

TABLE OF CONTENTS

1 INTRODUCTION	3
2 LAB REFERENCE & TOPOLOGY INFORMATION	3
3 DELETE THE EXISTING OUT OF BAND NODE MANAGEMENT ADDRESSES CONFIGURATION FOR YOUR DESIGNATED ACI FABRIC	4
4 CONFIGURE OUT OF BAND STATIC NODE MANAGEMENT ADDRESSES FOR DESIGNATED ACI FABRIC	8
5 VERIFY OUT OF BAND STATIC NODE MANAGEMENT ADDRESSES CONFIGURATION AND CONNECTIVITY FOR ALL NODES IN YOUR DESIGNATED ACI FABRIC	10

1 Introduction

The following lab sections will introduce you a new Out-Of-Band Feature for Static Node Management Addresses. As your recall from the Fabric Infrastructure Lab 1, The Out-Of-Band Configuration section had you configure a “Static” Address in an IP Address Pool\Range of “1” address. To address this workaround configuration for assigning a single IP address to a Node in the Fabric, Version 1.0(2x) introduced the “Static Node Management Addresses” feature. Now, you can simply created a Static Node Management Address assignment to a specific Node.

Note: This Lab is to be completed AFTER your designated ACI Fabric has successfully been upgraded to Firmware Version 1.0(2m).

2 Lab Reference & Topology Information

For the following sections in this lab, please use the following fabric information for the POD1 in your fabric pod assignments.

Device\Entity	NodeID	Fabric 1	Fabric 2
APIC 1 (OOB IP Address)	1	10.122.254.211	10.122.254.141
APIC 2 (OOB IP Address)	2	10.122.254.212	10.122.254.142
APIC 3 (OOB IP Address)	3	10.122.254.213	10.122.254.143
Spine 1 (OOB IP Address)	201	10.122.254.244	10.122.254.130
Spine 2 (OOB IP Address)	202	10.122.254.245	10.122.254.131
Leaf 1 (OOB IP Address)	101	10.122.254.241	10.122.254.128
Leaf 2 (OOB IP Address)	102	10.122.254.242	10.122.254.135
Leaf 3 (OOB IP Address)	103	10.122.254.243	10.122.254.136
Leaf 4 (OOB IP Address)	104	10.122.254.154	10.122.254.137
OOB Default Gateway		10.122.254.1 / 24	10.122.254.1 / 24

The Online documentation for Out-Of-Band management configuration (at the time of writing this lab) does not mention this feature in the “APIC Getting Started Guide”. Here are the Two Help Screens that are accessible on the APIC itself. Configuration steps are somewhat similar to those used before in the earlier lab and are straightforward.

Static Node Management Addresses - Screenshot examples of the APIC GUI Online Help:

Static Node Management Addresses Panel

Property	Description
Node	The node identifier.
Address	The management IP address.
Gateway	The management Gateway address.
EPG	The end point group.

Create Static Node Management Addresses Wizard

Property	Description
Node Range	Set the node selection range.
Config	Set the policy configuration to Out-of-Band or In-Band addresses.

3 Delete the Existing Out Of Band Node Management Addresses configuration for your designated ACI Fabric

For this lab section, you will delete your designated ACI Fabric's existing Node Management Addresses for Out-Of-Band Management. You are deleting the Node Management Addresses for Out-Of-Band Management that you created in the first Infrastructure Lab (when running Firmware version 1.0(1n)).

