# 排除ACI管理和核心服务故障 — 带内和带外管理

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# 简介

本文档介绍对ACI带外(OOB)和带内(INB)管理进行故障排除的步骤。

# 背景信息

本文档中的资料摘自<u>思科以应用为中心的基础设施故障排除,第二版</u>书,具体来说**是"管理和核心服** 务 — 带内和带外管理"一章。

# 带内管理与带外管理

ACI交换矩阵节点有两种管理连接选项;带外(OOB)(管理设备背面的专用物理管理端口)或带内 (INB)(使用管理租户中的特定EPG/BD/VRF调配带内(INB),具有一定程度的可配置参数)。管理 ("mgmt")租户中存在OOB EPG,但默认情况下存在,且无法修改。它仅允许配置提供的OOB合同 。在APIC上,在"ifconfig"命令输出中观察到OOB接口为"oobmgmt",带内接口将由"bond.x"接口表 示,其中是为带内EPG配置的封装VLAN。

apic1# ifconfig oobmgmt
oobmgmt: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
 inet 192.168.4.20 netmask 255.255.255.0 broadcast 192.168.4.255
 inet6 fe80::7269:5aff:feca:2986 prefixlen 64 scopeid 0x20
 ether 70:69:5a:ca:29:86 txqueuelen 1000 (Ethernet)
 RX packets 495815 bytes 852703636 (813.2 MiB)

RX errors 0 dropped 0 overruns 0 frame 0
TX packets 432927 bytes 110333594 (105.2 MiB)
TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

#### apic1# ifconfig bond0.300

bond0.300: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1496 inet 10.30.30.254 netmask 255.255.255.0 broadcast 10.30.30.255 inet6 fe80::25d:73ff:fec1:8d9e prefixlen 64 scopeid 0x20 ether 00:5d:73:c1:8d:9e txqueuelen 1000 (Ethernet) RX packets 545 bytes 25298 (24.7 KiB) RX errors 0 dropped 0 overruns 0 frame 0 TX packets 6996 bytes 535314 (522.7 KiB) TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

#### 在枝叶上,在"ifconfig"命令输出中,OOB接口被视为"eth0",INB被视作专用SVI。用户可以通过 "ifconfig"或"show ip interface vrf mgmt:"查看接口,其中是为带内VRF选择的名称。

```
leaf101# show interface momt 0
mgmt0 is up
admin state is up,
 Hardware: GigabitEthernet, address: 00fc.baa8.2760 (bia 00fc.baa8.2760)
 Internet Address is 192.168.4.23/24
 MTU 1500 bytes, BW 1000000 Kbit, DLY 10 usec
 reliability 255/255, txload 1/255, rxload 1/255
 Encapsulation ARPA, medium is broadcast
 Port mode is routed
 full-duplex, 1000 Mb/s
 Beacon is turned off
 Auto-Negotiation is turned on
 Input flow-control is off, output flow-control is off
 Auto-mdix is turned off
 EtherType is 0x0000
 30 seconds input rate 3664 bits/sec, 4 packets/sec
 30 seconds output rate 4192 bits/sec, 4 packets/sec
 Rx
   14114 input packets 8580 unicast packets 5058 multicast packets
   476 broadcast packets 2494768 bytes
 Ͳx
    9701 output packets 9686 unicast packets 8 multicast packets
    7 broadcast packets 1648081 bytes
```

#### leaf101# show ip interface vrf mgmt:inb

IP Interface Status for VRF "mgmt:inb-vrf"
vlan16, Interface status: protocol-up/link-up/admin-up, iod: 4, mode: pervasive
IP address: 10.30.30.1, IP subnet: 10.30.30.0/24
secondary IP address: 10.30.30.3, IP subnet: 10.30.30.0/24
IP broadcast address: 255.255.255
IP primary address route-preference: 0, tag: 0

#### "show ip interface vrf mgmt:"将显示带内管理BD子网IP作为辅助IP地址;这是预期输出。

在主干交换机上,带内管理IP地址被添加为"mgmt:"VRF中的专用环回接口。因此,此实施与枝叶 交换机上的带内管理IP实施不同。观察主**干交换机上下面的"show ip int vrf mgmt**:"命令输出

```
IP Interface Status for VRF "mgmt:inb"
lo10, Interface status: protocol-up/link-up/admin-up, iod: 98, mode: pervasive
IP address: 10.30.30.12, IP subnet: 10.30.30.12/32
IP broadcast address: 255.255.255.255
IP primary address route-preference: 0, tag: 0
```

