CHAPTER 7

Managing Applications in Selective High-Availability Environment

This chapter describes how to configure Selective High Availability in Cisco Prime DCNM appliances (OVA and ISO) deployment for Cisco Prime DCNM with Fabric enhancements.

Overview

Selective High Availability (HA) is a feature introduced in Cisco Prime DCNM Release 7.1(2). The Cisco Prime DCNM appliances (OVA and ISO) allows you to selectively enable failover for certain applications rather than forcefully applying it for all applications in Cisco Prime DCNM appliance. In Cisco Prime DCNM Release 7.1(2), you can selectively enable HA for auto-configuration, which is a crucial feature in most deployments. Since HA is not enabled for all the applications, this doesn’t require external database users or an NFS repository, thus reducing dependencies in a production environment.

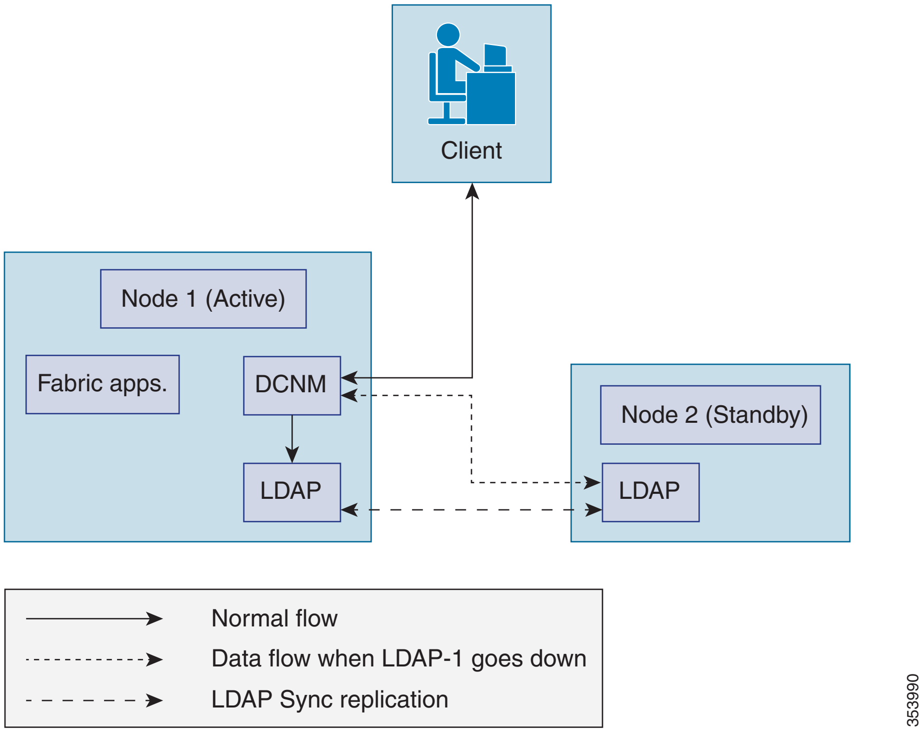
The term “appliance” refers to any of the following.

- Cisco Prime DCNM Open Virtual Appliance deployed on VMWare vSphere
- Cisco Prime DCNM ISO Appliance deployed on VMWare vSphere
- Cisco Prime DCNM ISO deployed as a Kernel-based Virtual Machine
- Cisco Prime DCNM ISO deployed on a bare-metal (physical) server

This section includes the following:

Selective High-Availability with Two Cisco Prime DCNM Appliances

The below figure shows a setup in which High Availability has been selectively enabled for auto-configuration feature. This means that failover is available only for LDAP. Node-1 is configured as active with all the applications necessary for Fabric deployments. This includes DCNM, LDAP, XMPP, AMQP, TFTP, DHCP. Node-2 is configured as standby with only LDAP (necessary for auto-configuration). With the initial configuration, DCNM on Node-1 uses LDAP on Node-1 for updates. The standby LDAP (on Node-2) gets synced with the active LDAP (on Node-1) via sync replication.



