

ACI遠端枝葉發現和配置

目錄

[簡介](#)

[背景資訊](#)

[必要條件](#)

[需求](#)

[採用元件](#)

[背景資訊](#)

[設定](#)

[網路圖表](#)

[組態](#)

[遠端WAN配置 \(ACI主交換矩陣端 \)](#)

[遠端WAN配置 \(RLEAF端 \)](#)

[ACI配置步驟1. 配置Pod交換矩陣設定策略](#)

[ACI配置步驟2. 配置從骨幹到IPN的外部路由](#)

[ACI配置步驟3. 發現遠端枝葉](#)

[ACI配置步驟4. 配置從RLEAF到IPN的路由外端](#)

[ACI配置步驟5. 建立交換矩陣外部連線策略](#)

[ACI配置步驟6. 將遠端枝葉註冊到ACI交換矩陣Pod](#)

[ACI配置步驟7. 遠端枝葉的QoS配置](#)

[ACI配置步驟8 \(可選 \)。使用遠端枝葉建立虛擬埠通道\(vPC\)顯式保護組](#)

[驗證](#)

[RLeaf TEP審閱](#)

[主幹TEP稽核](#)

[遠端枝葉可路由子網](#)

[F0467配置失敗](#)

[啟動驗證](#)

[相關資訊](#)

簡介

本文描述了使用應用策略基礎設施控制器(APIC)GUI在現有以應用為中心的基礎設施(ACI)交換矩陣中發現和配置遠端枝葉(RLEAF)的步驟。

背景資訊

ACI遠端枝葉交換機部署可幫助客戶將ACI交換矩陣 (ACI服務和APIC管理) 擴展到沒有連線本地主幹交換機或APIC的遠端資料中心。遠端枝葉交換機通過廣域網(WAN)新增到交換矩陣中的現有Pod。在主資料中心中部署的所有策略都部署在遠端交換機中，其行為類似於屬於交換矩陣的本地枝葉交換機。在遠端枝葉拓撲中，所有單播流量都通過第3層通過VXLAN傳輸。第2層廣播、未知的單點傳播和多點傳播(BUM)流量會透過前端複製(HER)通道傳送，不需要使用多點傳送。遠端站點上的所有本地流量都直接在端點之間交換，無論是物理的還是虛擬的。任何需要使用脊柱代理的流

量都會轉發到主交換矩陣。與本地枝葉一樣，遠端枝葉可用於連線虛擬伺服器、物理伺服器和容器。到連線到遠端枝葉的終端的流量通過遠端枝葉交換機進行本地轉發。

必要條件

需求

思科建議您瞭解以下主題：

- ACI光纖
- ACI GUI
- ACI枝葉和主幹交換機CLI
- NXoS交換機CLI

採用元件

本文中的資訊係根據以下軟體和硬體版本：

- APIC版本3.1(2q)
- 主幹LC N9K-X9732C-EX
- 枝葉N9K-X9732C-EX
- IP網路(IPN)- Nexus 7000、N7K-SUP2E、N7K-F348XP-25

本文中的資訊是根據特定實驗室環境內的裝置所建立。文中使用到的所有裝置皆從已清除（預設）的組態來啟動。如果您的網路運作中，請確保您瞭解任何指令可能造成的影響。

背景資訊

ACI 3.1(1)版本支援遠端枝葉解決方案。表中列出了截至編寫本文檔之日支援遠端枝葉解決方案的硬體清單。

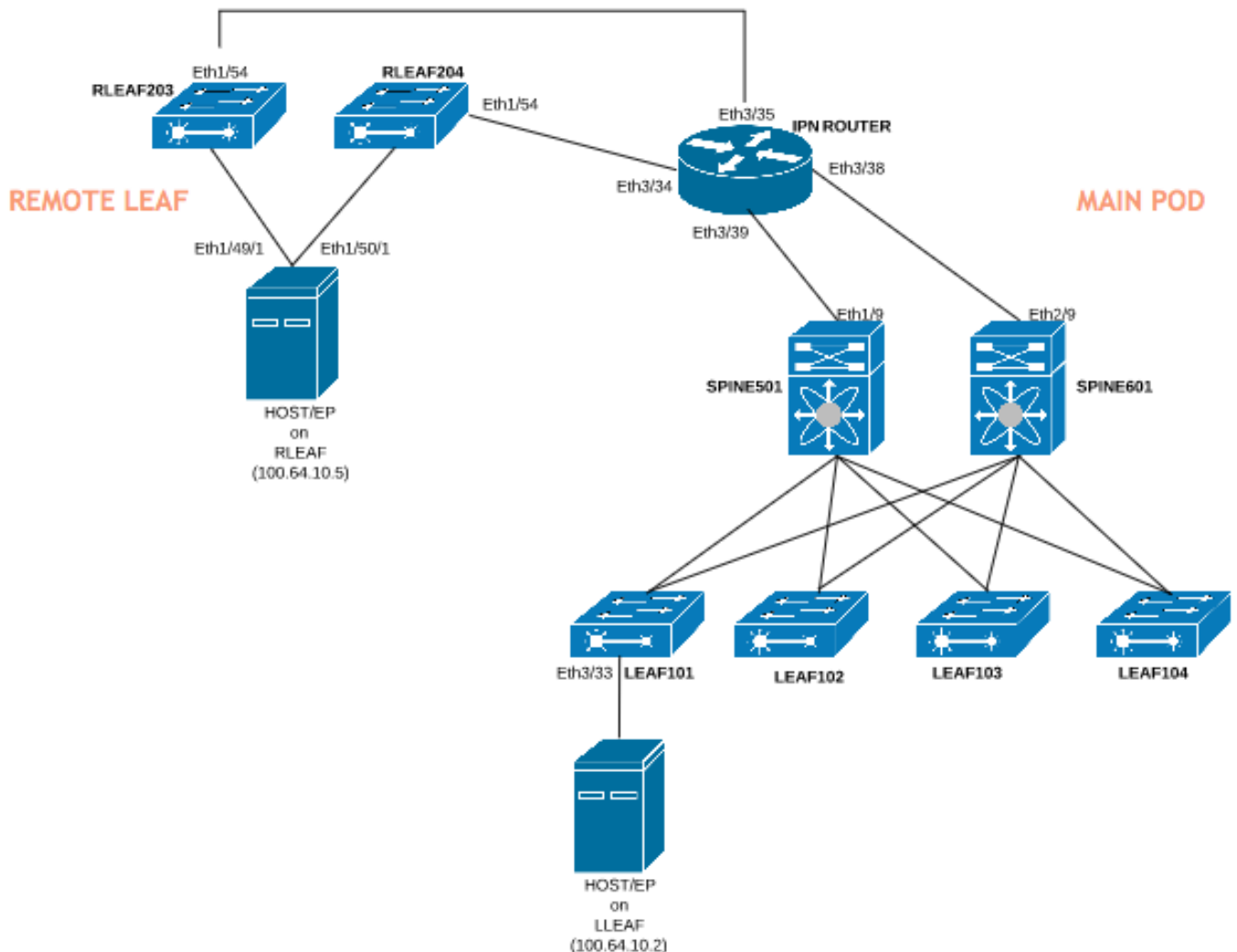
| 骨幹/枝葉 | 型號 |
|---------|-------------------------------------------|
| 固定骨幹 | N9364C |
| 模組化主幹LC | N9732C-EX N9736C-FX |
| 葉 | N93180YC-EX N93180YC-FX N93108TC-EX |

| | |
|--|-------------|
| | N93108TC-FX |
| | N93180LC-EX |
| | N9348GC-FXP |
| | N9336C-FX2 |

設定

網路圖表

此網路圖表說明此範例中使用的拓撲。



組態

本文檔主要介紹用於遠端枝葉部署的配置的ACI端，但不涉及IPN交換機WAN端配置的全部詳細資訊。但是，此處列出了來自IPN的一些重要配置以供參考。

遠端WAN配置 (ACI主交換矩陣端)