在System Settings下,有一个设置用于选择APIC的带内连接首选项或带外连接首选项。

只有从APIC发送的流量将使用"APIC连接首选项"中选择的管理首选项。 APIC仍然可以在带内或带 外接收流量(假设已配置其中之一)。APIC使用以下转发逻辑:

- •进入接口并流出同一接口的数据包。
- •从APIC发往直连网络的数据包通过直连接口。
- 根据APIC连接首选项,源自APIC、发往远程网络的数据包首选带内或带外。

### APIC连接首选项



已选择OOB的APIC路由表。观察oobmgmt接口的度量值16,该值低于bond0.300带内管理接口度量 32。这意味着带外管理接口将用于传出管理流量。

apic1# <b>bash</b>								
admin@apic1:~> r	route -n							
ernel IP routing table								
Destination	Gateway	Genmask	Flags	Metric	Ref	Use	Iface	
0.0.0.0	192.168.4.1	0.0.0.0	UG	16	0	0	oobmgmt	
0.0.0.0	10.30.30.1	0.0.0.0	UG	32	0	0	bond0.300	

选择带内的APIC路由表。观察带bond0.300管理接口的度量(如果为8,现在该度量低于 oobmgmt接口度量16)。这意味着带bond0.300管理接口将用于传出管理流量。

Kernel IP routir	ng table						
Destination	Gateway	Genmask	Flags	Metric	Ref	Use	Iface
0.0.0.0	10.30.30.1	0.0.0.0	UG	8	0	0	bond0.300
0.0.0.0	192.168.4.1	0.0.0.0	UG	16	0	0	oobmgmt

### 枝叶和主干节点管理首选项不受此设置的影响。这些连接首选项在协议策略下选择。以下是NTP的 示例。

cisco	APIC								admin	٩	C	•	\$	
System	Tenants Fabric	Virtual Netw	orking	L4-L7 Se	rvices	Admin	Operations	Apps	Integr	rations				
Inver	ntory   Fabric Policies	Access Policies												
Policies	Ē	O Prov	/iders - N	TP Server	10.48.3	7 151							0	~
Our Quick St. > ■ Pods	art				10.40.0			Policy	Ope	rational	Fau	lts	Histo	ry
> 🚞 Switches		0	0000									0	+	×-
> 🚞 Modules	s	Pro	operties Host Name/I	IP Address:	10.48.37.15	51								
✓ ➡ Policies ✓ ➡ Pod			C	Description:										
~ 🚞 Da	ate and Time			Preferred:	~									
~ =	Policy DateTimePolicy	,	Minimum Polli	ing Interval:	4		$\bigcirc$							
	NTP Server 10.48.37.151	N	laximum Polli	ing Interval:	6		0							
> =	Policy default			Keys:										+
> 🚞 Si	MP				🔺 Key									
> 🖿 м Е IS	anagement Access IS Policy default						Se	No items have be lect Actions to crea	en found. te a new iten	η.				
> 🚞 Switc	h ace													
> 🚞 Globa	al contract of the second s													
> 🧮 Monit	oring			1 500		1.5 MR COLD								
> 🚞 Troub	leshooting		Manage	ement EPG:	select an o	ption	~							
> 🚞 Geolo	ocation				mamt/de	out-of-Ba fault	nd)							
> Macs	ec				inh man	ot (In-Ban	0							
> 🔜 Analy	tics nt Quota				mgmt/de	fault	<i>''</i>	Sh	ow Usage					

如果在"APIC连接首选项"下选择带内,但在协议下选择带外,则使用协议数据包的哪个接口?

- APIC连接首选项将始终优先于APIC上的协议选择。
- •枝叶节点则相反,它们只引用协议下的选择。

### 场景:无法访问管理网络

如果用户无法访问管理网络,可能是由于许多不同的问题,但他们始终可以使用相同的方法隔离问题。此场景中的假设是用户不能从其L3Out后面访问管理网络中的任何设备。

- •检验APIC连接首选项。图"APIC连接首选项"中对此进行了概述,选项为OOB或带内。
- 根据所选的首选项,验证配置是否正确、接口是否启用、默认网关是否可通过所选接口访问,以及数据包的路径上无丢弃。