The lab tasks for this section of the lab:

- **Delete the existing “Managed Node Connectivity Groups” from OOB Lab 1.**
- **Delete the existing “IP Address Pools” from OOB Lab 1.**
- **Delete the existing “Node Management Addresses” from OOB Lab 1.**

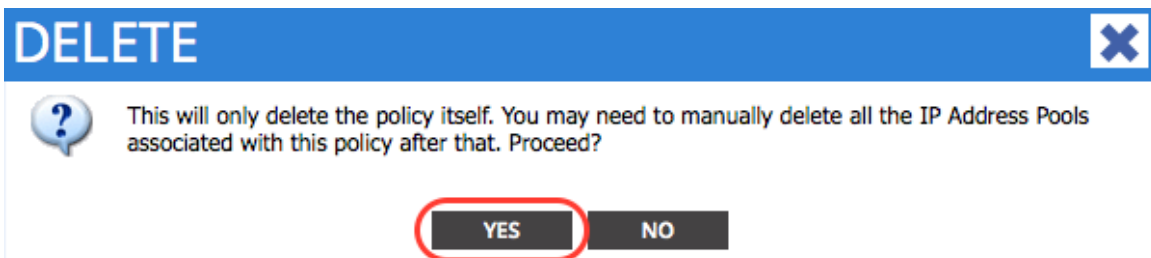
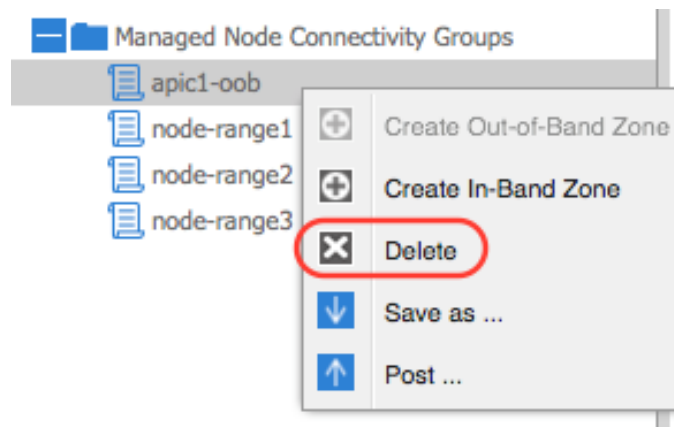
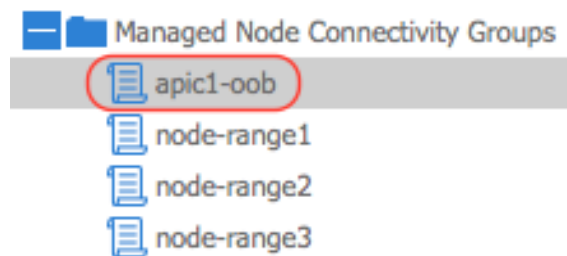
Note: APIC Firmware Version 1.0(2m) should be running in Fabric at the beginning of this lab.

Task 1: Delete the existing “Managed Node Connectivity Groups” from OOB Lab 1.

On the menu bar, choose TENANTS > mgmt. In the Navigation pane, expand MANAGED NODE CONNECTIVITY GROUPS. To Delete the Managed Node Connectivity Groups, perform the following actions:

- 1.1. Select a Managed Node Connectivity Groups created in OOB Lab 1. ([apic1-oob](#)).
- 1.2. Right Click and Select **Delete**
- 1.3. Click on "Yes" to Confirm Delete
- 1.4. **Repeat** the above steps and Delete the remaining Managed Node Connectivity Groups that you created in the earlier Out-Of-Band Management Lab.

Task 1 - Screenshot example:

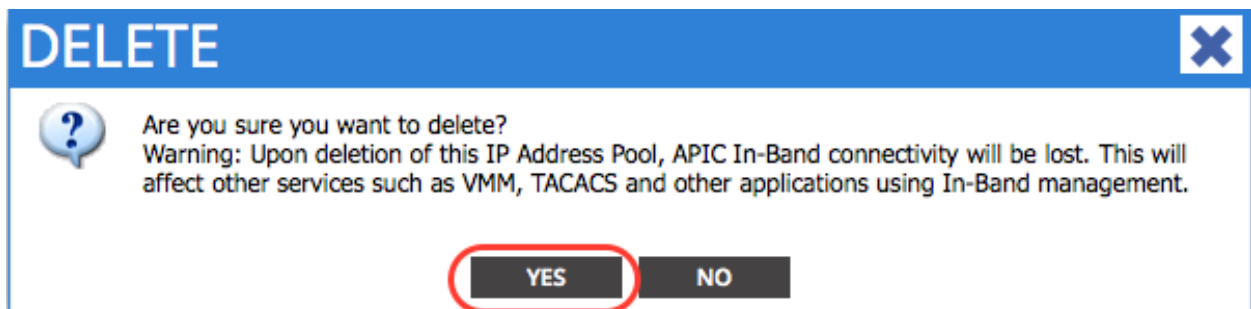
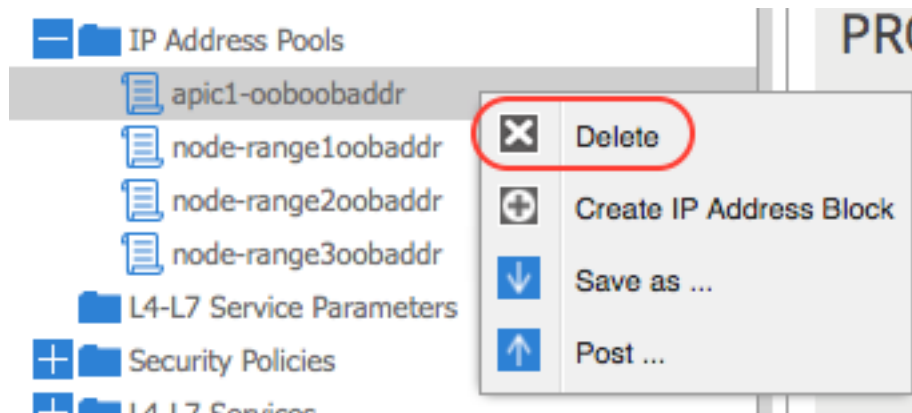
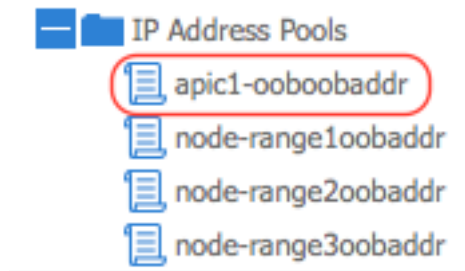


Task 2: Delete the existing "IP Address Pools" from OOB Lab 1.

On the menu bar, choose TENANTS > mgmt. In the Navigation pane, expand IP ADDRESS POOLS. To Delete the IP Address Pools, perform the following actions:

- 2.1. Select an IP Address Pool created in OOB Lab 1. ([apic1-ooboobaddr](#)).
- 2.2. Right Click and Select **Delete**
- 2.3. Click on "**Yes**" to Confirm Delete
- 2.4. **Repeat** the above steps and Delete the remaining IP Address Pools that you created in the earlier Out-Of-Band Management Lab.

Task 2 - Screenshot example:

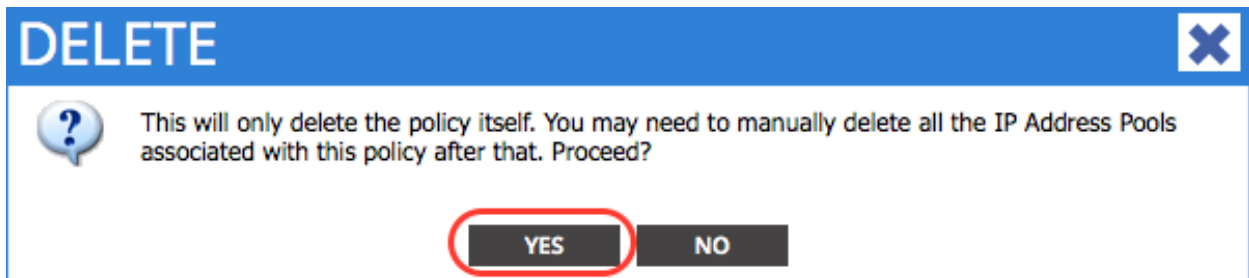
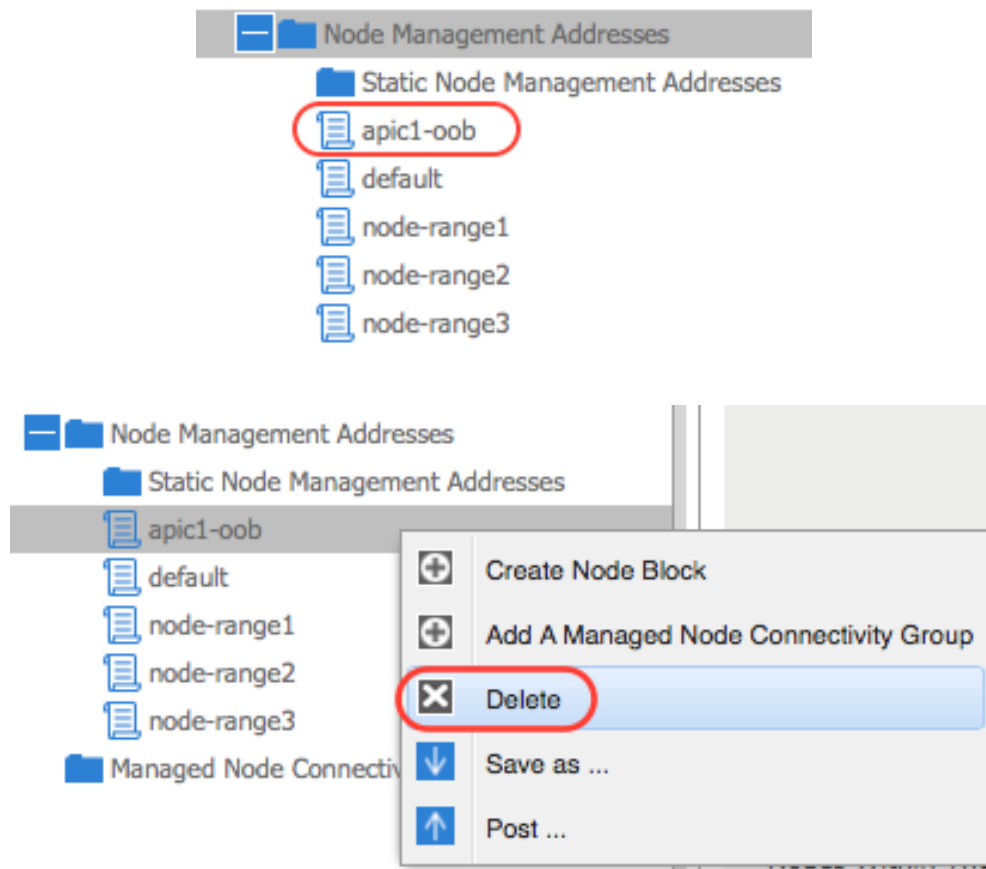


Task 3: Delete the existing “Node Management Addresses” from OOB Lab 1.

On the menu bar, choose TENANTS > mgmt. In the Navigation pane, expand NODE MANAGEMENT ADDRESSES. To Delete the Node Management Addresses, perform the following actions:

- 3.1. Select a Node Management Address created in OOB Lab 1. ([apic1-oob](#)).
- 3.2. Right Click and Select **Delete**
- 3.3. Click on "Yes" to Confirm Delete
- 3.4. **Repeat** the above steps and Delete the remaining Node Management Addresses that you created in the earlier Out-Of-Band Management Lab.

Task 3 - Screenshot example:



4 Configure Out Of Band **Static Node Management Addresses** for designated ACI Fabric

For this lab section, you will create Out-Of-Band Management Addresses using the new Out-Of-Band Feature for Static Node Management Addresses. Refer to Section 2 above for your designated ACI Fabric's NodeID and OOB IP Address information.

The lab tasks for this section of the lab:

- **Create "Static Node Management Addresses" for all of the APIC Controllers and Switch Nodes in your designated ACI Fabric.**

Note: APIC Firmware Version 1.0(2m) should be running in Fabric at the beginning of this lab.

