Configure Leaf or Spine Replacement in ACI

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Introduction

This document describes how to replace a leaf or spine switch in the Application Centric Infrastructure (ACI) fabric.

Prerequisites

Requirements

Cisco recommends that you have knowledge of these topics:

- ACI Fabric
- ACI Application Policy Infrastructure Controller (APIC) GUI
- ACI Leaf and Spine Switch CLI

Components Used

The information in this document is based on these software and hardware versions:

- ACI Leaf Switch N9K-C9372TX-E Model
- ACI Fabric Version 2.x. Some GUI updates have been added representing later releases.

The information in this 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



Note: The procedure listed here is applicable for any model of the switch and any ACI version that runs on the fabric.

These are the steps to ensure that the switch is in ACI mode.

- 1. Power on the switch and connect a console.
- 2. Enter the command show version and check to see if the switch is in NxOS mode or ACI mode.
- 3. If it runs in NxOS mode, refer to Converting from Cisco NX-OS to ACI Boot Mode and from ACI Boot Mode Back to Cisco NX-OS in order to convert the switch to ACI mode.

Note: If you are in the USA, choose the preferred version of ACI software to be preloaded when you place the Return Material Authorization (RMA) request.

Configure

Clean Up the Replacement Switch

Once you confirm the switch is in ACI mode, these are the steps to clean up the replacement switch.

- 1. From the new switch console, enter the command setup-clean-config.sh.
- 2. Reload (enter the command reload) in order to clean up any configurations that already exist on the switch.

This prevents the issue due to some configurations that already exist in the new switch that conflicts with the current fabric, even if the new switch was configured with another ACI fabric previously.

Configuration

Step 1. Decommission/Remove the Current/Failed Switch From the Controller

1. In the ACI GUI, navigate to Fabric > Inventory > Fabric Membership and identify the switch to be replaced. In this example, as shown in the image, leaf 103 is replaced.

cisco	System	Tenants	Fabric	VM Networking	L4-L7 Services	Admin	Operations	Apps				Advanced Mode welcome, admin -
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Di Quick Start		raono membe	n or nby									
Pod 1		0 ±										ACTIONS +
 Fabric Membership 	oecy	Serial Number	- Pod 10	Node ID	Node Name	Rack Name	Model	Role		Decomissioned	Supported Model	SSL Certificate
> 🛤 Unmanaged Fabric !	Nodes	FDO20160TPP	1	102	leaf102	default	N9K-C93180YC-EX	leaf	10.0.24.95/32	Falso	True	yes
Urreachable Nodes		FDO203318KQ	1	101	leaf101		N9K-C93180YC-EX	leaf	10.0.168.64/32	False	True	yes
Disabled Interfaces	and Decommissioned Switches	FGE18200AVP		201	spine201		N9K-C9508	spine	10.0.24.94/32	False	True	yes
		SAL1943RTS1	1	104	leaf104		N9K-C9372TX-E	leaf	10.0.24.92/32	False	True	yes
		SAL1943RTT7	1	103	leaf103		N9K-C9372TX-E	leaf	10.0.24.91/32	False	True	yes

- 2. Right-click the switch to be replaced and from the drop-down list choose Decommission Switch. Now a new pop-up window opens, as shown in the image. Check point 4 to see how the GUI differs in the later release.
- 3. Select Remove from Controller and then click Submit.
- 4. As shown in the image, click Yes in order to confirm the decommission process. Now the switch disappears from the Fabric Membership page.

