

Configure Standby APIC

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Introduction

This document describes how to configure Cold Standby functionality on a Cisco Application Policy Infrastructure Controller (APIC). Standby APIC cluster enables you to operate the APICs in a cluster in an Active/Standby mode. In an APIC cluster, the designated active APICs share the load and the designated standby APICs can act as a replacement for any of the APICs in an active cluster.

Standby APIC feature was added starting from Danube Release (ACI 2.2 software version).

Prerequisites

Requirement

Cisco recommends that you have knowledge of these topics:

- Out-of-Band Management (OOB) on the Fabric
- Apic Clustering

Components Used

The information in this document is based on ACI Fabric running software version 3.1(1i).

The document was created from the devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If your network is live, ensure that you understand the potential impact of any command.

Background Information

- It is supported by a single and Multipod setup.
- Standby APIC can be connected to any leaf in any POD in the Fabric. Restores editing

functionality in a Fabric/POD in minority.

- The standby APIC is automatically updated with firmware updates to keep the backup APIC at the same firmware version as the active cluster.
- During an upgrade process, once all the active APICs are upgraded, the standby APIC is also be upgraded automatically.
- Temporary IDs are assigned to standby APICs. After a standby APIC is switched over to an active APIC, a new ID is assigned.
- Admin log in is not enabled on standby APIC.
- To troubleshoot Cold Standby, you must log in to the standby using SSH as rescue-user.
- During switchover the replaced active APIC is powered down, to prevent connectivity to the replaced APIC. Standby APIC does not participate in policy configuration or fabric management.
- Cisco recommends standby APICs in the same POD as the active APICs it can replace. No data is replicated to standby unit, not even admin credentials (Rescue-user log in works).
- The standby APIC does not participate in policy configuration or management.
- No information is replicated to standby controllers, including admin credentials.

Configuration

Starting version 2.2, Initial Configuration Script prompts a new question asking whether this APIC is Standby or not, default is **[NO]**, once the answer is **[YES]**, Standby Controller ID must be chosen, which can be the number of Active APICs +1 until 29, recommended range would be starting from 21 - 29.

- There must be three active APICs in order to add a standby APIC.
- The minimum cluster size required is 3 - a number higher can be Standby.
- Standby APIC must be brought in to the cluster with the same version as the Active APIC.
- Cisco recommends to keep standby APICs in the same POD as the active APICs it can replace.

As a part of the discovery process, the Standby APIC must match:

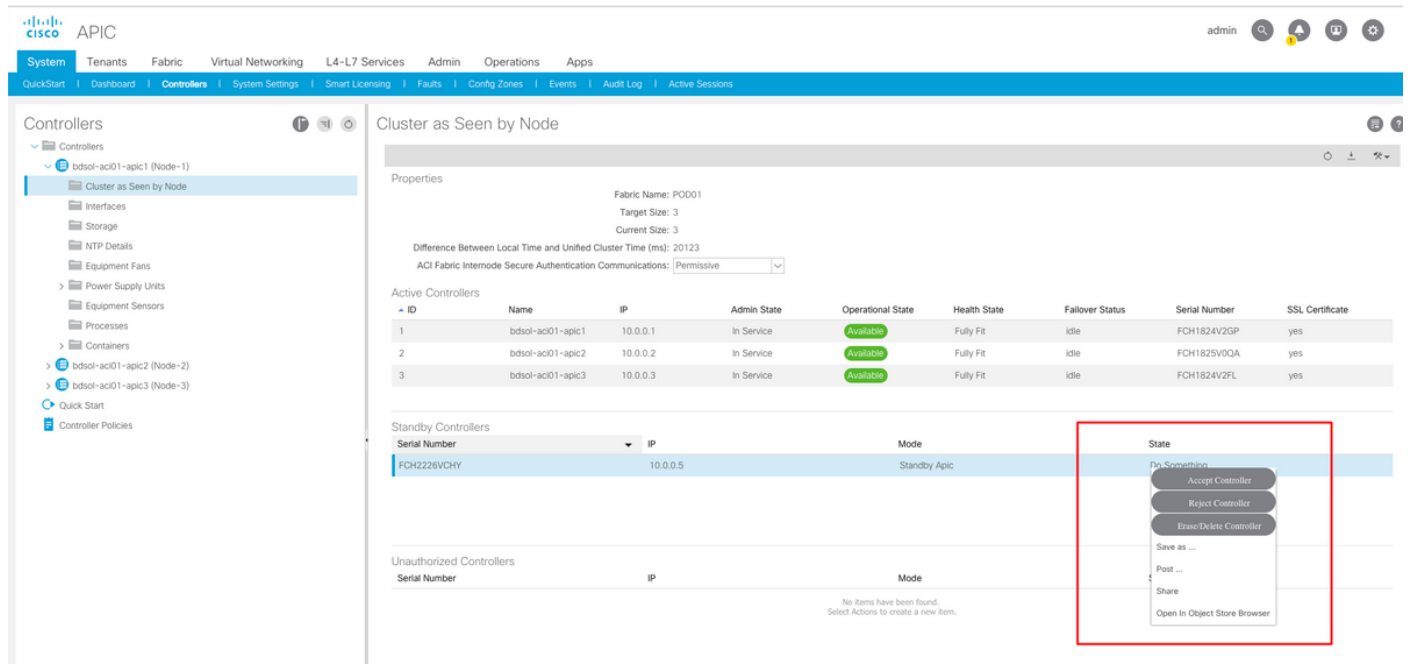
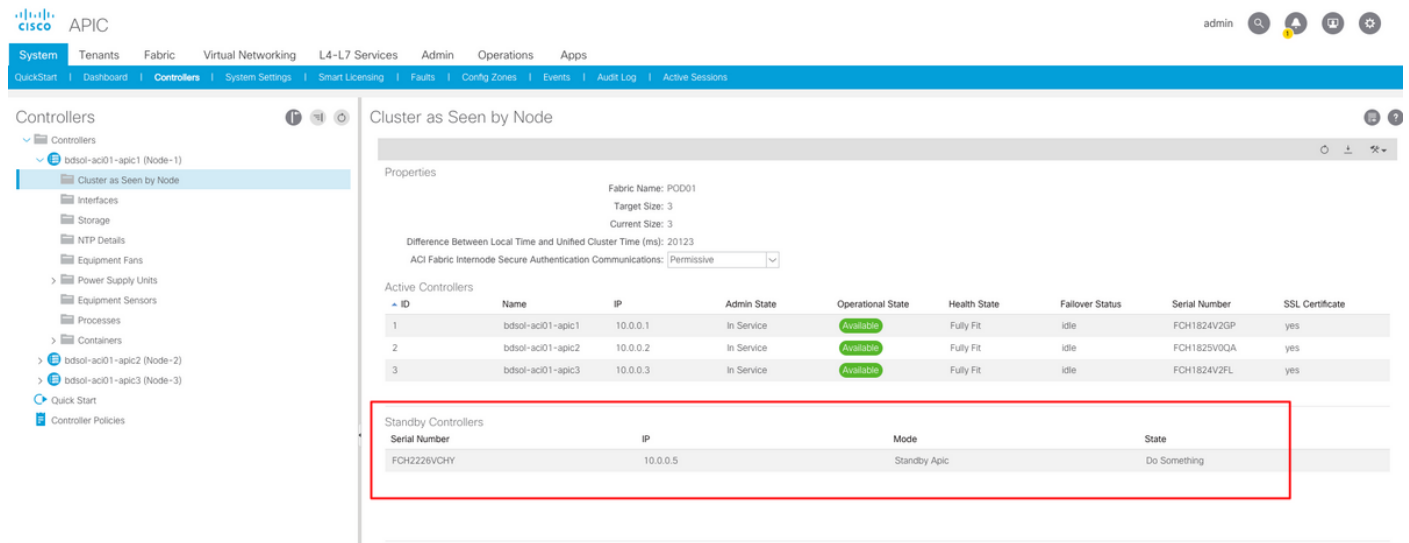
Fabric Domain Infra VLAN TEP Address Pool Serial Number Approved - in Strict Mode Certificate validation

```
Cluster configuration ...
Enter the fabric name [POD15]:
Enter the fabric ID (1-128) [1]:
Enter the number of active controllers in the fabric (1-9) [3]:
Enter the POD ID (1-9) [1]:
Is this a standby controller? [YES]:
Enter the standby controller ID (Recommended value > 20) (4-29) [4]:
Enter the controller name [STDBYAPIC21]:
Enter address pool for TEP addresses [15.0.0.0/16]:
Note: The infra VLAN ID should not be used elsewhere in your environment
and should not overlap with any other reserved VLANs on other platforms.
Enter the VLAN ID for infra network (1-4094) [3965]:

Out-of-band management configuration ...
Enable IPv6 for Out of Band Mgmt Interface? [N]:
Enter the IPv4 address [10.48.31.27/24]:
Enter the IPv4 address of the default gateway [10.48.31.1]:
Enter the interface speed/duplex mode [auto]:
```

