為使用NX-OS和Windows Server 2022的Nexus 9000配置並驗證VxLAN交換矩陣中的DHCP

目錄

簡介

本文檔介紹如何在具有Nexus 9000交換機的VxLAN交換矩陣中配置DHCP並對其進行故障排除。

必要條件

需求

思科建議您瞭解以下主題：

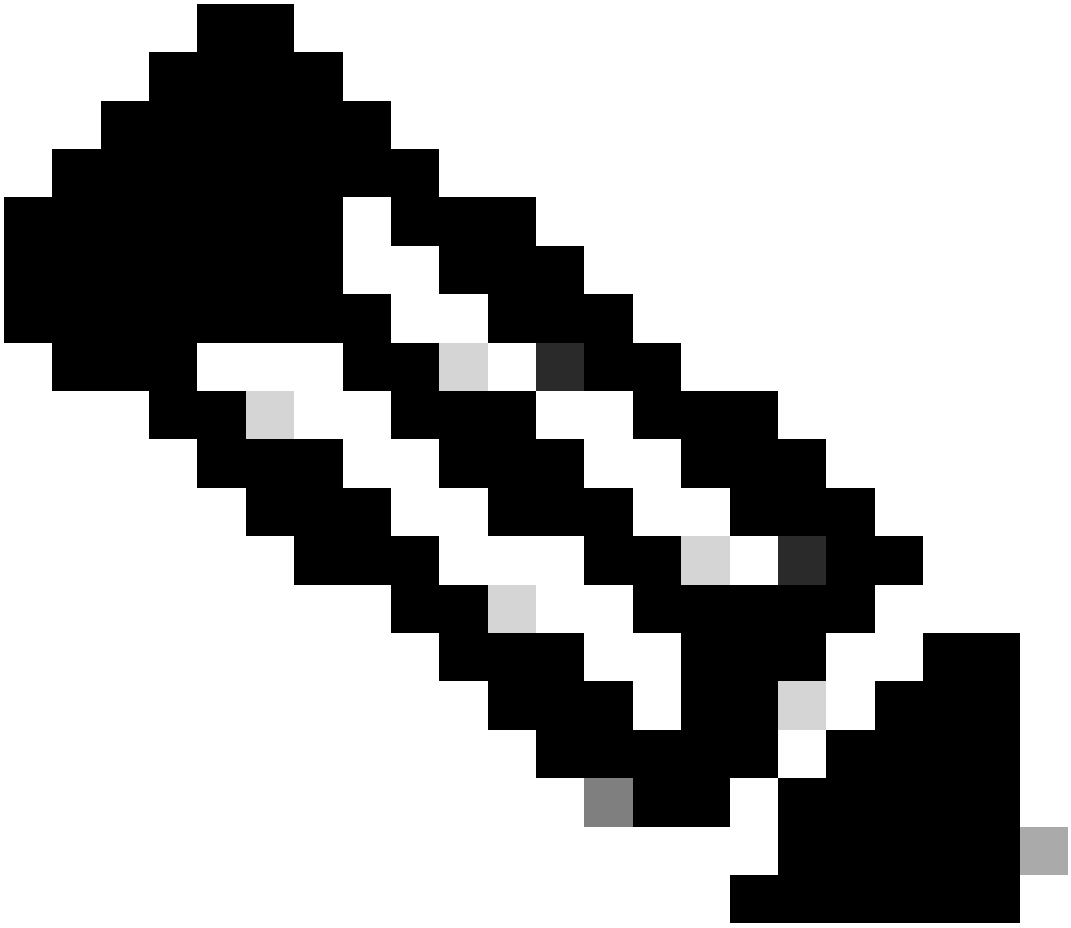
- Nexus NX-OS軟體。
- 虛擬連線埠通道(vPC)。
- VxLAN BGP L2VPN EVPN
- BGP address-family IPv4
- OSPF
- 多點傳送PIM （稀疏模式）
- DHCP

採用元件

本文中的資訊係根據以下軟體和硬體版本：

- Cisco Nexus 9000和Cisco NX-OS。
  - N9K-C93180YC-EX
  - N9K-C93180YC-FX
  - NX-OS 10.3(4a)
- Windows Server 2022資料中心

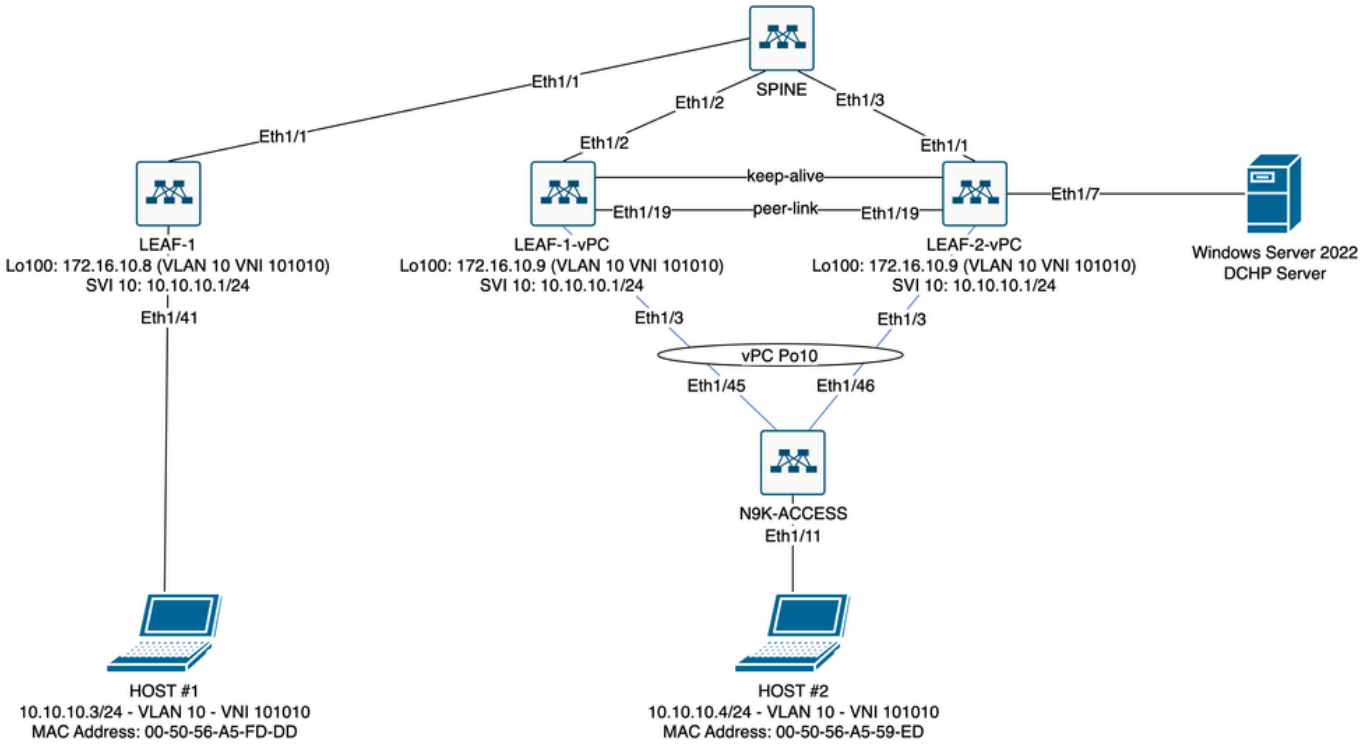
本文中的資訊是根據特定實驗室環境內的裝置所建立。文中使用到的所有裝置皆從已清除（預設）的組態來啟動。如果您的網路運作中，請確保您瞭解任何指令可能造成的影響。



注意：有關第三方軟體或硬體的配置和整合的任何問題均不在思科支援範圍內。使用第三方工具是向客戶演示思科裝置的配置和運行的最佳方法。

背景資訊

實驗室中VxLAN的底層與重疊配置



實驗室中的VxLAN交換矩陣圖

- 骨幹:
  - 此Nexus交換機傳送DHCP（發現、提供、請求、確認）資料包，在此場景中不會解除封裝。僅使用外部標頭。
  - 充當網路交換矩陣中的中心路由點。
  - 負責連線所有LEAF交換機並促進它們之間的資料流。
  - 參與BGP以將EVPN路由分發到枝葉交換機。
  - 執行IP路由，並可以透過檢視外部IP報頭來路由不同子網或VxLAN網段之間的流量。
  - 將重疊網路(VxLAN)與底層物理網路分離。
  - 使用傳統IP路由協定管理底層，而重疊則由使用BGP EVPN的VxLAN管理，從而提供可擴展且靈活的網路架構。

- 枝葉1：
  - 枝葉交換機為伺服器、儲存裝置和其他網路裝置等終端提供物理連線。
  - 枝葉交換機充當VTEP，這意味著它們會封裝和解封VxLAN資料包。
  - 在這種情況下，主機1發出IP地址請求。
  - LEAF-1負責封裝VxLAN報頭中的DCHP資料包。
  - HOST#1以傳統乙太網透明方式接收DCHP資料包。

- LEAF-1-vPC和LEAF-2-vPC：
  - 枝葉交換機透過運行BGP和交換路由資訊參與EVPN控制平面。這允許分配MAC和IP地址資訊，確保流量可以透過VxLAN交換矩陣有效路由。
  - 在此場景中，DHCP伺服器與VLAN 10相關聯，VNI 101010與HOST#1相同。這表示它只是VxLAN橋接。
  - 如果DHCP伺服器與HOST#1以外的VNI關聯，則路由嚴格需要L3VNI。必須建立源和目標VNI。
  - DCHP伺服器作為傳統乙太網透明接收DCHP資料包。
  - vPC中的兩個Nexus交換機均接收BUM流量，但只有在vPC中運行的主要Nexus交換機

傳送流量。輔助Nexus交換機丟棄流量。在此場景中，LEAF-1-vPC在操作上為主要。
    - 必須使用infra-vlan，因為如果LEAF-2-vPC到SPINE的介面斷開，則無法傳送DCHP資料包。要將VxLAN封裝流量傳送到LEAF-1-vPC，需要此備份VLAN。這樣，LEAF-1-vPC可以將DCHP資料包傳送到骨幹。

- N9K-ACCESS：
    - 此Nexus交換機僅使用vPC埠通道為向HOST#2提供冗餘目的而提供到兩個枝葉的連線

骨幹

```
nv overlay evpn
feature ospf
feature bgp
feature pim
feature netconf
feature nv overlay

ip pim rp-address 192.168.11.11 group-list 224.10.10.0/24
ip pim ssm range 232.0.0.0/8
ip pim anycast-rp 192.168.11.11 192.168.0.11

ip prefix-list direct_routes seq 5 permit 10.104.11.0/30 le 32
route-map redistribution permit 10
  match ip address prefix-list direct_routes

interface Ethernet1/1
  speed 1000
  ip address 10.104.11.1/30
  ip ospf network point-to-point
  ip router ospf 1 area 0.0.0.0
  ip pim sparse-mode
  no shutdown

interface Ethernet1/2
  ip address 10.102.11.1/30
  ip ospf network point-to-point
  ip router ospf 1 area 0.0.0.0
  ip pim sparse-mode
  no shutdown

interface Ethernet1/3
  speed 1000
  ip address 10.103.11.1/30
  ip ospf network point-to-point
  ip router ospf 1 area 0.0.0.0
  ip pim sparse-mode
  no shutdown

interface loopback0
  description ANYCAST-RP
  ip address 192.168.0.11/32
  ip router ospf 1 area 0.0.0.0
  ip pim sparse-mode

interface loopback1
  description ANYCAST-RP-CANDIDATE
  ip address 192.168.11.11/32
```

```
  ip router ospf 1 area 0.0.0.0
  ip pim sparse-mode

router ospf 1

router bgp 65000
  neighbor 192.168.3.3
    remote-as 65000
    update-source loopback0
    address-family l2vpn evpn
      send-community
      send-community extended
      route-reflector-client
  neighbor 192.168.4.4
    remote-as 65000
    update-source loopback0
    address-family l2vpn evpn
      send-community
      send-community extended
      route-reflector-client
  neighbor 192.168.5.5
    remote-as 65000
    update-source loopback0
    address-family l2vpn evpn
      send-community
      send-community extended
      route-reflector-client
```