ululu cisco	System	Tenants	Fabric	VM Networking	L4-L7 Service	s Admin	Operations	Apps		P	1	Advanced Mode welcome, sdmin +
		lessenter										
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POD Fabric Setup Policy		Serial Number	= Pod ID	Node ID	Node Name	Decommission Leaf103	(SAL1943RTT7)	() X	p	Decomissioned	Supported Model	SSL Certificate
Facric Membership		FDO20160TPP	1	102	lear102	Record and Record To Base	-		10.0.24.95/32	Faise	True	yes
ED0203318KD		FDO203318KQ	1	101	leaf101	P Rev	ove from controller		10.0.168.64/32	Falso	True	yes
E FGE18200AVP		FGE18200AVP	1	201	spine201		-		10.0.24 94/12	Exten	Trut	yes
SAL1943RTS1		SAL1943RTS1	1	104	icaf104	Warning: The decommiss	ion process can take up to 10	minutes	10.0.24 Decomm	lission	x	yes
SAL1943RTT7		SAL1943RTT7	1	103	leaf103	to complete. The node w	It be automatically wiped and r	reloaded.	10.0.9t (2) Do	you want to decommission	this switch?	yes
Unreachable Nodes Disabled Interfaces and Decom	nissioned Switches	(5) 40	Repair Switch Commaster Switch	50000A		DO NOT manually reload	or power off the node during t	his time.	Ť,			
			Decommission Switch	1			3 SUBM	CLOSE		YES NO		

On later releases, the GUI option can show up differently. Select **Remove From Controller** for switch replacement on 5.x. On 6.0.x, select **Decomission** and then click**Decomission & Remove** to proceed with the switch removal.

System Tenants Fabric Virtual Network	ng Admin Operations	Apps Integrations	5.2.x	release	admin	0 0 😽	
Inventory Fabric Policies Access Policies Inventory	Fabric Membership	Registered Nodes No	les Pending Registration	Unreachable Nodes	Unmanaged Fabric N	lodes Auto	Firmware Update
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	Serial Number Model	Pod ID 🔷 Nod	e ID Name	Node Type	IP	Maintenance	O ± *⊀≁ Status
	FD020160TQN NOV-C02190V	. 101	leaf-K-101	Leaf	10.0.96.64/32	No	Active
	FDO20370BEJ Edit Node and Rac	k Names 102	leaf-L-102	Leaf	10.0.96.67/32	No	Active
	FD0202406AF Decommission	10.4	leaf-N-104	Leaf	10.0.96.68/32	No	Active
	FOX1948G3U7 Maintenance (GIR)	201	spine-R-201	Spine	10.0.96.65/32	No	Active
	FD022220V7C Remove From Con	troller 202	spine-S-202	Spine	10.0.96.66/32	No	Active
Inventory (P) (G) (G) > O- Quick Start (G) Topology	Fabric Membership	Registered Nodes	Nodes Pending Registrat	tion Unreachable Nodes	Unmanaged Fabric	Nodes Auto	Firmware Update
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Inventory (C)	Fabric Membership	Registered Nodes standow Output Virtual Virtual Pod ID • Node de and Rack Names 101 ston 102 ston 201 ance (0.0%) 2101 2 2201	Nodes Pending Registral O Decommissioned O Martenance O Active O Active O Active Sg D Name LF101 Decommission L Decommissi L Decommission L Decommissi L Decommis	tion Unreachable Nodes 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	Unmanaged Fabric I Virtual Spines IP 10.0.176.64/32 Units to complete. The ed from the controller. Units time. Second Remove	Nodes Auto commissioned anternance trive Maintenance No switch will be wip It will show up as	Firmware Update

- 5. Disconnect the switch to be replaced from the fabric and disconnect the power cable.
- 6. Unmount the old switch and mount the new switch.

D Tip: The Remove from Controller option completely removes the node from the ACI fabric and the serial

number is disassociated from the Node ID. The **Regular** option (in the earlier release) is used in order to temporarily remove the node from the ACI fabric, with the expectation that the same node rejoins the fabric with the same Node ID in the future. For instance, if the node needs to be temporarily powered down for maintenance.

Step 2. Commission the New Switch

Note: Ensure that the new leaf/spine switch is connected to all the spine/leaf switches in the fabric. If you replace a leaf switch, connect only the uplink cables to your spines. Wait for the leaf switch to be active (step 5) in the fabric before you connect the downlink cables.

Note: Before you add the new replacement switch to the fabric, you have to upgrade it manually to the target image or an image that has a direct upgrade path to the target image (in case you would like the last upgrade step done by a policy upgrade to make sure the BIOS/FPGA is updated properly). When you add a switch with an image that has multiple upgrade steps to the target image, it causes multiple issues and impacts your production environment.

If the switch is in ACI mode and you have connected it to the fabric, the new switch, once powered on, can get discovered automatically through Link Layer Discovery Protocol (LLDP).

