01m01vc01.lax01.rainpole.local** tree.

3 Expand the **lax01m01vc01.lax01.rainpole.local > lax01-m01dc** tree and click **lax01-m01-mgmt01**.

4 Click the **Configure** tab, and under Configuration, select **VM/Host Groups**.

5 Create a VM group for the vRealize Automation IaaS database.

   a On the VM/Host Groups page, click the **Add** button.

   b In the Create VM/Host Group dialog box, configure the following settings and click **OK**.

Setting	Value
Name	vRealize Automation IaaS Database
Type	VM Group
Members	vra01mssql01.rainpole.local

6 Repeat the step to create the following VM/host groups.

VM/Host Group Name	VM/Host Group Member
vRealize Automation Appliances	■ vra01svr01a.rainpole.local ■ vra01svr01b.rainpole.local
vRealize Automation IaaS Web Servers	■ vra01iws01a.rainpole.local ■ vra01iws01b.rainpole.local
vRealize Automation IaaS Managers	■ vra01ims01a.rainpole.local ■ vra01ims01b.rainpole.local
vRealize Automation IaaS DEM Workers	■ vra01dem01a.rainpole.local ■ vra01dem01b.rainpole.local
vRealize Automation IaaS Proxy Agents	■ lax01ias01a.lax01.rainpole.local ■ lax01ias01b.lax01.rainpole.local
vRealize Business Servers	vrb01svr01.rainpole.local
vRealize Business Remote Collectors	lax01vrbc01.lax01.rainpole.local

7 Create a rule to power on the vRealize Automation IaaS database before the vRealize Automation Appliances.

a On the Configure tab, click **VM/Host Rules** under Configuration.

b In the Create VM/Host Rule dialog , enter **`SDDC Cloud Management Platform 01`** in the **Name** field, ensure that the **Enable Rule** check box is selected, select **Virtual Machines to Virtual Machines** from the **Type** drop down.

c Select **vRealize Automation IaaS Database** for the **First restart VMs in VM group** drop down list.

d Select **vRealize Automation Virtual Appliances** for the **Then restart VMs in VM group** drop down list

e Click **OK** to save the rule.

8 Repeat Step 7 to create the following VM/Host rules so that the virtual machines of the Cloud Management Platform restart in the correct order.

VM/Host Rule Name	First restart VMs in VM group	Then restart VMs in VM group
SDDC Cloud Management Platform 02	vRealize Automation Virtual Appliances	vRealize Automation IaaS Web Servers
SDDC Cloud Management Platform 03	vRealize Automation IaaS Web Servers	vRealize Automation IaaS Managers
SDDC Cloud Management Platform 04	vRealize Automation IaaS Managers	vRealize Automation IaaS DEM Workers
SDDC Cloud Management Platform 05	vRealize Automation IaaS Managers	vRealize Automation IaaS Proxy Agents
SDDC Cloud Management Platform 06	vRealize Automation IaaS Managers	vRealize Business Servers
SDDC Cloud Management Platform 07	vRealize Business Servers	vRealize Business Remote Collectors

Test the Failover of Management Applications

Test the recovery plan for the management applications in the SDDC to identify potential problems during a future failover.

- Test Failover of vRealize Operations Manager on page 27

  Test the recovery plan for vRealize Operations Manager to identify potential problems during a future failover. Site Recovery Manager runs the analytics virtual machines on the test network and on a temporary snapshot of replicated data in Region B.

- Test Failover of the Cloud Management Platform on page 28

  Test the recovery plan for vRealize Automation, vRealize Orchestrator, and vRealize Business to validate the configuration. Site Recovery Manager runs the virtual machines on the test network and on a temporary snapshot of replicated data in Region B.

Test Failover of vRealize Operations Manager

Test the recovery plan for vRealize Operations Manager to identify potential problems during a future failover. Site Recovery Manager runs the analytics virtual machines on the test network and on a temporary snapshot of replicated data in Region B.

Procedure

1 Log in to the Management vCenter Server by using the vSphere Web Client.

  a Open a Web browser and go to **`https://sfo01m01vc01.sfo01.rainpole.local/vsphere-client`**.

  b Log in using the following credentials.

Setting	Value
User name	administrator@vsphere.local
Password	*vsphere_admin_password*

2 From the **Home** menu of the vSphere Web Client, select **Site Recovery**.

3 On the Site Recovery home page, click **Sites** and double-click the **sfo01m01vc01.sfo01.rainpole.local** protected site.

4 If the Log In Site dialog box appears, re-authenticate by using the **`svc-srm@rainpole.local`** user name and the ***`svc-srm_password`*** password.

  Re-authentication is required if the network connection between Region A and Region B has been interrupted after the last successful authentication.

5 On the **Related Objects** tab, click the **Recovery Plans** tab and click the **SDDC Operations Management RP** recovery plan.

6 On the SDDC Operations Management RP page, click the **Monitor** tab and click **Recovery Steps**.

7 Click the **Test Recovery Plan** icon to run a test recovery.

  The Test wizard appears.

8 On the Confirmation options page, leave the **Replicate recent changes to recovery site** check box selected and click **Next**.

9 On the Ready to complete page, click **Finish** to start the test recovery.

  Test failover starts. You can follow the progress on the Recovery Steps page.

10 After the test recovery is complete, click the **Cleanup Recovery Plan** icon to clean up all the created test VMs.

11 On the Confirmation options page of the Cleanup wizard, click **Next**.

12 On the Ready to complete page, click **Finish** to start the clean-up process.

Test Failover of the Cloud Management Platform

Test the recovery plan for vRealize Automation, vRealize Orchestrator, and vRealize Business to validate the configuration. Site Recovery Manager runs the virtual machines on the test network and on a temporary snapshot of replicated data in Region B.

Procedure

1 Log in to the Management vCenter Server by using the vSphere Web Client.

a Open a Web browser and go to **`https://sfo01m01vc01.sfo01.rainpole.local/vsphere-client`**.

b Log in using the following credentials.

Setting	Value
User name	administrator@vsphere.local
Password	*vsphere_admin_password*

2 From the **Home** menu of the vSphere Web Client, select **Site Recovery**.

3 On the Site Recovery home page, click **Sites** and double-click the **sfo01m01vc01.sfo01.rainpole.local** protected site.

4 If the Log In Site dialog box appears, re-authenticate by using the **`svc-srm@rainpole.local`** user name and the ***`svc-srm_password`*** password.

Re-authentication is required if the network connection between Region A and Region B has been interrupted after the last successful authentication.

5 On the **Related Objects** tab, click the **Recovery Plans** tab and click the **SDDC Cloud Management RP** recovery plan.

6 On the SDDC Cloud Management RP page, click the **Monitor** tab and click **Recovery Steps**.

7 Click the **Test Recovery Plan** icon to run a test recovery.

The Test wizard appears.

8 On the Confirmation options page, leave the **Replicate recent changes to recovery site** check box selected and click **Next**.

9 On the Ready to complete page, click **Finish** to start the test recovery.

Test failover starts. You can follow the progress on the Recovery Steps page.

Note Because recovered VMs are using the test network, VMware Tools in vra01svr01a.rainpole.local and vra01svr01b.rainpole.local VMs might not become online in the default timeout. In the recovery plan, increase the startup delay for VMware Tools for these VMs to complete the test. See "Customize the Recovery Plan for the Cloud Management Platform," on page 23.

10 After the test recovery is complete, click the **Cleanup Recovery Plan** icon to clean up all the created test VMs.

11 On the Confirmation options page of the Cleanup wizard, click **Next**.

12 On the Ready to complete page, click **Finish** to start the clean-up process.

Perform Planned Migration of Management Applications

After you have successfully configured and tested failover of the management applications, you can start a migration process from Region A to Region B. Planned migration of the SDDC management components helps you keep the SDDC operational, for example, when you upgrade the hardware or change the network configuration in Region A.

- Initiate a Planned Migration of vRealize Operations Manager on page 29

  You can run a recovery plan under planned circumstances to migrate the virtual machines of the analytics cluster of vRealize Operations Manager from Region A to Region B. You can also run a recovery plan under unplanned circumstances if an unforeseen event that might result in data loss occurs in Region A.

- Initiate a Planned Migration of the Cloud Management Platform on page 30

  You can run a recovery plan under planned circumstances to migrate the virtual machines of vRealize Automation and vRealize Business from Region A to Region B. You can also run a recovery plan under unplanned circumstances if an unforeseen event that might result in data loss occurs in Region A.

Initiate a Planned Migration of vRealize Operations Manager

You can run a recovery plan under planned circumstances to migrate the virtual machines of the analytics cluster of vRealize Operations Manager from Region A to Region B. You can also run a recovery plan under unplanned circumstances if an unforeseen event that might result in data loss occurs in Region A.

Procedure

1 Log in to the Management vCenter Server by using the vSphere Web Client.

  a Open a Web browser and go to `https://sfo01m01vc01.sfo01.rainpole.local/vsphere-client`.

  b Log in using the following credentials.

Setting	Value
User name	administrator@vsphere.local
Password	*vsphere_admin_password*

2 From the **Home** menu of the vSphere Web Client, select **Site Recovery**.

3 On the Site Recovery home page, click **Sites** and double-click the **sfo01m01vc01.sfo01.rainpole.local** protected site.

4 On the **Related Objects** tab, click the **Recovery Plans** tab and click the **SDDC Operations Management RP** recovery plan.

5 On the SDDC Operations Management RP page, click the **Monitor** tab and click **Recovery Steps**.

6 Click the **Run Recovery Plan** icon to run the recovery plan and initiate the failover of the analytics cluster.

  The Recovery wizard appears.

7 On the Confirmation options page, configure the following settings and click **Next**.

Confirmation Option	Value
I understand that this process will permanently alter the virtual machines and infrastructure of both the protected and recovery datacenters	Selected
Recovery type	Planned migration

8 On the Ready to complete page, click **Finish** to initiate vRealize Operations Manager failover.

What to do next

1 Verify that vRealize Operations Manager is up and operational after failover. See *Validate vRealize Operations Manager* in the *VMware Validated Design Operational Verification* documentation.

2 Prepare vRealize Operations Manager for failback by reprotecting the virtual machines of the analytics cluster in Site Recovery Manager. See "Reprotect vRealize Operations Manager," on page 72.

Initiate a Planned Migration of the Cloud Management Platform

You can run a recovery plan under planned circumstances to migrate the virtual machines of vRealize Automation and vRealize Business from Region A to Region B. You can also run a recovery plan under unplanned circumstances if an unforeseen event that might result in data loss occurs in Region A.

Procedure

1 Log in to the Management vCenter Server by using the vSphere Web Client.

a Open a Web browser and go to **`https://sfo01m01vc01.sfo01.rainpole.local/vsphere-client`**.

b Log in using the following credentials.

Setting	Value
User name	administrator@vsphere.local
Password	*vsphere_admin_password*

2 From the **Home** menu of the vSphere Web Client, select **Site Recovery**.

3 On the Site Recovery home page, click **Sites** and double-click the **sfo01m01vc01.sfo01.rainpole.local** protected site.

4 On the **Related Objects** tab, click the **Recovery Plans** tab and click the **SDDC Cloud Management RP** recovery plan.

5 On the SDDC Cloud Management RP page, click the **Monitor** tab and click **Recovery Steps**.

6 Click the **Run Recovery Plan** icon to run the recovery plan and initiate the failover of the Cloud Management Platform.

The Recovery wizard appears.

7 On the Confirmation options page, configure the following settings and click **Next**.

Confirmation Option	Value
I understand that this process will permanently alter the virtual machines and infrastructure of both the protected and recovery datacenters	Selected
Recovery type	Planned migration

8 On the Ready to complete page, click **Finish** to initiate failover of the cloud management platform.

What to do next

1 Verify that vRealize Automation and vRealize Business VMs are up and is operational. See *Validate the Cloud Management Platform* in the*VMware Validated Design Operational Verification* documentation.

2 Prepare vRealize Automation and vRealize Business for failback by reprotecting their virtual machines in Site Recovery Manager. See "Reprotect the Cloud Management Platform," on page 73.

Perform Disaster Recovery of Management Applications

Prepare networking in Region B and perform failover of Realize Automation, vRealize Orchestrator, vRealize Business, and vRealize Operations Manager to Region B if Region A becomes unavailable in the event of a disaster or if you plan a graceful migration.