Once the configuration is submitted, the Standby APIC is auto-discovered by the Active Cluster, and it can be seen under Standby Controllers.

In order to change the status to **Approve**, click on **Do Something** (current status) and then select **Accept Controller**, as shown in the image.



After successful discovery, continuous keepalive messages are exchanged between Active and Standby APICs, and new APIC can be seen.

```
APIC1# show controller
Fabric Name : POD15
Operational Size : 3
Cluster Size : 3
Time Difference : 725204
```

```
Fabric Security Mode : permissive
```

ID	Pod	Address	In-Band IPv4	In-Band IPv6	OoB IPv4	OoB IPv6	Version	Flags	Serial Number	Health
1*	1	15.0.0.1	0.0.0.0	fc00::1	10.48.22.122	fe80::8a1d:fcff:fe99:ec16	3.1(1i)	crva-	FCH1843V022	fully-fit
2	1	15.0.0.2	0.0.0.0	fc00::1	10.48.22.123	fe80::d66d:50ff:fecf:5d3c	3.1(1i)	crva-	FCH1846V2XU	fully-fit
3	1	15.0.0.3	0.0.0.0	fc00::1	10.48.22.124	fe80::8a1d:fcff:fe99:ef16	3.1(1i)	crva-	FCH1843V0DK	fully-fit
4~		15.0.0.4						----	FCH2123V17P	

Flags - c:Commissioned | r:Registered | v:Valid Certificate | a:Approved | f/s:Failover fail/success
(*)Current (~)Standby