- 1. Power on the new switch and connect the new switch to the fabric.
- 2. Navigate back to GUI > Fabric > Inventory > Fabric Membership and look for a new switch which does not have an IP address assigned (0.0.0.0) and no node ID assigned, as shown in the image. Cross verify the switch with its serial number.

cisco	System	Tenants	Fabric	VM Networking	L4-L7 Services	Admin	Operations	Apps				Advanced Mod welcome, admin
		Inventory										
mentary		Enbrin Mombo	rehin									8
M Quick Start		Paulie Menie	a Sing.									
Topology		0 ±										ACTIONS -
PCD Fabric Setup Policy		Serial Number	+ Pod ID	Node ID	Node Name	Rack Name	Model	Role	p	Decomissioned	Supported Model	SSL Certificate
FDO20160TPP		FDO20160TPP	1	102	leaf102	default	N9K-C93180YC-EX	leaf	10.0.24.95/32	False	True	yes
E0020331880		FDO20331BKQ	1	101	leaf101		N9K-C93180YC-EX	leaf	10.0.168.64/32	False	True	yes
FGE18200AVP		FGE18200AVP	1	201	spine201		N9K-C9508	spine	10.0.24.94/32	False	True	yes
SAL1943RTS1		SAL1943RTS1	1	104	leaf104		N9K-C93727X-E	leaf	10.0.24.92/32	False	True	yes
SAL1943RTT7 Minimanaged Fabric Nodes Unreachable Nodes		SAL1943RTT7	1	0			N9K-C9372TX-E	leaf	0.0.0	false	Falso	n/a

3. As shown in the image, right-click the new switch and from the drop-down list choose Register Switch.

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		Inventor										
wentery	S 3	Fabric Membe	rship									E .
Quick Start			in crimp									
Pod 1		0+										ACTIONS -
POD Fabric Setup Policy		Serial Number	- Pod D	Note D	Node Name	Rack Name	Model	Role		Decomissioned	Supported Model	SSL Certificate
Fabric Membership		FDO20160TPP	1	102	leaf102	default	N9K-C93180YC-EX	leaf	10.0.24.95/32	False	True	yes
Unerscheite Nodes	FDO203318KQ	1	101	leaf101		N9K-C93180YC-EX	leaf	10.0.168.64/32	False	True	yes	
	FGE18200AVP	1	201	spine201		N9K-C9508	spine	10.0.24.94/32	Faine	True	VIII	
		SAL 19438751	1	104	jeaf104		N9K-C9372TX-E	leaf	10.0.24.92/32	Faise	The	ves.
		SAL 19439TT2		0			N9K-C9322TX-E	last	0.0.0.0	Ealso	Faine	nia
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Intellin CISCO	System	Tenants Tenants Deverso Fabric Member Fobosiserse Fobosiserse Fobosiserse Fobosiserse Fobosiserse Fobosiserse Fobosiserse	Seconsesson Belton Peelle Y I Fabrico Y I Fabrico Profilio - Pod ID 1 1	VM Networking ms Policies Node ID 102 101 201	L4-L7 Services	Admin Reck Name default	Operations Note: New-Ceb180rC-EX New-Ceb180rC-EX New-Ceb180rC-EX	Appa Role Keal Keal Keal	P 10.02495/32 100.14684/32	Decomposed Fase Fase Fase	i Supported Model Trae Trae	Advenced biod webcores, advise Control of the SSE, Construme yets yets yets
Classifier Cost Start Cost	System E D Commissioned Switches	Tonanta Tonanta Fabric Member Focoisonre Focoisonre Focoisonre Focoisonre Focoisonre Focoisonre Focoisonre	Seconsesson Belton Deale y I Fabrico y I Fabrico Proble Publice 1 Acc enship 1 1 1 1 1	Vul Networking - met Pulsee 102 101 201 201	L4-L7 Services	Admin Rec Nane defaut	Openations Notel NINC-G31807C-EX NINC-G31807C-EX NINC-G303807C-EX	Apps Note Seaf Leaf Spine	P 100.24.95/32 100.24.94/32 100.24.94/32 100.24.94/32	Decontragonee False False False False	l Supported Moder True True True True	Adamasi Mati wekane, adata ACTORE - SOL Contrain yes yes yes yes yes
Classical Interfaces and D Costs Start Costs Start Costs Start Costs Starts Faces Press Costs Starts Starts Press Costs Starts Starts Press Costs Starts Starts Press Costs Starts Starts Starts Starts Costs Costs	System E 2 s Decommissioned Switches	Tenores Tenores Exercise Fabric Member Poccosorerre Poccosorerre Poccosorerre Poccosorerre Poccosorerre Poccosorerre Poccosorerre Poccosorerre Poccosorerre	Seconservation Behavior People y Feddric Petricker Acco arship Peol ID 1 1 1 1 1	VAI Networking met Paktee Network 102 101 201 201 201 201 201 201 201 201	Ket-L7 Services Note home Metho2: Metho3 Serve21 Metho4	Admin Reck Name default	Operations Need NeedBitIntro-DX Net-Catalitor-DX Net-Catalitor-DX Net-Catalitor-DX Net-Catalitor-DX	Appos Nois Nois Nois Nois Nois Nois Nois No	P 100.24.95/32 100.24.95/32 100.24.95/32 100.24.95/32 100.24.95/32	Deconstoled False False False False False False	1 Supporter Model True True True True	Advanced Mod welcome, editerio welcome, editerio Actitodes – 505, Controler 945 945 945 945 945