以下是在連線到主交換矩陣中的ACI主幹的IPN裝置中使用的配置：

```
vrf context RLEAF
  description VRF created for remote-leaf lab
```

```
router ospf 1
```

```
  vrf RLEAF
    router-id 172.16.191.191
    area 0.0.0.1 nssa
```

In this example same IPN router is used to connect to RLEAF and SPINE

```
interface loopback191
  vrf member RLEAF
  ip address 172.16.191.191/32
```

連線到主幹的IPN上的介面特定配置。

| 朝向骨幹-601 | 朝向骨幹-501 |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <pre>interface Ethernet3/38 mtu 9150 no shut interface Ethernet3/38.4 指向spine601的描述連結 mtu 9150 encapsulation dot1Q 4 vrf成員RLEAF ip address 10.10.19.10/24 ip ospf network point-to-point</pre> | <pre>interface Ethernet3/39 mtu 9150 no shut interface Ethernet3/39.4 指向spine501的描述連結 mtu 9150 encapsulation dot1Q 4 vrf成員RLEAF ip address 10.10.20.10/24 ip ospf network point-to-point</pre> |

| | |
|-----------------------------------------------|-----------------------------------------------|
| <pre>ip router ospf 1 區域0.0.0.1 no shut</pre> | <pre>ip router ospf 1 區域0.0.0.1 no shut</pre> |
|-----------------------------------------------|-----------------------------------------------|

遠端WAN配置 (RLEAF端)


以下是在連線到遠端枝葉的IPN裝置中使用的配置：

| |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <pre>vrf情景RLEAF 說明為遠端枝葉實驗室建立的VRF router ospf 1 vrf RLEAF router-id 172.16.191.191 區域0.0.0.1 nssa #在本示例中，使用同一IPN路由器連線到RLEAF和SPINE interface loopback191 vrf成員RLEAF ip address 172.16.191.191/32</pre> |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

連線到RLEAF的IPN上的介面特定配置：


| 向RLEAF-204前進 | 朝RLEAF-203 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <pre>interface Ethernet3/34 mtu 9150 no shut interface Ethernet3/34.4 指向rleaf204的描述連結 mtu 915 encapsulation dot1Q 4 ip access-group 100 in vrf成員RLEAF</pre> | <pre>interface Ethernet3/35 mtu 9150 no shut interface Ethernet3/35.4 指向rleaf203的描述連結 mtu 9150 encapsulation dot1Q 4 ip access-group 100 in vrf成員RLEAF</pre> |

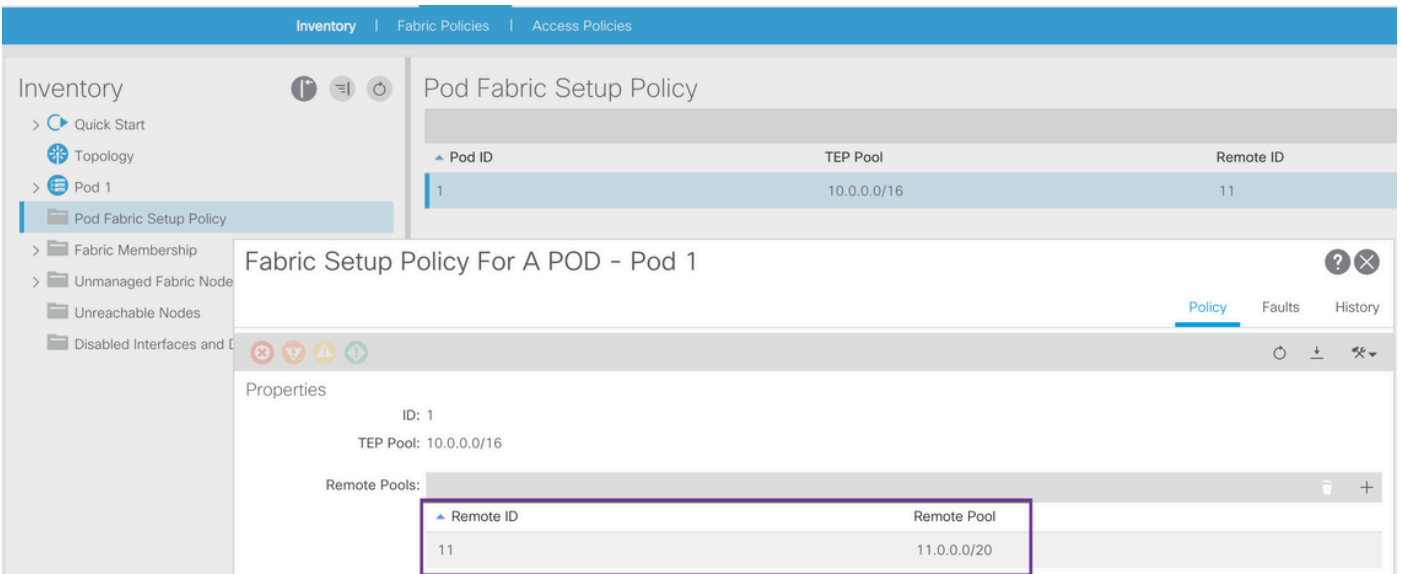
| | |
|--------------------------------|--------------------------------|
| ip address 10.10.21.10/24 | ip address 10.10.22.10/24 |
| ip ospf network point-to-point | ip ospf network point-to-point |
| ip router ospf 1區域0.0.0.1 | ip router ospf 1區域0.0.0.1 |
| ip dhcp中繼地址10.0.0.1 | ip dhcp中繼地址10.0.0.1 |
| ip dhcp中繼地址10.0.0.2 | ip dhcp中繼地址10.0.0.2 |
| ip dhcp中繼地址10.0.0.3 | ip dhcp中繼地址10.0.0.3 |
| no shut | no shut |

 註：確保dhcp中繼IP在連線到遠端枝葉的介面下配置了APIC交換矩陣IP地址。這是遠端枝葉從APIC獲取載入程式檔案所必需的。在本示例中，10.0.0.1、10.0.0.2、10.0.0.3是APIC TEP IP地址。遠端枝葉向WAN傳送DHCP DISCOVER，以獲取連線到WAN路由器的子介面的IP地址。WAN路由器將DHCP發現消息從遠端枝葉中繼到POD中的APIC。

ACI配置步驟1。配置Pod交換矩陣設定策略

- 1.定位至「結構」>「庫存」>「Pod結構設定策略」。
- 2.按兩下以開啟現有Pod的交換矩陣設定策略。
- 3.新增(+)遠端池，提供遠端ID（在本例中為11）和遠端池(在本例中為172.17.0.0/20)，然後按一下Submit。影象片段可以顯示不同的IP編址方案。

 注意：遠端枝葉TEP池子網不能與主交換矩陣TEP池子網重疊。使用的子網必須是/24或更低。



The screenshot displays the ACI GUI configuration for a Pod Fabric Setup Policy. The main configuration table is as follows:

| Pod ID | TEP Pool | Remote ID |
|--------|-------------|-----------|
| 1 | 10.0.0.0/16 | 11 |