Procedure

1 Reconfigure the NSX Instance for the Management Cluster in Region B on page 32

In the event of a site failure, when Region A becomes unavailable, prepare the network layer in Region B for failover of management applications. Change the role of the NSX Manager to primary, deploy universal controller cluster, and synchronize the universal controller cluster configuration.

2 Recover the Control VM of the Universal Distributed Logical Router in Region B on page 34

Because of the failure of Region A, dynamic routing in Region B is not available. Deploy a Control VM for the universal distributed logical router sfo01m01udlr01 in Region B to recover dynamic routing in the environment. You then configure the recovered Control VM to provide dynamic routing for the SDDC management applications that are failed over.

3 Reconfigure the Universal Distributed Logical Router and NSX Edges for Dynamic Routing in Region B on page 35

Configure the universal distributed logical router sfo01m01udlr01 and NSX Edges lax01m01esg01 and lax01m01esg02 to support dynamic routing in Region B before you start disaster recovery from Region A. In this way, the management components of the SDDC will continue to communicate using optimal routes in a fault-tolerant network.

4 Verify Establishment of BGP for the Universal Distributed Logical Router in Region B on page 37

Verify that the UDLR for the management applications is successfully peering, and that BGP routing has been established in Region B. After you perform disaster recovery, they can continue communicating to keep SDDC operational.

5 Enable Network Connectivity for the NSX Load Balancer in Region B on page 38

Enable the network connectivity on lax01m01lb01 load balancer to support high-availability and distribute the network traffic load for vRealize Operations Manager and the Cloud Management Platform after disaster recovery to Region B.

6 Initiate Disaster Recovery of vRealize Operations Manager in Region B on page 38

If a disaster event occurs in Region A, initiate disaster recovery of vRealize Operations Manager to fail it over to Region B and keep the monitoring functionality of the SDDC running.

7 Initiate Disaster Recovery of the Cloud Management Platform in Region B on page 39

In the event of a disaster in Region A, initiate disaster recovery of the vRealize Automation and vRealize Business components to fail them over to Region B and keep the workload provisioning functionality of the SDDC available.

Reconfigure the NSX Instance for the Management Cluster in Region B

In the event of a site failure, when Region A becomes unavailable, prepare the network layer in Region B for failover of management applications. Change the role of the NSX Manager to primary, deploy universal controller cluster, and synchronize the universal controller cluster configuration.

Procedure

1 Log in to vCenter Server by using the vSphere Web Client.

a Open a Web browser and go to `https://lax01m01vc01.lax01.rainpole.local/vsphere-client`.

b Log in using the following credentials.

Setting	Value
User name	administrator@vsphere.local
Password	*vsphere_admin_password*

2 Promote the NSX Manager for the management cluster in Region B to the primary role.

You must first disconnect the NSX Manager for the management cluster in Region B from the Primary NSX Manager in Region A.

a From the **Home** menu, select **Networking & Security**.

b In the Navigator, click **Installation**.

c On the **Management** tab, select the **172.17.11.65** instance.

d Click the **Actions** menu and click **Disconnect from Primary NSX Manager**.

e In the Disconnect from Primary NSX Manager confirmation dialog box, click **Yes**.

The NSX Manager gets the Transit role.

f On the **Management** tab, select the **172.17.11.65** instance again.

g Click **Actions** and select **Assign Primary Role**.

h In the Assign Primary Role confirmation dialog box, click **Yes**.

3 Configure an IP pool for the new universal controller cluster.

a In the Navigator, click **NSX Managers**.

b Under NSX Managers, click the **172.17.11.65** instance.

c On the **Manage** tab, click **Grouping Objects**, click **IP Pools**, and click the **Add New IP Pool** icon.

d In the Add Static IP Pool dialog box, enter the following settings, and click **OK**.

Setting	Value
Name	lax01-mgmt01-nsxc01
Gateway	172.17.11.253
Prefix Length	24
Primary DNS	172.17.11.5
Secondary DNS	172.17.11.4
DNS Suffix	lax01.rainpole.local
Static IP Pool	172.17.11.118-172.17.11.120

4 Deploy the universal controller cluster in Region B.

a In the Navigator, click **Networking & Security** and click **Installation**.

b Under NSX Controller nodes, click the **Add** icon to deploy three NSX Controller nodes with the same configuration.

c In the Add Controller dialog box, enter the following settings and click **OK**.

You configure a password only during the deployment of the first controller. The other controllers use the same password.

Setting	Value
Name	■ lax01m01nsxc01 for controller 1 ■ lax01m01nsxc02 for controller 2 ■ lax01m01nsxc03 for controller 3
NSX Manager	172.17.11.65
Datacenter	lax01-m01dc
Cluster/Resource Pool	lax01-m01-mgmt01
Datastore	lax01-m01-vsan01
Connected To	lax01-m01-vds01-management
IP Pool	lax01-mgmt01-nsxc01
Password	*mgmtnsx_controllers_password*
Confirm Password	*mgmtnsx_controllers_password*

d After the **Status** of the controller node changes to `Connected`, deploy the remaining two NSX Controller nodes lax01m01nsxc02 and lax01m01nsxc03.

Wait until the current deployment is finished before you start the next one.

5 Configure DRS affinity rules for the deployed NSX Controller nodes.

a From the **Home** menu of the vSphere Web Client, select **Hosts and Clusters**.

b Expand the **lax01m01vc01.lax01.rainpole.local > lax01-m01dc** and click the **sfo01-m01-mgmt01**. cluster

c Click the **Configure** tab, under Configuration, click **VM/Host Rules**, and click **Add**.

d In the lax01-m01-mgmt01 - Create VM/Host Rule dialog box, enter the following settings and click **OK**

Setting	Value
Name	anti-affinity-rule-nsxc
Enable rule	Selected
Type	Separate Virtual Machines
Members	■ lax01m01nsxc01 ■ lax01m01nsxc02 ■ lax01m01nsxc03

6 Use the Update Controller State mechanism on the NSX Manager to synchronize the state of the newly deployed controllers.

Update Controller State pushes the current VXLAN and universal distributed logical router configuration from NSX Manager to the controller cluster.

a From the **Home** menu of the vSphere Web Client, select **Networking & Security**.

b In the Navigator, click **Installation**.

c On the **Management** tab, select the **172.17.11.65** instance.

d From the **Actions** menu, select **Update Controller State**.

e In the Update Controller State confirmation dialog box, click **Yes**.

Recover the Control VM of the Universal Distributed Logical Router in Region B

Because of the failure of Region A, dynamic routing in Region B is not available. Deploy a Control VM for the universal distributed logical router sfo01m01udlr01 in Region B to recover dynamic routing in the environment. You then configure the recovered Control VM to provide dynamic routing for the SDDC management applications that are failed over.

Procedure

1 Log in to vCenter Server by using the vSphere Web Client.

a Open a Web browser and go to `https://lax01m01vc01.lax01.rainpole.local/vsphere-client`.

b Log in using the following credentials.

Setting	Value
User name	administrator@vsphere.local
Password	*vsphere_admin_password*

2 From the **Home** menu of the vSphere Web Client, click **Networking & Security**.

3 In the Navigator, click **NSX Edges**.

4 Select **172.17.11.65** from the **NSX Manager** drop-down menu.

5 Double-click **sfo01m01udlr01**.

6 Re-deploy the Control VM of the universal distributed logical router and enable high availability.

a Click the **Manage** tab and click **Settings**.

b Select **Configuration**, and under Logical Router Appliances click the **Add** icon.

c In the Add NSX Edge Appliance dialog box, enter the following settings and click **OK**.

Setting	Value
Data center	lax01-m01dc
Cluster/Resource Pool	lax01-m01-mgmt01
Datastore	lax01-m01-vsan01

d Click the **Add** icon to deploy another NSX Edge device with the same configuration.

7 Configure high availability for the Control VM.

a On the **Configuration** page for sfo01m01udlr01, click **Change** under HA Configuration, configure the following settings, and click **OK**.

Setting	Value
HA Status	Enable
Connected To	lax01-m01-vds01-management
Enable Logging	Selected

b In the Change HA configuration dialog box, click **Yes**.

8 Configure the CLI Credentials for the Control VM.

a In the Navigator, click **NSX Edges**.

b Select **172.17.11.65** from the **NSX Manager** drop-down menu.

c Right-click **sfo01m01udlr01** and select **Change CLI Credentials**.

d In the Change CLI Credentials dialog box, configure the following settings and click **OK**.

Setting	Value
User Name	admin
Password	*udlr_admin_password*
Enable SSH access	Selected

Reconfigure the Universal Distributed Logical Router and NSX Edges for Dynamic Routing in Region B

Configure the universal distributed logical router sfo01m01udlr01 and NSX Edges lax01m01esg01 and lax01m01esg02 to support dynamic routing in Region B before you start disaster recovery from Region A. In this way, the management components of the SDDC will continue to communicate using optimal routes in a fault-tolerant network.

Procedure

1 Log in to vCenter Server by using the vSphere Web Client.

a Open a Web browser and go to `https://lax01m01vc01.lax01.rainpole.local/vsphere-client`.

b Log in using the following credentials.

Setting	Value
User name	administrator@vsphere.local
Password	*vsphere_admin_password*

2 From the **Home** menu of the vSphere Web Client, select **Networking & Security** .

3 In the Navigator, click **NSX Edges**.

4 Select **172.17.11.65** from the **NSX Manager** drop-down menu.

5 Verify the routing configuration for the universal distributed logical router.

a Double-click **sfo01m01udlr01**.

b Click the **Manage** tab, click **Routing** and verify the following settings.

Setting	Value
Global Configuration > ECMP	Enabled
Dynamic Routing Configuration > Router ID	192.168.10.3

6 On the left side, select **BGP** to verify the protocol settings and configure BGP peering between the UDLR device and the NSX Edge devices for the ECMP-enabled North/South routing in Region A.

a On the BGP page, verify the following settings.

Setting	Value
Status	Enabled
Local AS	65003
Graceful Restart	Enabled

b Select **192.168.10.50** which represents the connection settings for the lax01m01esg01 neighbor and click **Edit** icon.

c In the Edit Neighbour dialog box, update the **Weight** value to **60**, enter the BGP password that was configured during the initial setup of the UDLR, and click **OK**.

Setting	lax01m01esg01 Value	lax01m01esg02 Value
IP Address	192.168.10.50	192.168.10.51
Forwarding Address	192.168.10.3	192.168.10.3
Protocol Address	192.168.10.4	192.168.10.4
Remote AS	65003	65003
Weight	**60**	**60**
Keep Alive Time	1	1
Hold Down Time	3	3
Password	***BGP_password***	***BGP_password***

d On the BGP page, repeat the steps for the **192.168.10.51** neighbor which represents the lax01m01esg02 device.

e Click **Publish Changes**.

7 On the left side, select **Route Redistribution** to verify redistribution status.

Category	Setting	Value
Route Redistribution Status	OSPF	Deselected
	BGP	Selected
Route Redistribution table	Learner	BGP
	From	Connected
	Prefix	Any
	Action	Permit

8 Reconfigure the routing and weight value of lax01m01esg01 and lax01m01esg02 edges.

a In the Navigator, click **NSX Edges**.

b Select **172.17.11.65** from the **NSX Manager** drop-down menu.

c Double-click **lax01m01esg01** to open its configuration interface.

d Click the **Manage** tab and click the **Routing** tab.

e On the left side, select **BGP**, select the **192.168.10.4** neighbor under Neighbors, and click the **Edit** icon.

f In the Edit Neighbour dialog box, change the **Weight** value to **`60`** and click **OK**.

g Click **Publish Changes**.

h Repeat the step for the lax01m01esg02 edge.

Verify Establishment of BGP for the Universal Distributed Logical Router in Region B

Verify that the UDLR for the management applications is successfully peering, and that BGP routing has been established in Region B. After you perform disaster recovery, they can continue communicating to keep SDDC operational.

Procedure

1 Log in to the UDLR virtual appliance by using a Secure Shell (SSH) client.

a Open an SSH connection to **`sfo01m01udlr01`**.

b Log in using the following credentials.

Setting	Value
User name	admin
Password	*udlr_admin_password*

2 Verify that the UDLR can peer with the ECMP-enabled NSX Edge services gateways.

a Run the `show ip bgp neighbors` command to display information about the BGP and TCP connections to the UDLR neighbors.

b In the command output, verify that the BGP state is `Established, up` for 192.168.10.50 (lax01m01esg01) and 192.168.10.51 (lax01m01esg02).