不要忘记在GUI的每个配置部分中检查故障。但是,某些配置错误可能会表现为意外状态,但 在其他部分中可能会生成错误,而不是用户最初认为的错误。

# 带外管理访问



## 带外配置验证

对于带外配置,在名为"mgmt"的特殊租户下有四个文件夹要验证:

- •节点管理地址。
- 节点管理EPG。
- •带外合同(根据合同)。
- 外部网络实例配置文件。

节点管理地址可以静态分配,也可以从池中分配。以下是静态地址分配的示例。验证已分配带外 IP地址类型以及默认网关是否正确。

### 静态节点管理地址GUI验证

cisco APIC					adı	min 🔇 🤇		٥
System Tenants Fabric Virtual	Networking L4-L7	Services Admi	n Operatio	ons App	os Integratio	ons		
ALL TENANTS   Add Tenant   Tenant Search:	name or descr	common   infr	a   mgmt	Ecommerce				
mgmt ( ) ( )	Static Node Man	agement Address	es					00
> 🕞 Quick Start							Ó	+ **-
mgmt     mgmt     mgmt	<ul> <li>Node ID</li> </ul>	Name	Туре	EPG	IPV4 Address	IPV4 Gateway	IPV6 Address	IPV6 Gateway
> 🚞 Networking	pod-1/node-1	bdsol-aci37-apic1	Out-Of-Band	default	10.48.176.57/24	10.48.176.1		
> E IP Address Pools	pod-1/node-101	S1P1-Leaf101	Out-Of-Band	default	10.48.176.70/24	10.48.176.1	::	:
> Contracts	pod-1/node-102	S1P1-Leaf102	Out-Of-Band	default	10.48.176.71/24	10.48.176.1		
	pod-1/node-2	bdsol-aci37-apic2	Out-Of-Band	default	10.48.176.58/24	10.48.176.1		
> Node Management EPGs	pod-1/node-201	S1P1-Spine201	Out-Of-Band	default	10.48.176.74/24	10.48.176.1		
<ul> <li>External Management Network Instance Profil.</li> </ul>	pod-1/node-202	S1P1-Spine202	Out-Of-Band	default	10.48.176.75/24	10.48.176.1		
Node Management Addresses	pod-1/node-301	S1P2-Leaf301	Out-Of-Band	default	10.48.176.72/24	10.48.176.1		
Static Node Management Addresses	pod-1/node-302	S1P2-Leaf302	Out-Of-Band	default	10.48.176.73/24	10.48.176.1		
= default	pod-1/node-401	S1P2-Spine401	Out-Of-Band	default	10.48.176.76/24	10.48.176.1		::
> Managed Node Connectivity Groups	pod-1/node-402	S1P2-Spine402	Out-Of-Band	default	10.48.176.77/24	10.48.176.1		
	pod-2/node-3	bdsol-aci37-apic3	Out-Of-Band	default	10.48.176.59/24	10.48.176.1		

带外EPG应出现在节点管理EPG文件夹下。

# 带外EPG — 默认

cisco	APIC								admin	٩	0	
System	Tenants	Fabric	Virtual N	Networking	L4-L7 Servio	ces Admin	Operations	Apps Inte	grations			
ALL TENAN	TS   Add Te	nant   Ter	nant Search:	name or descr	I co	mmon <b>i mgmt</b>	l infra l l	commerce				
mgmt		(		Out-of-E	Band EPG - de	fault	_					0.0
> C► Quick S ∨ Ⅲ mgmt	Start									Policy	Faults	History
> 🖿 App	olication Profiles			8 🗸								O <u>+</u>
> 🖬 Net	working			Properti	es	default						0
> = IP A > = Con	Address Pools htracts icies				Tags:	enter tags separated by	/ comma	$\checkmark$				
> 🖬 Serv	vices de Management i	PGs		Cor	nfiguration Issues: onfiguration State: Class ID:	applied 16387						
	n-Band EPG - in	b_mgmt		•	QoS Class:	Unspecified	~					
	Out-of-Band EPC	à - default		Provi	ded Out-of-Band Contracts:							☆ +
> Exte	ernal Managemei de Management /	it Network In Addresses	stance Profil			OOB Contract	Tenant	Туре	<ul> <li>QoS Clas</li> </ul>	s	State	
> 🖿 Man	naged Node Con	nectivity Grou	ups			OOB-default	mgmt	oobbrc-OOB-defaul	t Unspecified		formed	
				<					Show Usage		Reset	Submit