LAB - Configuring Out-of-Band Management Access Using the GUI

Task 1: Create "Static Node Management Addresses" for all of the APIC Controllers and Switch Nodes in your designated ACI Fabric.

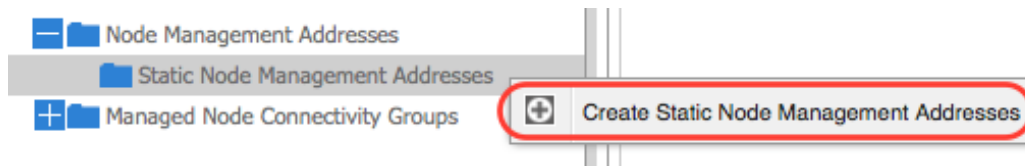
For Static Node Management Addresses, You will create a Node Range of "**1 Device**" to statically assign an IP address to Each Node in the Fabric.

On the menu bar, choose **TENANTS > mgmt**. In the Navigation pane, expand Tenant mgmt. Expand Node Management Addresses, perform the following actions:

- 1.1. Select **Static Node Management Addresses**
- 1.2. Right Click and Select "**Create Static Node Management Addresses**"
- 1.3. In the Create Static Node Management Addresses dialog box, perform the following actions:
 - 1.3.1. Enter **Node Range** (Enter 1 for APIC1)
 - 1.3.2. Select **Config Type** (Check Out-Of-Band Addresses)
 - 1.3.3. Select **Out-Of-Band Management EPG** (default)
 - 1.3.4. Enter **Out-Of-Band Starting IP Address** (10.122.254.141/24)
 - 1.3.5. Enter **Mask** (if not already applied)
 - 1.3.6. Enter **Out-Of-Band Gateway** (10.122.254.1)
 - 1.3.7. Click **SUBMIT**
 - 1.3.8. Click "**YES**" to Confirm
 - 1.3.9. **Repeat** the above steps for all Controllers & Switches in your designated Fabric

The Static Node Management Addresses for Out-Of-Band Management are configured for All the Nodes in your designated ACI Fabric.

Figure Task 1 - Screenshot examples



CREATE STATIC NODE MANAGEMENT ADDRESSES...

Specify policy name and a node range, and set their IPs.

Node Range: -
From To

Config: Out-Of-Band Addresses
 In-Band Addresses

OUT-OF-BAND ADDRESSES

Out-Of-Band Management EPG:

Out-Of-Band Starting IP Address: Mask:

Out-Of-Band Gateway:

CONFIRM

This will assign new management IP addresses to the selected range of nodes. Proceed?

5 Verify Out Of Band Static Node Management Addresses configuration and connectivity for all Nodes in your designated ACI Fabric