The detailed view for Pod 1 shows the following properties:

- ID: 1
- TEP Pool: 10.0.0.0/16
- Remote Pools:

| Remote ID | Remote Pool |
|-----------|-------------|
| 11 | 11.0.0.0/20 |

ACI配置步驟2.配置從骨幹到IPN的外部路由

- 1.導航到租戶>基礎設施>外部路由網路。
- 2.按一下右鍵並建立Routed Outside。
- 3.配置脊柱到IPN的OSPF外部路由。
- 4.使用OSPF作為路由協定。
- 5.使用overlay-1作為VRF。


在此示例中，遠端枝葉連線到單個Pod交換矩陣。因此，未選擇「Enable remote leaf with Multipod」。如果將遠端枝葉與多容器交換矩陣一起使用，則必須選中此選項。

The screenshot displays the ACI configuration interface for 'L3 Outside - spine2rleaf'. The left sidebar shows the navigation tree with 'spine2rleaf' selected. The main panel shows the configuration for 'L3 Outside - spine2rleaf' with the following settings:

- Route Control Enforcement: Import Export
- VRF: overlay-1
- Resolved VRF: infra/overlay-1
- External Routed Domain: spine-I3
- Route Profile for Interleak: select a value
- Route Control For Dampening: Address Family Type, Route Dampening Policy (No items have been found. Select Actions to create a new item.)
- Enable BGP/EIGRP/OSPF: BGP OSPF EIGRP
- OSPF Area ID: 0.0.0.1
- OSPF Area Control: Send redistributed LSAs into NSSA area, Originate summary LSA, Suppress forwarding address in translated LSA
- OSPF Area Type: NSSA area, Regular area, Stub area
- OSPF Area Cost: 1
- Enable remote leaf with Multipod:

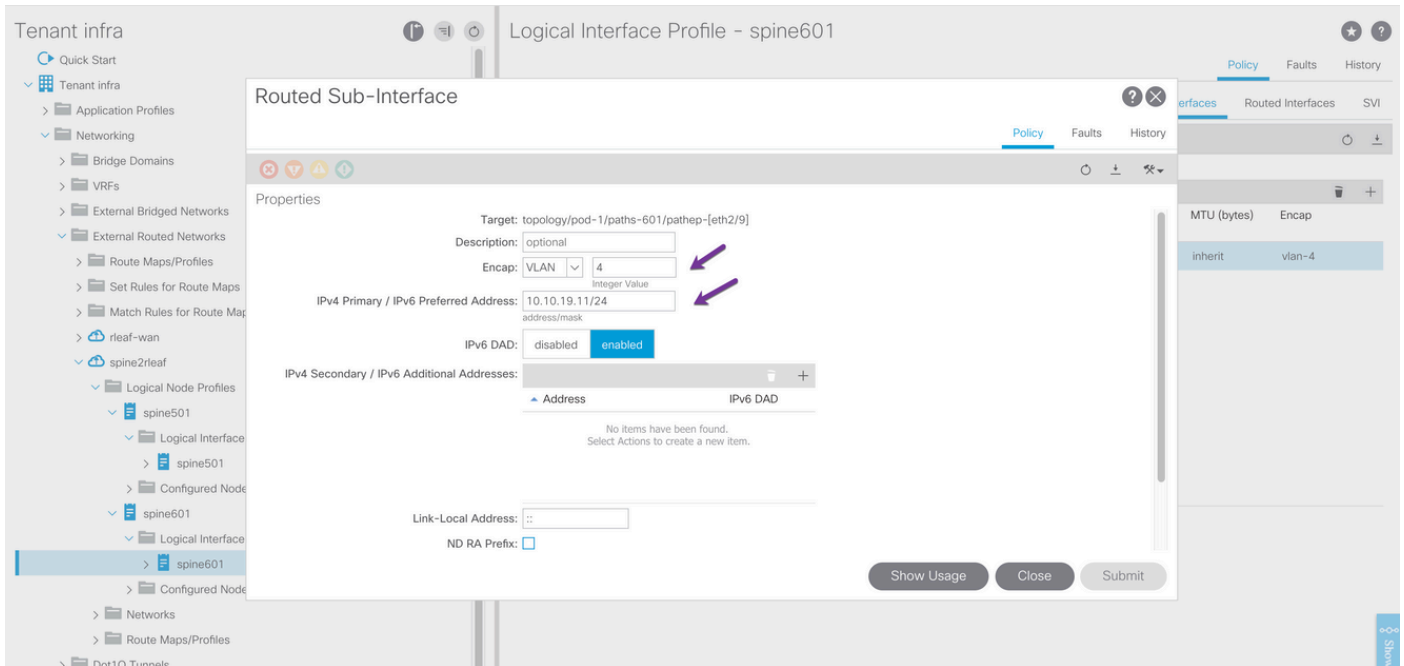
為連線到IPN的每個主幹 (在本示例中為node-501和node-601) 配置節點配置檔案。此處顯示了node-501的示例。對節點601執行相同的步驟。影象片段可以顯示不同的IP編址方案。

為IPN連線配置介面配置檔案。

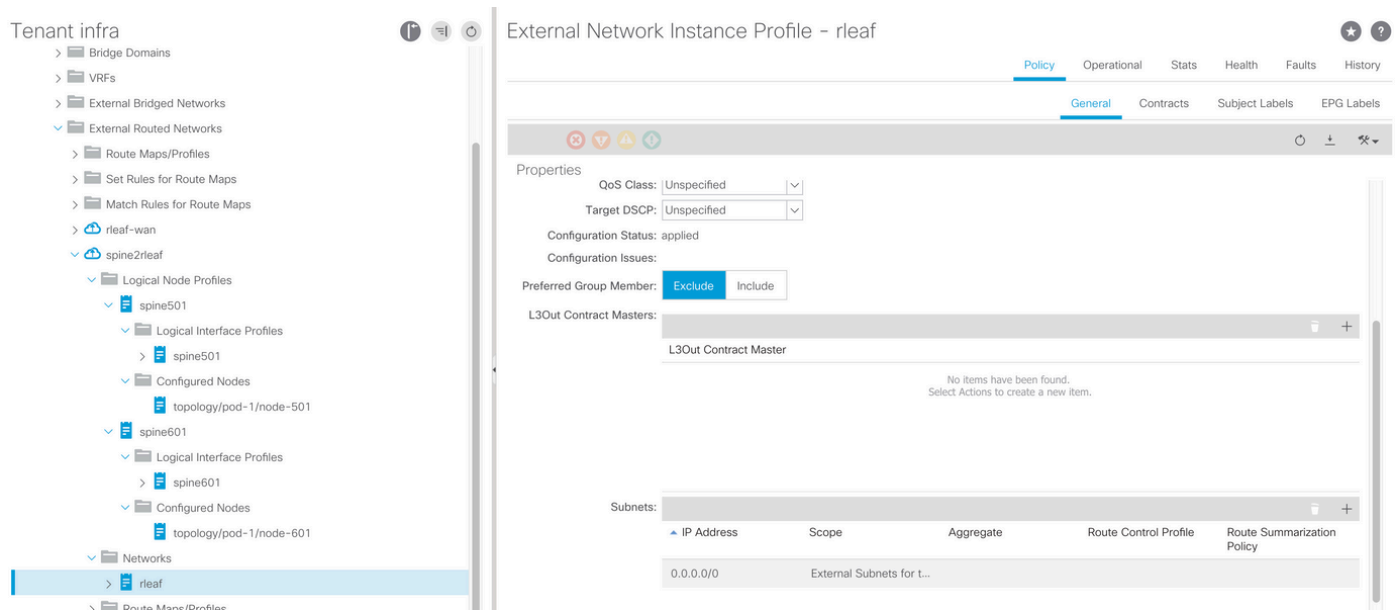
 注意：確保使用encap vlan-4與單個Pod進行遠端枝葉整合。

例如path-501/pathep-[eth1/9]。

path-601/pathep-[eth2/9]示例。



為IPN配置L3Out網路 (外部EPG) 。



現在您已將OSPF L3Out從骨幹 (節點501和節點601) 配置到IPN裝置。如果IPN上的OSPF配置正確，則OSPF鄰接關係應處於開啟狀態並交換路由。因此，請檢查從脊柱到IPN裝置的OSPF相鄰關係。