3 Verify that the UDLR receives routes by using BGP and that multiple routes are established to BGP-learned networks.

a Run the `show ip route` command.

b In the command output, verify that the routes to the networks are marked with the letter B and several routes to each adjacent network exist.

The letter B in front of each route indicates that the route is established over BGP.

Enable Network Connectivity for the NSX Load Balancer in Region B

Enable the network connectivity on lax01m01lb01 load balancer to support high-availability and distribute the network traffic load for vRealize Operations Manager and the Cloud Management Platform after disaster recovery to Region B.

Procedure

1 Log in to vCenter Server by using the vSphere Web Client.

   a Open a Web browser and go to `https://lax01m01vc01.lax01.rainpole.local/vsphere-client`.

   b Log in using the following credentials.

Setting	Value
User name	administrator@vsphere.local
Password	*vsphere_admin_password*

2 From the **Home** menu of the vSphere Web Client, select **Networking & Security**.

3 In the Navigator, click **NSX Edges**.

4 Select **172.17.11.65** from the **NSX Manager** drop-down menu.

5 Double-click the **lax01m01lb01** device.

6 Click the **Manage** tab and click the **Settings** tab.

7 Click **Interfaces**, select the **OneArmLB** vNIC, and click **Edit**.

8 In the Edit NSX Edge Interface dialog box, set **Connectivity Status** to `Connected` and click **OK**.

Initiate Disaster Recovery of vRealize Operations Manager in Region B

If a disaster event occurs in Region A, initiate disaster recovery of vRealize Operations Manager to fail it over to Region B and keep the monitoring functionality of the SDDC running.

Procedure

1 Log in to vCenter Server by using the vSphere Web Client.

   a Open a Web browser and go to `https://lax01m01vc01.lax01.rainpole.local/vsphere-client`.

   b Log in using the following credentials.

Setting	Value
User name	administrator@vsphere.local
Password	*vsphere_admin_password*

2 From the **Home** menu of the vSphere Web Client, select **Site Recovery**.

3 On the Site Recovery home page, click **Sites** and double-click the **lax01m01vc01.lax01.rainpole.local** protected site.

4 On the **Related Objects** tab, click the **Recovery Plans** tab and click the **SDDC Operations Management RP** recovery plan.

5 On the SDDC Operations Management RP page, click the **Monitor** tab and click **Recovery Steps**.

6 Click the **Run Recovery Plan** icon to run the recovery plan and initiate the failover of the analytics cluster.

The Recovery wizard appears.

7 On the Confirmation options page of the Recovery wizard, configure the following settings and click **Next**.

Setting	Value
I understand that this process will permanently alter the virtual machines and infrastructure of both the protected and recovery datacenters	Selected
Recovery type	Disaster recovery

8 On the Ready to complete page, click **Finish** to initiate vRealize Operations Manager failover.

Site Recovery Manager runs the recovery plan. After disaster recovery, the Plan status of the recovery plan changes to `Disaster recovery complete`.

What to do next

1 Verify that vRealize Operations Manager is up and functions flawlessly after failover. See *Validate vRealize Operations Manager* in the*VMware Validated Design Operational Verification* documentation.

2 Prepare vRealize Operations Manager for failback by reprotecting the virtual machines of the analytics cluster in Site Recovery Manager.See "Reprotect vRealize Operations Manager," on page 72.

Initiate Disaster Recovery of the Cloud Management Platform in Region B

In the event of a disaster in Region A, initiate disaster recovery of the vRealize Automation and vRealize Business components to fail them over to Region B and keep the workload provisioning functionality of the SDDC available.

Procedure

1 Log in to vCenter Server by using the vSphere Web Client.

a Open a Web browser and go to **`https://lax01m01vc01.lax01.rainpole.local/vsphere-client`**.

b Log in using the following credentials.

Setting	Value
User name	administrator@vsphere.local
Password	*vsphere_admin_password*

2 From the **Home** menu of the vSphere Web Client, select **Site Recovery**.

3 On the Site Recovery home page, click **Sites** and double-click the **lax01m01vc01.lax01.rainpole.local** protected site.

4 On the **Related Objects** tab, click the **Recovery Plans** tab and click the **SDDC Cloud Management RP** recovery plan.

5 On the SDDC Operations Management RP page, click the **Monitor** tab and click **Recovery Steps**.

6 Click the **Run Recovery Plan** icon to run the recovery plan and initiate the failover of the cloud management platform.

7 On the Confirmation options page of the Recovery wizard, configure the following settings and click **Next**.

Confirmation Option	Value
I understand that this process will permanently alter the virtual machinesand infrastructure of both the protected and recovery datacenters	Selected
Recovery type	Disaster recovery

8 On the Ready to complete page, click **Finish** to initiate the failover of the cloud management platform.

Site Recovery Manager runs the recovery plan. After disaster recovery, the Plan status of the recovery plan changes to `Disaster recovery complete`.

What to do next

1 Verify that vRealize Automation and vRealize Business VMs are up and operational after failover. See *Validate the Cloud Management Platform* in the*VMware Validated Design Operational Verification* documentation.

2 Prepare vRealize Automation and vRealize Business for failback by reprotecting their virtual machines in Site Recovery Manager. See "Reprotect the Cloud Management Platform," on page 73.

Post-Failover Configuration of Management Applications

After failover of the cloud management platform and vRealize Operations Manager, you must perform certain tasks to ensure that applications perform as expected.

Procedure

1 Configure the NSX Controllers and UDLR Control VM to Forward Events to vRealize Log Insight in Region B on page 40

Configure the NSX Controllers and UDLR Control VM instances for the management cluster to forward log information to vRealize Log Insight in Region B. Use the NSX REST API to configure the NSX Controllers. To enable log forwarding, you can use a REST client, such as the Postman application for Google Chrome.

2 Update the vRealize Log Insight Logging Address after Failover on page 45

After you fail over the management applications in the SDDC to Region B, update the address configured on the management applications for vRealize Log Insight. All management applications are still configured to send logs to the vRealize Log Insight instance in Region A.

3 Reconfigure the NSX Instance for the Management Cluster in Region A after Failover on page 45

After Region A comes back online, you must perform additional configuration of the networking layer to avoid conflicts.

Configure the NSX Controllers and UDLR Control VM to Forward Events to vRealize Log Insight in Region B

Configure the NSX Controllers and UDLR Control VM instances for the management cluster to forward log information to vRealize Log Insight in Region B. Use the NSX REST API to configure the NSX Controllers. To enable log forwarding, you can use a REST client, such as the Postman application for Google Chrome.

Procedure

1 Log in to the Windows host that has access to your data center.

2 In a Chrome browser, start the Postman application and log in.

3 Specify the request headers for requests to the NSX Manager.

a On the **Authorization** tab, configure the following authorization settings and click **Update Request**.

Settings	Value
Type	Basic Auth
User name	admin
Password	*lax01m01nsx01_admin_password*

The Authorization:Basic XXX header appears in the Headers pane.

b On the **Headers** tab, enter the following header details.

Setting	Value
Key	Content-Type
Value	application/xml

The Content-Type:application/xml header appears in the Headers pane.

4 Contact the NSX Manager to retrieve the IDs of the associated NSX Controllers.

a Select **GET** from the drop-down menu that contains the HTTP request methods.

b In the **URL** text box next to the selected method, enter the following URL, and click **Send**.

NSX Manager	URL
NSX Manager for the management cluster	https://lax01m01nsx01.lax01.rainpole.local/api/2.0/vdn/controller

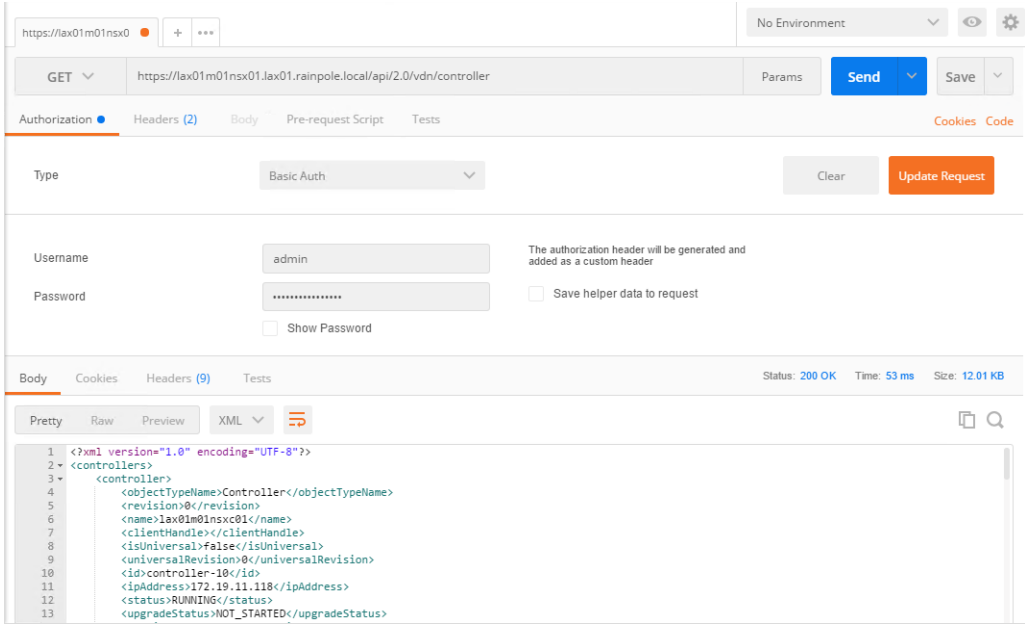
The Postman application sends a query to the NSX Manager about the installed NSX controllers.

c After the NSX Manager sends a response back, click the **Body** tab in the response pane.

The response body contains a root <controllers> XML element that groups the details about the three controllers that form the controller cluster.

d Within the <controllers> element, locate the <controller> element for each controller and write down the content of the <id> element.

Controller IDs have the `controller-id` format where *id* represents the sequence number of the controller in the cluster.



5 For each NSX Controller, send a request to configure vRealize Log Insight as a remote syslog server.

a In the request pane at the top, select **POST** from the drop-down menu that contains the HTTP request methods, and in the **URL** text box, enter the following URL.

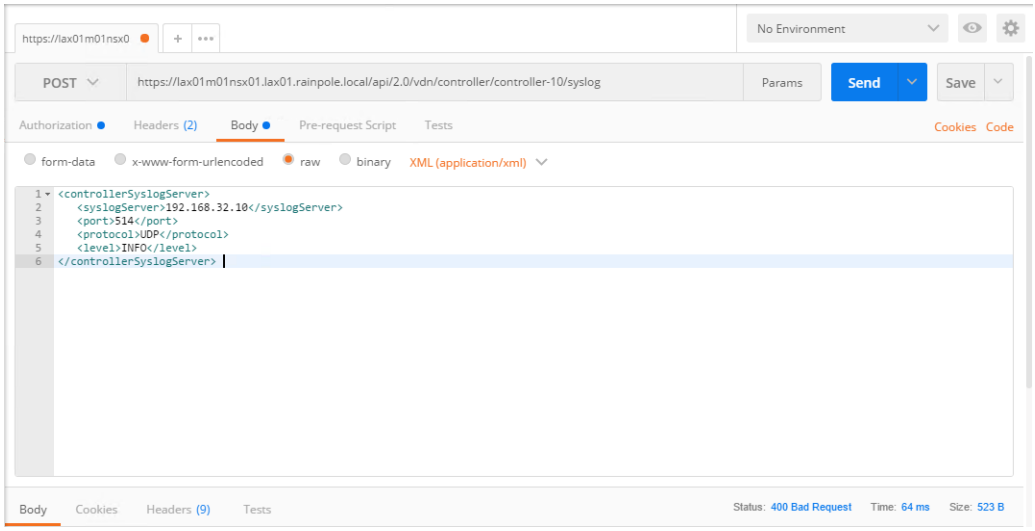
Replace *controller-ID* with the controller IDs you have written down.

NSX Manager	NSX Controller in the Controller Cluster	POST URL
NSX Manager for the management cluster	NSX Controller 1	https://lax01m01nsx01.lax01.rainpole.local/api/2.0/vdn/controller/**controller-1**/syslog
	NSX Controller 2	https://lax01m01nsx01.lax01.rainpole.local/api/2.0/vdn/controller/**controller-2**/syslog
	NSX Controller 3	https://lax01m01nsx01.lax01.rainpole.local/api/2.0/vdn/controller/**controller-3**/syslog

b In the Request pane, click the **Body** tab, select **Raw**, and using the drop-down menu, select **XML (Application/XML)**.

c Paste the following request body in the **Body** text box and click **Send**.

```
<controllerSyslogServer>
   <syslogServer>192.168.32.10</syslogServer>
   <port>514</port>
   <protocol>UDP</protocol>
   <level>INFO</level>
</controllerSyslogServer>
```



d Repeat the steps for the other NSX Controllers in the management cluster.