枝葉-1

```
nv overlay evpn
feature ospf
feature bgp
feature pim
feature interface-vlan
feature vn-segment-vlan-based
feature dhcp
feature nv overlay

fabric forwarding anycast-gateway-mac 0000.0a0a.0a0a

ip pim rp-address 192.168.11.11 group-list 224.10.10.0/24
ip pim ssm range 232.0.0.0/8

vlan 1,10,20,300
vlan 10
  vn-segment 101010
vlan 20
  vn-segment 202020
vlan 300
  vn-segment 303030

spanning-tree vlan 10 priority 4096

ip prefix-list host_subnets seq 5 permit 10.10.10.0/24 le 32
ip prefix-list host_subnets seq 10 permit 192.168.20.0/24 le 32
ip prefix-list host_subnets seq 15 permit 172.16.10.8/32
```

```
route-map direct_routes_tenant-a permit 10
  match ip address prefix-list host_subnets

vrf context tenant-a
  vni 303030
  rd auto
  address-family ipv4 unicast
    route-target both auto
    route-target both auto evpn

interface Vlan10
  no shutdown
  vrf member tenant-a
  no ip redirects
  ip address 10.10.10.1/24
  no ipv6 redirects
  fabric forwarding mode anycast-gateway
  ip dhcp relay address 10.10.10.150
  ip dhcp relay source-interface loopback100

interface Vlan20
  no shutdown
  vrf member tenant-a
  no ip redirects
  ip address 192.168.20.1/24
  no ipv6 redirects
  fabric forwarding mode anycast-gateway

interface Vlan300
  no shutdown
  vrf member tenant-a
  no ip redirects
  ip forward
  no ipv6 redirects

interface nve1
  no shutdown
  host-reachability protocol bgp
  source-interface loopback0
  member vni 101010
    suppress-arp
    mcast-group 224.10.10.10
  member vni 202020
    suppress-arp
    mcast-group 224.10.10.10
  member vni 303030 associate-vrf

interface Ethernet1/1
  ip address 10.104.11.2/30
  ip ospf network point-to-point
  ip router ospf 1 area 0.0.0.0
  ip pim sparse-mode
  no shutdown

interface loopback0
  description UNDERLAY-VERIFICATION
  ip address 192.168.5.5/32
  ip router ospf 1 area 0.0.0.0
  ip pim sparse-mode

interface loopback100
  vrf member tenant-a
```

```
  ip address 172.16.10.8/32

router ospf 1

router bgp 65000
  address-family ipv4 unicast
  neighbor 192.168.0.11
    remote-as 65000
    update-source loopback0
    address-family l2vpn evpn
      send-community
      send-community extended
  vrf tenant-a
    address-family ipv4 unicast
      redistribute direct route-map direct_routes_tenant-a
evpn
  vni 101010 l2
    rd auto
    route-target import auto
    route-target export auto
  vni 202020 l2
    rd auto
    route-target import auto
    route-target export auto
```

枝葉-1-vPC

```
nv overlay evpn
feature ospf
feature bgp
feature pim
feature interface-vlan
feature vn-segment-vlan-based
feature lacp
feature dhcp
feature vpc
feature nv overlay

fabric forwarding anycast-gateway-mac 0000.0a0a.0a0a

ip pim rp-address 192.168.11.11 group-list 224.10.10.0/24
ip pim ssm range 232.0.0.0/8

vlan 1,10,300,777
vlan 10
  vn-segment 101010
vlan 300
  vn-segment 303030
vlan 777
  name BACKUP_VLAN_ROUTING_NVE_INFRA
spanning-tree vlan 1,10,300 hello-time 4

ip prefix-list host_subnets seq 5 permit 10.10.10.0/24 le 32
ip prefix-list host_subnets seq 15 permit 172.16.10.9/32
route-map direct_routes_tenant-a permit 10
  match ip address prefix-list host_subnets
```

```
vrf context tenant-a
  vni 303030
  rd auto
  address-family ipv4 unicast
    route-target both auto
    route-target both auto evpn
system nve infra-vlans 777

vpc domain 1
  peer-switch
  peer-keepalive destination 10.88.238.195
  peer-gateway
  layer3 peer-router
  ip arp synchronize

interface Ethernet1/3
  switchport
  switchport mode trunk
  switchport trunk allowed vlan 1,10,20
  channel-group 10 mode active
  no shutdown

interface Ethernet1/19
  switchport
  switchport mode trunk
  channel-group 1 mode active
  no shutdown

interface port-channel1
  switchport
  switchport mode trunk
  spanning-tree port type network
  vpc peer-link

interface port-channel10
  switchport
  switchport mode trunk
  switchport trunk allowed vlan 1,10
  vpc 10

interface mgmt0
  vrf member management
  ip address 10.88.238.194/29

interface loopback0
  description UNDERLAY-VERIFICATION
  ip address 192.168.3.3/32
  ip router ospf 1 area 0.0.0.0
  ip pim sparse-mode

interface loopback1
  description OVERLAY-NVE
  ip address 192.168.13.1/32
  ip address 192.168.13.254/32 secondary
  ip router ospf 1 area 0.0.0.0
  ip pim sparse-mode

interface loopback10
  vrf member tenant-a
  ip address 172.16.10.1/32

interface loopback100
```

```
  vrf member tenant-a
  ip address 172.16.10.9/32

interface Vlan10
  no shutdown
  vrf member tenant-a
  no ip redirects
  ip address 10.10.10.1/24
  no ipv6 redirects
  fabric forwarding mode anycast-gateway
  ip dhcp relay address 10.10.10.150
  ip dhcp relay source-interface loopback100

interface Vlan300
  no shutdown
  vrf member tenant-a
  no ip redirects
  ip forward
  no ipv6 redirects

interface Vlan777
  description BACKUP_UNDERLAY_INFRA-VLAN
  no shutdown
  no ip redirects
  ip address 10.255.77.1/30
  no ipv6 redirects
  ip ospf network point-to-point
  ip router ospf 1 area 0.0.0.0
  ip pim sparse-mode

interface Ethernet1/2
  ip address 10.102.11.2/30
  ip ospf network point-to-point
  ip router ospf 1 area 0.0.0.0
  ip pim sparse-mode
  no shutdown

interface nve1
  no shutdown
  host-reachability protocol bgp
  advertise virtual-rmac
  source-interface loopback1
  member vni 101010
    suppress-arp
    mcast-group 224.10.10.10
  member vni 303030 associate-vrf

router ospf 1

router bgp 65000
  address-family ipv4 unicast
  address-family l2vpn evpn
    advertise-pip
  neighbor 192.168.0.11
    remote-as 65000
    update-source loopback0
    address-family l2vpn evpn
      send-community
      send-community extended
  neighbor 192.168.88.2
    remote-as 65000
    description OVERLAY_BACKUP
```

```
    update-source Vlan888
    address-family l2vpn evpn
      send-community
      send-community extended
  vrf tenant-a
    address-family ipv4 unicast
      redistribute direct route-map direct_routes_tenant-a
evpn
  vni 101010 l2
    rd auto
    route-target import auto
    route-target export auto
  vni 202020 l2
    rd auto
    route-target import auto
    route-target export auto
```

枝葉-2-vPC

```
nv overlay evpn
feature ospf
feature bgp
feature pim
feature interface-vlan
feature vn-segment-vlan-based
feature lacp
feature dhcp
feature vpc
feature nv overlay

fabric forwarding anycast-gateway-mac 0000.0a0a.0a0a

ip pim rp-address 192.168.11.11 group-list 224.10.10.0/24
ip pim ssm range 232.0.0.0/8

vlan 1,10,20,300,777
vlan 10
  vn-segment 101010
vlan 20
  vn-segment 202020
vlan 300
  vn-segment 303030
vlan 777
  name BACKUP_VLAN_ROUTING_NVE_INFRA

spanning-tree vlan 1,10,20,300 hello-time 4

ip prefix-list host_subnets seq 5 permit 10.10.10.0/24 le 32
ip prefix-list host_subnets seq 10 permit 192.168.20.0/24 le 32
ip prefix-list host_subnets seq 15 permit 172.16.10.10/32
route-map direct_routes_tenant-a permit 10
  match ip address prefix-list host_subnets

vrf context tenant-a
  vni 303030
  rd auto
  address-family ipv4 unicast
```

```
    route-target both auto
    route-target both auto evpn

system nve infra-vlans 777

vpc domain 1
  peer-switch
  peer-keepalive destination 10.88.238.194
  peer-gateway
  layer3 peer-router
  ip arp synchronize

interface Ethernet1/1
  ip address 10.103.11.2/30
  ip ospf network point-to-point
  ip router ospf 1 area 0.0.0.0
  ip pim sparse-mode
  no shutdown

interface Ethernet1/19
  switchport
  switchport mode trunk
  channel-group 1 mode active
  no shutdown
interface port-channel1
  switchport
  switchport mode trunk
  spanning-tree port type network
  vpc peer-link

interface port-channel10
  switchport
  switchport mode trunk
  switchport trunk allowed vlan 1,10,20
  vpc 10

interface mgmt0
  vrf member management
  ip address 10.88.238.195/29

interface loopback0
  description UNDERLAY-VERIFICATION
  ip address 192.168.4.4/32
  ip router ospf 1 area 0.0.0.0
  ip pim sparse-mode

interface loopback1
  description OVERLAY-NVE
  ip address 192.168.13.2/32
  ip address 192.168.13.254/32 secondary
  ip router ospf 1 area 0.0.0.0
  ip pim sparse-mode

interface loopback10
  vrf member tenant-a
  ip address 172.16.10.2/32

interface loopback100
  vrf member tenant-a
  ip address 172.16.10.10/32

interface Vlan10
```

```
  no shutdown
  vrf member tenant-a
  no ip redirects
  ip address 10.10.10.1/24
  no ipv6 redirects
  fabric forwarding mode anycast-gateway
  ip dhcp relay address 10.10.10.150
  ip dhcp relay source-interface loopback100

interface Vlan20
  no shutdown
  vrf member tenant-a
  no ip redirects
  ip address 192.168.20.1/24
  no ipv6 redirects
  fabric forwarding mode anycast-gateway

interface Vlan300
  no shutdown
  vrf member tenant-a
  no ip redirects
  ip forward
  no ipv6 redirects

interface Vlan777
  description BACKUP_UNDERLAY_INFRA-VLAN
  no shutdown
  no ip redirects
  ip address 10.255.77.2/30
  no ipv6 redirects
  ip ospf network point-to-point
  ip router ospf 1 area 0.0.0.0
  ip pim sparse-mode

interface nve1
  no shutdown
  host-reachability protocol bgp
  advertise virtual-rmac
  source-interface loopback1
  member vni 101010
    suppress-arp
    mcast-group 224.10.10.10
  member vni 202020
    suppress-arp
    mcast-group 224.10.10.10
  member vni 303030 associate-vrf

router ospf 1

router bgp 65000
  address-family ipv4 unicast
  address-family l2vpn evpn
    advertise-pip
  neighbor 192.168.0.11
    remote-as 65000
    update-source loopback0
    address-family l2vpn evpn
      send-community
      send-community extended
  neighbor 192.168.88.1
    remote-as 65000
    description OVERLAY_BACKUP
```

```
    update-source Vlan888
    address-family l2vpn evpn
      send-community
      send-community extended
  vrf tenant-a
    address-family ipv4 unicast
      redistribute direct route-map direct_routes_tenant-a
evpn
  vni 101010 l2
    rd auto
    route-target import auto
    route-target export auto
  vni 202020 l2
    rd auto
    route-target import auto
    route-target export auto
```