從骨幹：

```
spine501# show ip ospf neighbors vrf overlay-1
OSPF Process ID default VRF overlay-1
Total number of neighbors: 1
Neighbor ID      Pri State           Up Time  Address           Interface
172.16.191.191  1 FULL/ -         00:00:36 10.10.20.10      Eth1/9.9
spine501#
```

```

spine601# show ip ospf neighbors vrf overlay-1
OSPF Process ID default VRF overlay-1
Total number of neighbors: 1
Neighbor ID      Pri State                Up Time  Address      Interface
172.16.191.191  1 FULL/ -                00:00:39 10.10.19.10  Eth2/9.9
spine601#

```

在IPN上：

```

SPINE-IPN# show ip ospf neighbors vrf RLEAF
OSPF Process ID 1 VRF RLEAF
Total number of neighbors: 2
Neighbor ID      Pri State                Up Time  Address      Interface
172.16.60.60     1 FULL/ -                00:00:06 10.10.19.11  Eth3/38.4
172.16.50.50     1 FULL/ -                00:00:17 10.10.20.11  Eth3/39.4
SPINE-IPN#

```

現在，您在脊柱和IPN之間具有OSPF鄰居關係，您可以看到通往ACI交換矩陣Pod基礎設施網路的路由是通過OSPF在IPN中學習的。

```

SPINE-IPN# show ip route vrf RLEAF
IP Route Table for VRF "RLEAF"
'*' denotes best ucast next-hop
'**' denotes best mcast next-hop
'[x/y]' denotes [preference/metric]
 '%' in via output denotes VRF

10.0.0.0/16, ubest/mbest: 2/0
  *via 10.10.19.11, Eth3/38.4, [110/20], 00:01:21, ospf-1, nssa type-2
  *via 10.10.20.11, Eth3/39.4, [110/20], 00:01:21, ospf-1, nssa type-2
< snip >
SPINE-IPN#

```

ACI配置步驟3.發現遠端枝葉

在此階段，交換矩陣已準備好通過WAN發現連線到IPN的遠端枝葉。確保連線到RLEAF的IPN具有通過WAN網路到達ACI Pod Infra網路的路由。

<#root>

RLEAF-IPN#

show lldp neighbors

Capability codes:

```

(R) Router, (B) Bridge, (T) Telephone, (C) DOCSIS Cable Device
(W) WLAN Access Point, (P) Repeater, (S) Station, (O) Other
Device ID           Local Intf       Hold-time  Capability  Port ID
switch              Eth3/34         120       BR          Eth1/54
switch              Eth3/35         120       BR          Eth1/54
Total entries displayed: 2
RLEAF-IPN#

```

```
RLEAF-IPN#
```

```
show ip route vrf RLEAF
```

```

IP Route Table for VRF "RLEAF"
'*' denotes best ucast next-hop
 '**' denotes best mcast next-hop
 '[x/y]' denotes [preference/metric]
 '%<string>' in via output denotes VRF <string>

```

```

10.0.0.0/16, ubest/mbest: 2/0
  *via 10.10.19.11, Eth3/38.4, [110/20], 00:01:21, ospf-1, nssa type-2
  *via 10.10.20.11, Eth3/39.4, [110/20], 00:01:21, ospf-1, nssa type-2

```

```
< snip >
```

檢查連線到遠端枝葉的IPN，確保APIC交換矩陣IP地址配置為DHCP中繼。

```
<#root>
```

```
RLEAF-IPN#
```

```
show ip dhcp relay
```

```
< snip >
```

```
Helper addresses are configured on the following interfaces:
```

| Interface | Relay Address | VRF Name |
|----------------|---------------|----------|
| Ethernet3/34.4 | 10.0.0.1 | |
| Ethernet3/34.4 | 10.0.0.2 | |
| Ethernet3/34.4 | 10.0.0.3 | |
| Ethernet3/35.4 | 10.0.0.1 | |
| Ethernet3/35.4 | 10.0.0.2 | |
| Ethernet3/35.4 | 10.0.0.3 | |

```
RLEAF-IPN#
```

在ACI GUI中導航到Inventory > Fabric Membership，然後檢查是否發現了新交換機。


| Serial Number | Pod ID | Node ID | RL TEP Pool | Node Name | Rack Name | Model | Role | IP | Support Model | SSL Certif | Status |
|---------------|--------|---------|-------------|-----------|-----------|-----------------|-------|----------------|---------------|------------|--------|
| FDO20331BFQ | 1 | 202 | 0 | leaf202 | | N9K-C93180YC-EX | leaf | 10.0.232.68/32 | True | yes | Active |
| FDO21031WXP | 1 | 201 | 0 | leaf201 | | N9K-C93108TC-FX | leaf | 10.0.232.72/32 | True | yes | Active |
| FDO220810B0 | 1 | 0 | 0 | | | N9K-C93180YC-EX | leaf | 0.0.0.0 | True | n/a | |
| FOX1948G9EA | 1 | 601 | 0 | spine601 | | N9K-C9504 | spine | 10.0.232.65/32 | True | yes | Active |
| FOX1949GHHM | 1 | 501 | 0 | spine501 | | N9K-C9504 | spine | 10.0.232.66/32 | True | yes | Active |
| SAL1946SWJM | 1 | 101 | 0 | leaf101 | | N9K-C9372PX-E | leaf | 10.0.232.64/32 | True | yes | Active |
| SAL1946SWNS | 1 | 102 | 0 | leaf102 | | N9K-C9372PX-E | leaf | 10.0.232.73/32 | True | yes | Active |
| SAL1946SWNT | 1 | 104 | 0 | leaf104 | | N9K-C9372PX-E | leaf | 10.0.8.64/32 | True | yes | Active |
| SAL1946SWNU | 1 | 103 | 0 | leaf103 | | N9K-C9372PX-E | leaf | 10.0.232.69/32 | True | yes | Active |
| FDO22080JDA | 1 | 0 | 0 | | | N9K-C93180YC-EX | leaf | 0.0.0.0 | True | n/a | |