管理哪些管理服务由带外EPG提供的合同是带外合同文件夹中配置的特殊合同。

带外合同

uluiju cisco	APIC									admin	٩	0		٢	
System	Tenants	Fabric	Virtual N	etworking	L4-L7 Service	Admin	Operati	ons Ap	ops Integ	rations					
ALL TENAN	TS   Add Te	nant   Tena	ant Search: n	ame or descr	l com	mon <b>  mgmt</b>	l infra	Ecommerc	<b>:e</b>						
mgmt		Ē	00	Contract	Subject - OOB	-default								0	0
> 🕞 Quick S	Start										Policy	Fau	Its	History	1
> 🖿 App	blication Profiles											Gen	eral	Label	1
> 💼 Net > 🚞 IP A	working Address Pools			8 🗸									0	+ %	Ŧ
🗸 🖿 Cor	ntracts			Property	/										
> 🖬	Standard Taboos				Name: O Description:	OB-default ptional									
	Imported			Rev	verse Filter Ports: 🔽										
	Filters Out-Of-Band Co	ntracts	<b>1</b>		Filters:									1 +	
	OOB-default					Name	Т	nant	State	9	ļ	Action			
	DOB-defa	ult				default	С	ommon	form	ned	1	Permit			
> 🚞 Poli	icies														
> 🚞 Ser	vices														
> 🚞 Noc	de Management l	PGs													
> 🚞 Exte	ernal Managemer	nt Network Inst	ance Profil												
> Noc	de Management /	Addresses													
> 🖿 Mar	naged Node Con	nectivity Group	os							Show Usage					

接下来,验证已创建外部管理网络实例配置文件,并且已将正确的带外合同配置为"消耗的带外合同 "。

## 外部管理网络实例配置文件

						\$	
System Tenants Fabric Virtual Networking L4-L7 Services Admin	Operatio	ns Apps Inte	grations				
ALL TENANTS   Add Tenant   Tenant Search: name or descr   common   infra	mgmt	Ecommerce					
mgmt (F) (=) (O) External Management Network Instar	ce Profile -	default				0	0
C Quick Start						U	U
∼ ∰ mgmt			Po	olicy F	aults	Histor	y
> 🚍 Application Profiles 🛛 🔞 🕥 🛆 🕧						Ó	+
>  Networking  Properties							
> 🚞 IP Address Pools Name: default							^
> Contracts Tags:	1.00.000.000.0	$\sim$					
Policies     Configuration Issues:	y comma						
> E Services Configuration State: applied							
> Class: Unspecified QoS Class: Unspecified	~						
V 🖿 External Management Network Instance Profil Consumed Out-of-Band						+	
default Out-of-Band	Tenant	Туре	<ul> <li>QoS Class</li> </ul>	s St	ate		
Node Management Addresses							а.
Managed Node Connectivity Groups     OOB-default	mgmt	oobbrc-OOB-default	Unspecified	fo	rmed		
							~
		Sho	ow Usage	Reset			

接下来要检验的项目是接口状态和布线,然后是到网关的连接。

• 要检查oobmgmt接口是否启用,请在APIC CLI上输入"ifconfig oobmgmt"。确认接口标志为 "UP"和"RUNNING",配置了正确的IP地址,并且数据包在RX和TX计数器中增加。如果缺少任 何检查,请验证使用的电缆是否正确,以及它们是否连接到APIC上正确的物理管理端口。管理 端口将被标记为Eth1-1和Eth1-2,最近的硬件带有带外接口的oobmgmt标签。有关APIC背面的 物理带外管理端口的详细信息,请参阅"交换矩阵发现"一章中的"初始交换矩阵设置"部分。

apic1# ifconfig oobmgmt

oobmgmt: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500 inet 192.168.4.20 netmask 255.255.255.0 broadcast 192.168.4.255 inet6 fe80::7269:5aff:feca:2986 prefixlen 64 scopeid 0x20 ether 70:69:5a:ca:29:86 txqueuelen 1000 (Ethernet) RX packets 295605 bytes 766226440 (730.7 MiB) RX errors 0 dropped 0 overruns 0 frame 0 TX packets 253310 bytes 38954978 (37.1 MiB) TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