4. The fields, as shown in the image, are to be filled with the required information.

- POD ID: Default is 1. If you have a multi-pod fabric, use the correct POD ID.
- Node ID: It is very important to configure the correct node ID. Enter the same node ID as the previous switch because the APIC pushes the configuration based on the node ID. Once you assign and it gets registered, you cannot change this without decommissioning the switch.
- Node Name: Enter the same name for the node as before.
- 5. As shown in the image, the new leaf gets an IP assigned from the APIC DHCP pool.

cisco System	Tenants	Fabric	VM Networking	L4-L7 Services	Admin	Operations	Apps		P	i	Advanced Mode welcome, admin +
	Inventor										
Constant Constant	Fabric Membe	ership									i
Topology M Pod 1 POD Fabric Satur Policy	0 ₹										ACTIONS -
* 🖿 Fabric Membership	Serial Number	- Pod ID	Node ID	Node Name	Rack Name	Model	Role	P	Decomissioned	Supported Model	SSL Certificate
Unmanaged Fabric Nodes	FD020160TPP	10	102	leaf102	default	N9K-C93180YC-EX	loof	10.0.24.95/32	False	True	Yes
Contractable Nodes	FDO203318KQ	1	101	leaf101		N9K-C93180YC-EX	leaf	10.0.168.64/32	Falso	Truo	yes
Disabled Interfaces and Decommissioned Switches	FGE18200AVP	1	201	spine201		N9K-C9508	spine	10.0.24.94/32	False	True	yes
	SAL1943RTS1	1	104	leaf104		N9K-C9372TX-E	leaf	10.0.24.92/32	False	True	yes
	SAL1943RTT7	1	103	leaf103		N9K-C9072TX-E	leaf	10.0.184.95/32	Falso	True	yes

6. If you replace the leaf switch, connect the downlink cables now and confirm all ports are up.



Note: If the decommissioned node has Port Profile deployed on it, an additional reload is necessary in the commissioned node in order to apply the configuration in the ports.

Verify

Use this section in order to confirm that your configuration works properly.

1. You can verify the switch status in GUI > Fabric > Inventory > Topology. The new switch is part of the topology, as shown in the image.



2. Connect to the APIC IP address through SSH and enter the command acidiag fnvread in order to confirm the new switch state which shows up as active.

apic1# ac ID	idiag fnvread Pod ID	Name	Serial Number	IP Address	Role	State	.astUpdMsgId
101	1	leaf101	FD020331BKQ	10.0.168.64/32	leaf	active	0
102	1	leaf102	FD020160TPP	10.0.24.95/32	leaf	active	0
103	1	leaf103	SAL1943RTT7	10.0.184.96/32	leaf	active	0
104	1	leaf104	SAL1943RTS1	10.0.24.92/32	leaf	active	0
201	1	spine201	FGE18200AVP	10.0.24.94/32	spine	active	0
Total 5 n	odes						
apic1# 📒							

Troubleshoot

This section provides information you can use in order to troubleshoot your configuration.