將新發現的枝葉註冊到現有交換矩陣：

1. 根據序列號識別新的枝葉。
2. 按一下右鍵新發現的枝葉，然後按一下Register。
3. 提供正確的Pod ID和節點ID。
4. 選擇RL TEP POOL。
5. 提供節點名稱。
6. 檢查並確認已將Role選為遠端枝葉。
7. 按一下更新。

| Serial Number | Pod ID | Node ID | RL TEP Pool | Node Name | Rack Name | Model | Role | IP | Support Model | SSL Certif | Status |
|---------------|--------|---------|-------------|-----------|-----------|-----------------|-------|----------------|---------------|------------|--------|
| FDO22080JDA | 1 | 203 | 11 | rleaf203 | select | N9K-C93180YC-EX | leaf | 0.0.0.0 | True | n/a | |
| FDO220810B0 | 1 | 204 | 11 | rleaf204 | select | N9K-C93180YC-EX | leaf | 0.0.0.0 | True | n/a | |
| FOX1948G9EA | 1 | 601 | 0 | spine601 | | N9K-C9504 | spine | 10.0.232.65/32 | True | yes | Active |

Update Cancel

 注意：請確保選擇在步驟1中配置的正确RL TEP池。此外，從下拉選單中選擇RL TEP POOL時，請選中並確認已自動將Role選為遠端枝葉。

現在，您可以看到節點型別標識為「遠端枝葉」，狀態標識為「發現」。該節點尚未獲得結構IP地址。

| Serial Number | Pod ID | Node ID | RL TEP Pool | Node Name | Rack Name | Model | Role | IP | Support Model | SSL Certif | Status |
|---------------|--------|---------|-------------|-----------|-----------|-----------------|-------------|----------------|---------------|------------|-------------|
| FDO20331BFQ | 1 | 202 | 0 | leaf202 | | N9K-C93180YC-EX | leaf | 10.0.232.68/32 | True | yes | Active |
| FDO21031WXP | 1 | 201 | 0 | leaf201 | | N9K-C93108TC-FX | leaf | 10.0.232.72/32 | True | yes | Active |
| FDO22080JDA | 1 | 203 | 11 | rleaf203 | | N9K-C93180YC-EX | remote leaf | 0.0.0.0 | True | yes | Discovering |
| FDO220810B0 | 1 | 204 | 11 | rleaf204 | | N9K-C93180YC-EX | remote leaf | 0.0.0.0 | True | yes | Discovering |
| FOX1948G9EA | 1 | 601 | 0 | spine601 | | N9K-C9504 | spine | 10.0.232.65/32 | True | yes | Active |
| FOX1949GHMM | 1 | 501 | 0 | spine501 | | N9K-C9504 | spine | 10.0.232.66/32 | True | yes | Active |
| SAL1946SWJM | 1 | 101 | 0 | leaf101 | | N9K-C9372PX-E | leaf | 10.0.232.64/32 | True | yes | Active |
| SAL1946SWNS | 1 | 102 | 0 | leaf102 | | N9K-C9372PX-E | leaf | 10.0.232.73/32 | True | yes | Active |
| SAL1946SWNT | 1 | 104 | 0 | leaf104 | | N9K-C9372PX-E | leaf | 10.0.8.64/32 | True | yes | Active |
| SAL1946SWNU | 1 | 103 | 0 | leaf103 | | N9K-C9372PX-E | leaf | 10.0.232.69/32 | True | yes | Active |

ACI配置步驟4.配置從RLEAF到IPN的路由外端

1.定位至「租戶」>「基礎設施」>「外部路由網路」，然後創建「外部路由」。

Create Routed Outside

STEP 1 > Identity

Define the Routed Outside

Description: optional

Tags:

PIM:

Route Control Enforcement: Import Export

Target DSCP: Unspecified

VRF: overlay-1

External Routed Domain: rleaf-l3

Route Profile for Interleaf: select a value

Route Control For Dampening:

Consumer Label:

BGP EIGRP OSPF

OSPF Area ID: 1

OSPF Area Control: Send redistributed LSAs into NSSA area Originate summary LSA Suppress forwarding address in translated LSA

OSPF Area Type: NSSA area Regular area Stub area

OSPF Area Cost: 1

Enable Remote Leaf:

Address Family Type:

Route Dampening Policy:

Address Family Type:

Nodes and Interfaces Protocol Profiles

| Name | Description | DSCP | Nodes |
|--------------------|-------------|-------------|----------|
| rleaf-node-profile | | Unspecified | 203, 204 |

Previous Cancel Next

2.為節點203和204建立RLEAF節點配置檔案。

現在，您可以從Node ID下拉選單中選擇rleaf-203(Node-203)和rleaf-204(Node-204)，因為它們現在已在交換矩陣中發現。

RLEAF 203節點配置檔案：

Create Routed Outside

Select Node

Select Node and Configure Static Routes

Node ID: rleaf203 (Node-203)

Router ID: 203.203.203.203

Use Router ID as Loopback Address:

External Control Peering:

Loopback Addresses:

IP

Static Routes:

IP Address

Next Hop IP

Cancel

OK

RLEAF 204節點配置檔案：

Create Routed Outside

Select Node

Select Node and Configure Static Routes

Node ID: rleaf204 (Node-204) ▼

Router ID: 204.204.204.204

Use Router ID as Loopback Address:

External Control Peering:

Loopback Addresses:

▲ IP

Static Routes:


IP Address

Next Hop IP

Cancel

OK

為node-203和node-204建立RLEAF介面配置檔案：

 註：由於RLEAF203或RLEAF204未註冊，因此您無法在Node下拉選單中看到Noderleaf-203(Node-203)或rleaf-204(Node-204)。因此，請在節點與路徑欄位中手動輸入路徑，如下圖所示。

為node-203建立介面配置檔案。手動輸入節點和路徑欄位，如下所示。

Node: topology/pod-1/node-203

Path: topology/pod-1/paths-203/pathep-[eth1/54]

Select Routed Sub-Interface



Specify the Interface

Node:
Ex: topology/pod-1/node-1

Path:
Ex: topology/pod-1/paths-101/pathep-[eth1/23]

Description:

Encap:
Integer Value

IPv4 Primary / IPv6 Preferred Address:
address/mask

IPv6 DAD:

IPv4 Secondary / IPv6 Additional
Addresses:

| Address | IPv6 DAD |
|---------|----------|
| | |

MAC Address:

MTU (bytes):

Link-local Address:

為node-204建立介面配置檔案。手動輸入節點和路徑欄位，如下所示。

Node: topology/pod-1/node-204

Path: topology/pod-1/paths-204/pathep-[eth1/54]

Select Routed Sub-Interface



Specify the Interface

Node: ▼
Ex: topology/pod-1/node-1

Path: ▼
Ex: topology/pod-1/paths-101/pathep-[eth1/23]

Description:

Encap: ▼
Integer Value

IPv4 Primary / IPv6 Preferred Address:
address/mask

IPv6 DAD:

IPv4 Secondary / IPv6 Additional Addresses: +
Address IPv6 DAD

MAC Address:

MTU (bytes):

Link-local Address:

建立L3Out外部網路 (外部EPG) :

Create Routed Outside



[STEP 2 > External EPG Networks](#)

1. Identity **2. External EPG Networks**

Configure External EPG Networks

Create Route Profiles:

External EPG Networks

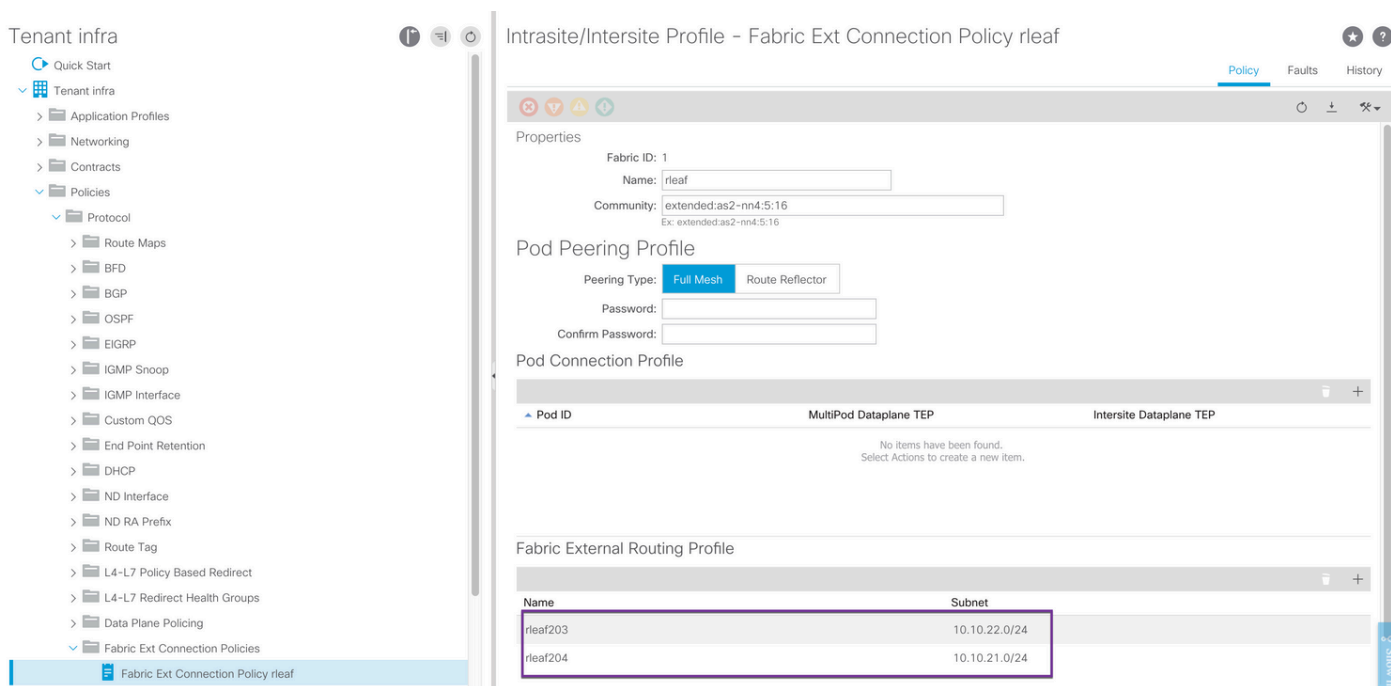
| Name | QoS Class | Description | Target DSCP | Subnet |
|-------------|-------------|-------------|-------------|-----------|
| rleaf-l3out | Unspecified | | Unspecified | 0.0.0.0/0 |

ACI配置步驟5. 建立交換矩陣外部連線策略

1. 導航到 Tenant > Infra > Policies > Protocol > Fabric Ext Connection Policy > Fabric External Connection Policy 並建立 Intransite/Intersite Profile。

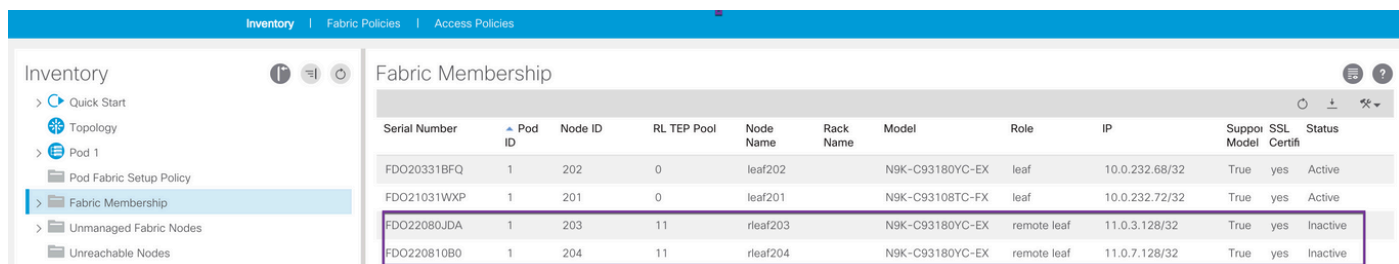
2.使用連接到WAN路由器(IPN)的RLEAF203和RLEAF204的外部網路，新增交換矩陣外部路由配置檔案。

3.在本例中，這些地址分別為10.10.22.0/24和10.10.21.0/24。

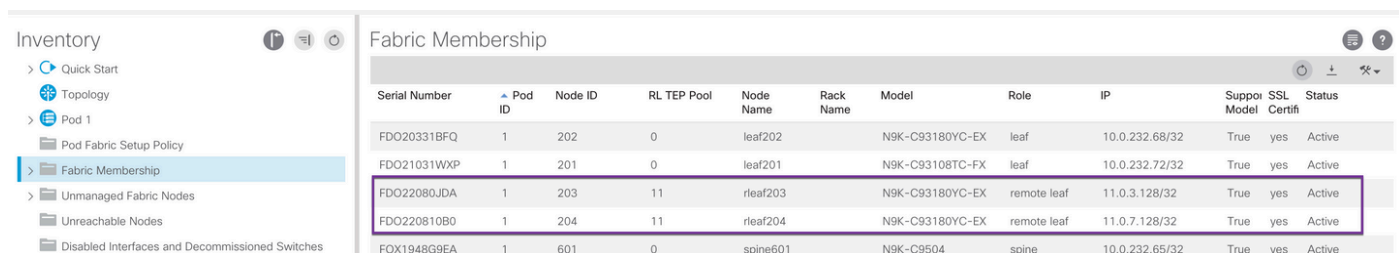


ACI配置步驟6.將遠端枝葉註冊到ACI交換矩陣Pod

然後，遠端枝葉從APIC TEP池獲取交換矩陣IP地址。



請等待一段時間，以使遠端枝葉進入活動狀態。現在，您可以看到遠端枝葉rleaf-203和rleaf-204已註冊到ACI交換矩陣。



```
<#root>
```

```
apic3#
```

```
acidiag fmvread
```

| ID | Pod ID | Name | Serial Number | IP Address | Role | State | LastU |
|-----|--------|----------|---------------|-----------------|-------|--------|-------|
| 101 | 1 | leaf101 | SAL1946SWJM | 10.0.232.64/32 | leaf | active | 0 |
| 102 | 1 | leaf102 | SAL1946SWNS | 10.0.232.73/32 | leaf | active | 0 |
| 103 | 1 | leaf103 | SAL1946SWNU | 10.0.232.69/32 | leaf | active | 0 |
| 104 | 1 | leaf104 | SAL1946SWNT | 10.0.8.64/32 | leaf | active | 0 |
| 201 | 1 | leaf201 | FDO21031WXP | 10.0.232.72/32 | leaf | active | 0 |
| 202 | 1 | leaf202 | FDO20331BFQ | 10.0.232.68/32 | leaf | active | 0 |
| 203 | 1 | rleaf203 | FDO22080JDA | 172.17.3.128/32 | leaf | active | 0 |
| 204 | 1 | rleaf204 | FDO220810B0 | 172.17.7.128/32 | leaf | active | 0 |
| 501 | 1 | spine501 | FOX1949GHM | 10.0.232.66/32 | spine | active | 0 |
| 601 | 1 | spine601 | FOX1948G9EA | 10.0.232.65/32 | spine | active | 0 |

```
Total 10 nodes
```

```
apic3#
```