▪ 要通过OOB检查网络连接,请使用ping测试数据包通过带外网络的路径。

#### apic1# ping 192.168.4.1

PING 192.168.4.1 (192.168.4.1) 56(84) bytes of data. 64 bytes from 192.168.4.1: icmp\_seq=1 ttl=255 time=0.409 ms 64 bytes from 192.168.4.1: icmp\_seq=2 ttl=255 time=0.393 ms 64 bytes from 192.168.4.1: icmp\_seq=3 ttl=255 time=0.354 ms

在APIC的bash shell中使用traceroute,跟踪与最终用户的连接。如果traceroute不完整,请登录此 设备(如果可访问),ping oobmgmt接口并ping主机。根据故障方向,将问题作为传统网络问题进 行故障排除。

Traceroute的工作方式是,从1开始,以不断增加的TTL发送UDP数据包。如果路由器收到包含TTL 1的数据包并需要对其进行路由,它会丢弃该帧并向发送方发送一条ICMP不可达消息。每跳在当前TTL发送3个UDP数据包,星号表示未收到ICMP不可达/TTL已超出的数据包的尝试。由于某些路由设备禁用了ICMP不可达/超出TTL消息,因此当它们收到需要路由的TTL1数据包时,它们只会丢弃该数据包,并且不会将该消息发送回发送方,因此在大多数网络中都预期存在这3个星号块。

apic1# bash
admin@apic1:~> traceroute 10.55.0.16
traceroute to 10.55.0.16 (10.55.0.16), 30 hops max, 60 byte packets
1 192.168.4.1 (192.168.4.1) 0.368 ms 0.355 ms 0.396 ms
2 \* \* \*
3 \* \* \*
4 10.0.255.221 (10.0.255.221) 6.419 ms 10.0.255.225 (10.0.255.225) 6.447 ms \*
5 \* \* \*
6 \* \* \*
7 10.55.0.16 (10.55.0.16) 8.652 ms 8.676 ms 8.694 ms

枝叶交换机可以访问tcpdump命令,该命令可用于验证哪些数据包通过oobmgmt接口。以下示例捕获在枝叶和主干交换机上使用的oobmgmt接口"eth0",并使用"——n"选项为tcpdump提供使用的IP地 址而不是DNS名称,然后特别针对NTP数据包(UDP端口123)进行过滤。回想一下,在上一个示例中,枝叶正在轮询NTP服务器172.18.108.14。下面,用户可以验证NTP数据包是否通过带外接口 传输,以及枝叶是否正在接收来自服务器的响应。

#### fab1-leaf101# tcpdump -n -i eth0 dst port 123

tcpdump: verbose output suppressed, use -v or -vv for full protocol decode listening on eth0, link-type EN10MB (Ethernet), capture size 65535 bytes 16:49:01.431624 IP 192.168.4.23.123 > 172.18.108.14.123: NTPv4, Client, length 48 16:49:01.440303 IP 172.18.108.14.123 > 192.168.4.23.123: NTPv4, Server, length 48

带内管理配置需要第2层或第3层部署的特定注意事项。本示例仅介绍第3层部署和故障排除。





验证具有子网的管理租户中有一个BD,带内节点管理地址将从该BD分配给交换矩阵节点以实现带 内连接,并确保L3Out在带内管理BD下相关联。

将充当带内管理网关的网桥域子网

cisco APIC					admin Q	<b>C</b> e	
System Tenants Fabric Virtual Ne	tworking L4-L7 Services Admi	n Operations	Apps In	tegrations			
ALL TENANTS   Add Tenant   Tenant Search: na	ime or descr   common mg	mat infra   Eco	ommerce				
mgmt (♪ ④ () ④ > () ◆ Quick Start ✓ ∰ mgmt > ≧ Application Profiles	Bridge Domain - inb	Summary	Policy O	perational Sta	ats Health	Faults	History
V D Networking			Genera	ai E3 Coningui	Additis	Wallced/ ITou	neshooting
<ul> <li>inb</li> <li>DHCP Relay Labels</li> <li>Subnets</li> <li>10.30.30.1/24</li> <li>ND Proxy Subnets</li> <li>VRFs</li> <li>External Bridged Networks</li> <li>L3Outs</li> <li>inbmgmt_13out</li> <li>Dot1Q Tunnels</li> </ul>	Properties Unicast Routing: Operational Value for Unicast Routing: Custom MAC Address: Virtual MAC Address: Subnets:	Control of the second	Scope Advertised Externally	Primary IP Address False	Virtual IP False	Subnet	Control
> IP Address Pools > IP Address Pools > IP Contracts > IP Policies > IP Services	Associated L3 Outs:	▲ L3 Out inbmgmt_l3out					≘ +
S      Node Management EPGs      External Management Network Instance Pr      default      Mode Management Addresses      Mode Management Addresses      Managed Node Connectivity Groups	4			Show	v Usage		, v Submit