Scenario 1. The New Node is Not Discovered in the Fabric

- 1. Connect a console and enter the command show version.
- 2. If it is in NxOS mode, convert to ACI mode.
- 3. Enter the command show lldp neighbors and check if it discovers the directly connected switch.
- 4. If it is not listed, check and confirm the cable is good. Otherwise, open a case with the Technical Assistance Center (TAC) for help.

Note: For the procedure to convert NxOS mode to ACI mode, refer to the Background Information section.

Scenario 2. The Newly Added Switch is Shown as NOT SUPPORTED

- 1. Navigate to GUI > Fabric > Inventory > Fabric Membership.
- 2. Check whether the new switch is listed as No under the Supported Model column.
- 3. If No, it could be the issue of your APIC catalog firmware which is too old. Thus, the model of the new switch is not listed in the catalog.

In order to solve this, upgrade the APIC to the same code version as the new switch. After which, the new switch can join the fabric.

Scenario 3. SSL Certificate Issue

If the switch fails to get registered with the fabric after you assign a node ID and node name, there could be an SSL certificate issue. In order to verify this, from the console enter the command netstat -an | grep <TEP ip of APIC> and check for an ESTABLISHED session with APIC on port 12215. This session can be established with any of the APICs in your fabric. In order to verify, enter the command again with different APIC IP addresses.

leaf102#	netsta	t -an grep 10.0.0.		
tcp	0	0 10.0.248.0:53492	10.0.0.3:12343	ESTABLISHED
tcp	0	0 10.0.248.0:59471	10.0.0.1:7777	TIME_WAIT
tcp	0	0 10.0.248.0:12183	10.0.0.2:40202	ESTABLISHED
tcp	0	0 10.0.248.0:45388	10.0.0.1:12343	ESTABLISHED
tcp	0	0 10.0.248.0:54347	10.0.0.3:12567	ESTABLISHED
tcp	0	0 10.0.248.0:54645	10.0.0.2:12567	ESTABLISHED
tcp	0	0 10.0.248.0:47119	10.0.0.64:4097	ESTABLISHED
tcp	0	0 10.0.248.0:12439	10.0.0.2:39259	ESTABLISHED
tcp	0	0 10.0.248.0:42683	10.0.0.2:12119	ESTABLISHED
tcp	0	0 10.0.248.0:12183	10.0.0.1:33975	ESTABLISHED
tcp	0	0 10.0.248.0:51140	10.0.0.1:12567	ESTABLISHED
tcp	0	0 10.0.248.0:12151	10.0.0.1:46026	ESTABLISHED
tcp	0	0 10.0.248.0:48348	10.0.0.1:12119	ESTABLISHED
tcp	0	0 10.0.248.0:47141	10.0.0.64:4096	ESTABLISHED
tcp	0	0 10.0.248.0:50292	10.0.0.1:12375	ESTABLISHED
tcp	0	0 10.0.248.0:53474	10.0.0.3:12375	ESTABLISHED
tcp	0	0 10.0.248.0:34757	10.0.0.1:12343	ESTABLISHED
tcp	0	0 10.0.248.0:38933	10.0.0.2:12343	ESTABLISHED
tcp	0	0 10.0.248.0:50201	10.0.0.64:5001	ESTABLISHED
tcp	0	0 10.0.248.0:54683	10.0.0.3.12119	ESTABLISHED
tcp	0	0 10.0.248.0:54608	10.0.0.2:12215	ESTABLISHED
tcp	0	0 10.0.248.0:44738	10.0.0.3:1250/	ESTABLISHED

Example:

An established session with any of the APICs on port 12215 means that the new switch is able to communicate with the APIC policy manager. If you do not see this session with any of the APICs, it could be an SSL certificate issue. Open a case with TAC for further assistance.

Scenario 4. New Switch Does not Get a TEP IP Address Assigned

If the new switch does not get a TEP IP address assigned after you register the switch, it can be because of an issue in DHCP IP address allocation from the APIC. Open a case with TAC for assistance.