6 Verify the syslog configuration on each NSX Controller.

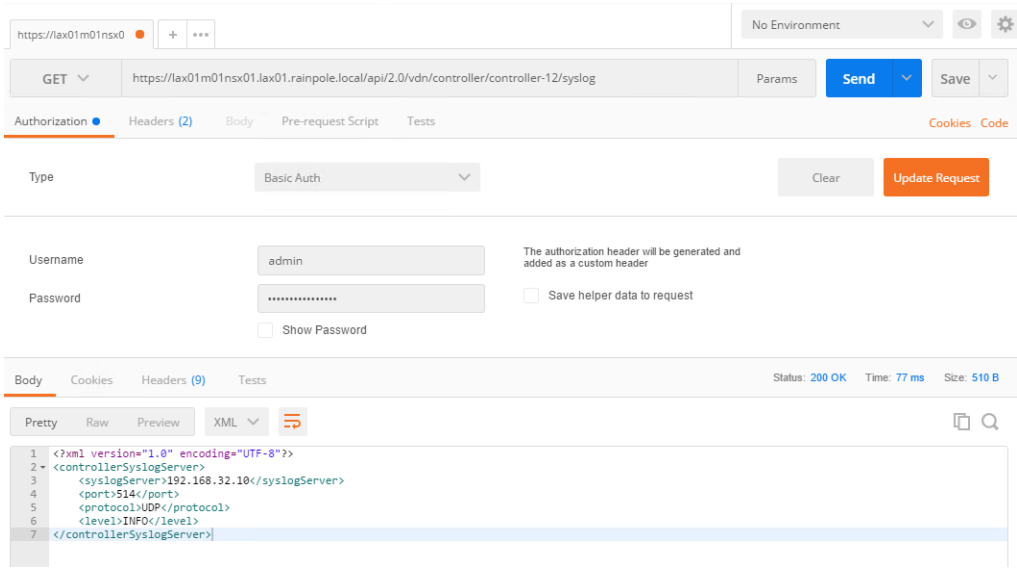
a In the Request pane, from the **Method** drop-down menu, select **GET**, in the **URL** text box, enter the controller-specific syslog URL from the previous step, and click the **SEND** button.

b After the NSX Manager sends a response back, click the **Body** tab under Response.

The response body contains a root <controllerSyslogServer> element, which represents the settings for the remote syslog server on the NSX Controller.

c Verify that the value of the <syslogServer> element is 192.168.32.10.

d Repeat the steps for the other NSX Controllers to verify the syslog configuration.



7 Log in to the Management vCenter Server by using the vSphere Web Client.

a Open a Web browser and go to **`https://lax01m01vc01.lax01.rainpole.local/vsphere-client`**.

b Log in using the following credentials.

Setting	Value
User name	administrator@vsphere.local
Password	*vsphere_admin_password*

8 Configure the newly-deployed Control VM of the UDLR in Region B to forward events to vRealize Log Insight in Region B.

a From the **Home** menu of the vSphere Web Client, click **Networking & Security**.

b In the Navigator, click **NSX Edges**.

c Select **172.17.11.65** from the **NSX Manager** drop-down menu.

d Double-click **sfo01m01udlr01** to open its configuration interface.

e On the NSX Edge device page, click the **Manage** tab, click **Settings**, and click **Configuration**.

f In the Details pane, click **Change** next to **Syslog servers**.

g In the Edit Syslog Servers Configuration dialog box, enter the following settings and click **OK**.

Setting	Value
Syslog Server 1	192.168.32.10
Protocol	udp

Update the vRealize Log Insight Logging Address after Failover

After you fail over the management applications in the SDDC to Region B, update the address configured on the management applications for vRealize Log Insight. All management applications are still configured to send logs to the vRealize Log Insight instance in Region A.

You update the DNS entry for sfo01vrli01.sfo01.rainpole.local to point to the IP address 192.168.32.10 of lax01vrli01.lax01.rainpole.local in Region B.

Procedure

1 Log in to the DNS server dc51rpl.rainpole.local that resides iin Region B.

2 Open the Windows **Start** menu, enter **`dns`** in the **Search** text box and press Enter.

The DNS Manager dialog box appears.

3 In the DNS Manager dialog box, under Forward Lookup Zones, select the **sfo01.rainpole.local** domain by expanding the tree and locate the sfo01vrli01 record on the right side.

4 Double-click the **sfo01vrli01** record, change the IP address of the record from 192.168.31.10 to **`192.168.32.10`** and click **OK**.

Setting	Value
Fully qualified domain name (FQDN)	sfo01vrli01.sfo01.rainpole.local
IP Address	192.168.32.10
Update associated pointer (PTR) record	Selected

Reconfigure the NSX Instance for the Management Cluster in Region A after Failover

After Region A comes back online, you must perform additional configuration of the networking layer to avoid conflicts.

You demote the NSX Manager to the secondary role, delete the universal controller cluster, disable the load balancer, and perform additional configuration on the NSX Edges.

Procedure

1 Log in to vCenter Server by using the vSphere Web Client.

a Open a Web browser and go to **`https://sfo01m01vc01.sfo01.rainpole.local/vsphere-client`**.

b Log in using the following credentials.

Setting	Value
User name	administrator@vsphere.local
Password	*vsphere_admin_password*

2 From the **Home** menu of the vSphere Web Client, select **Networking & Security**.

3 In the Navigator, click **Installation** and click the **Management** tab.

You see that both NSX Managers 172.16.11.65 and 172.17.11.65 are assigned the primary role.

4 Force the removal of the registered secondary NSX Manager before removing the primary role from the NSX Manager in Region A.

a Select the **172.16.11.65** instance, and select **Actions > Remove Secondary NSX Manager**.

b Select the **Perform operation even if the NSX manage is inaccessible** check box and click **OK**.

5 Demote the original primary site NSX Manager in Region A to the transit role.

a Select the **172.16.11.65** instance, click **Actions > Remove Primary Role**.

b Click **Yes** in the confirmation dialog box.

6 Delete the NSX Controllers in the protected site.

a Select the **sfo01m01nsxc01** node and click **Delete**.

b In the Delete Controller confirmation dialog box, click **Yes**.

c Repeat the step to delete the remaining two NSX Controller nodes.

d Select **Forcefully Delete** and **Check here to acknowledge the warning** option when you delete the last controller.

7 Delete the UDLR edge in the protected site.

a In the Navigator, click **NSX Edges**.

b Select **172.16.11.65** from the **NSX Manager** drop-down menu.

c Select the **sfo01m01udlr01** and click **Delete**.

d In the Delete NSX Edge confirmation dialog box, click **Yes**.

8 Assign the NSX Manager for the management cluster in Region A the secondary role to the already promoted primary NSX Manager in Region B.

a In the Navigator, click **Installation**.

b On the **Management** tab select the primary **172.17.11.65** instance.

c Select **Actions > Add Secondary NSX Manager**.

d In the Add secondary NSX Manager dialog box, enter the following settings and click **OK**.

Setting	Value
NSX Manager	172.16.11.65
User Name	admin
Password	*mgmtnsx_admin_password*
Confirm Password	*mgmtnsx_admin_password*

e In the Trust Certificate confirmation dialog box, click **Yes**.

9 Disable network connectivity for the NSX load balancer in Region A.

a In the Navigator, click **NSX Edges**.

b Select **172.16.11.65** from the **NSX Manager** drop-down menu.

c Double-click the **sfo01m01lb01** device.

d Click the **Manage** tab and click the **Settings** tab.

e Click **Interfaces**, select the **OneArmLB** vnic, and click **Edit**.

f In the Edit NSX Edge Interface dialog box, select **Disconnected** as **Connectivity Status** and click **OK**.

10 Configure the routing on the universal distributed logical router in Region B.

a In the Navigator, click **NSX Edges**.

b Select **172.17.11.65** from the **NSX Manager** drop-down menu.

c Double-click **sfo01m01udlr01**.

d Click the **Manage** tab and click **Routing**.

e On the left, select **BGP**.

f Select the following NSX Edge devices, click **Edit**, configure the following settings, and click **OK**.

Setting	sfo01m01esg01 Value	sfo01m01esg02 Value
IP Address	192.168.10.1	192.168.10.2
Forwarding Address	192.168.10.3	192.168.10.3
Protocol Address	192.168.10.4	192.168.10.4
Remote AS	65003	65003
Weight	10	10
Keep Alive Time	1	1
Hold Down Time	3	3
Password	*BGP_password*	*BGP_password*

g Click **Publish Changes**.

h On the left, select **Static Routes**.

i On the Static Routes page, click the existing static route (Network: 172.17.11.0/24) and click **Edit** button.

j In the Edit Static Route dialog box, update the following values and click **OK**.

Setting	Value
Network	172.16.11.0/24
Next Hop	192.168.10.1,192.168.10.2
MTU	9000
Admin Distance	1

k Click **Publish Changes**.

11 Reconfigure the weight value of sfo01m01esg01 and sfo01m01esg02 edges.

a In the Navigator, click **NSX Edges**.

b Select **172.16.11.65** from the **NSX Manager** drop-down menu.

c Double-click **sfo01m01esg01**.

d Click the **Manage** tab and click **Routing**.

e On the left, select **BGP**, select the **192.168.10.4** neighbour and click **Edit**.

f In the Edit Neighbour dialog box, change the **Weight** value to **10** and click **OK**.

g Click **Publish Changes**.

h Repeat the step for the sfo01m01esg02 edge.

12 Verify that the NSX Edge devices are successfully peering, and that BGP routing has been established.

a Log in to the sfo01m01esg01 NSX Edge device using a Secure Shell (SSH) client with the following credentials.

Setting	Value
User name	admin
Password	*edge_admin_password*

b Run the `show ip bgp neighbors` command to display information about the BGP connections to neighbors.

The BGP State will display `Established UP` if you have successfully peered with UDLR.

c Run the `show ip route` command to verify that you are receiving routes using BGP.

d Repeat the step for the sfo01m01esg02 NSX Edge device.

13 After Region A comes back online, you change back the DNS entry for sfo01vrli01.sfo01.rainpole.local to point to the its original IP address 192.168.31.10 .

a Open a Remote Desktop Protocol (RDP) connection.Log in to the DNS server dc01rpl.rainpole.local that resides in Region A.

b Log in using the following credentials.

Option	Description
User name	Active Directory administrator
Password	*ad_admin_password*

c Open the Windows **Start** menu, enter **dns** in the **Search** text box and press Enter.

d In the DNS Manager dialog box, under Forward Lookup Zones, expand the tree and select the **sfo01.rainpole.local** domain.

e Double-click the **sfo01vrli01** record on the right, change the IP address of the record from 192.168.32.10 to 192.168.31.10, and click **OK**.

Setting	Value
Fully qualified domain name (FQDN)	sfo01vrli01.sfo01.rainpole.local
IP Address	**`192.168.31.10`**
Update associated pointer (PTR) record	Selected

Failback of the SDDC Management Applications

4

Configure and perform failback of the management applications in the SDDC from the protected region, Region B, to the recovery region, Region A. In this way, you restore the pre-recovery configuration of the SDDC before planned migration or disaster recovery.

You fail back the following management components:

- Analytics cluster of vRealize Operations Manager

  The remote collector nodes of vRealize Operations Manager are not failed back. You deploy a separate pair of remote collectors in each region in the application virtual network that is dedicated to the region.

- Primary components of vRealize Automation with embedded vReaize Orchestrator and vRealize Business

  The vSphere Proxy Agents of vRealize Automation and the vRealize Business data collector are not failed back. You deploy a separate pair of agents and collector in each region in an application isolated network.

Table 4-1. SDDC Management Components That Are Failed Back

Management Component		Failed Over or Failed Back
vRealize Operations Manager	Analytics nodes	X
	Remote collectors	
Cloud Management Platform	vRealize Automation Appliance	X
	IaaS Components	X
	Microsoft SQL Server	X
	vSphere Proxy Agents	
	vRealize Business server	X
	vRealize data collectors	

Procedure

1 Test the Failback of Management Applications on page 50

Test the recovery plan for the management applications in the SDDC to identify potential problems during a future failback.