When active LDAP (on Node-1) fails, DCNM automatically uses the standby LDAP (on Node-2) to make any further updates, thus providing application failover.

Once selective HA is configured on Node-1, backups for all applications are triggered at regular intervals (by default, every six hours) and transferred to Node-2 and stored at

/var/lib/backups/selective-ha/active_backups

Once selective HA is configured on Node-2, the LDAP is backed-up at regular intervals (by default, every six hours) and transferred to Node-1 to be stored at

/var/lib/backups/selective-ha/standby_backups

On both nodes, only the last 5 backups are maintained.

Note You can change the backup interval. See Changing the Backup Interval, page 7-6.

Selective High-Availability with Redundancy

To have redundancy and to reduce the downtime in case of a server failure, it is advisable to deploy a redundant pair of active and standby nodes during the initial setup. The sequence would be:

- Setup Selective HA for the first pair of servers. For more information, see Selective High-Availability with Two Cisco Prime DCNM Appliances.
- Setup the second pair with an identical network configuration as the secondary server. Ensure that the IP address and port groups assigned to the interfaces of the primary server must be the same as the secondary server.
- In case of server failure of any of the hot servers, power on the corresponding spare server and restore the backup from the hot server.

Prerequisites

You must deploy two standalone Cisco Prime DCNM appliances (OVA and ISO). When you deploy both appliances, meet the following criteria:

- Both appliances should have their corresponding management access (eth0) and enhanced fabric management (eth1) interfaces in the same subnet, i.e., the management access interface of both Node-1 and Node-2 should be in the same subnet and the EFM interface of both Node-1 and Node-2 should be in the same subnet.
- Both appliances should be deployed with the same administrative password.

After the appliance is powered up, verify that all the applications are up and running by using **appmgr status all** command.

After the applications are up and running, stop the applications by using the **appmgr stop all** command.

Note When the Cisco Prime DCNM Appliance is started up for the first time, please wait for all the applications to run before you shut down any of the applications or power off the virtual appliance.

Note If you are using HA Selective Setup in conjunction with VMWare snapshot, please note that while using with VMWare snapshot, there are some extra steps to be updated in the restore.
If using VMWare snapshot restoration in Selective-HA setup, the sync process between selective-HA active and selective-HA standby node maybe impacted.
This sync can be restored by restoring the saved backup file from a previously saved DCNM setup. In order to ensure that the backup file always has the updated Auto-config changes, outside periodic backups, you are recommended to trigger manual backups whenever organization, paritions or network updates are made.
To manually create a backup, execute the command **/root/cluster/selective-ha/selective-ha-backup.sh**.

Time synchronization using NTP server

For most of the HA functionality to work, you must synchronize the time on both appliances by using an NTP server. The installation would typically be in the management access network (eth0) interfaces.

Configuring Selective High-Availability

Because both of the Cisco Prime DCNM Appliance in an HA environment are deployed identically, either one of them can be the Active peer. The other Cisco Prime DCNM Appliance would be the Standby peer.

Note All of the configuration CLI commands in the following sections are executed from the secure shell (SSH) terminal.

This sections includes the following:

- Configuring Active Cisco Prime DCNM Appliance, page 7-4
- Configuring Standby Cisco Prime DCNM Appliance, page 7-5
- Starting Applications in Active Cisco Prime DCNM Appliance, page 7-6
- Starting Applications in Standby Cisco Prime DCNM Appliance, page 7-6
- Changing the Backup Interval, page 7-6

Configuring Active Cisco Prime DCNM Appliance

Step 1 Log in to the SSH terminal of the Cisco Prime DCNM Appliance of the Active appliance and enter the following command:

appmgr setup selective-ha active –feature auto-config

```
Active-peer# appmgr setup selective-ha active -feature auto-config
*********************************************************
You are about to selectively enable High Availability in this DCNM virtual appliance for
the following features
Auto-Configuration
Please make sure that you have the following
1.      An NTP server for time synchronization
2.      A peer DCNM deployed with the same user credentials (same username/password)
3.      Shut down all applications in this server using 'appmgr stop all'
*********************************************************
Do you want to continue? [y/n] [y]
```

Step 2 Make sure that each prerequisite is in place and press y if not all of the pre-requisites are in place, press **n** to exit.