N9K-ACCESS

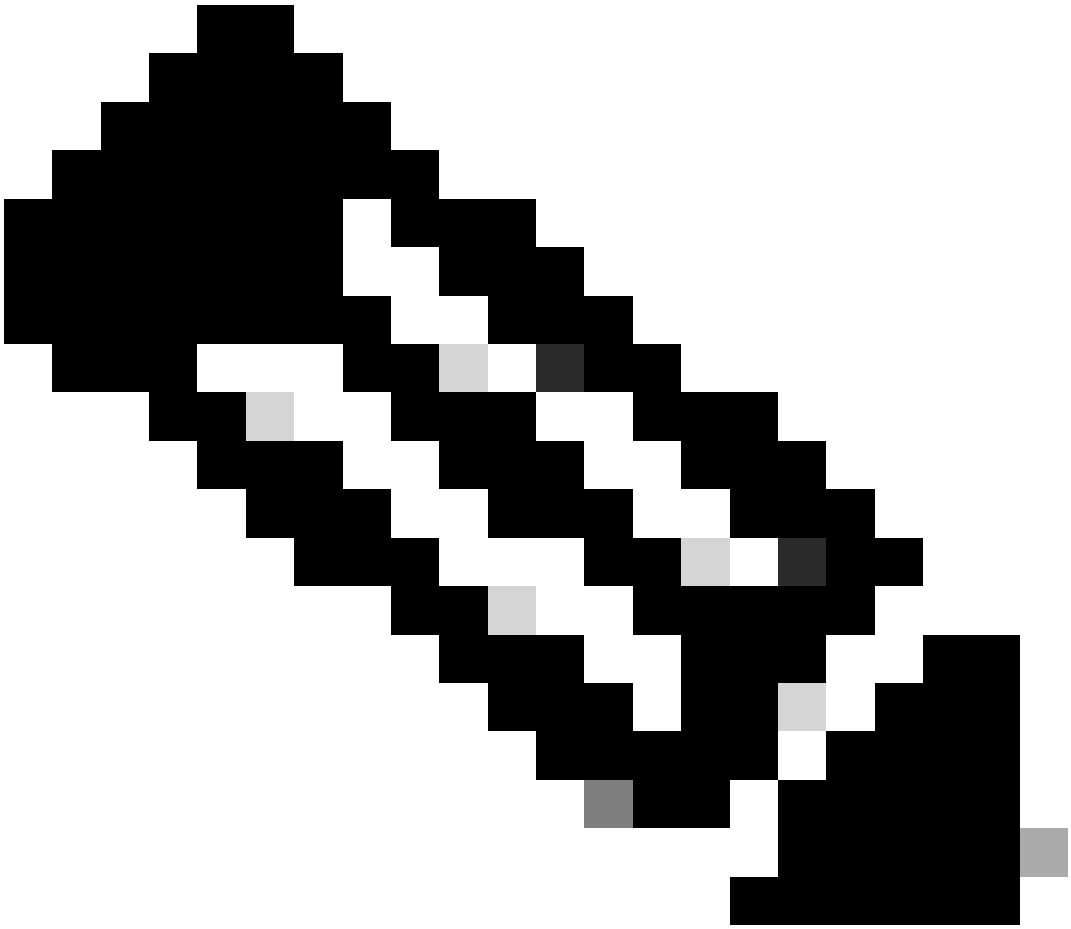
```
feature lacp

vlan 1,10

interface port-channel10
  switchport
  switchport mode trunk

interface Ethernet1/11
  switchport
  switchport access vlan 10
  no shutdown

interface Ethernet1/45
  switchport
  switchport mode trunk
  channel-group 10 mode active
  no shutdown

interface Ethernet1/46
  switchport
  switchport mode trunk
  channel-group 10 mode active
  no shutdown
```

Nexus交換機上的DHCP配置

枝葉-1

步驟 1.啟用功能DCHP。

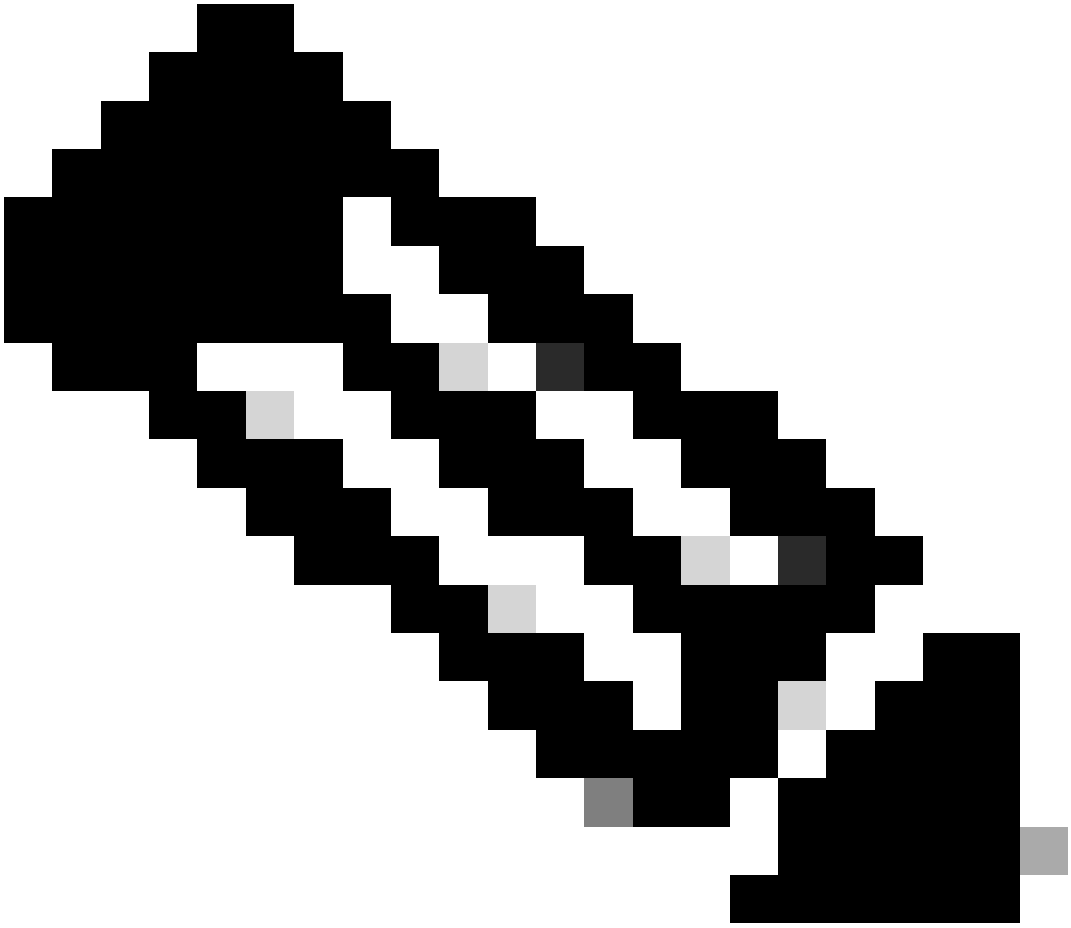
```
LEAF-1(config)# feature dhcp
```



注意：自NX-OS 7.x以來，DHCP伺服器和中繼代理命令service dhcp、ip dhcp relay和ipv6 dhcp relay預設處於啟用狀態。

步驟 2.應用命令ip dhcp relay information option。

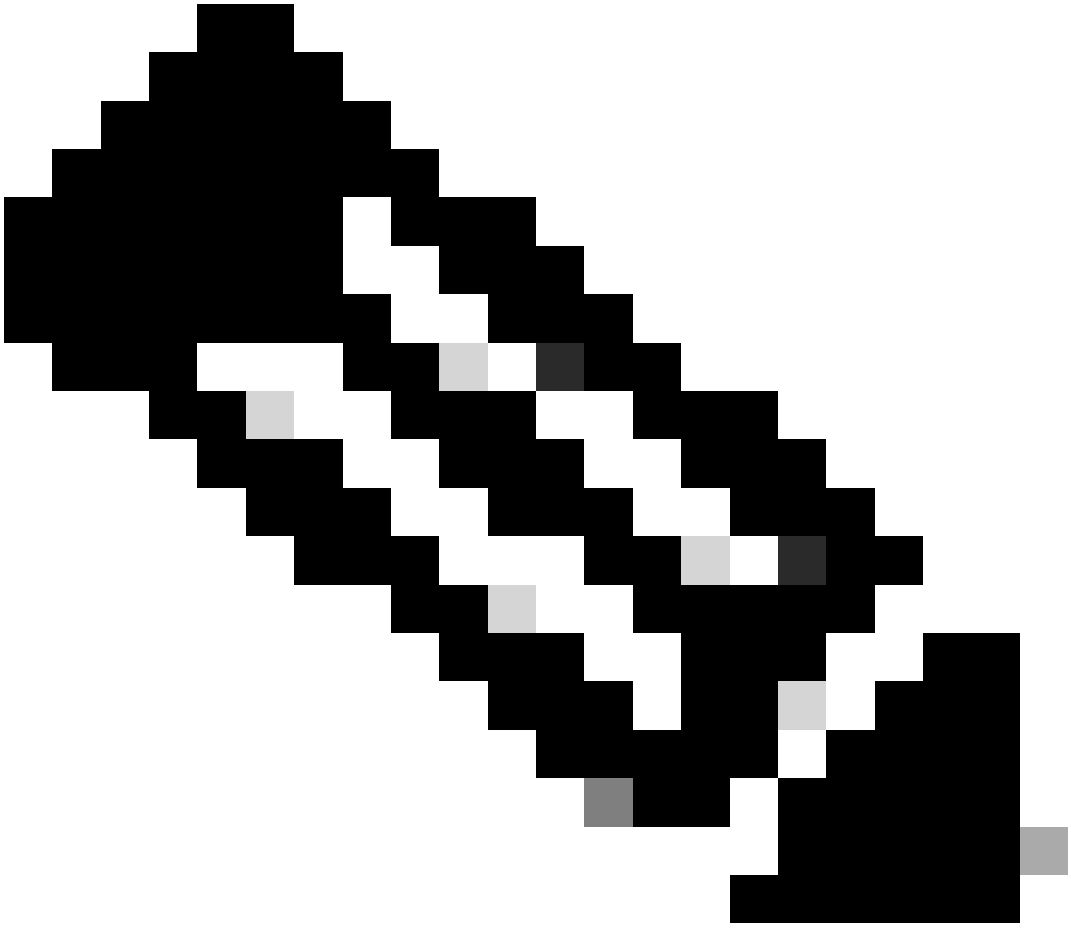
```
LEAF-1(config)# ip dhcp relay information option
```



