Managing APIC Clusters

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Cluster Management Guidelines

The APIC cluster is comprised of multiple APIC controllers that provide operators a unified real time monitoring, diagnostic, and configuration management capability for the ACI fabric. To assure optimal system performance, follow the guidelines below for making changes to the APIC cluster.

Prior to initiating a change to the cluster, always verify its health. When performing planned changes to the cluster, all controllers in the cluster should be healthy. If one or more of the APIC controllers' health status in the cluster is not "fully fit", remedy that situation before proceeding. Also, assure that cluster controllers added to the APIC are running the same version of firmware as the other controllers in the APIC cluster.

Follow these general guidelines when managing clusters:

• Cisco recommends that you have at least 3 active APICs in a cluster, along with additional standby APICs. A cluster size of 3, 5, or 7 APICs is recommended. A cluster size of 4 or 6 APICs is not recommended.

• Disregard cluster information from APICs that are not currently in the cluster; they do not provide accurate cluster information.

• Cluster slots contain an APIC ChassisID. Once you configure a slot, it remains unavailable until you decommission the APIC with the assigned ChassisID.

• If an APIC firmware upgrade is in progress, wait for it to complete and the cluster to be fully fit before proceeding with any other changes to the cluster.

• When moving an APIC, first ensure that you have a healthy cluster. After verifying the health of the APIC Cluster, choose the APIC you intend to shut down. After the APIC has shutdown, move the APIC, re-connect it, and then turn it back on. From the GUI, verify that the all controllers in the cluster return to a fully fit state.
Only move one APIC at a time.

- When an APIC cluster is split into two or more groups, the ID of a node is changed and the changes are not synchronized across all APICs. This can cause inconsistency in the node IDs between APICs and also the affected leaf nodes may not appear in the inventory in the APIC GUI. When you split an APIC cluster, decommission the affected leaf nodes from APIC and register them again, so that the inconsistency in the node IDs is resolved and the health status of the APICs in a cluster are in a fully fit state.

- Before configuring the APIC cluster, ensure that all the APICs are running the same firmware version. Initial clustering of APICs running differing versions is an unsupported operation and may cause problems within the cluster.

This section contains the following topics:

# Expanding and Contracting Clusters

## Expanding the APIC Cluster Size

Follow these guidelines to expand the APIC cluster size:

- Schedule the cluster expansion at a time when the demands of the fabric workload will not be impacted by the cluster expansion.

- If one or more of the APIC controllers' health status in the cluster is not "fully fit", remedy that situation before proceeding.

- Stage the new APIC controller(s) according to the instructions in their hardware installation guide. Verify in-band connectivity with a PING test.

- Increase the cluster target size to be equal to the existing cluster size controller count plus the new controller count. For example, if the existing cluster size controller count is 3 and you are adding 3 controllers, set the new cluster target size to 6. The cluster proceeds to sequentially increase its size one controller at a time until all new the controllers are included in the cluster.

- Depending on the amount of data the APIC must synchronize upon the addition of each appliance, the time required to complete the expansion could be more than 10 minutes per appliance. Upon successful expansion of the cluster, the APIC operational size and the target size will be equal.

- Allow the APIC to complete the cluster expansion before making additional changes to the cluster.
Expanding the Cisco APIC Cluster

Expanding the Cisco APIC cluster is the operation to increase any size mismatches, from a cluster size of N to size N+1, within legal boundaries. The operator sets the administrative cluster size and connects the APICs with the appropriate cluster IDs, and the cluster performs the expansion.

During cluster expansion, regardless of in which order you physically connect the APIC controllers, the discovery and expansion takes place sequentially based on the APIC ID numbers. For example, APIC2 is discovered after APIC1, and APIC3 is discovered after APIC2 and so on until you add all the desired APICs to the cluster. As each sequential APIC is discovered, a single data path or multiple data paths are established, and all the switches along the path join the fabric. The expansion process continues until the operational cluster size reaches the equivalent of the administrative cluster size.

Expanding the APIC Cluster Using the REST API

The cluster drives its actual size to the target size. If the target size is higher than the actual size, the cluster size expands.

Procedure

Step 1  Set the target cluster size to expand the APIC cluster size.

Example:

POST
https://<IP address>/api/node/mo/uni/controller.xml
<infraClusterPol name='default' size=3/>

Step 2  Physically connect the APIC controllers that you want to add to the cluster.

Contracting the Cisco APIC Cluster

Contracting the Cisco APIC cluster is the operation to decrease any size mismatches, from a cluster size of N to size N -1, within legal boundaries. As the contraction results in increased computational and memory load for the remaining APICs in the cluster, the decommissioned APIC cluster slot becomes unavailable by operator input only.

During cluster contraction, you must begin decommissioning the last APIC in the cluster first and work your way sequentially in reverse order. For example, APIC4 must be decommissioned before APIC3, and APIC3 must be decommissioned before APIC2.

Contracting the APIC Cluster Using the REST API

The cluster drives its actual size to the target size. If the target size is lower than the actual size, the cluster size contracts.
Procedure

**Step 1** Set the target cluster size so as to contract the APIC cluster size.

**Example:**

```plaintext
POST https://<IP address>/api/node/mo/uni/controller.xml
<infraClusterPol name='default' size=1/>
```

**Step 2** Decommission APIC3 on APIC1 for cluster contraction.

**Example:**

```plaintext
POST https://<IP address>/api/node/mo/topology/pod-1/node-1/av.xml
<infraWiNode id=3 adminSt='out-of-service'/>
```

**Step 3** Decommission APIC2 on APIC1 for cluster contraction.

**Example:**

```plaintext
POST https://<IP address>/api/node/mo/topology/pod-1/node-1/av.xml
<infraWiNode id=2 adminSt='out-of-service'/>
```