APIC2# acidiag avread

```
Local appliance ID=2 ADDRESS=15.0.0.2 TEP ADDRESS=15.0.0.0/16 CHASSIS_ID=3a248ab6-f54a-11e7-8e54-afbc07c905f6
Cluster of 3 lm(t):2(2018-01-09T14:47:58.704+00:00) appliances (out of targeted 3 lm(t):2(2018-01-09T14:49:26.223+00:00)) with FABRIC_DOMAIN name=POD15 set to version=apic-3.1(1i)
lm(t):2(2018-01-09T14:48:06.897+00:00); discoveryMode=PERMISSIVE lm(t):0(1970-01-01T00:00:00.003+00:00)
  appliance id=1 address=15.0.0.1 lm(t):2(2018-01-09T14:35:38.982+00:00) tep address=15.0.0.0/16 lm(t):1(2018-01-03T07:34:33.587+00:00) oob address=10.48.22.122/24
  lm(t):2(2018-01-09T14:57:56.857+00:00) version=3.1(1i) lm(t):1(2018-01-09T14:57:55.508+00:00) chassisId=6e1d8cec-f058-11e7-b798-953038fb2c3c lm(t):1(2018-01-09T14:57:55.508+00:00)
  capabilities=0X7FFFFFFF-0X2020-0X3 lm(t):1(2018-01-09T14:48:05.476+00:00) rK=(stable,present,0X206173722D687373) lm(t):2(2018-01-09T14:57:56.857+00:00)
  aK=(stable,present,0X206173722D687373) lm(t):2(2018-01-09T14:57:56.857+00:00) cntrlSbst=(APPROVED, FCH1843V022) lm(t):1(2018-01-03T11:43:44.155+00:00) (targetMbSsn=
  lm(t):0(zeroTime), failoverStatus=0 lm(t):0(zeroTime)) podId=1 lm(t):1(2018-01-05T14:31:24.921+00:00) commissioned=YES lm(t):2(2018-01-09T14:35:38.804+00:00) registered=YES
  lm(t):2(2018-01-09T14:35:38.804+00:00) standby=NO lm(t):3(2018-01-09T14:35:38.804+00:00) active=YES(2018-01-09T14:48:01.004+00:00) health=(applnc:255 lm(t):1(2018-01-09T14:48:54.488
  +00:00) svc's)
  appliance id=2 address=15.0.0.2 lm(t):2(2018-01-09T14:35:30.447+00:00) tep address=15.0.0.0/16 lm(t):2(2018-01-09T14:35:30.447+00:00) oob address=10.48.22.123/24
  lm(t):2(2018-01-09T14:35:35.348+00:00) version=3.1(1i) lm(t):2(2018-01-09T14:57:55.423+00:00) chassisId=3a248ab6-f54a-11e7-8e54-afbc07c905f6 lm(t):2(2018-01-09T14:57:55.423+00:00)
  capabilities=0X7FFFFFFF-0X2020-0X7 lm(t):2(2018-01-09T14:53:05.175+00:00) rK=(stable,present,0X206173722D687373) lm(t):2(2018-01-09T14:35:35.351+00:00)
  aK=(stable,present,0X206173722D687373) lm(t):2(2018-01-09T14:35:35.351+00:00) cntrlSbst=(APPROVED, FCH1846V2XU) lm(t):2(2018-01-09T14:57:55.423+00:00) (targetMbSsn=
  lm(t):0(zeroTime), failoverStatus=0 lm(t):1(2018-01-09T14:42:04.461+00:00)) podId=1 lm(t):2(2018-01-09T14:35:30.447+00:00) commissioned=YES lm(t):2(zeroTime) registered=YES
  lm(t):2(2018-01-09T14:35:30.447+00:00) standby=NO lm(t):2(2018-01-09T14:35:30.447+00:00) active=YES(2018-01-09T14:35:30.447+00:00) health=(applnc:255 lm(t):2(2018-01-09T14:48:54.397
  +00:00) svc's)
  appliance id=3 address=15.0.0.3 lm(t):2(2018-01-09T14:35:38.982+00:00) tep address=15.0.0.0/16 lm(t):3(2018-01-05T14:45:24.749+00:00) oob address=10.48.22.124/24