注意：使用此命令，DHCP中繼代理可以插入和刪除選項82有關轉發資料包的資訊。

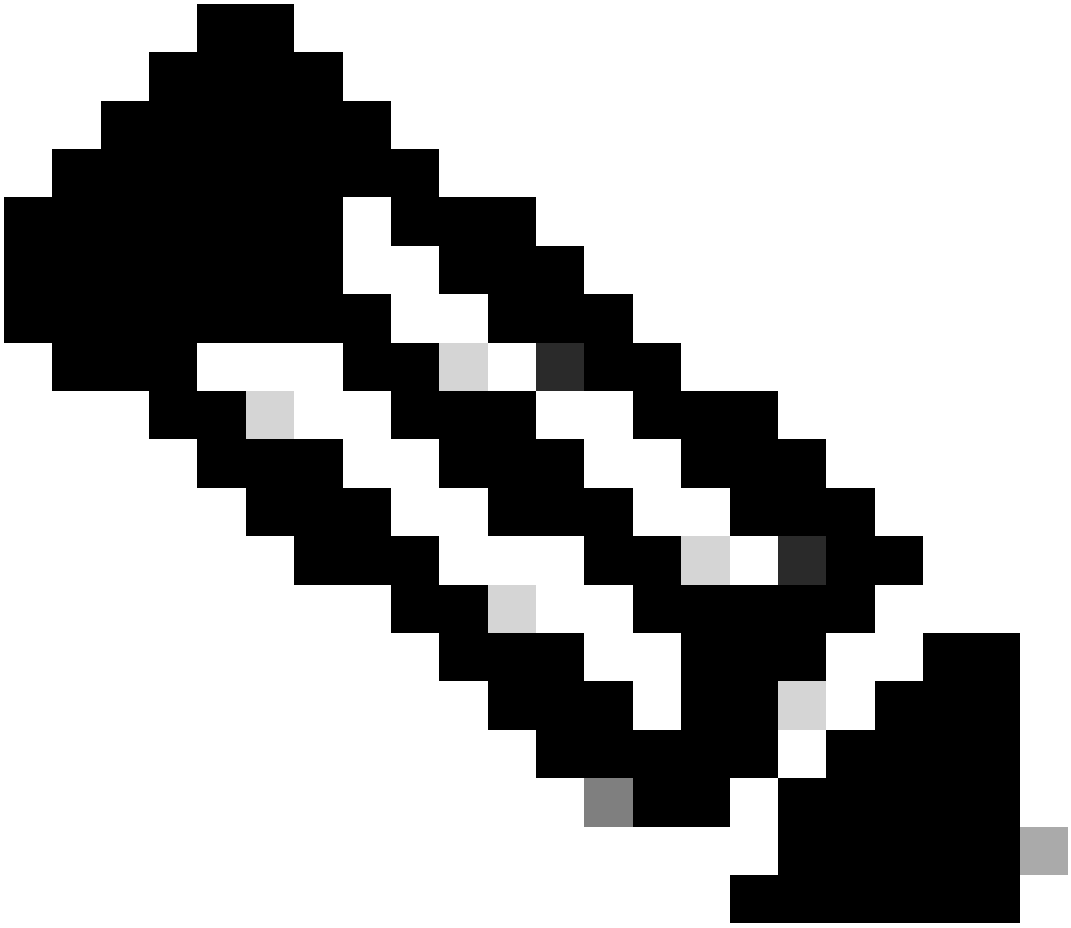
步驟 3.應用命令ip dhcp relay information option vpn。

```
LEAF-1(config)# ip dhcp relay information option vpn
```



注意：此命令用於啟用到達該DHCP伺服器所屬的不同VRF的DHCP中繼請求。

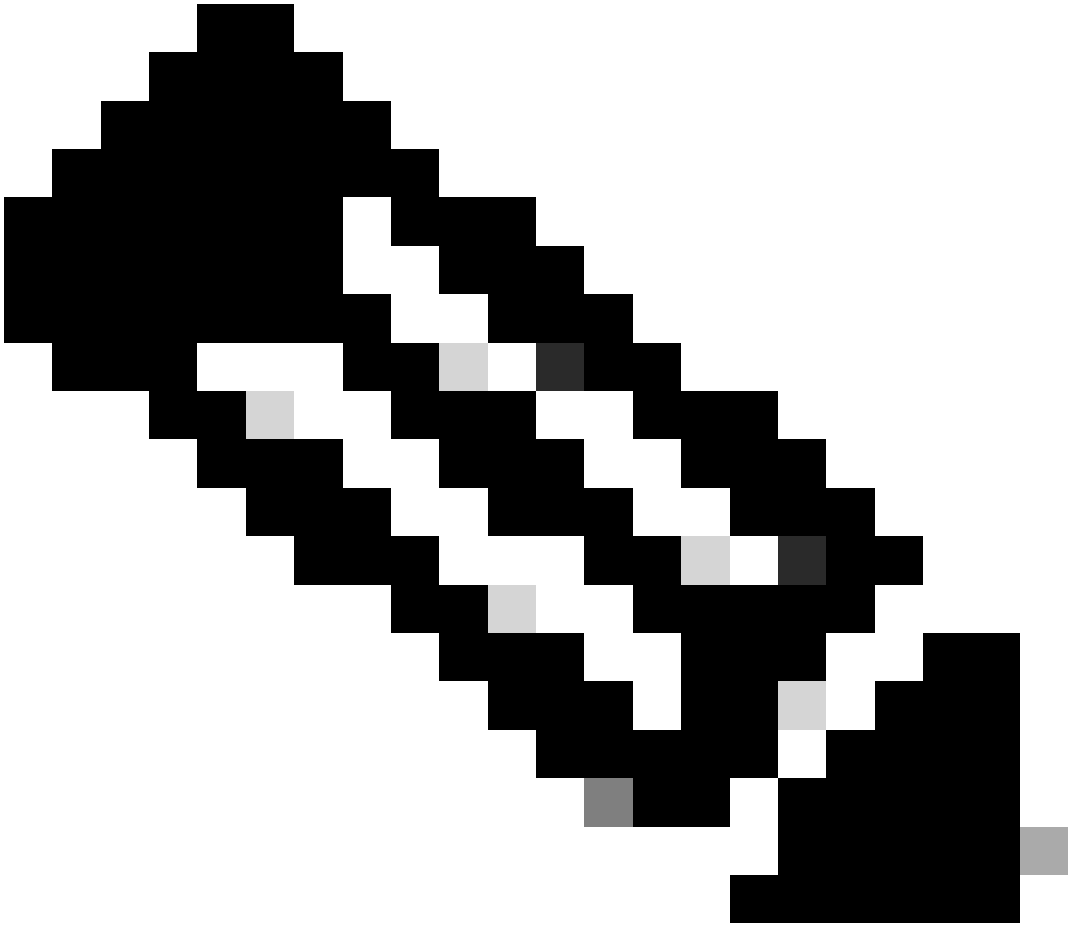
步驟 4.應用命令「ip dhcp relay address [DCHP server的ip地址]」。



注意：在本示例中，DCHP伺服器的IP地址為10.10.10.150。

```
LEAF-1(config)# interface vlan 10
LEAF-1(config-if)# ip dhcp relay address 10.10.10.150
```

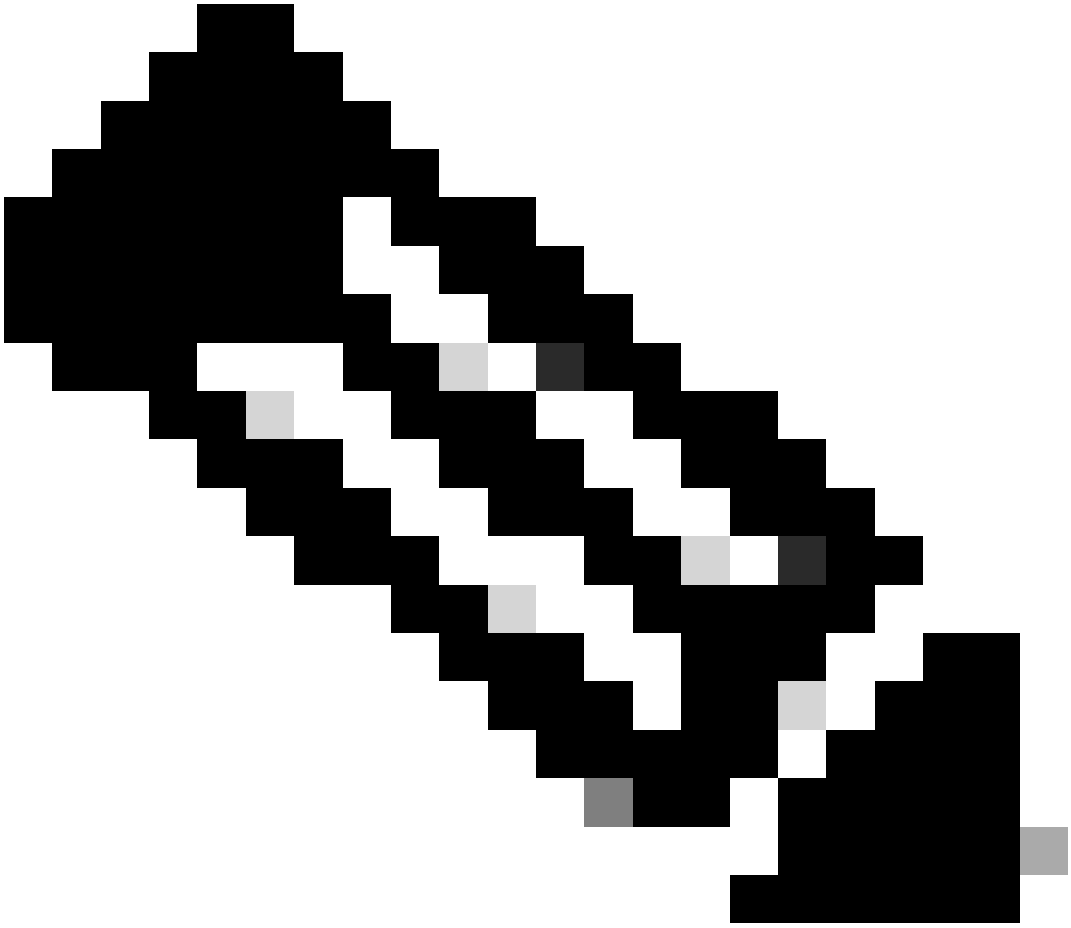
步驟 5.應用命令「ip dhcp relay source-interface [unique loopback]」。



注意：此命令配置DHCP中繼代理的源IP地址，以針對單播通訊處理Discover、Offer、Request和ACK，DHCP中繼代理將SVI的IP地址用作DHCP中繼代理的源IP地址。這是不需要的，因為此IP地址由多個VTEP共用，並且可能會發生DHCP資料包的黑洞。要避免這種情況，需要使用唯一的IP地址（使用環回介面）來區分每個VTEP。

```
LEAF-1(config)# interface vlan 10
LEAF-1(config-if)# ip dhcp relay source-interface loopback100
```