2 Perform Failback as Planned Migration of Management Applications on page 52

After you have restored the infrastructure of Region A and have successfully tested failback of the SDDC management applications, start the migration process from Region B back to Region A.

3 Perform Failback as Disaster Recovery of Management Applications on page 54

Prepare the network and NSX network devices in Region A. Then perform failback of vRealize Automation and vRealize Business, and of vRealize Operations Manager to Region A if Region B becomes unavailable in the event of a disaster.

4 Post-Failback Configuration of Management Applications on page 63

After failback of the Cloud Management Platform and vRealize Operations Manager, you must perform certain tasks to ensure that applications perform as expected.

Test the Failback of Management Applications

Test the recovery plan for the management applications in the SDDC to identify potential problems during a future failback.

- Test the Failback of vRealize Operations Manager on page 50

  Test the recovery plan for vRealize Operations Manager to prevent potential problems during a future failback. Site Recovery Manager runs the analytics virtual machines on the test network and on a temporary snapshot of replicated data in Region A.

- Test Failback of the Cloud Management Platform on page 51

  Test the recovery plan for vRealize Automation and vRealize Business to validate the configuration. Site Recovery Manager runs the virtual machines on the test network and on a temporary snapshot of replicated data in Region A.

Test the Failback of vRealize Operations Manager

Test the recovery plan for vRealize Operations Manager to prevent potential problems during a future failback. Site Recovery Manager runs the analytics virtual machines on the test network and on a temporary snapshot of replicated data in Region A.

Site Recovery Manager runs the analytics virtual machines on the test network and on a temporary snapshot of replicated data in Region A.

Procedure

1 Log in to vCenter Server by using the vSphere Web Client.

   a Open a Web browser and go to **`https://lax01m01vc01.lax01.rainpole.local/vsphere-client`**.

   b Log in using the following credentials.

Setting	Value
User name	administrator@vsphere.local
Password	*vsphere_admin_password*

2 From the **Home** menu of the vSphere Web Client, select **Site Recovery**.

3 On the Site Recovery home page, click **Sites** and double-click the **lax01m01vc01.lax01.rainpole.local** protected site.

4 If the Log In Site dialog box appears, re-authenticate by using the **`svc-srm@rainpole.local`** user name and the ***`svc-srm_password`*** password.

   Re-authentication is required if the network connection between Region A and Region B has been interrupted after the last successful authentication.

5 On the **Related Objects** tab, click the **Recovery Plans** tab and click the **SDDC Operations Management RP** recovery plan.

6 On the SDDC Operations Management RP page, click the **Monitor** tab and click **Recovery Steps**.

7 Click the **Test Recovery Plan** icon to run a test recovery.

The Test wizard appears.

8 On the Confirmation options page, leave the **Replicate recent changes to recovery site** check box selected and click **Next**.

9 On the Ready to complete page, click **Finish** to start the test recovery.

Test failback starts. You can follow the progress on the Recovery Steps page.

10 After the test recovery is complete, click the **Cleanup Recovery Plan** icon to clean up all the created test VMs.

11 On the Confirmation options page of the Cleanup wizard, click **Next**.

12 On the Ready to complete page, click **Finish** to start the clean-up process.

Test Failback of the Cloud Management Platform

Test the recovery plan for vRealize Automation and vRealize Business to validate the configuration. Site Recovery Manager runs the virtual machines on the test network and on a temporary snapshot of replicated data in Region A.

Procedure

1 Log in to vCenter Server by using the vSphere Web Client.

a Open a Web browser and go to **`https://lax01m01vc01.lax01.rainpole.local/vsphere-client`**.

b Log in using the following credentials.

Setting	Value
User name	administrator@vsphere.local
Password	*vsphere_admin_password*

2 From the **Home** menu of the vSphere Web Client, select **Site Recovery**.

3 On the Site Recovery home page, click **Sites** and double-click the **lax01m01vc01.lax01.rainpole.local** protected site.

4 If the Log In Site dialog box appears, re-authenticate by using the **`svc-srm@rainpole.local`** user name and the ***`svc-srm_password`*** password.

Re-authentication is required if the network connection between Region A and Region B has been interrupted after the last successful authentication.

5 On the **Related Objects** tab, click the **Recovery Plans** tab and click the **SDDC Cloud Management RP** recovery plan.

6 On the SDDC Cloud Management RP page, click the **Monitor** tab and click **Recovery Steps**.

7 Click the **Test Recovery Plan** icon to run a test recovery.

The Test wizard appears.

8 On the Confirmation options page, leave the **Replicate recent changes to recovery site** check box selected and click **Next**.

9 On the Ready to complete page, click **Finish** to start the test recovery.

Test failback starts. You can follow the progress on the Recovery Steps page.

10 After the test recovery is complete, click the **Cleanup Recovery Plan** icon to clean up all the created test VMs.

Note Because recovered VMs are using the Test network, VMware Tools in vra01svr01a.rainpole.local and vra01svr01b.rainpole.local VMs might not become online within the default timeout value. Increase the timeout value for the VMs to complete the test.

11 On the Confirmation options page of the Cleanup wizard, click **Next**.

12 On the Ready to complete page, click **Finish** to start the clean-up process.

Perform Failback as Planned Migration of Management Applications

After you have restored the infrastructure of Region A and have successfully tested failback of the SDDC management applications, start the migration process from Region B back to Region A.

- Initiate Failback as Planned Migration of vRealize Operations Manager on page 52

  You can run a recovery plan under planned circumstances to migrate the virtual machines of the analytics cluster of vRealize Operations Manager from Region B to Region A. You can also run a recovery plan under unplanned circumstances if Region B suffers an unforeseen event that might result in data loss.

- Initiate Failback as Planned Migration of the Cloud Management Platform on page 53

  You can run a recovery plan under planned circumstances to migrate the virtual machines of vRealize Automation and vRealize Business from Region B to Region A. You can also run a recovery plan under unplanned circumstances if Region B suffers an unforeseen event that might result in data loss.

Initiate Failback as Planned Migration of vRealize Operations Manager

You can run a recovery plan under planned circumstances to migrate the virtual machines of the analytics cluster of vRealize Operations Manager from Region B to Region A. You can also run a recovery plan under unplanned circumstances if Region B suffers an unforeseen event that might result in data loss.

Procedure

1 Log in to the Management vCenter Server by using the vSphere Web Client.

  a Open a Web browser and go to `https://lax01m01vc01.lax01.rainpole.local/vsphere-client`.

  b Log in using the following credentials.

Setting	Value
User name	administrator@vsphere.local
Password	*vsphere_admin_password*

2 From the **Home** menu of the vSphere Web Client, select **Site Recovery**.

3 On the Site Recovery home page, click **Sites** and double-click the **lax01m01vc01.lax01.rainpole.local** protected site.

4 On the **Related Objects** tab, click the **Recovery Plans** tab and click the **SDDC Operations Management RP** recovery plan.

5 On the SDDC Operations Management RP page, click the **Monitor** tab and click **Recovery Steps**.

6 Click the **Run Recovery Plan** icon to run the recovery plan and initiate the failback of the analytics cluster.

  The Recovery wizard appears.

7 On the Confirmation options page, configure the following settings and click **Next**.

Confirmation Option	Value
I understand that this process will permanently alter the virtual machines and infrastructure of both the protected and recovery datacenters	Selected
Recovery type	Planned Migration

8 On the Ready to complete page, click **Finish** to initiate vRealize Operations Manager failback.

What to do next

1 Verify that vRealize Operations Manager is up and operational after failback. See *Validate vRealize Operations Manager* in the *VMware Validated Design Operational Verification* documentation.

2 Prepare vRealize Operations Manager for failover by reprotecting the virtual machines of the analytics cluster in Site Recovery Manager. See "Reprotect vRealize Operations Manager," on page 72.

Initiate Failback as Planned Migration of the Cloud Management Platform

You can run a recovery plan under planned circumstances to migrate the virtual machines of vRealize Automation and vRealize Business from Region B to Region A. You can also run a recovery plan under unplanned circumstances if Region B suffers an unforeseen event that might result in data loss.

Procedure

1 Log in to vCenter Server by using the vSphere Web Client.

a Open a Web browser and go to `https://lax01m01vc01.lax01.rainpole.local/vsphere-client`.

b Log in using the following credentials.

Setting	Value
User name	administrator@vsphere.local
Password	*vsphere_admin_password*

2 From the **Home** menu of the vSphere Web Client, select **Site Recovery**.

3 On the Site Recovery home page, click **Sites** and double-click the **lax01m01vc01.lax01.rainpole.local** protected site.

4 On the **Related Objects** tab, click the **Recovery Plans** tab and click the **SDDC Cloud Management RP** recovery plan.

5 On the SDDC Cloud Management RP page, click the **Monitor** tab and click **Recovery Steps**.

6 Click the **Run Recovery Plan** icon to run the recovery plan and initiate the failback of the cloud management platform.

The Recovery wizard appears.

7 On the Confirmation options page, configure the following settings and click **Next**.

Confirmation Option	Value
I understand that this process will permanently alter the virtual machines and infrastructure of both the protected and recovery datacenters	Selected
Recovery type	Planned Migration

8 On the Ready to complete page, click **Finish** to initiate failback of the cloud management platform.

What to do next

1 Verify that vRealize Automation and vRealize Business VMs are up and operational after failback. See *Validate the Cloud Management Platform* in the*VMware Validated Design Operational Verification* documentation.

2 Prepare vRealize Automation and vRealize Business Server for failover by reprotecting the virtual machines of the vRealize Automation components in Site Recovery Manager. See "Reprotect the Cloud Management Platform," on page 73.

Perform Failback as Disaster Recovery of Management Applications

Prepare the network and NSX network devices in Region A. Then perform failback of vRealize Automation and vRealize Business, and of vRealize Operations Manager to Region A if Region B becomes unavailable in the event of a disaster.

Procedure

1 Reconfigure the NSX Instance for the Management Cluster in Region A on page 55

In the event of a site failure, when Region B becomes unavailable, prepare the network layer in Region A for failback of management applications. Change the role of the NSX Manager in Region A to primary, re-deploy the universal controller cluster, and synchronize the universal controller cluster configuration.

2 Recover the Control VM of the Universal Distributed Logical Router in Region A on page 57

In the case of failback, because of the failure in Region B, dynamic routing in Region A is not available. Deploy a Control VM for the universal dynamic logical router sfo01m01udlr01 in Region A to recover dynamic routing in the environment. You then re-configure the recovered Control VM to provide dynamic routing for the SDDC management applications that are failed back.

3 Reconfigure the Universal Distributed Logical Router and NSX Edges for Dynamic Routing in Region A on page 58

Configure the universal distributed logical router sfo01m01udlr01, and NSX Edges sfo01m01esg01 and sfo01m01esg02 to support dynamic routing in Region A before you start disaster recovery from Region B. In this way, the management components of the SDDC will continue to communicate using optimal routes in a fault-tolerant network.

4 Verify the Establishment of BGP for the Universal Distributed Logical Router in Region A on page 60

Verify that the UDLR for the management applications is successfully peering, and that BGP routing has been established in Region A. After you perform failback for disaster recovery, they can continue communicating to keep SDDC operational.

5 Enable Network Connectivity for the NSX Load Balancer in Region A on page 60

Enable the network connectivity on sfo01m01lb01 load balancer to support high-availability and distribute the network traffic load for vRealize Operations Manager and the Cloud Management Platform after disaster recovery to Region A.

6 Initiate Disaster Recovery of vRealize Operations Manager in Region A on page 61

If a disaster event occurs in Region B, initiate the disaster recovery of vRealize Operations Manager in Region A to fail vRealize Operations Manager back to Region A.

7 Initiate Disaster Recovery of the Cloud Management Platform in Region A on page 62

In the event of a disaster in Region B, initiate disaster recovery of vRealize Automation and vRealize Business in Region A to fail the Cloud Management Platform back to Region A.

Reconfigure the NSX Instance for the Management Cluster in Region A

In the event of a site failure, when Region B becomes unavailable, prepare the network layer in Region A for failback of management applications. Change the role of the NSX Manager in Region A to primary, re-deploy the universal controller cluster, and synchronize the universal controller cluster configuration.

Procedure

1 Log in to the Management vCenter Server by using the vSphere Web Client.

   a Open a Web browser and go to `https://sfo01m01vc01.sfo01.rainpole.local/vsphere-client`.

   b Log in using the following credentials.