  lm(t):2(2018-01-09T14:57:56.858+00:00) version=3.1(1i) lm(t):3(2018-01-09T14:57:55.461+00:00) chassisId=c4c33538-f058-11e7-8775-219f757b8829 lm(t):3(2018-01-09T14:57:55.461+00:00)
  capabilities=0X7FFFFFFF-0X2020-0X5 lm(t):3(2018-01-09T14:48:05.684+00:00) rK=(stable,present,0X206173722D687373) lm(t):2(2018-01-09T14:57:56.858+00:00)
  aK=(stable,present,0X206173722D687373) lm(t):2(2018-01-09T14:57:56.858+00:00) cntrlSbst=(APPROVED, FCH1843V0DK) lm(t):3(2018-01-09T14:41:22.331+00:00) (targetMbSsn=
  lm(t):0(zeroTime), failoverStatus=0 lm(t):0(zeroTime)) podId=1 lm(t):3(2018-01-05T14:45:24.749+00:00) commissioned=YES lm(t):2(2018-01-09T14:35:38.792+00:00) registered=YES
  lm(t):2(2018-01-09T14:35:38.804+00:00) standby=NO lm(t):1(2018-01-09T14:35:38.804+00:00) active=YES(2018-01-09T14:47:58.730+00:00) health=(applnc:255 lm(t):3(2018-01-09T14:48:54.442
  +00:00) svc's)
*****Additional elements outside of cluster*****
  appliance id=4 address=15.0.0.4 lm(t):101(2018-01-09T14:57:54.426+00:00) tep address=15.0.0.0/16 lm(t):21(2018-01-09T14:57:47.378+00:00) oob address=10.48.31.27/24
  lm(t):2(2018-01-09T14:57:55.201+00:00) version=3.1(1i) lm(t):21(2018-01-09T14:57:55.606+00:00) chassisId=5846ced4-f54d-11e7-a3dd-576b808dca3 lm(t):21(2018-01-09T14:57:55.606+00:00)
  capabilities=0X7FFFFFFF-0X2020-0X100000 lm(t):21(2018-01-09T14:57:55.606+00:00) rK=(stable,absent,0) lm(t):0(zeroTime) aK=(stable,absent,0) lm(t):0(zeroTime) cntrlSbst=(APPROVED,
  FCH2123V17P) lm(t):3(2018-01-09T14:57:54.473+00:00) (targetMbSsn= lm(t):0(zeroTime), failoverStatus=0 lm(t):0(zeroTime)) podId=1 lm(t):101(2018-01-09T14:57:54.426+00:00)
  commissioned=YES lm(t):3(2018-01-09T14:57:54.469+00:00) registered=YES lm(t):3(2018-01-09T14:57:54.469+00:00) standby=YES lm(t):101(2018-01-09T14:57:54.426+00:00) active=YES oob gw
  address=10.48.31.1 lm(t):2(2018-01-09T14:57:55.201+00:00) oob address v6=:/64 lm(t):2(2018-01-09T14:57:55.201+00:00) oob gw address v6=: lm(t):2(2018-01-09T14:57:55.201+00:00)
  (2018-01-09T14:57:55.355+00:00) health=(applnc:112 lm(t):21(2018-01-09T14:58:03.355+00:00) svc's)3]1 lm(t):21(2018-01-09T14:57:51.483+00:00)[6]:1 lm(t):21(2018-01-09T14:57:51.483+
  00:00)[9]:1 lm(t):21(2018-01-09T14:57:51.483+00:00)[10]:1 lm(t):21(2018-01-09T14:57:51.483+00:00)[11]:1 lm(t):21(2018-01-09T14:57:51.483+00:00)[14]:1 lm(t):21(2018-01-09T14:57:51.483+
  00:00)[16]:1 lm(t):21(2018-01-09T14:57:51.483+00:00)[22]:1 lm(t):21(2018-01-09T14:57:51.483+00:00)[23]:1 lm(t):21(2018-01-09T14:57:51.483+00:00)[34]:1 lm(t):21(2018-01-09T14:57:51.483
  +00:00)[35]:1 lm(t):21(2018-01-09T14:57:51.483+00:00)]
clusterTime=<diff=739781 common=2018-01-09T14:58:14.989+00:00 local=2018-01-09T14:45:55.208+00:00 pF=<displForm=0 offsSt=0 offsVlu=0 lm(t):2(2018-01-09T14:49:26.492+00:00)>>
```