現在，您可以看到遠端枝葉和IPN之間的OSPF相鄰關係。

從2003年RLEAF開始：

```
<#root>
```

```
rleaf203#
```

```
show ip ospf neighbors vrf overlay-1
```

```
OSPF Process ID default VRF overlay-1
Total number of neighbors: 1
Neighbor ID    Pri State           Up Time  Address      Interface
172.16.191.191 1 FULL/ -          00:24:57 10.10.22.10  Eth1/54.6
rleaf203#
```

```
rleaf203#
```

```
show ip route vrf overlay-1
```

```
IP Route Table for VRF "overlay-1"
'*' denotes best ucast next-hop
 '**' denotes best mcast next-hop
 '[x/y]' denotes [preference/metric]
 '%<string>' in via output denotes VRF <string>
```

```
10.0.0.0/16, ubest/mbest: 1/0
  *via 10.10.22.10, eth1/54.6, [110/20], 00:30:24, ospf-default, nssa type-2
10.0.0.1/32, ubest/mbest: 1/0
  *via 10.10.22.10, eth1/54.6, [110/20], 00:30:24, ospf-default, nssa type-2

< snip >
```

從2004年RLEAF開始：

```
<#root>
```

```
rleaf204#
```

```
show ip ospf neighbors vrf overlay-1
```

```
OSPF Process ID default VRF overlay-1
Total number of neighbors: 1
Neighbor ID      Pri State           Up Time  Address      Interface
172.16.191.191  1 FULL/ -          00:25:36 10.10.21.10  Eth1/54.6
rleaf204#
```

```
rleaf204#
```

```
show ip route vrf overlay-1
```

```
IP Route Table for VRF "overlay-1"
'*' denotes best ucast next-hop
 '**' denotes best mcast next-hop
 '[x/y]' denotes [preference/metric]
 '%<string>' in via output denotes VRF <string>
```

```
10.0.0.0/16, ubest/mbest: 1/0
  *via 10.10.21.10, eth1/54.6, [110/20], 00:31:37, ospf-default, nssa type-2
10.0.0.1/32, ubest/mbest: 1/0
  *via 10.10.21.10, eth1/54.6, [110/20], 00:31:37, ospf-default, nssa type-2

< snip >
```

在IPN上：

```
<#root>
```

```
RLEAF-IPN#
```

```
show ip ospf neighbors vrf RLEAF
```

```
OSPF Process ID 1 VRF RLEAF
Total number of neighbors: 4
Neighbor ID      Pri State           Up Time  Address      Interface
172.16.204.204  1 FULL/ -          00:26:03 10.10.21.11  Eth3/34.4
172.16.203.203  1 FULL/ -          00:26:03 10.10.22.11  Eth3/35.4
RLEAF-IPN#
```

ACI配置步驟7.遠端枝葉的QoS配置

需要將ACI交換矩陣類 (QoS級別) 分類為IPN內的DSCP值。要達到此要求，應使用L3流量的DSCP class-cos轉換策略啟用ACI交換矩陣。使用此配置可以將ACI QOS級別和預設類對映到IPN中的DSCP值。

導覽至Tenant > Infra > Policies > DSCP class-cos translation policy for L3 traffic，如下圖所示。

DSCP class-cos translation policy for L3 traffic

Policy History

Properties

| | | |
|---------------------------|----------|---------|
| Translation Policy State: | Disabled | Enabled |
| User Level 1: | CS0 | ▼ |
| User Level 2: | CS1 | ▼ |
| User Level 3: | CS2 | ▼ |
| Control Plane Traffic: | CS3 | ▼ |
| Policy Plane Traffic: | CS4 | ▼ |
| Span Traffic: | CS5 | ▼ |
| Traceroute Traffic: | CS6 | ▼ |

ACI配置步驟8 (可選)。使用遠端枝葉建立虛擬埠通道(vPC)顯式保護組

由於遠端枝葉交換機已註冊到ACI交換矩陣，因此您可以使用遠端枝葉建立vPC顯式保護組。導航到Fabric > Access Policies > Switch Policies > Policies > Virtual Port Channel Default並創建顯式VPC保護組(+)。影象片段顯示了不同的IP編址方案。

VPC Explicit Protection Group - VPC Protection Group Rleaf-Vpc

Policy Faults History

Properties

Name: rleaf-vpc

Logical Pair ID: 234

VPC Domain Policy: default

Virtual IP: 11.0.3.130/32

| Switch Pairs: | Node ID | Peer IP |
|---------------|---------|---------------|
| | 203 | 11.0.3.129/32 |
| | 204 | 11.0.7.129/32 |

```
<#root>
```

```
rleaf203#
```

```
show system internal epm vpc
```

```
Local TEP IP                : 172.17.3.128
```

```
Peer TEP IP                 : 172.17.7.129
```

```
vPC configured              : Yes
```

```
vPC VIP                     : 172.17.3.130
```

```
MCT link status             : Up
```

```
Local vPC version bitmap    : 0x7
```

```
Peer vPC version bitmap     : 0x7
```

```
Negotiated vPC version      : 3
```

```
Peer advertisement received  : Yes
```

```
Tunnel to vPC peer          : Up
```

```
vPC# 343
```

```
if : port-channel1, if index : 0x16000000
```

```
local vPC state : MCEC_STATE_UP, peer vPC state : MCEC_STATE_UP
```

```
current link state : LOCAL_UP_PEER_UP
```

```
vPC fast conv : Off
```

```
rleaf203#
```

驗證

RLeaf TEP審閱

遠端枝葉資料平面隧道端點(RL-DP-PTEP) — 此IP地址從分配給遠端位置的TEP池分配給每台遠端枝葉交換機。當遠端枝葉節點不是vPC域的一部分時，來自遠端枝葉節點的VXLAN資料包將用此TEP作為源IP地址發起。