Setting	Value
User name	administrator@vsphere.local
Password	*vsphere_admin_password*

2 Promote the NSX Manager for the management cluster in Region A to the primary role.

   You must first disconnect the NSX Manager for the management cluster in Region A from the Primary NSX Manager in Region B.

   a From the **Home** menu of the vSphere Web Client, click **Networking & Security**.

   b In the Navigator, click **Installation**.

   c On the **Management** tab, select the **172.16.11.65** instance.

   d Click the **Actions** menu and click **Disconnect from Primary NSX Manager**.

   e In the Disconnect from Primary NSX Manager confirmation dialog box, click **Yes**.

      The NSX Manager gets the **Transit** role.

   f On the **Management** tab, select the **172.16.11.65** instance again.

   g Click **Actions** and select **Assign Primary Role**.

   h In the Assign Primary Role confirmation dialog box, click **Yes**.

3 Deploy the universal controller cluster in Region A.

   a In the Navigator, click **Networking & Security** and click **Installation**.

   b Under NSX Controller nodes, click the **Add** icon to deploy three NSX Controller nodes with the same configuration.

c In the Add Controller dialog box, enter the following settings and click **OK**.

You configure a password only during the deployment of the first controller. The other controllers use the same password.

Setting	Value
Name	■ sfo01m01nsxc01 for controller 1 ■ sfo01m01nsxc02 for controller 2 ■ sfo01m01nsxc03 for controller 3
NSX Manager	172.16.11.65
Datacenter	sfo01-m01dc
Cluster/Resource Pool	sfo01-m01-mgmt01
Datastore	sfo01-m01-vsan01
Connected To	sfo01-m01-vds01-management
IP Pool	sfo01-mgmt01-nsxc01
Password	*mgmtnsx_controllers_password*
Confirm Password	*mgmtnsx_controllers_password*

d After the **Status** of the controller node changes to `Connected`, deploy the remaining two NSX Controller nodes sfo01m01nsxc02 and sfo01m01nsxc03.

Wait until the current deployment is finished, before you start the next one.

4 Configure DRS affinity rules for the deployed NSX Controller nodes.

a From the **Home** menu of the vSphere Web Client, select **Hosts and Clusters**.

b Expand the **sfo01m01vc01.sfo01.rainpole.local > sfo01-m01dc** tree and click the **sfo01-m01-mgmt01** cluster.

c Click the **Configure** tab, under Configuration, click **VM/Host Rules**, and click **Add**.

d In the sfo01-m01-mgmt01 - Create VM/Host Rule dialog box, enter the following settings and click **OK**.

Setting	Value
Name	anti-affinity-rule-nsxc
Enable rule	Selected
Type	Separate Virtual Machines
Members	■ sfo01m01nsxc01 ■ sfo01m01nsxc02 ■ sfo01m01nsxc03

5 Use the Update Controller State mechanism on the NSX Manager to synchronize the state of the newly deployed controllers.

Update Controller State pushes the current VXLAN and universal distributed logical router configuration from NSX Manager to the controller cluster.

a From the **Home** menu, select **Networking & Security**.

b In the Navigator, click **Installation**.

c On the **Management** tab, select the **172.16.11.65** instance.

d Click the **Actions** menu and select **Update Controller State**.

e In the Update Controller State confirmation dialog box, click **Yes**.

Recover the Control VM of the Universal Distributed Logical Router in Region A

In the case of failback, because of the failure in Region B, dynamic routing in Region A is not available. Deploy a Control VM for the universal dynamic logical router sfo01m01udlr01 in Region A to recover dynamic routing in the environment. You then re-configure the recovered Control VM to provide dynamic routing for the SDDC management applications that are failed back.

Procedure

1 Log in to the Management vCenter Server by using the vSphere Web Client.

   a Open a Web browser and go to `https://sfo01m01vc01.sfo01.rainpole.local/vsphere-client`.

   b Log in using the following credentials.

Setting	Value
User name	administrator@vsphere.local
Password	*vsphere_admin_password*

2 From the **Home** menu of the vSphere Web Client, click **Networking & Security**.

3 In the Navigator, click **NSX Edges**.

4 Select **172.16.11.65** from the **NSX Manager** drop-down menu.

5 Double-click **sfo01m01udlr01**.

6 Re-deploy the universal distributed logical router control VM and enable HA.

   a Click the **Manage** tab and click **Settings**.

   b Select **Configuration** and under Logical Router Appliances click the **Add** icon.

   c In the Add NSX Edge Appliance dialog box, enter the following settings and click **OK**.

Setting	Value
Data center	sfo01-m01dc
Cluster/Resource Pool	sfo01-m01-mgmt01
Datastore	sfo01-m01-vsan01

   d Click the **Add** icon to deploy another NSX Edge device with the same configuration.

7 Configure high availability for the Control VM.

   a On the Configuration page for sfo01m01udlr01, click **Change** under HA Configuration, configure the following settings, and click **OK**.

Setting	Value
HA Status	Enable
Connected To	sfo01-m01-vds01-management
Enable Logging	Selected

   b In the Change HA configuration dialog box, click **Yes**.

8 Configure the CLI Credentials for the Control VM.

   a In the Navigator, click **NSX Edges**.

   b Select **172.16.11.65** from the **NSX Manager** drop-down menu.

c Right-click **sfo01m01udlr01** and select **Change CLI Credentials**.

d In the Change CLI Credentials dialog box, configure the following settings and click **OK**.

Setting	Value
User Name	admin
Password	*udlr_admin_password*
Enable SSH access	Selected

Reconfigure the Universal Distributed Logical Router and NSX Edges for Dynamic Routing in Region A

Configure the universal distributed logical router sfo01m01udlr01, and NSX Edges sfo01m01esg01 and sfo01m01esg02 to support dynamic routing in Region A before you start disaster recovery from Region B. In this way, the management components of the SDDC will continue to communicate using optimal routes in a fault-tolerant network.

Procedure

1 Log in to the Management vCenter Server by using the vSphere Web Client.

a Open a Web browser and go to `https://sfo01m01vc01.sfo01.rainpole.local/vsphere-client`.

b Log in using the following credentials.

Setting	Value
User name	administrator@vsphere.local
Password	*vsphere_admin_password*

2 In the Navigator, click **Networking & Security** and click **NSX Edges**.

3 Select **172.16.11.65** from the **NSX Manager** drop-down menu.

4 Verify the routing configuration for the universal distributed logical router.

a Double-click **sfo01m01udlr01**.

b Click the **Manage** tab and click **Routing**.

Setting	Value
Global Configuration > ECMP	Enabled
Dynamic Routing Configuration > Router ID	192.168.10.3

5 On the left side, select **BGP** to verify the protocol settings and configure BGP peering between the UDLR device and the NSX Edge devices for the ECMP-enabled North/South routing in Region A.

a On the BGP page, verify the following settings.

Setting	Value
Status	Enabled
Local AS	65003
Graceful Restart	Enabled

b Select**192.168.10.1** which represents the connection settings for the sfo01m01esg01 neighbor and click **Edit** icon.

c In the Edit Neighbour dialog box, update the **Weight** value to **60** , enter the BGP password that was configured during the initial setup of the UDLR, and click **OK**.

Setting	sfo01m01esg01 Value	sfo01m01esg02 Value
IP Address	192.168.10.1	192.168.10.2
Forwarding Address	192.168.10.3	192.168.10.3
Protocol Address	192.168.10.4	192.168.10.4
Remote AS	65003	65003
Weight	**60**	**60**
Keep Alive Time	1	1
Hold Down Time	3	3
Password	***BGP_password***	***BGP_password***

d On the BGP page, repeat the steps for the **192.168.10.2** entry which represents the sfo01m01esg02 neighbor.

e Click **Publish Changes**.

6 On the left side, select **Route Redistribution** to verify redistribution status.

Category	Setting	Value
Route Redistribution Status	OSPF	Deselected
	BGP	Selected
Route Redistribution table	Learner	BGP
	From	Connected
	Prefix	Any
	Action	Permit

7 Reconfigure the routing and weight value of sfo01m01esg01 and sfo01m01esg02 edge devices.

a In the Navigator, click **NSX Edges**.

b Select **172.16.11.65** from the **NSX Manager** drop-down menu.

c Double-click **sfo01m01esg01** to open its configuration interface.

d Click the **Manage** tab and click the **Routing** tab.

e On the left side, select **BGP**, select the **192.168.10.4** neighbor, and click **Edit**.

f In the Edit Neighbour dialog box, change the **Weight** value to **60** and click **OK**.

g Click **Publish Changes**.

h Repeat the step for the sfo01m01esg02 edge.

Verify the Establishment of BGP for the Universal Distributed Logical Router in Region A

Verify that the UDLR for the management applications is successfully peering, and that BGP routing has been established in Region A. After you perform failback for disaster recovery, they can continue communicating to keep SDDC operational.

Procedure

1 Log in to the UDLR virtual appliance by using a Secure Shell (SSH) client.

   a Open an SSH connection to **sfo01m01udlr01**.

   b Log in using the following credentials.

Setting	Value
User name	admin
Password	*udlr_admin_password*

2 Verify that the UDLR can peer with the ECMP-enabled NSX Edge services gateways.

   a Run the `show ip bgp neighbors` command to display information about the BGP and TCP connections to the UDLR neighbors.

   b In the command output, verify that the BGP state is `Established, up` for 192.168.10.1 (sfo01m01esg01) and 192.168.10.2 (sfo01m01esg02).

3 Verify that the UDLR receives routes by using BGP and that multiple routes are established to BGP-learned networks.

   a Run the `show ip route` command.

   b In the command output, verify that the routes to the networks are marked with the letter B and several routes to each adjacent network exist.

   The letter B in front of each route indicates that the route is established over BGP.

Enable Network Connectivity for the NSX Load Balancer in Region A

Enable the network connectivity on sfo01m01lb01 load balancer to support high-availability and distribute the network traffic load for vRealize Operations Manager and the Cloud Management Platform after disaster recovery to Region A.

Procedure

1 Log in to the Management vCenter Server by using the vSphere Web Client.

   a Open a Web browser and go to **https://sfo01m01vc01.sfo01.rainpole.local/vsphere-client**.

   b Log in using the following credentials.

Setting	Value
User name	administrator@vsphere.local
Password	*vsphere_admin_password*

2 From the **Home** menu of the vSphere Web Client, click **Networking & Security**.

3 In the Navigator, click **NSX Edges**.

4 Select **172.16.11.65** from the **NSX Manager** drop-down menu.

5 Double-click the **sfo01m01lb01** device.

6 Click the **Manage** tab and click the **Settings** tab.

7 Click **Interfaces**, select the **OneArmLB** vNIC, and click **Edit**.

8 In the Edit NSX Edge Interface dialog box, set **Connectivity Status** to `Connected` and click **OK**.

Initiate Disaster Recovery of vRealize Operations Manager in Region A

If a disaster event occurs in Region B, initiate the disaster recovery of vRealize Operations Manager in Region A to fail vRealize Operations Manager back to Region A.

Procedure

1 Log in to the Management vCenter Server by using the vSphere Web Client.

a Open a Web browser and go to **`https://sfo01m01vc01.sfo01.rainpole.local/vsphere-client`**.

b Log in using the following credentials.

Setting	Value
User name	administrator@vsphere.local
Password	*vsphere_admin_password*

2 From the **Home** menu of the vSphere Web Client, select **Site Recovery**.

3 On the Site Recovery home page, click **Sites** and double-click the **sfo01m01vc01.sfo01.rainpole.local** protected site.

4 On the **Related Objects** tab, click the **Recovery Plans** tab and click the **SDDC Operations Management RP** recovery plan.

5 On the SDDC Operations Management RP page, click the **Monitor** tab and click **Recovery Steps**.

6 Click the **Run Recovery Plan** icon to run the recovery plan and initiate the failback of the analytics cluster.

The Recovery wizard appears.

7 On the Confirmation options page of the Recovery wizard, configure the following settings and click **Next**.

Setting	Value
I understand that this process will permanently alter the virtual machines and infrastructure of both the protected and recovery datacenters	Selected
Recovery type	Disaster recovery

8 On the Ready to complete page, click **Finish** to initiate vRealize Operations Manager failback.

After disaster recovery, the status of the recovery plan is `Disaster Recovery Completed`.

What to do next

1 Verify that vRealize Operations Manager is up and functional after failback. See *Validate vRealize Operations Manager* in the *VMware Validated Design Operational Verification* documentation.