You can replace a specific unit from any other operational unit in the cluster.

Cluster as Seen by Node

Properties

Fabric Name: POD15
Target Size: 3
Current Size: 3
Difference Between Local Time and Unified Cluster Time (ms): 725292
ACI Fabric Internode Secure Authentication Communications: Permissive

Active Controllers

ID	Name	IP	Admin State	Operational State	Health State	Failover Status	Serial Number	SSL Certificate
1	APIC1	15.0.0.1	In Service	Available	Fully Fit	idle	FCH1843V022	yes
2	APIC2	15.0.0.2	In Service	Available	Fully Fit	idle	FCH1846V2...	yes
3	APIC3	15.0.0.3	In Service	Available	Fully Fit	idle	H1843V0...	yes

Standby Controllers

Serial Number	IP	Mode
FCH2123V17P	15.0.0.4	Standby Apic

Context Menu Options: Commission, Decommission, **Replace**, Reset, Save as ..., Post ..., Share, Open In Object Store Browser

Buttons: Reset, Submit

In the case of multiple Standby APICs, you can choose the Standby APIC that you want based on the Serial Number, an enhancement request with the ID [CSCvh49791](#) has been filed to show the Standby APIC ID as well as the serial number when you follow the replacement procedure.

In case you have multiple Standby Units, you need to know the serial number of the unit he is going to use for replacement, which is important especially if APICs are in different PODs / Sites, and in some cases, the location of the unit is important.

Replace

Replace the controller with a backup

Standby Controller: select an option

Retain OOB IP address for Standby (new active): FCH2123V17P Pod-1/T/av

If any condition is true OOB IP update would fail and user should update the OOB policy after the replace operation.

Buttons: Cancel, Submit

As a part of the replacement operation, there is an option to update the Out of Band (OOB) policy with the Standby APIC OOB IP Address and details, which can be beneficial in case the Standby unit is located in a different pod, where original POD IP address is not routable in the second POD.

Replace



Replace the controller with a backup

Backup Controller: FCH2123V17P

Retain OOB IP address for Standby (new active):
Standby(new active) may not retain its OOB address if more than 1 active APICs are down/unavailable.
If any condition is true OOB IP update would fail and user should update the OOB policy after the replace operation.

Cancel Submit

Once the configuration is submitted, the replacement process can start to work on reprovisioning the standby unit.

Cluster as Seen by Node



Properties

Fabric Name: POD15

Target Size: 3

Current Size: 3

Difference Between Local Time and Unified Cluster Time (ms): 725340

ACI Fabric Internode Secure Authentication Communications:

Active Controllers

ID	Name	IP	Admin State	Operational State	Health State	Failover Status	Serial Number	SSL Certificate
1	APIC1	15.0.0.1	In Service	Available	Fully Fit	idle	FCH1843V022	yes
2	APIC2	15.0.0.2	In Service	Unavailable	Unknown	working-on-reprovisioning-standby	FCH1846V2...	yes
3	APIC3	15.0.0.3	In Service	Available	Fully Fit	idle	FCH1843V0...	yes

Standby Controllers

Serial Number	IP	Mode	State
FCH2123V17P	15.0.0.4	Standby Apic	Approved

Reset Submit

Cluster as Seen by Node

Properties

Fabric Name: POD15
Target Size: 3
Current Size: 3
Difference Between Local Time and Unified Cluster Time (ms): 725356
ACI Fabric Internode Secure Authentication Communications:

Active Controllers

ID	Name	IP	Admin State	Operational State	Health State	Fallover Status	Serial Number	SSL Certificate
1	APIC1	15.0.0.1	In Service	Available	Fully Fit	idle	FCH1843V022	yes
2	APIC2	0.0.0.0	In Service	Unregistered	Not Created	waiting-for-new-apic		yes
3	APIC3	15.0.0.3	In Service	Available	Fully Fit	idle	FCH1843V0...	yes

Standby Controllers

Serial Number	IP	Mode	State
No items have been found. Select Actions to create a new item.			

Reset Submit

Note: Time required for replacement is variable as it depends on the amount of configuration/data that needs to be synchronized, in an empty configuration lab environment, it can take around 10 minutes for the Standby unit to fully replicate and get to a Fully Fit state.