步驟 6.在BGP內對應的VRF租戶中，使用字首清單和路由對映（包括環回介面的IP地址）直接進行路由重分配。



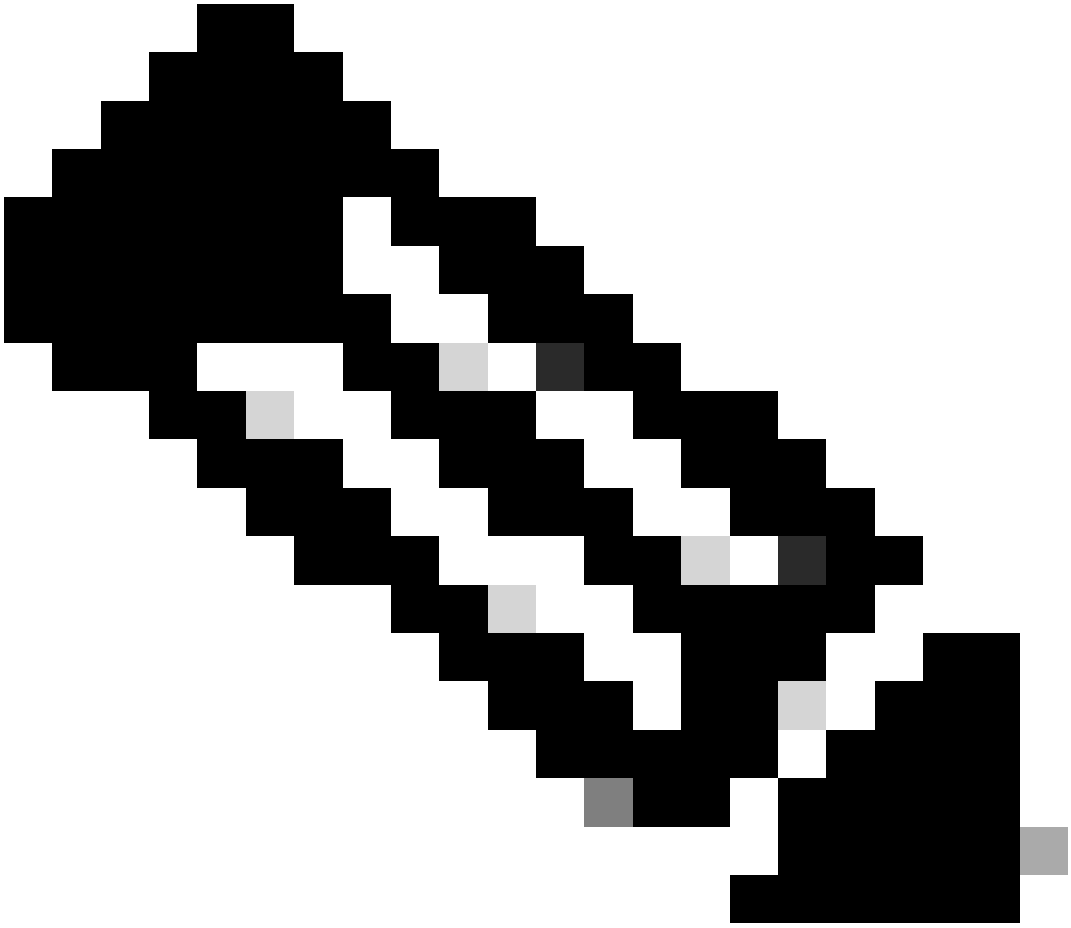
注意：此環回介面屬於SVI的租戶。

```
LEAF-1(config)# show running-config interface loopback 100
interface loopback100
  vrf member tenant-a
  ip address 172.16.10.8/32

LEAF-1(config)# ip prefix-list host_subnets seq 15 permit 172.16.10.8/32
LEAF-1(config)# route-map direct_routes_tenant-a permit 10
LEAF-1(config-route-map)# match ip address prefix-list host_subnets
LEAF-1(config-route-map)# router bgp 65000
LEAF-1(config-router)# vrf tenant-a
LEAF-1(config-router-vrf)# address-family ipv4 unicast
LEAF-1(config-router-vrf-af)# redistribute direct route-map direct_routes_tenant-a
```

步驟 7.使用命令show bgp l2vpn evpn [loopback IP] vrf [tenant vrf]驗證是否已在BGP L2VPN EVPN中向主幹通告環回介面的IP地址。

```
LEAF-1(config)# show bgp l2vpn evpn 172.16.10.8 vrf tenant-a
BGP routing table information for VRF default, address family L2VPN EVPN
Route Distinguisher: 192.168.5.5:4    (L3VNI 303030)
BGP routing table entry for [5]:[0]:[0]:[32]:[172.16.10.8]/224, version 421
Paths: (1 available, best #1)
Flags: (0x000002) (high32 00000000) on xmit-list, is not in l2rib/evpn

  Advertised path-id 1
  Path type: local, path is valid, is best path, no labeled nexthop
  Gateway IP: 0.0.0.0
  AS-Path: NONE, path locally originated
    192.168.5.5 (metric 0) from 0.0.0.0 (192.168.5.5)
      Origin incomplete, MED 0, localpref 100, weight 32768
      Received label 303030
      Extcommunity: RT:65000:303030 ENCAP:8 Router MAC:707d.b9b8.4daf

  Path-id 1 advertised to peers:
    192.168.0.11 <<<< Spine
```

步驟 8.驗證環回介面的IP地址是否已注入DHCP伺服器所在的BGP L2VPN EVPN中。

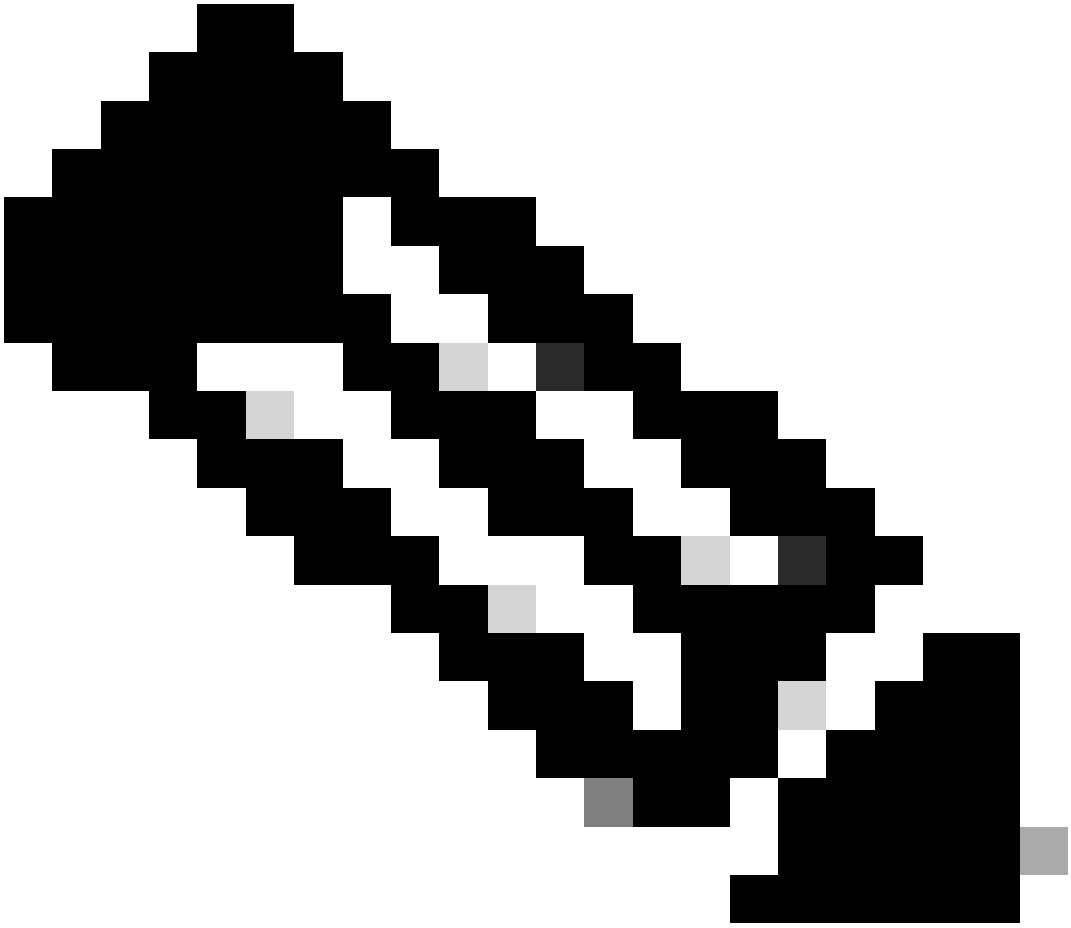


注意：如果vPC中有Nexus交換機，請確認它們都獲取BGP L2VPN EVPN中環回介面的IP地址。

```
LEAF-1# show bgp l2vpn evpn 172.16.10.8
BGP routing table information for VRF default, address family L2VPN EVPN
Route Distinguisher: 192.168.5.5:4
BGP routing table entry for [5]:[0]:[0]:[32]:[172.16.10.8]/224, version 754
Paths: (1 available, best #1)
Flags: (0x000002) (high32 00000000) on xmit-list, is not in l2rib/evpn, is not in HW

  Advertised path-id 1
  Path type: internal, path is valid, is best path, no labeled nexthop
             Imported to 2 destination(s)
             Imported paths list: tenant-a L3-303030
  Gateway IP: 0.0.0.0
  AS-Path: NONE, path sourced internal to AS
    192.168.5.5 (metric 45) from 192.168.0.11 (192.168.0.11)
      Origin incomplete, MED 0, localpref 100, weight 0
      Received label 303030
      Extcommunity: RT:65000:303030 ENCAP:8 Router MAC:707d.b9b8.4daf
      Originator: 192.168.5.5 Cluster list: 192.168.0.11
```

```
  Path-id 1 not advertised to any peer

Route Distinguisher: 192.168.3.3:4    (L3VNI 303030)
BGP routing table entry for [5]:[0]:[0]:[32]:[172.16.10.8]/224, version 761
Paths: (1 available, best #1)
Flags: (0x000002) (high32 00000000) on xmit-list, is not in l2rib/evpn, is not in HW

  Advertised path-id 1
  Path type: internal, path is valid, is best path, no labeled nexthop
             Imported from 192.168.5.5:4:[5]:[0]:[0]:[32]:[172.16.10.8]/224
  Gateway IP: 0.0.0.0
  AS-Path: NONE, path sourced internal to AS
    192.168.5.5 (metric 45) from 192.168.0.11 (192.168.0.11)
      Origin incomplete, MED 0, localpref 100, weight 0
      Received label 303030
      Extcommunity: RT:65000:303030 ENCAP:8 Router MAC:707d.b9b8.4daf
      Originator: 192.168.5.5 Cluster list: 192.168.0.11

  Path-id 1 not advertised to any peer
```

步驟 9. 使用命令show ip route [DHCP server IP] vrf [tenant vrf]驗證源租戶上是否存在DHCP伺服器的路由。



注意：要使用的路由條目必須從VxLAN到預設VRF。如果沒有可用的路由，請檢查VTEP在本機是否知道DCHP伺服器IP位址。

```
LEAF-1# show running-config interface vlan 10
interface Vlan10
  no shutdown
  vrf member tenant-a <<<< source tenant
  no ip redirects
  ip address 10.10.10.1/24
  no ipv6 redirects
  fabric forwarding mode anycast-gateway
  ip dhcp relay address 10.10.10.150 <<<< DHCP server
  ip dhcp relay source-interface loopback100

LEAF-1# show ip route 10.10.10.150 vrf tenant-a
10.10.10.150/32, ubest/mbest: 1/0
    *via 192.168.13.254%default, [200/0], 2w0d, bgp-65000, internal, tag 65000, segid: 303030 tunnelid:
```

步驟 10.使用命令ping [DHCP server IP] source-interface loopback [x] vrf [tenant vrf]驗證是否可使用環回介面和相應的VRF作為VRF源訪問DCHP伺服器IP。

```
LEAF-1# ping 10.10.10.150 source-interface loopback 100 vrf tenant-a
PING 10.10.10.150 (10.10.10.150): 56 data bytes
64 bytes from 10.10.10.150: icmp_seq=0 ttl=126 time=1.262 ms
64 bytes from 10.10.10.150: icmp_seq=1 ttl=126 time=0.833 ms
64 bytes from 10.10.10.150: icmp_seq=2 ttl=126 time=0.808 ms
64 bytes from 10.10.10.150: icmp_seq=3 ttl=126 time=0.795 ms
64 bytes from 10.10.10.150: icmp_seq=4 ttl=126 time=0.78 ms

--- 10.10.10.150 ping statistics ---
5 packets transmitted, 5 packets received, 0.00% packet loss
```

步驟 11.檢驗DHCP中繼代理的狀態。

```
LEAF-1# show ip dhcp status
Current CLI Operation: show ip dhcp status
Last CLI Operation: DME: ip dhcp relay information option enable
Last CLI Operation Status: SUCCESS
```