A prompt for the management IP of the standby peer appears.

```
...
Enter the mgmt IP of the peer DCNM (eth0 IP)  : <mgmt. ip of standby peer>
...
Retrieving peer information...
Peer Details :
=============
Peer IP   :  x.x.x.x
```

After you enter the management IP of the standby appliance, the active appliance generates a pair of authentication keys and transfers it to the peer's authorized keys.

Step 3 Enter the IP address of the NTP server and press **y** to continue.

After the active appliance is configured for Selective High-Availability, the following message appears:

```
**********************************************************************************
This node has been configured as active
Run 'appmgr setup selective-ha standby -feature auto-config' on 10.197.67.31 to complete
the HA setup.
**********************************************************************************
```

Step 4 Verify the HA role of the node by using the **appmgr show ha-role** command.

```
Active-peer # appmgr show ha-role
High Availability selectively enabled for Auto Configuration feature. This is an active
node.
```

Configuring Standby Cisco Prime DCNM Appliance

Step 1 Log into the SSH terminal of Standby Cisco Prime DCNM appliance and enter the **appmgr setup selective-ha standby-feature auto-config** command.

```
Standby-peer # appmgr setup selective-ha standby -feature auto-config
*********************************************************
You are about to selectively enable High Availability in this DCNM virtual appliance.
Please make sure that you have the following
1.      A peer DCNM virtual appliance deployed with the same user and configured as Active
peer
2.      Shut down all applications in this server using 'appmgr stop all'
*********************************************************
Do you want to continue? [y/n] [y] y
```

Step 2 Press **y** to continue.

The details of the active Cisco Prime DCNM appliance will be available in the standby, using which the standby appliance generates a pair of authentication keys and transfers it to the Cisco Prime DCNM appliance’s authorized keys.

```
Reading information from details entered on Active...
spawn sh /root/utils/sshAutoLogin.sh x.x.x.x
Enter the root password of the peer
The authenticity of host 'x.x.x.x (x.x.x.x)' can't be established.
RSA key fingerprint is d1:f9:66:b0:c3:28:c8:a2:e1:01:47:87:70:dc:c0:ac.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added 'x.x.x.x' (RSA) to the list of known hosts.
root@x.x.x.x's password:
Peer Details :
=============
Hostname        :  xyz.cisco.com
Eth0 IP :  x.x.x.x
Eth1 IP :  y.y.y.y
Do you want to continue? [y/n] [y]
```

Carefully check if it is the correct Cisco Prime DCNM appliance and press y to continue. Once the active appliance is configured for Selective High-Availability, and the following message is displayed.

```
*****************************************************************************************

This node has been configured as standby.
```

```
Run appmgr start all first on the active Cisco Prime DCNM appliance (x.x.x.x) and then
appmgr start ldap on the standby Cisco Prime DCNM appliance (y.y.y.y), to start using
applications.
****************************************************************************************
```

Step 3 Check the HA role of the node by entering the **appmgr show ha-role** command.

```
Standby-peer # appmgr show ha-role
High Availability selectively enabled for Auto Configuration feature. This is a standby
node running only LDAP.
```

Starting Applications in Active Cisco Prime DCNM Appliance

Step 1 Login into the SSH terminal of the Active Cisco Prime DCNM appliance.

Step 2 Start all applications by using the **appmgr start all** command.

Wait for all the applications to start.

Starting Applications in Standby Cisco Prime DCNM Appliance

Step 1 Login into the SSH terminal of the Standby Cisco Prime DCNM appliance and start the LDAP applications using the **appmgr start ldap** command.

Changing the Backup Interval

By default, on a node that has selective HA enabled, backup is performed every six hours. You can change the backup interval by following the below steps.

Step 1 Log into the SSH terminal of the node on which you want to change the backup interval and open the crontab in a vi editor.

