Cluster Management

Use the Administration > Cluster Management screen to create a Cisco vManage cluster and perform related tasks.

Note

- We recommend that all members of a Cisco vManage cluster be located in the same data center.
- We recommend that the IP addresses of all members of the Cisco vManage cluster be in the same subnet.
- The members of a vManage cluster rely on timestamps to synchronize data and to track device uptime. For this time-dependent data to remain accurate, you cannot change the clock time on any one of the Cisco vManage servers of the cluster after you create the cluster.

View Available Cluster Services

To view the services that are available and reachable on all members in the Cisco vManage cluster, click the Service Reachability tab.

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Configure the Cluster IP Address of a Cisco vManage Server

When you start Cisco vManage for the first time, the default IP address of the Cisco vManage server is shown as "localhost." Before you can add a new Cisco vManage server to a cluster, you must change "localhost" to an out-of-band IP address.

Cluster interconnection between Cisco vManage servers requires that each of the servers be assigned a static IP address. Do not use DHCP to assign IP addresses to Cisco vManage servers that are to be part of a cluster. Configure the IP address on a non-tunnel interface in VPN 0.
Configure the IP Address

Configure the IP address of a Cisco vManage server before you add the server to the cluster. To do so, follow these steps:

1. In the Administration > Cluster Management > Service Configuration tab, click Add vManage. The Edit vManage screen opens.
2. From the vManage IP Address drop-down list, choose an IP address to assign to the Cisco vManage server.
3. Enter the user name and password for logging in to the Cisco vManage server.
4. Click Update.

The Cisco vManage server reboots and displays the Cluster Management screen.

Add a Cisco vManage Server to a Cluster

Add a Cisco vManage Server to a Cluster

To add a new Cisco vManage to the cluster, perform the following steps on the primary Cisco vManage server:

1. In the Administration > Cluster Management > Service Configuration tab, click Add vManage. The Add vManage screen opens.
2. From the Cisco vManage IP Address drop-down list, select an IP address to assign to the Cisco vManage server.
3. Enter the a user name and password for logging in to the Cisco vManage server.
4. Enter the IP address of the Cisco vManage server you are adding to the cluster.
5. Specify the user name and password for the new Cisco vManage server.
6. Select the services to run on the Cisco vManage server. You can select from the services listed below. Note that the Application Server field is not editable. The Cisco vManage Application Server is the local Cisco vManage HTTP web server.
   • Statistics Database—Stores all real-time statistics from all Cisco SD-WAN devices in the network.
   • Configuration Database—Stores all the device and feature templates and configurations for all Cisco SD-WAN devices in the network.
   • Messaging Server—Distributes messages and shares state among all Cisco vManage cluster members.
7. Click Add. The Cisco vManage server that you just added then reboots before joining the cluster.

In a cluster, we recommend that you run at least three instances of each service.
Configure Statistics Database to Monitor Cisco vManage

View Statistics Database Space Usage
To view the amount of space available and utilized for the statistics database on the local Cisco vManage, in the Administration > Settings > Statistics Database Configuration and click View. The top of the screen shows the maximum space available for the database and the total amount of space currently being utilized. The table shows the disk space currently being utilized for each statistics type.

Configure Statistics Database
To configure the statistics database, which stores all real-time statistics from the local Cisco vManage:
1. In the Administration > Settings > Statistics Database Configuration screen, click Edit. The top of the screen specifies the maximum space available for the database.
2. For each Statistics Type field, assign the amount of storage to allocate, in gigabytes (GB). The total value of all fields cannot exceed the maximum available space.
3. Click Save.

Cisco vManage updates the storage allocations you have assigned once a day, at midnight.

View Cisco vManage Service Details
To view detailed information about the services running on a Cisco vManage server:
1. In the Administration > Cluster Management > Service Configuration tab, click the hostname of the Cisco vManage server. The vManage Details screen opens. This screen displays the process IDs of all the Cisco vManage services that are enabled on Cisco vManage.
2. Click Cluster Management in the breadcrumb in the title bar to return to the Cluster Management screen.

View Devices Connected to Cisco vManage
To view a list of devices connected to Cisco vManage:
1. To view a detailed list of all devices connected to Cisco vManage, click the Managed Devices tab in Administration > Cluster Management > Service Configuration screen.

Alternatively:
1. In the Administration > Cluster Management > Service Configuration tab, for Cisco vManage, click the More Actions icon to the right of its row.
2. Click Device Connected.