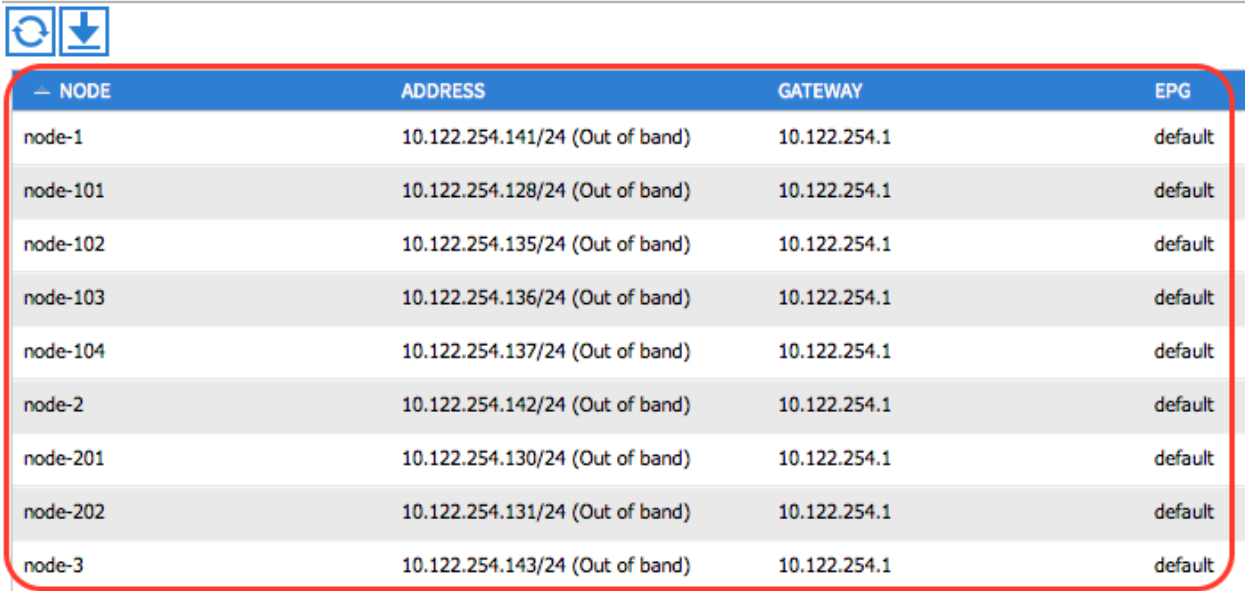
Use the section 2 Lab Reference & Topology Information, you have been provided a table of Out of Band (OOB) addresses for your designated Fabric.

5.1 Using the Admin APIC **GUI**, verify the Static Node Management Addresses are configured to the APICs and Node Switches.

On the menu bar, choose **TENANTS > mgmt.** In the Navigation pane, expand Tenant mgmt. Under Tenant mgmt, select **NODE MANAGEMENT ADDRESSES.** In the Work pane, Click on the **STATIC NODE MANAGEMENT ADDRESSES** Tab to Verify the Out-Of-Band Address configuration for the APIC Controllers and NODE Switches.

Figure Task 5.1 - Screenshot example

Static Node Management Addresses



NODE	ADDRESS	GATEWAY	EPG
node-1	10.122.254.141/24 (Out of band)	10.122.254.1	default
node-101	10.122.254.128/24 (Out of band)	10.122.254.1	default
node-102	10.122.254.135/24 (Out of band)	10.122.254.1	default
node-103	10.122.254.136/24 (Out of band)	10.122.254.1	default
node-104	10.122.254.137/24 (Out of band)	10.122.254.1	default
node-2	10.122.254.142/24 (Out of band)	10.122.254.1	default
node-201	10.122.254.130/24 (Out of band)	10.122.254.1	default
node-202	10.122.254.131/24 (Out of band)	10.122.254.1	default
node-3	10.122.254.143/24 (Out of band)	10.122.254.1	default

5.2 Using the **CLI** on the APIC Controllers and Node Switches, verify the OOB IP Address configured, the IP Route Table, and test IP Connectivity.

5.2.1 SSH to an **APIC** and perform the following actions:

- `ip link | grep oobmgmt`
- `ip route show | grep oobmgmt`
- `ifconfig -a oobmgmt`
- `ping < Default Gateway >`
- `ping < DNS Server 1 (Preferred) 64.102.6.247 >`
- `ping < NTP Server 1 (Preferred) 172.18.108.15 >`

Task 5.2.1 – Display Output

```
TDELEON-M-205R:~ tdeleon$ ssh admin@10.122.254.141
Happy New Year from the ACI Solutions Team!

admin@fab2-apic1:~> ip link | grep oobmgmt
7: bond1: <BROADCAST,MULTICAST,MASTER,UP,LOWER_UP> mtu 1500 qdisc noqueue
master oobmgmt state UP
57: oobmgmt: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue
state UP

admin@fab2-apic1:~> ip route show | grep oobmgmt
default via 10.122.254.1 dev oobmgmt metric 16
10.122.254.0/24 dev oobmgmt proto kernel scope link src 10.122.254.141

admin@fab2-apic1:~> ifconfig -a oobmgmt
oobmgmt  Link encap:Ethernet  HWaddr 74:26:AC:C9:91:A4
          inet addr:10.122.254.141  Bcast:10.122.254.255  Mask:255.255.255.0
          inet6 addr: fe80::7626:acff:fec9:91a4/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:413215 errors:0 dropped:0 overruns:0 frame:0
          TX packets:50438 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:38962457 (37.1 MiB)  TX bytes:87948859 (83.8 MiB)
```