Step 2 Edit the entry for the script **selective-ha-backup.sh.**

For example, the below configuration triggers a backup every hour.

```
SHELL=/bin/bash
PATH=/sbin:/bin:/usr/sbin:/usr/bin
MAILTO=root
HOME=/

# For details see man 4 crontabs

# Example of job definition:
# .---------------- minute (0 - 59)
# |  .------------- hour (0 - 23)
# |  |  .---------- day of month (1 - 31)
# |  |  |  .------- month (1 - 12) OR jan,feb,mar,apr ...
# |  |  |  |  .---- day of week (0 - 6) (Sunday=0 or 7) OR sun,mon,tue,wed,thu,fri,sat
# |  |  |  |  |
# *   *   *   *   * user-name command to be executed
* */1 * * * /root/cluster/selective-ha/selective-ha-backup.sh
```

Step 3 Load the crontab configuration file using the command

crontab /etc/crontab

Load the crontab configuration file into crontab

Step 4 Verify the cron entry by running

crontab -l

Recovering Active and Standby Nodes

Cisco Prime DCNM Selective HA allows you to recover data in case of failure of peers.

This section includes the following sections:

- Recovering DCNM Active Node, page 7-7
- Recovering DCNM Standby Node, page 7-8

Recovering DCNM Active Node

When Cisco Prime DCNM hot active node fails, you need to bring up the redundant spare active node, which has an identical configuration in terms of IP address and HA configuration as the original setup. (In a 4 box setup, you already have this ready, and need to likely power on the appliance to have this usable).

Step 1 Log into the SSH terminal of Standby node and navigate to the backup directory which contains the backups from the active node.

Standby-peer# cd /var/lib/backups/selective-ha/active_backups

Step 2 Identify the most recent active backup based on timestamp and move it to the spare DCNM active node.

Standby-peer#sftp root@x.x.x.x

x.x.x.x> put backup.mm_dd_yyyy__HH_MM_ss.tar.gz

Step 3 Log into the SSH terminal of DCNM active node and verify that all the applications are up and running by using the following command:

appmgr status all

Step 4 After all the applications are up, stop the applications by using the following command:

appmgr stop all

Step 5 Restore the backup using the following command:

Active-peer# appmgr restore all backup. mm_dd_yyyy__HH_MM_ss.tar.gz

Step 6 Once the restore is completed, start all applications on active node by using the **appmgr start all** command.

Step 7 Log into the SSH terminal of Standby node and restart the LDAP

Standby-peer# appmgr restart ldap

Recovering DCNM Standby Node

When the DCNM hot standby node fails, bring up the spare standby node, which has an identical configuration in terms of IP address and HA configuration as the original setup. (In a 4 box setup, you already have this ready, and need to likely power on the appliance to have this usable).

Step 1 Log into the SSH terminal of active node and navigate to the backup directory location which has the backups taken on the standby node.

Active-peer# cd /var/lib/backups/selective-ha/standby_backups

Step 2 Identify the most recent standby backup based on timestamp and move it to the spare DCNM standby node.

Standby-peer#sftp root@x.x.x.x

x.x.x.x> put backup.mm_dd_yyyy__HH_MM_ss.tar.gz

Step 3 Log into the SSH terminal of spare DCNM standby node and verify if the LDAP application is up and running by using the following command:

appmgr status ldap

Step 4 After the LDAP application is up, stop the application by using the following command:

a**ppmgr stop ldap**.

Step 5 Restore the LDAP application backup by using the following command.

Standby-peer# appmgr restore ldap backup. mm_dd_yyyy__HH_MM_ss.tar.gz

Step 6 After the restore operation is completed, start the LDAP application on standby node by using the following command:

appmgr start ldap

Step 7 Log into the SSH terminal of Standby node.

Step 8 Restart the LDAP application by using the following command:

Active-peer# appmgr restart ldap

Vacuum and Autovacuum Postgres Databases

It is absolutely critical to vacuum postgres databases in order for the databases to properly function.

For more information of how to vacuum the postgres database in Microsoft Windows and Linux, please refer to Data Center Network Manager (DCNM) - Vacuum and Autovacuum Postgres Databases chapter of the fundamental guide.