2 Prepare vRealize Operations Manager for failover by reprotecting the virtual machines of the analytics cluster in Site Recovery Manager. See "Reprotect vRealize Operations Manager," on page 72.

Initiate Disaster Recovery of the Cloud Management Platform in Region A

In the event of a disaster in Region B, initiate disaster recovery of vRealize Automation and vRealize Business in Region A to fail the Cloud Management Platform back to Region A.

Procedure

1 Log in to the Management vCenter Server by using the vSphere Web Client.

a Open a Web browser and go to `https://sfo01m01vc01.sfo01.rainpole.local/vsphere-client`.

b Log in using the following credentials.

Setting	Value
User name	administrator@vsphere.local
Password	*vsphere_admin_password*

2 From the **Home** menu of the vSphere Web Client, select **Site Recovery**.

3 On the Site Recovery home page, click **Sites** and double-click the **sfo01m01vc01.sfo01.rainpole.local** protected site.

4 On the **Related Objects** tab, click the **Recovery Plans** tab and click the **SDDC Cloud Management RP** recovery plan.

5 On the SDDC Cloud Management RP page, click the **Monitor** tab and click **Recovery Steps**.

6 Click the **Run Recovery Plan** icon to run the recovery plan and initiate the failback of the Cloud Management Platform.

7 On the Confirmation options page of the Recovery wizard, configure the following settings and click **Next**.

Confirmation Option	Value
I understand that this process will permanently alter the virtual machines and infrastructure of both the protected and recovery datacenters	Selected
Recovery type	Disaster recovery

8 On the Ready to complete page, click **Finish** to initiate the failback of the cloud management platform.

After disaster recovery, the status of the recovery plan is `Disaster Recovery Completed`.

What to do next

1 Verify that vRealize Automation and vRealize Business VMs are up and functional after failback. See *Validate the Cloud Management Platform* in the *VMware Validated Operational Verification* document.

2 Prepare vRealize Automation and vRealize Business Server for failover by reprotecting the virtual machines of the vRealize Automation components in Site Recovery Manager. See "Reprotect the Cloud Management Platform," on page 73.

Post-Failback Configuration of Management Applications

After failback of the Cloud Management Platform and vRealize Operations Manager, you must perform certain tasks to ensure that applications perform as expected.

Procedure

1 Configure the NSX Controllers and the UDLR Control VM to Forward Events to vRealize Log Insight in Region A on page 63

Configure the NSX Controllers and UDLR Control VM instances for the management cluster to forward log information to vRealize Log Insight in Region A. Use the NSX REST API to configure the NSX Controllers. To enable log forwarding, you can use a REST client, such as the Postman application for Google Chrome.

2 Reconfigure the NSX Instance for the Management Cluster in Region B after Failback on page 67

After Region B comes back online, you must perform additional configuration of the networking layer to avoid conflicts.

Configure the NSX Controllers and the UDLR Control VM to Forward Events to vRealize Log Insight in Region A

Configure the NSX Controllers and UDLR Control VM instances for the management cluster to forward log information to vRealize Log Insight in Region A. Use the NSX REST API to configure the NSX Controllers. To enable log forwarding, you can use a REST client, such as the Postman application for Google Chrome.

Procedure

1 Log in to the Windows host that has access to your data center.

2 In a Chrome browser, start the Postman application and log in.

3 Specify the request headers for requests to the NSX Manager.

a On the **Authorization** tab, configure the following authorization settings and click **Update Request**.

Settings	Value
Type	Basic Auth
User name	admin
Password	*sfo01m01nsx01_admin_password*

The Authorization:Basic XXX header appears in the Headers pane.

b On the **Headers** tab, enter the following header details.

Setting	Value
Key	Content-Type
Value	application/xml

The Content-Type:application/xml header appears in the Headers pane.

4 Contact the NSX Manager to retrieve the IDs of the associated NSX Controllers.

a Select **GET** from the drop-down menu that contains the HTTP request methods.

b In the **URL** text box next to the selected method, enter the following URL, and click **Send**.

NSX Manager	URL
NSX Manager for the management cluster	https://sfo01m01nsx01.sfo01.rainpole.local/api/2.0/vdn/controller

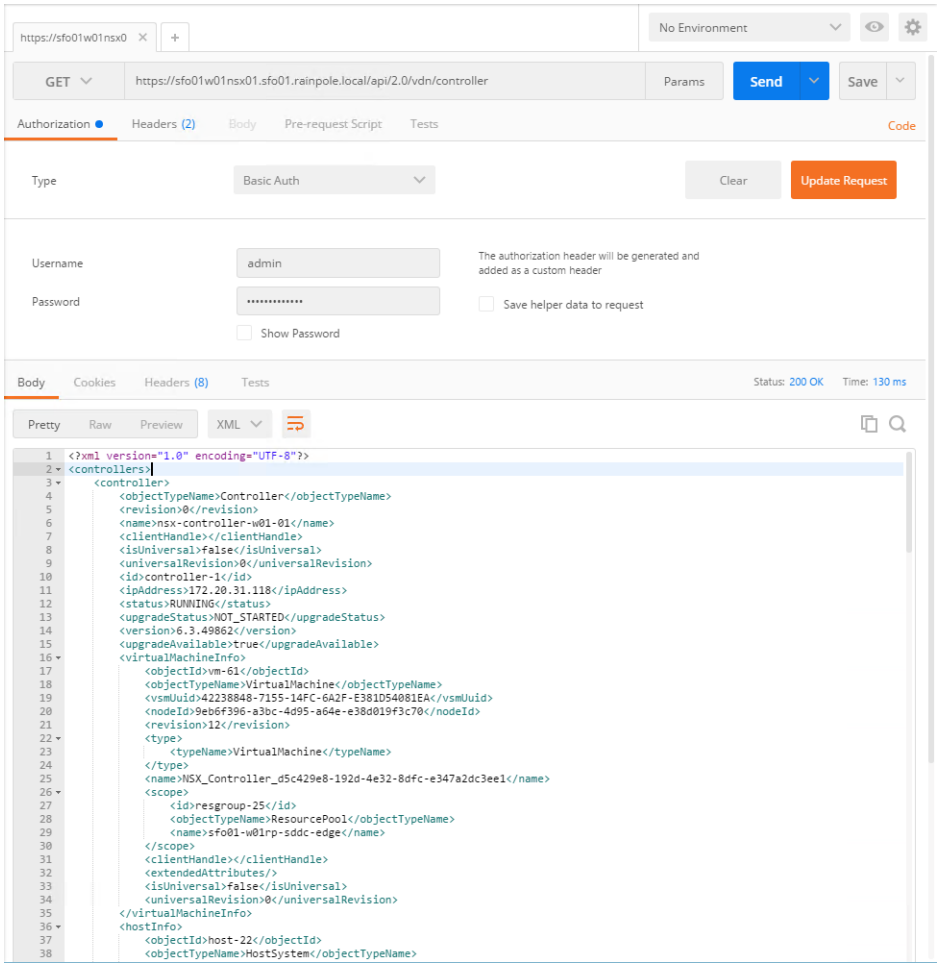
The Postman application sends a query to the NSX Manager about the installed NSX controllers.

c After the NSX Manager sends a response back, click the **Body** tab in the response pane.

The response body contains a root <controllers> XML element that groups the details about the three controllers that form the controller cluster.

d Within the <controllers> element, locate the <controller> element for each controller and write down the content of the <id> element.

Controller IDs have the `controller-`*id* format where *id* represents the sequence number of the controller in the cluster, for example, `controller-1` in the image below.



5 For each NSX Controller, send a request to configure vRealize Log Insight as a remote syslog server.

a In the request pane at the top, select **POST** from the drop-down menu that contains the HTTP request methods, and in the **URL** text box, enter the following URL.

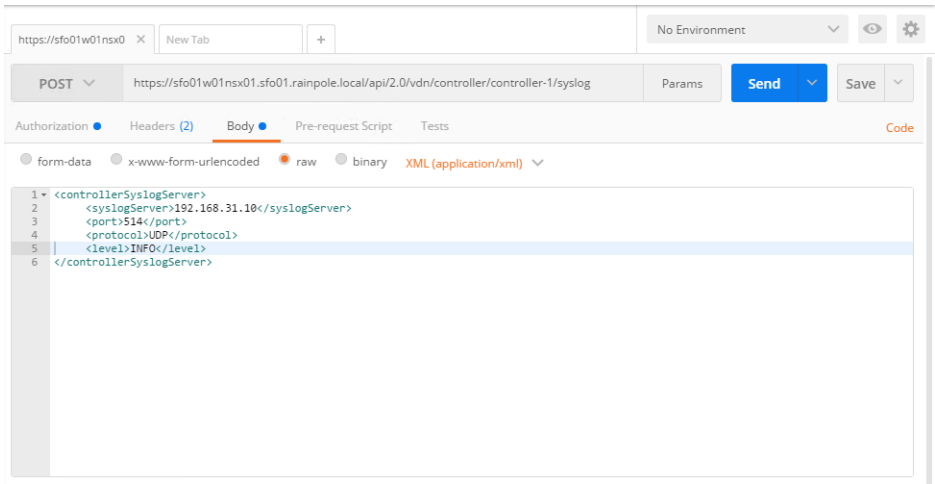
Replace *controller-ID* with the controller IDs you have written down.

NSX Manager	NSX Controller in the Controller Cluster	POST URL
NSX Manager for the management cluster	NSX Controller 1	https://sfo01m01nsx01.sfo01.rainpole.local/api/2.0/vdn/controller/**controller-1**/syslog
	NSX Controller 2	https://sfo01m01nsx01.sfo01.rainpole.local/api/2.0/vdn/controller/**controller-2**/syslog
	NSX Controller 3	https://sfo01m01nsx01.sfo01.rainpole.local/api/2.0/vdn/controller/**controller-3**/syslog

b In the Request pane, click the **Body** tab, select **Raw**, and using the drop-down menu, select **XML (Application/XML)**.

c Paste the following request body in the **Body** text box and click **Send**.

```
<controllerSyslogServer>
   <syslogServer>192.168.31.10</syslogServer>
   <port>514</port>
   <protocol>UDP</protocol>
   <level>INFO</level>
</controllerSyslogServer>
```



d Repeat the steps for the other NSX Controllers in the management cluster.

6 Verify the syslog configuration on each NSX Controller.

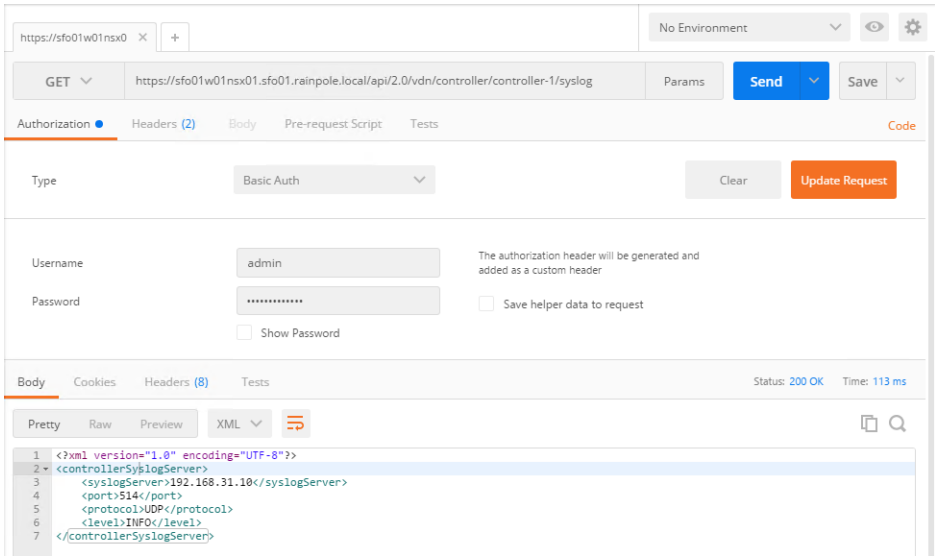
a In the Request pane, from the **Method** drop-down menu, select **GET**, in the **URL** text box, enter the controller-specific syslog URL from the previous step, and click the**SEND** button.

b After the NSX Manager sends a response back, click the **Body** tab under Response.

The response body contains a root <controllerSyslogServer> element, which represents the settings for the remote syslog server on the NSX Controller.

c Verify that the value of the <syslogServer> element is 192.168.31.10.

d Repeat the steps for the other NSX Controllers to verify the syslog configuration.