If a device is connected to Cisco vManage from a cluster, ensure that you do not configure the data stream hostname to the Cisco vManage system IP address. However, you can configure the management IP address on VPN 512 or internet public IP address on VPN 0. To know more about data stream troubleshooting tools, see Data Stream Troubleshooting Tools FAQ.
Edit Cisco vManage Parameters

1. In the Administration > Cluster Management > Service Configuration tab, for a Cisco vManage, click the More Actions icon to the right of its row and click Edit. The Edit vManage screen opens.

2. Select an IP address to edit.

3. Enter the username and password, and edit the cluster services provided by that Cisco vManage.

4. Click Update.

Update Configuration Database Login

Update Configuration Database Admin User Credentials

To update the default login credentials of configuration database, access Cisco vManage using a terminal and run the following commands:

Use request nms application-server stop to stop application servers on all Cisco vManage servers.

Use one of the following commands to reset the user name and password for the configuration database:

- For Cisco SD-WAN Release 20.1.1 and earlier:
  
  request nms configuration-db update-admin-user username password username password newusername newadminuser newpassword newpassword

- For releases beginning with Cisco SD-WAN Release 20.1.2:
  
  request nms configuration-db update-admin-user

  When prompted, enter your current user name and password, and your new user name and password.

When you execute one of the commands described above, Cisco vManage restarts the application server.

- If you do not know the default credentials of config DB, contact Cisco TAC to retrieve the credentials.
- You cannot use an older user name.
- Password can only be a mix of characters A to Z (upper or lowercase), digits 0-9, and special characters @#!*

Note: Don’t use the SSH terminal option in Cisco vManage to run these commands, because it leads to losing access to the Cisco vManage GUI.
Example

- For Cisco SD-WAN Release 20.1.1 and earlier:

  ```
  request nms configuration-db update-admin-user username neo4j password ********
  newusername myusername newpassword mypassword
  ```

- For releases beginning with Cisco SD-WAN Release 20.1.2:

  ```
  request nms configuration-db update-admin-user
  Enter current user name: neo47
  Enter current user password: 123
  Enter new user name: myusername
  Enter new user password: mypassword
  ```

After configuration database admin user update, if you are unable to view a specific Cisco vManage instance, use the `request nms application-server restart` command to restart the application server on that Cisco vManage instance again.

### Upgrade Cisco vManage Cluster

#### Table 1: Feature History

<table>
<thead>
<tr>
<th>Feature Name</th>
<th>Release Information</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cisco vManage Cluster Upgrade</td>
<td>Cisco IOS XE Release 17.3.1a</td>
<td>This feature outlines the upgrade procedure for Cisco vManage servers in a cluster to Cisco vManage Release 20.3.1.</td>
</tr>
<tr>
<td></td>
<td>Cisco SD-WAN Release 20.3.1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cisco vManage Release 20.3.1</td>
<td></td>
</tr>
</tbody>
</table>

#### Upgrade Cisco vManage instances in a Cluster

In Cisco vManage, use the `Tools > SSH Terminal` screen to establish an SSH session with Cisco vManage. From an SSH session, use the following commands to upgrade Cisco vManage instances in a cluster. For information on SSH terminal, see [SSH Terminal](#).

1. Take a snapshots of all vManage servers. Take a backup of the configuration database and save it to location outside of the Cisco vManage server using the following command:

   ```
   request nms configuration-db backup path </home/admin/backup_file_name>
   ```

2. Ensure that Cisco vManage release 18.3 or later is installed.

3. Copy the Cisco vManage Release 20.3.1 image on each Cisco vManage server in the cluster and install the image on each Cisco vManage server. Do not activate the image at this time.

   ```
   request software install <path>
   ```

4. Stop NMS services on all Cisco vManage instances in the cluster using the following command on each Cisco vManage instance:

   ```
   request nms all stop
   ```
5. Activate the Cisco vManage Release 20.3.1 or later image on each Cisco vManage server using the following command. All servers reboot simultaneously.

   `request software activate now <version>`

6. When each Cisco vManage server is active, confirm the upgrade using the following commands:

   `request software upgrade-confirm`

   This step is essential to prevent the software from reverting to the previous image version.

7. Use the following command to upgrade the configuration database on config DB node in the cluster. You can find config DB node from Cisco vManage:

   `request nms configuration-db upgrade`

   • Enter login credentials, if prompted. Login credentials are prompted if all vManage server establish control connection with each other. After a successful upgrade, all configuration-db services are UP across the cluster and the application-server is started.