验证带内节点管理EPG是否存在。根据下面的屏幕截图,带内EPG名称在GUI中以前缀"inb — "表示 。 验证带内EPG封装VLAN是否与VLAN池正确关联。

接入策略需要允许带内管理EPG中配置的封装VLAN:'inb mgmt EPG encap VLAN > VLAN Pool > Domain > AEP > Interface Policy Group > Leaf Interface Profile > Switch Profile'。 如果未配置支持访问策略,则会根据以下屏幕截图引发代码为F0467的故障。

### 故障F0467 — 内部EPG

8589935303 ID: 8589935303 Description: Fault delegate: Configuration failed for uni/tn-mgmt/mgmtp-default/inb-inbmgmt due to Invalid VLAN Configuration, debug message: i vlan-300 STP Segment Id not present for Encap. Either the EpG is not associated with a domain or the domain does not have this vlan a Severity: minor ted Object: uni/tn-mgmt/mgmtp-default/inb-inbmgmt jated From: topology/pod-1/node-101/local/svc-policyelem-id-0/uni/epp/inb-[uni/tn-mgmt/mgmtp-default/inb-inbmgmt]/nwissues Created: 2019-10-03T02:23:04.637+00:00 Code: F0467 Type: Config Cause: configuration-failed hange Set: Action: deletion Domain: Tenant Life Cycle: t Occurred: 1 ient Status: false

验证网桥域与上面为带内子网创建的域相同。最后,验证带内管理EPG上是否配置了由外部EPG使 用的提供的合同。

## 带内EPG

cisco APIC					adr	nin Q	C? 🖸	٢
System Tenants Fabric Virtual N	etworking L4-L7 Servio	ces Adm	in Operatio	ons Apps	s Integrations			
ALL TENANTS   Add Tenant   Tenant Search:	ame or descr 1 co	mmon   infr	ra   mgmt	Ecommerce				
mgmt (r) (=) (O)	In-Band EPG - inb mo	imt						0.0
> C • Quick Start					Policy Stats	Health	Faults	History
> Application Profiles								Policy
> 🧮 Networking								
> 🧮 IP Address Pools								0 ±
> 🧮 Contracts	Properties	inh mamt						<b>^</b>
> 🧮 Policies	Tags:	ino_ingint						
> 🚍 Services		enter tags separati	ed by comma					
🗸 🚞 Node Management EPGs	Encap:	vlan-300						
In-Band EPG - inb_mgmt	Configuration Issues:	e.g., vian- i						
Out-of-Band EPG - default	Configuration State:	applied						
External Management Network Instance Profil	Class ID:	32770						
> Mode Management Addresses	QoS Class:	Unspecified	~					
> Managed Node Connectivity Groups	Bridge Domain:	inb	~	Ø				
	Resolved Bridge Domain:	inb						
	Provided Contracts:							+ +
		Name	Tenant	Туре	QoS Class	Match Type	State	
		default	common	Contract	Unspecified	AtleastOne	formed	
								~
					Show Us	age Ro		

外部EPG实例配置文件

cisco	APIC					admin	0 0 0	
System	Tenants Fabric	Virtual N	etworking L4-	L7 Services Admin	Operations Ap	ps Integrations		
ALL TENAN	TS   Add Tenant	Tenant Search:	ame or descr	I common I infra	mgmt Ecommerce			
ngmt	Start	00	External EPG I	nstance Profile - Inband	J-Out	tional State	Health Faults	Q G
mgmt	lication Profiles				General	Contracts	Subject Labels	FPG Labels
✓ ■ Net > ■ E	working Bridge Domains		< Provided 0	Contracts Consumed C	Contracts Contract	Interfaces Taboo	Contracts Inh	erited Contra )
	VRFs		Name	Tenant	Type	OoS Class	State	O 🗊 +
	L3Outs inbmgmt_13out inbmgmt_13out inbmgmt_13out Encipical Node Profile External EPGs	5	default	common	Contract	Unspecified	formed	
> 🖬 ( > 🖬 ( > 🖬 (P A	Thband-Out Route map for impored Dot1Q Tunnels Iddress Pools	t and export						
> Con	itracts cies vices le Management EPGs ernal Management N <u>etwor</u> f	k Instance Pr						