Use PING to test connectivity to:

- **Default Gateway**

```
admin@fab2-apic1:~> ping 10.122.254.1
PING 10.122.254.1 (10.122.254.1) 56(84) bytes of data.
64 bytes from 10.122.254.1: icmp_seq=1 ttl=255 time=529 ms
64 bytes from 10.122.254.1: icmp_seq=2 ttl=255 time=0.456 ms
```

- **DNS Server 1 (Preferred) 64.102.6.247**

```
admin@fab2-apic1:~> ping 64.102.6.247
PING 64.102.6.247 (64.102.6.247) 56(84) bytes of data.
64 bytes from 64.102.6.247: icmp_seq=1 ttl=246 time=1.02 ms
64 bytes from 64.102.6.247: icmp_seq=2 ttl=246 time=1.03 ms
```

- **NTP Server 1 (Preferred) 172.18.108.15**

```
admin@fab2-apic1:~> ping 172.18.108.15
PING 172.18.108.15 (172.18.108.15) 56(84) bytes of data.
64 bytes from 172.18.108.15: icmp_seq=1 ttl=55 time=1.09 ms
64 bytes from 172.18.108.15: icmp_seq=2 ttl=55 time=2.14 ms
```

Note: Repeat the above PING tests on each of the APIC Controllers.

5.2.2 SSH to an APIC and **attach** to each of the **switches** and perform the following actions:

```
admin@fab2-apic1:~> acidiag fvnread
```

ID	Name	Serial Number	IP Address	Role	State	LastUpdMsgId
101	fab2-leaf1	SAL1802KLJ7	10.0.168.91/32	leaf	active	0
102	fab2-leaf2	SAL17236LZ2	10.0.168.95/32	leaf	active	0
103	fab2-leaf3	SAL1816QWKS	10.0.168.93/32	leaf	active	0
104	fab2-leaf4	SAL1816QWDQ	10.0.168.92/32	leaf	active	0
202	fab2-spine2	FGE173900SF	10.0.168.94/32	spine	active	0

Total 5 nodes

```
admin@fab2-apic1:~> attach fab2-leaf1
```

```
# Executing command: ssh fab2-leaf1
```

On **LEAF** Node Switches, execute the following commands:

- `ip link | grep eth0`
- `ip route show | grep eth0`
- `ifconfig -a eth0`
- `ping < Default Gateway >`
- `ping < DNS Server 1 (Preferred) 64.102.6.247 >`
- `ping < NTP Server 1 (Preferred) 172.18.108.15 >`

```
fab2-leaf1# ip link | grep eth0
```

```
2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc mq state UP  
mode DEFAULT qlen 1000
```

```
fab2-leaf1# ip route show | grep eth0
```

```
default via 10.122.254.1 dev eth0  
10.122.254.0/24 dev eth0 proto kernel scope link src 10.122.254.128
```

```
fab2-leaf1# ifconfig -a eth0
```

```
eth0      Link encap:Ethernet  HWaddr 7c:69:f6:10:5b:c8  
          inet addr:10.122.254.128  Bcast:10.122.254.255  
Mask:255.255.255.0  
          inet6 addr: fe80::7e69:f6ff:fe10:5bc8/64 Scope:Link  
UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1  
RX packets:814478 errors:0 dropped:0 overruns:0 frame:0  
TX packets:2584 errors:0 dropped:0 overruns:0 carrier:0  
collisions:0 txqueuelen:1000  
RX bytes:82085516 (78.2 MiB)  TX bytes:201116 (196.4 KiB)
```