7 Log in to the Management vCenter Server by using the vSphere Web Client.

a Open a Web browser and go to **`https://sfo01m01vc01.sfo01.rainpole.local/vsphere-client`**.

b Log in using the following credentials.

Setting	Value
User name	administrator@vsphere.local
Password	*vsphere_admin_password*

8 Configure the newly-deployed UDLR Control VM to forward events to vRealize Log Insight in Region A.

a From the **Home** menu of the vSphere Web Client, click **Networking & Security**.

b In the Navigator, click **NSX Edges**.

c Select **172.16.11.65** from the **NSX Manager** drop-down menu.

d Double-click **sfo01m01udlr01** to open its configuration interface.

e On the NSX Edge device page, click the **Manage** tab, click **Settings**, and click **Configuration**.

f In the Details pane, click **Change** next to **Syslog servers**.

g In the Edit Syslog Servers Configuration dialog box, enter the following settings and click **OK**.

Setting	Value
Syslog Server 1	192.168.31.10
Protocol	udp

Reconfigure the NSX Instance for the Management Cluster in Region B after Failback

After Region B comes back online, you must perform additional configuration of the networking layer to avoid conflicts.

You demote the NSX Manager to the secondary role, delete the universal controller cluster, disable the load balancer, and configure BGP on the NSX Edge devices.

Procedure

1 Log in to vCenter Server by using the vSphere Web Client.

   a Open a Web browser and go to `https://sfo01m01vc01.sfo01.rainpole.local/vsphere-client`.

   b Log in using the following credentials.

Setting	Value
User name	administrator@vsphere.local
Password	*vsphere_admin_password*

2 From the **Home** menu from the vSphere Web Client, click **Networking & Security**.

3 In the Navigator, click **Installation** and click the **Management** tab.

   You see that both NSX Managers 172.17.11.65 and 172.16.11.65 are assigned the primary role.

4 Force the removal of the registered secondary NSX Manager before removing the primary role.

   a Select the **172.17.11.65** instance and select **Actions > Remove Secondary NSX Manager** .

   b Select the **Perform operation even if the NSX manage is inaccessible** check box and click **OK**.

5 Demote the original primary site NSX Manager to the transit role.

   a Select the **172.17.11.65** instance, and select **Actions > Remove Primary Role**.

   b Click **Yes** in the confirmation dialog box.

6 Delete the NSX Controllers in the primary site.

   a Select the **lax01m01nsxc01** node and click **Delete**.

   b In the Delete Controller confirmation dialog box, click **Yes**.

   c Repeat the step to delete the remaining two NSX Controller nodes.

   d When you delete the last controller, select **Forcefully remove the controller** and **Check here to acknowledge the warning**.

7 Delete the UDLR edge in the protected site.

   a In the Navigator, click **NSX Edges**.

   b Select **172.17.11.65** from the **NSX Manager** drop-down menu.

   c Select the **sfo01m01udlr01** and click **Delete**.

   d In the Delete NSX Edge confirmation dialog box, click **Yes**.

8 Assign the NSX Manager for the management cluster in Region B the secondary role to the already promoted primary NSX Manager in Region A.

   a In the Navigator, click **Installation**.

   b On the **Management** tab, select the primary **172.16.11.65** instance.

c Select **Actions > Add Secondary NSX Manager**.

d In the Add secondary NSX Manager dialog box, enter the following settings and click **OK**.

Setting	Value
NSX Manager	172.17.11.65
User Name	admin
Password	*mgmtnsx_admin_password*
Confirm Password	*mgmtnsx_admin_password*

e In the Trust Certificate confirmation dialog box, click **Yes**.

9 Disable network connectivity for the NSX load balancer in Region B.

a In the Navigator, click **NSX Edges**.

b Select **172.17.11.65** from the **NSX Manager** drop-down menu.

c Double-click the **lax01m01lb01** device.

d Click the **Manage** tab and click the **Settings** tab.

e Click **Interfaces**, select the **OneArmLB** vNIC, and click **Edit**.

f In the Edit NSX Edge Interface dialog box, set **Connectivity Status** to **Disconnected** and click **OK**.

10 Configure the routing for the universal distributed logical router in Region A.

a In the Navigator, click **NSX Edges**.

b Select **172.16.11.65** from the **NSX Manager** drop-down menu.

c Double-click **sfo01m01udlr01** to open its configuration interface.

d Click the **Manage** tab and click **Routing**.

e On the left, select **BGP**.

f Select the following NSX Edge devices, click **Edit**, configure the following settings and click **OK**.

Setting	lax01m01esg01 Value	lax01m01esg02 Value
IP Address	192.168.10.50	192.168.10.51
Forwarding Address	192.168.10.3	192.168.10.3
Protocol Address	192.168.10.4	192.168.10.4
Remote AS	65003	65003
Weight	10	10
Keep Alive Time	1	1
Hold Down Time	3	3
Password	*BGP_password*	*BGP_password*

g Click **Publish Changes**.

h On the left, select **Static Routes**.

i On the Static Routes page, click the existing static route (Network: 172.16.11.0/24) and click **Edit** button.

j In the Edit Static Route dialog box, update the following values and click **OK**.

Setting	Value
Network	172.17.11.0/24
Next Hop	192.168.10.50,192.168.10.51
MTU	9000
Admin Distance	1

k Click **Publish Changes**.

11 Reconfigure the weight value of the lax01m01esg01 and lax01m01esg02 edges.

a In the Navigator, click **NSX Edges**.

b Select **172.17.11.65** from the **NSX Manager** drop-down menu.

c Double-click **lax01m01esg01**.

d Click the **Manage** tab and click **Routing**.

e On the left, select **BGP**, select the **192.168.10.4** neighbour and click **Edit**.

f In the Edit Neighbour dialog box, change the **Weight** value to **`10`** and click **OK**.

g Click **Publish Changes**.

h Repeat the step for the lax01m01esg02 edge.

12 Verify that the NSX Edge devices are successfully peering, and that BGP routing has been established.

a Log in to the lax01m01esg01 NSX Edge device using a Secure Shell (SSH) client with the following credentials.

Setting	Value
User name	admin
Password	*edge_admin_password*

b Run the `show ip bgp neighbors` command to display information about the BGP connections to neighbors.

The BGP State will display `Established, UP` if you have successfully peered with UDLR.

c Run the `show ip route` command to verify that you are receiving routes using BGP.

d Repeat the step for the lax01m01esg02 NSX Edge device.

Reprotect of the SDDC Management Applications 5

After a disaster recovery or planned migration, the recovery region becomes the protected region, but the virtual machines are not protected yet. If the original protected region is operational, you can reverse the direction of protection to protect the new primary region.

During the reprotect operation, after Site Recovery Manager reverses the direction of protection, it forces synchronization of the storage from the new protected region to the new recovery region. Forcing data synchronization ensures that the recovery region has a current copy of the protected virtual machines running at the protection region. Recovery is possible immediately after the reprotect operation completes.

Prerequisites for Performing Reprotect

To reprotect the virtual machines of the SDDC management applications, your environment must meet certain requirements for availability of the original protected region and state of recovery plans.

Make sure that your environment meets the following requirements before you perform the reprotect operation:

- The original protected region must be available. The vCenter Server instances, ESXi hosts, Site Recovery Manager Server instances, and corresponding databases must all be recoverable.

  You cannot restore the original region if, for example, a physical catastrophe destroyed it. To unpair and recreate the pairing of protected and recovery regions, both regions must be available. If you cannot restore the original protected region, you must reinstall Site Recovery Manager on the protected and recovery regions.

- If you performed a planned migration or disaster recovery, make sure that all steps of the recovery plan finish successfully. If errors occur during the recovery, resolve the problems that caused the errors and re-run the recovery plan. When you re-run a recovery plan, the operations that previously succeeded are skipped. For example, successfully recovered virtual machines are not recovered again and continue running without interruption.

- If you performed a disaster recovery operation, you must perform the following tasks before reprotect:
  - After the protected region is repaired, Site Recovery Manager detects the availability of the region and changes the Recovery Plan status to `Recovery Required`. Re-run the recovery plans for the Cloud Management Platform and vRealize Operations Manager again in the Recovery Required state so that Site Recovery Manager can perform actions on the original region which were failed during disaster recovery.
  - Perform a planned migration when both regions are running again.

    If errors occur during the attempted planned migration, resolve the errors and re-run the planned migration until it succeeds.

Reprotect vRealize Operations Manager

Prepare vRealize Operations Manager for failback or failover by reprotecting the virtual machines in Site Recovery Manager.

Procedure

1 Log in to vCenter Server by using the vSphere Web Client.

a Open a Web browser and go to the following URL.

Type of Reprotect	URL
Reprotect after failover	https://lax01w01vc01.lax01.rainpole.local/vsphere-client
Reprotect after failback	https://sfo01m01vc01.sfo01.rainpole.local/vsphere-client

b Log in using the following credentials.

Setting	Value
User name	administrator@vsphere.local
Password	*vsphere_admin_password*

2 From the **Home** menu of the vSphere Web Client, select **Site Recovery**.

3 Click **Recovery Plans**, right-click the **SDDC Operations Management RP** recovery plan, and select **Reprotect**.

The Reprotect wizard appears.

4 On the Confirmation options page, select the check box to confirm that you understand that the reprotect operation is irreversible and click **Next**.

5 On the Ready to complete page, review the reprotect information and click **Finish**.

6 Select the**SDDC Operations Management RP** recovery plan and click the **Monitor > Recovery Steps** tab to monitor the progress of the reprotect operation.

7 If the status of the SDDC Operations Management RP recovery plan changes to `Reprotect interrupted`, run the Reprotect wizard again and select the **Force cleanup** check box on the confirmation page.

8 After the status of the SDDC Operations Management RP recovery plan changes to `Ready`, click **Monitor > History** and click the **Export report for selected history item** button.

The recovery plan can return to the ready state even if errors occurred during the reprotect operation. Check the history report for the reprotect operation to make sure that no errors occurred. If errors occurred during reprotect, attempt to fix the errors and run a test recovery to make sure that the errors are fixed. If you do not fix errors and you subsequently attempt to run a planned migration or disaster recovery, some virtual machines might fail to recover.

After successful reprotect, Site Recovery Manager performs the following actions:

- Reverses the recovery site and protected site
- Creates placeholder copies of the virtual machines of vRealize Operations Manager from the new protected site to the new recovery site

Reprotect the Cloud Management Platform

Prepare vRealize Automation with embedded vRealize Orchestrator and vRealize Business Server for failback or failover by reprotecting the virtual machines in Site Recovery Manager.

Procedure

1 Log in to vCenter Server by using the vSphere Web Client.

a Open a Web browser and go to the following URL.

Type of Reprotect	URL
Reprotect after failover	https://lax01m01vc01.lax01.rainpole.local/vsphere-client
Reprotect after failback	https://sfo01m01vc01.sfo01.rainpole.local/vsphere-client

b Log in using the following credentials.

Setting	Value
User name	administrator@vsphere.local
Password	*vsphere_admin_password*

2 From the **Home** menu of the vSphere Web Client, select **Site Recovery**.

3 Click **Recovery Plans**, right-click the **SDDC Cloud Management RP** recovery plan, and select **Reprotect**.

The Reprotect wizard appears.

4 On the Confirmation options page, select the check box to confirm that you understand that the reprotect operation is irreversible and click **Next**.

5 On the Ready to complete page, review the reprotect information and click **Finish**.

6 Select the **SDDC Cloud Management RP** recovery plan and click the **Monitor > Recovery Steps** tab to monitor the progress of the reprotect operation.

7 If the status of the SDDC Cloud Management RP recovery plan changes to `Reprotect interrupted`, run the Reprotect wizard again and select the **Force cleanup** check box on the confirmation page.

8 After the status of the SDDC Cloud Management RP recovery plan changes to `Ready`, click the **Monitor > History** tab and click the **Export report for selected history item** button.

The recovery plan can return to the ready state even if errors occurred during the reprotect operation. Check the history report for the reprotect operation to make sure that no errors occurred. If errors occurred during reprotect, attempt to fix the errors and run a test recovery to make sure that the errors are fixed. If you do not fix the errors and you subsequently attempt to run a planned migration or disaster recovery, some virtual machines might fail to recover.

After successful reprotect, Site Recovery Manager performs the following actions:

- Reverses the recovery site and protected site
- Creates placeholder copies of the virtual machines of the Cloud Management Platform from the new protected site to the new recovery site