Cluster as Seen by Node

Properties

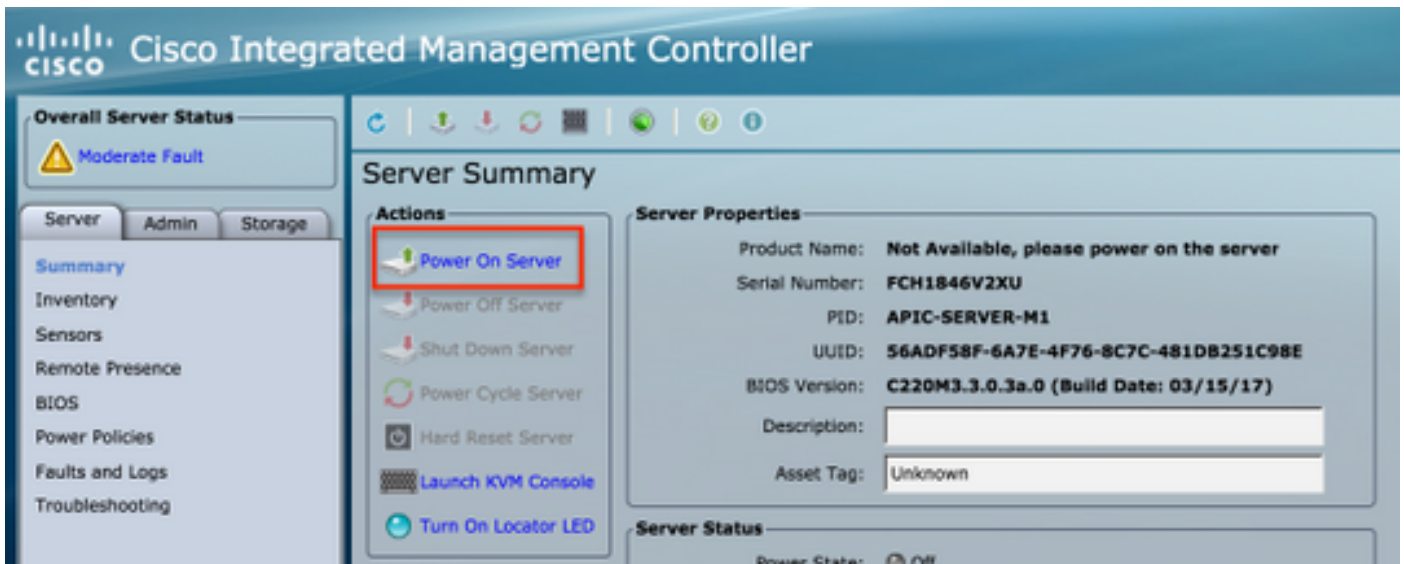
Fabric Name: POD15
Target Size: 3
Current Size: 3
Difference Between Local Time and Unified Cluster Time (ms): 725790
ACI Fabric Internode Secure Authentication Communications:

Active Controllers

ID	Name	IP	Admin State	Operational State	Health State	Fallover Status	Serial Number	SSL Certificate
1	APIC1	15.0.0.1	In Service	Available	Fully Fit	idle	FCH1843V022	yes
3	APIC3	15.0.0.3	In Service	Available	Fully Fit	idle	FCH1843V0DK	yes
2	STDBYAPIC21	15.0.0.2	In Service	Available	Fully Fit	completed	FCH2123V17P	yes

Additional Procedures

In case replaced APIC was operational, it can be placed in Shut Down state, to re-enable it, it needs to be done through the Cisco Integrated Management Controller (CIMC).



Old APIC cannot have access to the Fabric.

```

APIC2# aci diag env read
      ID  Pod ID      Name      Serial Number      IP Address      Role      State      LastUpdMsgId
-----
101     1             LEAF101    SAL19069C0L        15.0.88.64/32   leaf      inactive   0x1000000000040c
102     1             LEAF102    SAL19079J4L        15.0.240.65/32  leaf      inactive   0x1000000000040d
103     1             LEAF3      PDO20392L8S        15.0.240.66/32  leaf      inactive   0x1000000000040e
104     1             LEAF4      PDO20400M25        15.0.56.64/32   leaf      inactive   0x1000000000040f
201     1             SPINE1     SAL1925H0L8        15.0.88.65/32   spine     inactive   0x10000000000410
202     1             SPINE2     SAL1925H0M4        15.0.240.64/32  spine     inactive   0x10000000000411

Total 6 nodes
APIC2#
  
```



Verify

There is currently no verification procedure available for this configuration.

Troubleshoot

There is currently no specific troubleshooting information available for this configuration.