步驟 12.驗證選項82（例如vpn選項）和中繼代理下的正確中繼IP地址。

```
LEAF-1# show ip dhcp relay
DHCP relay service is enabled   <<<<<<
Insertion of option 82 is enabled  <<<<<<
Insertion of option 82 customize circuitid is disabled
TLV format in CircuitId and RemoteId suboptions is enabled
Insertion of VPN suboptions is enabled  <<<<<<<
Insertion of cisco suboptions is disabled
Global smart-relay is disabled
Relay Trusted functionality is disabled
Relay Trusted Port is Globally disabled
V4 Relay Source Address HSRP is Globally disabled
Server-ID-override-disable is disabled

Smart-relay is enabled on the following interfaces:
-----------------------------------------------------


Subnet-broadcast is enabled on the following interfaces:
-----------------------------------------------------


Relay Trusted Port is enabled on the following interfaces:
-----------------------------------------------------------


Relay Source Address HSRP is enabled on the following interfaces:
-------------------------------------------------------------------
```

```
Helper addresses are configured on the following interfaces:
 Interface        Relay Address     VRF Name
 -------------    -------------     --------
 Vlan10            10.10.10.150   <<<<<<<<<
```

步驟 13.檢驗已處理和轉發的資料包的統計資訊。

```
LEAF-1# show ip dhcp global statistics
Packets processed 1297177
Packets received through cfsoe 0
Packets forwarded 1297175
Packets forwarded on cfsoe 0
Total packets dropped 0
Packets dropped from untrusted ports 0
Packets dropped due to MAC address check failure 0
Packets dropped due to Option 82 insertion failure 0
Packets dropped due to o/p intf unknown 0
Packets dropped which were unknown 0
Packets dropped due to no trusted ports 0
Packets dropped due to dhcp relay not enabled 0
Packets dropped due to no binding entry 0
Packets dropped due to interface error/no interface 0
Packets dropped due to max hops exceeded 0
Packets dropped due to Queue full 0
```

步驟 14.檢驗中繼資料包的統計資訊。

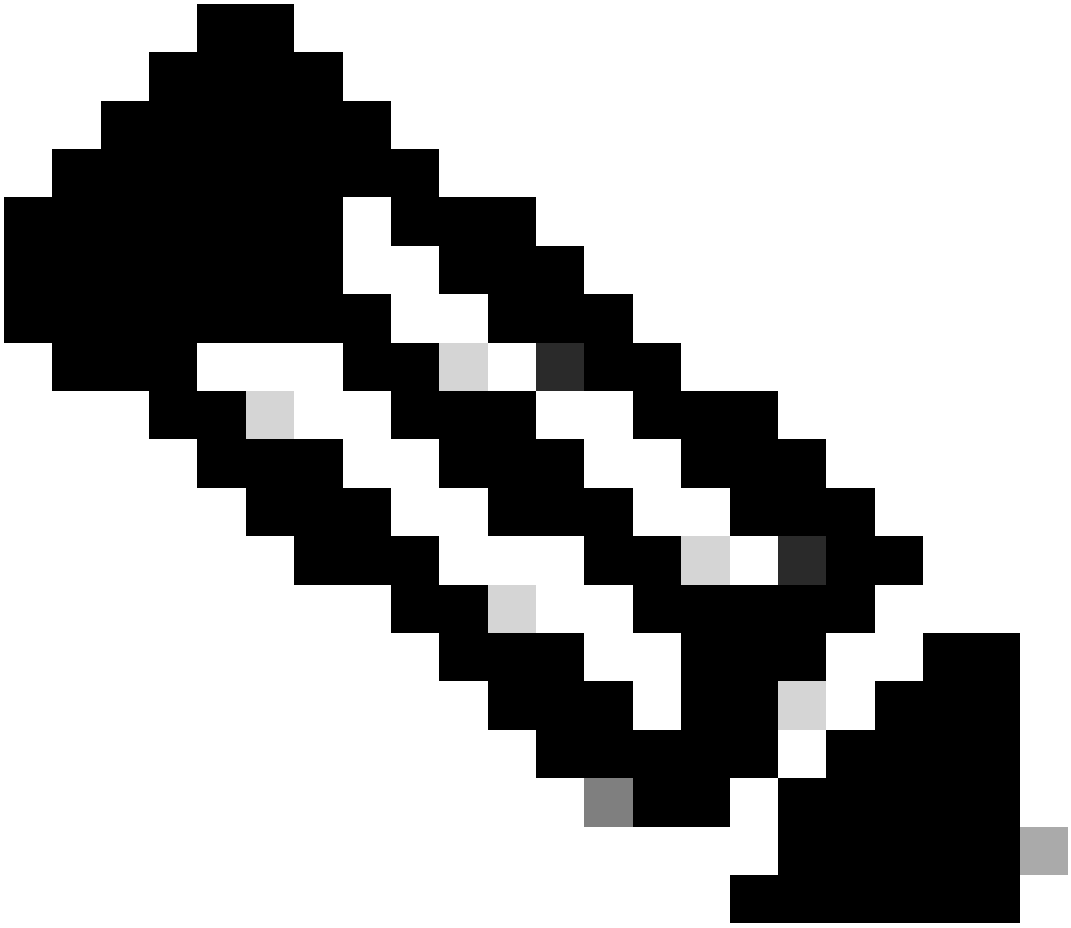
```
LEAF-1# show ip dhcp relay statistics
--------------------------------------------------------------------------
Message Type              Rx              Tx           Drops
--------------------------------------------------------------------------
Discover              260521          260520               0
Offer                 289330          289330               0
Request(*)            267162          267161               0
Ack                     8322            8322               0
Release(*)            181121          181121               0
Decline                    1               1               0
Inform(*)                  0               0               0
Nack                  289280          289280               0
--------------------------------------------------------------------------
Total                1295737         1295735               0
--------------------------------------------------------------------------

DHCP L3 FWD:
Total Packets Received                          :         0
Total Packets Forwarded                         :         0
Total Packets Dropped                           :         0
Non DHCP:
Total Packets Received                          :         0
Total Packets Forwarded                         :         0
Total Packets Dropped                           :         0
DROP:
```

```
DHCP Relay not enabled                          :         0
Invalid DHCP message type                       :         0
Interface error                                 :         0
Tx failure towards server                       :         0
Tx failure towards client                       :         0
Unknown output interface                        :         0
Unknown vrf or interface for server             :         0
Max hops exceeded                               :         0
Option 82 validation failed                     :         0
Packet Malformed                                :         0
DHCP Request dropped on MCT                     :         0
Relay Trusted port not configured               :         0
*  -  These counters will show correct value when switch
receives DHCP request packet with destination ip as broadcast
address. If request is unicast it will be HW switched
```

枝葉1-vPC DHCP

步驟 1.啟用功能DCHP。

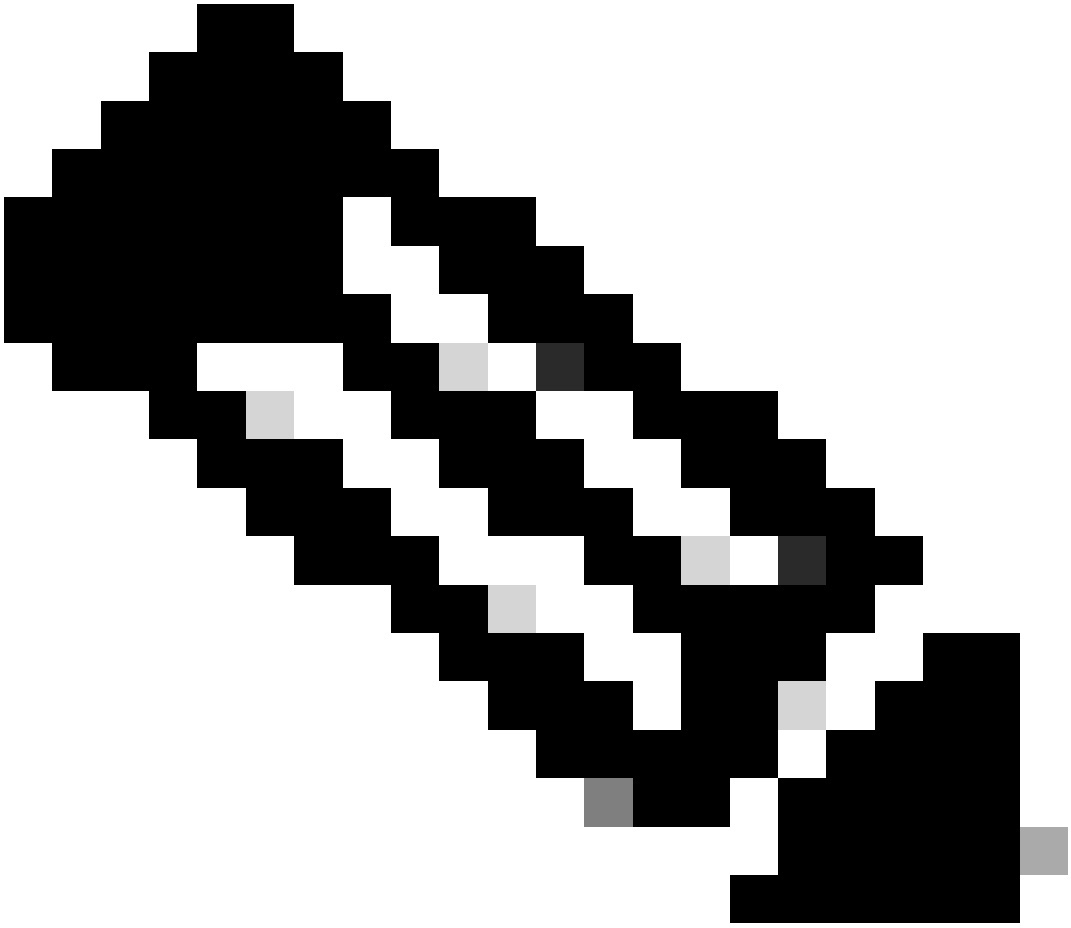
```
LEAF-1-VPC(config)#feature dhcp
```



注意：自NX-OS 7.x以來，DHCP伺服器和中繼代理命令service dhcp、ip dhcp relay和ipv6 dhcp relay預設處於啟用狀態。

步驟 2.應用命令ip dhcp relay information option。

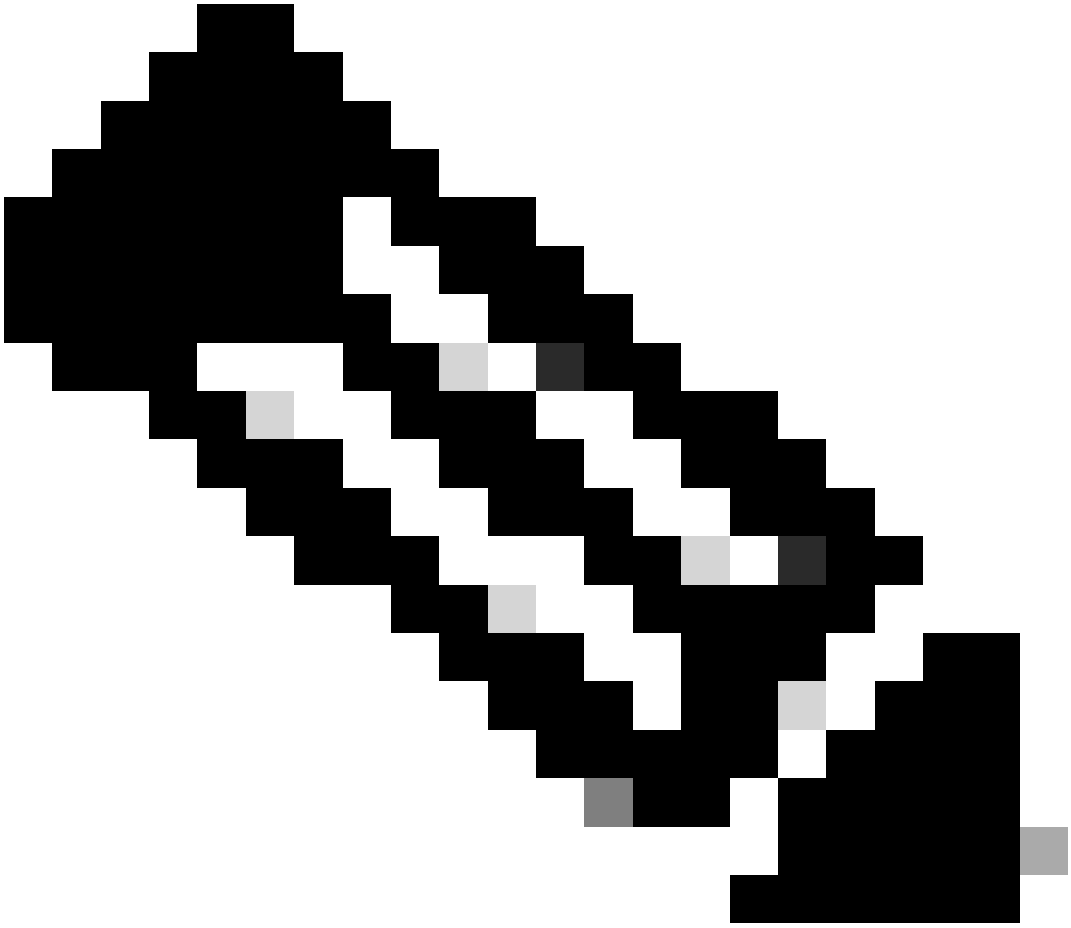
```
LEAF-1-VPC(config)#ip dhcp relay information option
```