遠端枝葉vPC通道端點(RL-vPC) — 這是從分配給遠端位置的TEP池中分配給遠端枝葉節點的vPC對的任播IP地址。如果遠端枝葉交換機是vPC域的一部分，則源自兩個遠端枝葉交換機的所有VXLAN資料包均源自此TEP地址。

```
<#root>
```

```
rleaf203#
```

```
show ip int vrf overlay-1
```

```
IP Interface Status for VRF "overlay-1"
```

```
eth1/54.6, Interface status: protocol-up/link-up/admin-up, iod: 64, mode: external
```

```
IP address: 10.10.22.11, IP subnet: 10.10.22.0/24
```

```
IP broadcast address: 255.255.255.255
```

```
IP primary address route-preference: 1, tag: 0
```

```
lo0, Interface status: protocol-up/link-up/admin-up, iod: 4, mode: ptep
```

```
IP address: 172.17.3.128, IP subnet: 172.17.3.128/32
```

```
IP broadcast address: 255.255.255.255
```

```
IP primary address route-preference: 1, tag: 0
```

```
lo1, Interface status: protocol-up/link-up/admin-up, iod: 65, mode: unspecified
```

```
IP address: 172.16.203.203, IP subnet: 172.16.203.203/32
```

```
IP broadcast address: 255.255.255.255
```

```
IP primary address route-preference: 1, tag: 0
```

```
lo2, Interface status: protocol-up/link-up/admin-up, iod: 72, mode: vpc
```

```
IP address: 172.17.3.130, IP subnet: 172.17.3.130/32
```

```
IP broadcast address: 255.255.255.255
```

```
IP primary address route-preference: 1, tag: 0
```

```
lo3, Interface status: protocol-up/link-up/admin-up, iod: 75, mode: dp-ptep
```

```
IP address: 172.17.3.129, IP subnet: 172.17.3.129/32
```

```
IP broadcast address: 255.255.255.255
```

```
IP primary address route-preference: 1, tag: 0
```

```
lo1023, Interface status: protocol-up/link-up/admin-up, iod: 66, mode: ftep
```

```
IP address: 172.17.0.32, IP subnet: 172.17.0.32/32
```

```
IP broadcast address: 255.255.255.255
```

```
IP primary address route-preference: 1, tag: 0
```

```
rleaf203#
```

```
<#root>
```

```
rleaf204#
```

```
show ip int vrf overlay-1
```

```
IP Interface Status for VRF "overlay-1"
```

```
eth1/54.6, Interface status: protocol-up/link-up/admin-up, iod: 64, mode: external
```

```
IP address: 10.10.21.11, IP subnet: 10.10.21.0/24
```

```
IP broadcast address: 255.255.255.255
IP primary address route-preference: 1, tag: 0
lo0, Interface status: protocol-up/link-up/admin-up, iod: 4, mode: ptep
IP address: 172.17.7.128, IP subnet: 172.17.7.128/32
IP broadcast address: 255.255.255.255
IP primary address route-preference: 1, tag: 0
lo1, Interface status: protocol-up/link-up/admin-up, iod: 65, mode: unspecified
IP address: 172.16.204.204, IP subnet: 172.16.204.204/32
IP broadcast address: 255.255.255.255
IP primary address route-preference: 1, tag: 0
lo2, Interface status: protocol-up/link-up/admin-up, iod: 71, mode: dp-ptep
```

```
IP address: 172.17.7.129, IP subnet: 172.17.7.129/32
```

```
IP broadcast address: 255.255.255.255
```

```
IP primary address route-preference: 1, tag: 0
```

```
lo9, Interface status: protocol-up/link-up/admin-up, iod: 81, mode: vpc
```

```
IP address: 172.17.3.130, IP subnet: 172.17.3.130/32
```

```
IP broadcast address: 255.255.255.255
```

```
IP primary address route-preference: 1, tag: 0
```

```
lo1023, Interface status: protocol-up/link-up/admin-up, iod: 66, mode: ftep
IP address: 172.17.0.32, IP subnet: 172.17.0.32/32
IP broadcast address: 255.255.255.255
IP primary address route-preference: 1, tag: 0
```

```
rleaf204#
```

主幹TEP稽核

遠端枝葉單播隧道端點(RL-UCAST) — 這是本地TEP池的任播IP地址部分，自動分配給與遠端枝葉交換機關聯的所有主幹。當單點傳播封包從連線到RLEAF節點的終端傳送到ACI主Pod時，VLAN封裝封包會傳送目的地RL-Ucast-TEP位址，來源為RL-DP-TEP或RL-vPC。因此，ACI主DC Pod中的任何主幹都可以接收流量，將其解除封裝，執行所需的第2層或第3層查詢，最後重新封裝它並將其轉發到最終目的地。

遠端枝葉 單點傳播-多點傳送通道端點(RL-MCAST-HREP) — 這是本地TEP池中的另一個任播IP位址部分，自動分配給與遠端枝葉交換器相關聯的所有主幹。當連線到遠端枝葉節點的終端產生BUM (第2層廣播、未知單點傳播或多點傳送) 流量時，封包會被RLEAF節點封裝，並以目的地為

RL-Mcast-TEP位址以及來源為RL-DP-TEP或RL-vPC來傳送。 ACI Pod中的任何主幹都可以接收BUM流量並將其轉送到交換矩陣內。

```
<#root>
```

```
spine501#
```

```
show ip int vrf overlay-1
```

```
< snip >
```

```
lo12, Interface status: protocol-up/link-up/admin-up, iod: 88, mode: rl-mcast-hrep
```

```
IP address: 10.0.0.37, IP subnet: 10.0.0.37/32
```

```
IP broadcast address: 255.255.255.255
```

```
IP primary address route-preference: 1, tag: 0
```

```
lo13, Interface status: protocol-up/link-up/admin-up, iod: 91, mode: rl-ucast
```

```
IP address: 10.0.0.36, IP subnet: 10.0.0.36/32
```

```
IP broadcast address: 255.255.255.255
```

```
IP primary address route-preference: 1, tag: 0
```

```
spine501#
```

```
<#root>
```

```
spine601#
```

```
show ip int vrf overlay-1
```

```
< snip >
```

```
lo11, Interface status: protocol-up/link-up/admin-up, iod: 76, mode: rl-mcast-hrep
```

```
IP address: 10.0.0.37, IP subnet: 10.0.0.37/32
```

```
IP broadcast address: 255.255.255.255
```

```
IP primary address route-preference: 1, tag: 0
```

```
lo12, Interface status: protocol-up/link-up/admin-up, iod: 79, mode: rl-ucast
```

```
IP address: 10.0.0.36, IP subnet: 10.0.0.36/32
```

```
IP broadcast address: 255.255.255.255
```

```
IP primary address route-preference: 1, tag: 0
```

```
spine601#
```

遠端枝葉可路由子網

如果可以通過IPN/ISN/WAN訪問APIC，則無需遠端子網即可發現遠端枝葉節點。此子網用於為主幹交換機上的APIC建立NAT條目並支援vPOD。此功能也可以與RL Direct結合使用。

F0467配置失敗

如果您使用嚮導將遠端枝葉新增到Pod，則該嚮導不會配置此處列出的所需訪問策略，並且您會看到常見的F0467故障消息。您需要手動建立它們。

- 遠端枝葉節點和枝葉選擇器的枝葉交換機配置檔案
- 遠端枝葉節點的枝葉介面配置檔案和上行鏈路的介面選擇器
- 訪問介面策略組

```
F0467 Fault delegate: Configuration failed for uni/tn-infra/out-rl-infra.13out/instP-ipnInstP node 203  
topology/pod-1/node-203/local/svc-policyelem-id-0/uni/epp/rtd-[uni/tn-infra/out-rl-infra.13out/instP-ip
```

啟動驗證

由於啟用Bootscript驗證，遠端枝葉可能無法被發現。

基本上，啟用Bootscript Validation後，枝葉會啟動並瞭解其應通過DHCP運行的版本，然後它應從APICS下載映像。但問題是，對於啟用了RL direct的遠端站點，必須在枝葉上安裝特定的攝影機規則，以允許已捕獲的APIC流量。因為bootscript驗證失敗了這些規則，並且對象沒有安裝在RL上。但是，由於未安裝這些對象/規則，因此無法從APIC成功下載映像。

如果您遇到這種情況，請嘗試在BSV關閉的情況下發現RL。

相關資訊

- <https://www.cisco.com/c/en/us/solutions/collateral/data-center-virtualization/application-centric-infrastructure/white-paper-c11-740861.html>
- [技術支援與文件 - Cisco Systems](#)

關於此翻譯

思科已使用電腦和人工技術翻譯本文件，讓全世界的使用者能夠以自己的語言理解支援內容。請注意，即使是最佳機器翻譯，也不如專業譯者翻譯的內容準確。Cisco Systems, Inc. 對這些翻譯的準確度概不負責，並建議一律查看原始英文文件（提供連結）。