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**Note**

If you are upgrading a cluster that utilizes Cisco vManage signed certificates and contains Cisco CSR100vs, Cisco ISRv (ENCS), Cisco ASR 1002-X, or any other Cisco IOS XE SD-WAN cloud-based devices, contact Cisco SD-WAN TAC Support after upgrading the cluster and before upgrading any of these devices to 17.3.x or higher.

8. After the vManage devices reboot, stop NMS services on all vManage devices in the cluster:

   `request nms all stop`

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**Note**

If you are upgrading a Cisco vManage cluster setup from Cisco vManage Release 20.3.1 and Cisco vManage Release 20.4.1 to Cisco vManage Release 20.5.1 or higher, you must do it through CLI.

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**Note**

You can check the database upgrade logs at the following location:

`<vmanage-server>/var/log/nms/neo4j-upgrade.log`

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For information on how to upgrade Cisco vManage clusters through Cisco vManage GUI, refer to Upgrade the Software Image on a Device

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**Manually Restart vManage Processes**

When the cluster is in a bad state as part of the upgrade, you should manually restart the NMS processes. Restart the processes one at a time in an orderly manner instead of using `request nms all restart` or a similar command. The following manual restart order might vary for your cluster, depending on what services you are running on the vManage devices in the cluster. The following order is based on a basic cluster with three vManage devices.
Consider bringing up the services manually as mentioned in the following method whenever you have to reboot a vManage device or after an upgrade.

1. On each vManage device, stop all NMS services.
   request nms all stop

2. Verify that all services have stopped. It is normal for the above command to give some message about failing to stop a service if it takes too long, so use the following command to verify that everything is stopped before proceeding.
   request nms all status

3. Start the Statistics database on each device that is configured to run it. Wait for the service to start each time before proceeding to the next vManage device.
   request nms statistics-db start

4. Verify that the service is started before proceeding to start it on the next vManage. After service starts, perform step 3 to start the Statistics database on the next vManage device. Once all the vManage devices have the Statistics database running, proceed to the next step.
   request nms statistics-db status

5. Start the Configuration database on each device that is configured to run it. Wait for the service to start each time before proceeding to the next vManage device.
   request nms configuration-db start

6. Verify that the service has started before proceeding to start it on the next vManage device. Go to vshell and tail a log file to look for a database is online message. When confirmed, go to step 5 to start the Configuration database on the next vManage device. After all vManage devices have the Configuration database running, proceed to the next step.
   tail -f -n 100 /var/log/nms/vmanage-orientdb-database.log

7. Start the Coordination server on each device. Wait for the service to start each time before proceeding to the next vManage device.
   request nms coordination-server start

8. Verify that the service is started before proceeding to start it on the next vManage device. After verifying, go to step 7 to start the Coordination server on the next vManage device. After the Coordination server runs on all the vManage devices, proceed to the next step.
   request nms coordination-server status

9. Start the Messaging server on each device. Wait for the service to start each time before proceeding to the next vManage device.
   request nms messaging-server start

10. Verify that the service has started before proceeding to start it on the next vManage device. After verifying, go to step 9 to start the Messaging server on the next vManage device. After the Messaging server runs on all vManage devices, proceed to the next step.
    request nms messaging-server status

11. Start the Application server on each device. Wait for the service to start each time before proceeding to the next vManage device.
12. Verify that the service has started before proceeding to start it on the next vManage device. To verify if the service is fully started, open the GUI of that vManage device. After the GUI is fully loaded and you are able to log in, go to step 11 to start the Application server on the next vManage device.

13. Restart the NMS cloud services on each device. Wait for the service to start each time before proceeding to the next vManage device.

```
request nms cloud-agent start
```

14. Verify that the service has started before proceeding to start it on the next vManage device. After verifying, go to step 12 to start the cloud services on the next vManage device. After the cloud services run on all vManage devices, proceed to the next step.

```
request nms cloud-agent status
```

15. For Cisco vManage Release 20.3.1 and later releases, on each Cisco vManage device, start the server-proxy service as follows:

```
request nms server-proxy start
```

16. To verify that there are no errors and everything has loaded cleanly, tail the log files.

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**Remove Cisco vManage from a Cluster**

1. In the **Administration > Cluster Management > Service Configuration** tab, click the More Actions icon to the right of its row and click **Remove**. The Remove vManage dialog box opens.

2. Enter the username and password to confirm removal of the device from the network.

3. Click **Remove**.

   The Cisco vManage instance is removed from the cluster, the device is invalidated, and the certificates for that device are deleted. The remaining members in the cluster rebalance the network management services.

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**Note**

You can only remove n - 2 Cisco vManage instances from a cluster of n instances. You must retain at least two Cisco vManage instances in a cluster.