注意：使用此命令，DHCP中繼代理可以插入和刪除選項82有關轉發資料包的資訊。

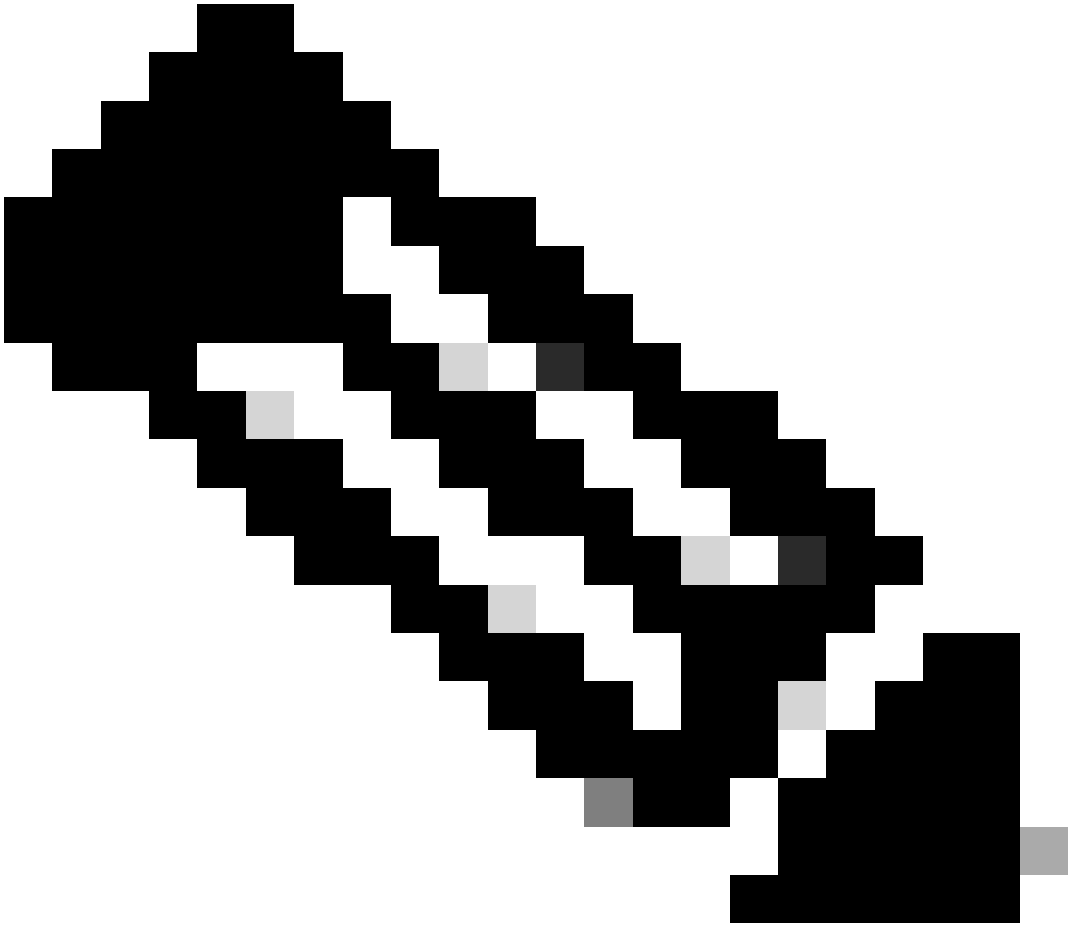
步驟 3.應用命令「ip dhcp relay information option vpn」。

```
LEAF-1-VPC(config)# ip dhcp relay information option vpn
```



注意：此命令用於啟用到達該DHCP伺服器所屬的不同VRF的DHCP中繼請求。

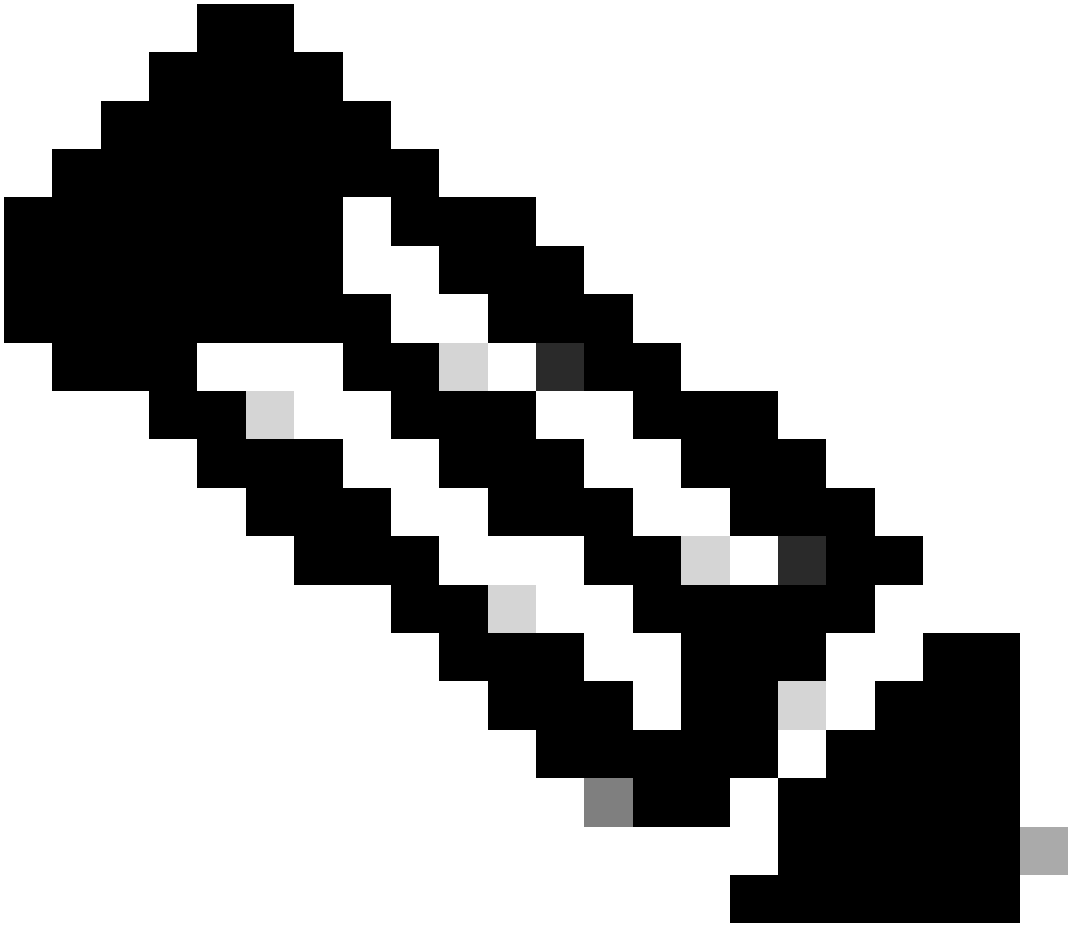
步驟 4.應用命令ip dhcp relay address [DCHP伺服器的IP地址]。



注意：在本示例中，DCHP伺服器的IP地址為10.10.10.150。

```
LEAF-1-VPC(config)#interface vlan 10
LEAF-1-VPC(config-if)#ip dhcp relay address 10.10.10.150
```

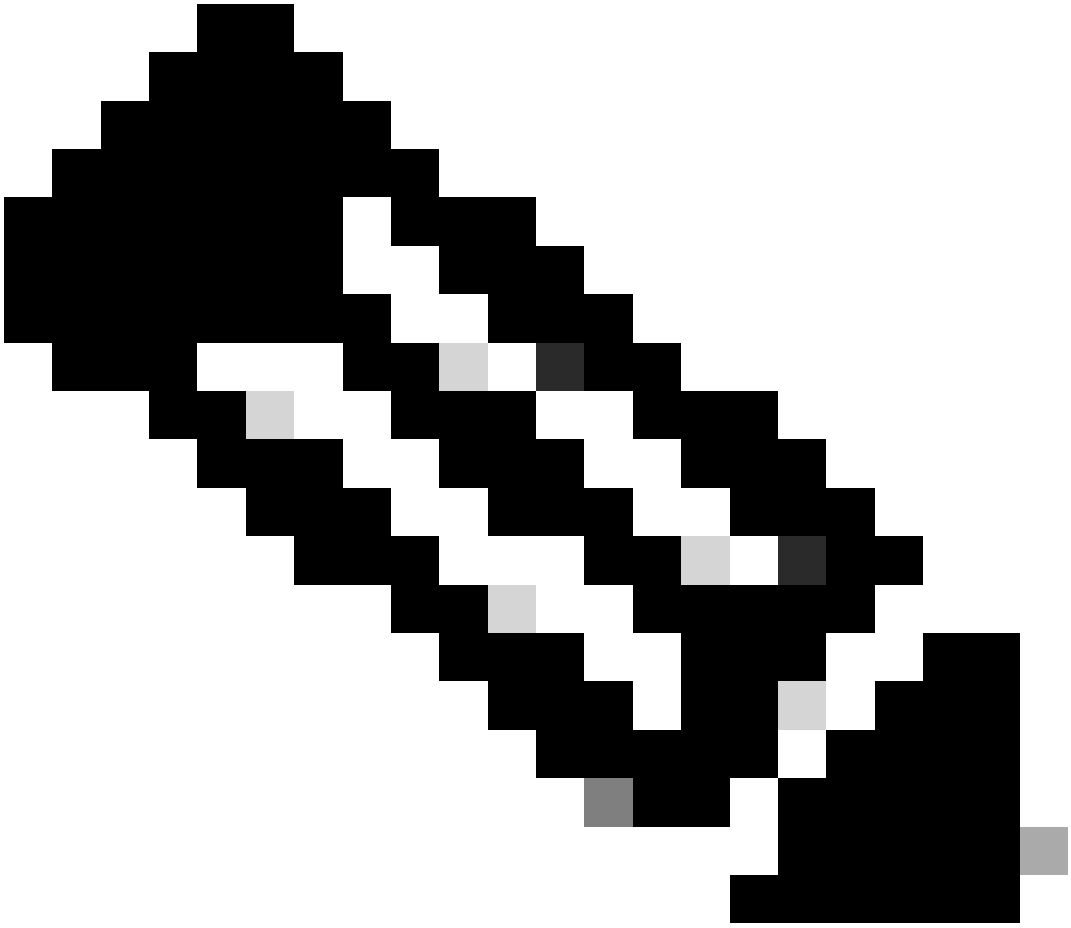
步驟 5.應用命令「ip dhcp relay source-interface [unique loopback]」。