Use PING to test connectivity to:

- **Default Gateway**

```
fab2-leaf1# ping 10.122.254.1
```

```
PING 10.122.254.1 (10.122.254.1): 56 data bytes  
64 bytes from 10.122.254.1: icmp_seq=0 ttl=255 time=6.218 ms  
64 bytes from 10.122.254.1: icmp_seq=1 ttl=255 time=0.457 ms
```

- **DNS Server 1 (Preferred) 64.102.6.247**

```
fab2-leaf1# ping 64.102.6.247
PING 64.102.6.247 (64.102.6.247): 56 data bytes
64 bytes from 64.102.6.247: icmp_seq=0 ttl=246 time=1.097 ms
64 bytes from 64.102.6.247: icmp_seq=1 ttl=246 time=1.075 ms
```

- **NTP Server 1 (Preferred) 172.18.108.15**

```
fab2-leaf1# ping 172.18.108.15
PING 172.18.108.15 (172.18.108.15): 56 data bytes
64 bytes from 172.18.108.15: icmp_seq=0 ttl=55 time=3.536 ms
64 bytes from 172.18.108.15: icmp_seq=1 ttl=55 time=3.207 ms
```

Note: Repeat the above PING tests on each of the LEAF Node Switches.

```
admin@fab2-apic1:~> attach fab2-spine2
# Executing command: ssh fab2-spine2
```

On **SPINE** Node Switches, execute the following commands:

- `ip link | grep eth6`
- `ip route show | grep eth6`
- `ifconfig -a eth6`
- `ping < Default Gateway >`
- `ping < DNS Server 1 (Preferred) 64.102.6.247 >`
- `ping < NTP Server 1 (Preferred) 172.18.108.15 >`

```
fab2-spine2# ip link | grep eth6
8: eth6: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc mq state UP
mode DEFAULT qlen 1000
```

```
fab2-spine2# ip route show | grep eth6
default via 10.122.254.1 dev eth6
10.122.254.0/24 dev eth6 proto kernel scope link src 10.122.254.131
```

```
fab2-spine2# ifconfig -a eth6
eth6      Link encap:Ethernet  HWaddr 00:22:bd:fc:04:7a
          inet addr:10.122.254.131  Bcast:10.122.254.255
          Mask:255.255.255.0
          inet6 addr: fe80::222:bdf:fe:fc:47a/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:810857 errors:0 dropped:0 overruns:0 frame:0
```

```
TX packets:2574 errors:0 dropped:0 overruns:0 carrier:0
collisions:0 txqueuelen:1000
RX bytes:81802489 (78.0 MiB) TX bytes:200364 (195.6 KiB)
```

Use PING to test connectivity to:

- **Default Gateway**

```
fab2-spine2# ping 10.122.254.1
PING 10.122.254.1 (10.122.254.1): 56 data bytes
64 bytes from 10.122.254.1: icmp_seq=0 ttl=255 time=5.447 ms
64 bytes from 10.122.254.1: icmp_seq=1 ttl=255 time=0.498 ms
```

- **DNS Server 1 (Preferred) 64.102.6.247**

```
fab2-spine2# ping 64.102.6.247
PING 64.102.6.247 (64.102.6.247): 56 data bytes
64 bytes from 64.102.6.247: icmp_seq=0 ttl=246 time=1.008 ms
64 bytes from 64.102.6.247: icmp_seq=1 ttl=246 time=1.103 ms
```

- **NTP Server 1 (Preferred) 172.18.108.15**

```
fab2-spine2# ping 172.18.108.15
PING 172.18.108.15 (172.18.108.15): 56 data bytes
64 bytes from 172.18.108.15: icmp_seq=0 ttl=55 time=3.437 ms
64 bytes from 172.18.108.15: icmp_seq=1 ttl=55 time=2.483 ms
```

Note: Repeat the above PING tests on each of the SPINE Node Switches.

End of Document