与带外类似,交换矩阵节点的带内管理IP地址可以静态分配,也可以从预先选择的范围动态分配。 验证应用于带内类型的地址是否与之前配置的BD子网匹配。还要验证默认网关是否正确。

## 静态节点管理地址

cisco	APIC					а	idmin 🔍 🤇	9 🛛	٥
System	Tenants Fabric Virtual N	etworking L4-L7	Services Adm	in Operation	ns App	s Integration	S		
ALL TENANTS	S   Add Tenant   Tenant Search: n	ame or descr	common   mg	ımt   infra	Ecommerce				
mgmt	$(\hat{\mathbf{r}})$	Static Node Mar	agement Address	es					0.0
> C Quick St	art								00
v 🎹 mgmt				-	500			0.	* ***
> 🖿 Appli	cation Profiles	<ul> <li>Node ID</li> </ul>	Name	Type	EPG	IPV4 Address	IPV4 Gateway	Address	Gateway
> 🚞 Netw	orking	pod-1/node-1	bdsol-aci37-apic1	Out-Of-Band	default	10.48.176.57/24	10.48.176.1		
> 🚞 IP Ad	idress Pools	pod-1/node-101	S1P1-Leaf101	In-Band	inb_mg	10.30.30.101/24	10.30.30.1		
> 🚞 Contr	racts	pod-1/node-101	S1P1-Leaf101	Out-Of-Band	default	10.48.176.70/24	10.48.176.1		
> 🚞 Polici	ies	pod-1/node-102	S1P1-Leaf102	Out-Of-Band	default	10.48.176.71/24	10.48.176.1		
> 🚞 Servi	ces	pod-1/node-2	bdsol-aci37-apic2	Out-Of-Band	default	10 48 176 58/24	10 48 176 1		
> Node	Management EPGs	pod-1/mde-201	S1P1-Spine201	Out-Of-Band	default	10 48 176 74/24	10 48 176 1		
> Exter	Management Addresses	pod-1/00de-202	S1D1_Spine202	Out-Of-Rood	default	10 49 176 75/24	10.48.176.1		
	tatic Node Management Addresses	pod-1/hode-202	S1P3 L == £201	Out-Of-Band	default	10.40.176.70/24	10.40.176.1		
E de	efault	pod-1/node-301	STP2-Lear301	Out-Or-Band	derault	10.46.176.72/24	10.46.176.1		
> 🚞 Mana	ged Node Connectivity Groups	pod-1/node-302	S1P2-Leaf302	Out-Of-Band	default	10.48.176.73/24	10.48.176.1		
		pod-1/node-401	S1P2-Spine401	Out-Of-Band	default	10.48.176.76/24	10.48.176.1		
		pod-1/node-402	S1P2-Spine402	Out-Of-Band	default	10.48.176.77/24	10.48.176.1		
		pod-2/node-3	bdsol-aci37-apic3	Out-Of-Band	default	10.48.176.59/24	10.48.176.1		

ping操作以验证带内连接在ACI中是否正常工作。

主干节点不会响应带内上的ping,因为它们使用环回接口进行连接,而环回接口不响应ARP。

枝叶交换机上使用的带内接口是kpm\_inb。使用类似的tcpdump捕获,检验数据包是否从带内 CPU接口发出。

fab2-leaf101# tcpdump -n -i kpm\_inb dst port 123 tcpdump: verbose output suppressed, use -v or -vv for full protocol decode listening on kpm\_inb, link-type EN10MB (Ethernet), capture size 65535 bytes 16:46:50.431647 IP 10.30.30.3.123 > 172.18.108.14.123: NTPv4, Client, length 48 16:47:19.431650 IP 10.30.30.3.123 > 172.18.108.15.123: NTPv4, Client, length 48 验证用于带内的SVI是"protocol-up/link-up/admin-up"。

fab1-leaf101# show ip interface vrf mgmt:inb-vrf
IP Interface Status for VRF "mgmt:inb-vrf"
vlan16, Interface status: protocol-up/link-up/admin-up, iod: 4, mode: pervasive
 IP address: 10.30.30.1, IP subnet: 10.30.30.0/24 secondary
 IP address: 10.30.30.3, IP subnet: 10.30.30.0/24
 IP broadcast address: 255.255.255
 IP primary address route-preference: 0, tag: 0

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