注意：此命令配置DHCP中繼代理的源IP地址，以針對單播通訊處理Discover、Offer、Request和ACK，DHCP中繼代理將SVI的IP地址用作DHCP中繼代理的源IP地址。這是不需要的，因為此IP地址由多個VTEP共用，並且可能會發生DHCP資料包的黑洞。要避免這種情況，需要使用唯一的IP地址（使用環回介面）來區分每個VTEP。

```
LEAF-1-VPC(config)#interface vlan 10
LEAF-1-VPC(config-if)# ip dhcp relay source-interface loopback100
```

步驟 6.在BGP內對應的VRF租戶中，使用字首清單和路由對映（包括環回介面的IP地址）直接進行路由重分配。



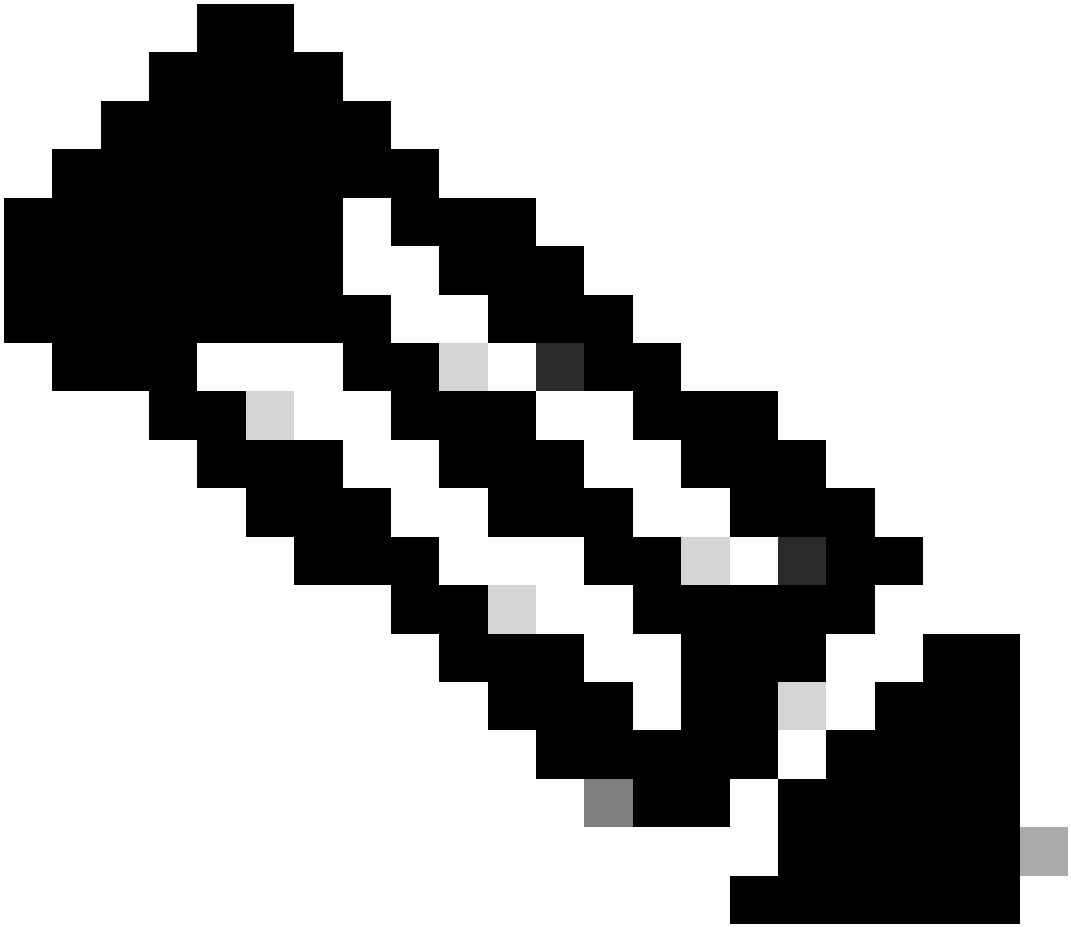
注意：此環回介面屬於SVI的租戶。

```
LEAF-1-VPC(config)# show running-config interface loopback 100
interface loopback100
  vrf member tenant-a
  ip address 172.16.10.9/32

LEAF-1-VPC(config)# ip prefix-list host_subnets seq 15 permit 172.16.10.9/32
LEAF-1-VPC(config)# route-map direct_routes_tenant-a permit 10
LEAF-1-VPC(config-route-map)# match ip address prefix-list host_subnets
LEAF-1-VPC(config-route-map)# router bgp 65000
LEAF-1-VPC(config-router)# vrf tenant-a
LEAF-1-VPC(config-router-vrf)# address-family ipv4 unicast
LEAF-1-VPC(config-router-vrf-af)# redistribute direct route-map direct_routes_tenant-a
```

步驟 7.使用命令show bgp l2vpn evpn [loopback IP] vrf [tenant vrf]驗證是否已在BGP L2VPN EVPN中向主幹通告環回介面的IP地址。

```
LEAF-1-VPC# show bgp l2vpn evpn 172.16.10.9 vrf tenant-a
BGP routing table information for VRF default, address family L2VPN EVPN
Route Distinguisher: 192.168.3.3:4    (L3VNI 303030)
BGP routing table entry for [5]:[0]:[0]:[32]:[172.16.10.9]/224, version 637
Paths: (1 available, best #1)
Flags: (0x000002) (high32 00000000) on xmit-list, is not in l2rib/evpn

  Advertised path-id 1
  Path type: local, path is valid, is best path, no labeled nexthop
  Gateway IP: 0.0.0.0
  AS-Path: NONE, path locally originated
    192.168.13.1 (metric 0) from 0.0.0.0 (192.168.3.3)
      Origin incomplete, MED 0, localpref 100, weight 32768
      Received label 303030
      Extcommunity: RT:65000:303030 ENCAP:8 Router MAC:6026.aa85.9887

  Path-id 1 advertised to peers:
    192.168.0.11
```

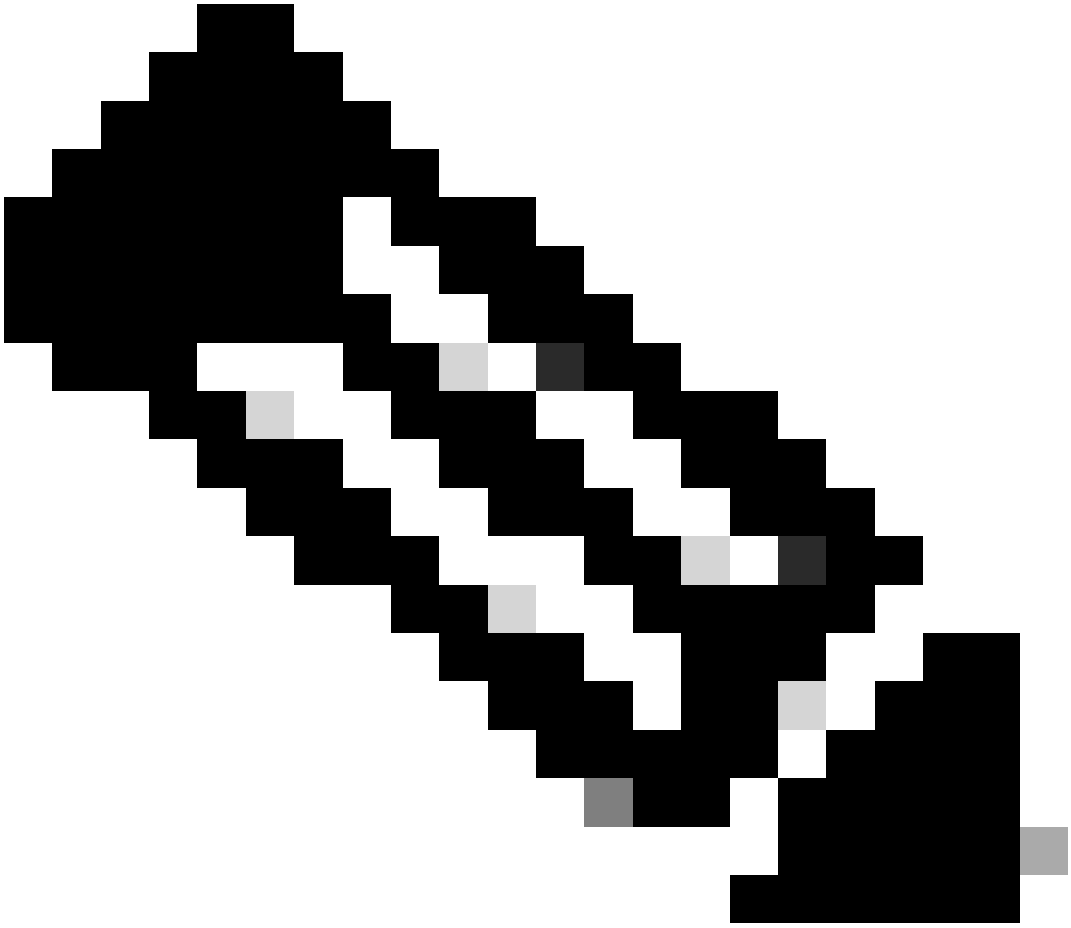
步驟 8.驗證環回介面的IP地址是否已注入DHCP伺服器所在的BGP L2VPN EVPN中。



注意：如果vPC中有Nexus交換機，請確認它們都獲取BGP L2VPN EVPN中環回介面的IP地址。

```
LEAF-1-VPC# show bgp l2vpn evpn 172.16.10.9
BGP routing table information for VRF default, address family L2VPN EVPN
Route Distinguisher: 192.168.3.3:4    (L3VNI 303030)
BGP routing table entry for [5]:[0]:[0]:[32]:[172.16.10.9]/224, version 637
Paths: (1 available, best #1)
Flags: (0x000002) (high32 00000000) on xmit-list, is not in l2rib/evpn

  Advertised path-id 1
  Path type: local, path is valid, is best path, no labeled nexthop
  Gateway IP: 0.0.0.0
  AS-Path: NONE, path locally originated
    192.168.13.1 (metric 0) from 0.0.0.0 (192.168.3.3)
      Origin incomplete, MED 0, localpref 100, weight 32768
      Received label 303030
      Extcommunity: RT:65000:303030 ENCAP:8 Router MAC:6026.aa85.9887

  Path-id 1 advertised to peers:
    192.168.0.11
```

步驟 9. 使用命令show ip route [DHCP server IP] vrf[tenant vrf]驗證源租戶上是否存在DHCP伺服器的路由。



注意：要使用的路由條目必須從VxLAN到預設VRF。如果沒有可用的路由，請檢查VTEP在本機是否知道DCHP伺服器IP位址。

```
LEAF-1-VPC# show running-config interface vlan 10
interface Vlan10
  no shutdown
  vrf member tenant-a  <<<< source tenant
  no ip redirects
  ip address 10.10.10.1/24
  no ipv6 redirects
  fabric forwarding mode anycast-gateway
  ip dhcp relay address 10.10.10.150
  ip dhcp relay source-interface loopback100

LEAF-1-VPC# show ip route 10.10.10.150 vrf tenant-a
10.10.10.150/32, ubest/mbest: 1/0, attached
    *via 10.10.10.150, Vlan10, [190/0], 6d07h, hmm
```

步驟 10.使用命令ping [DHCP server IP] source-interface loopback [x] vrf [tenvrf]，驗證是否可使用環回介面和相應的VRF作為VRF源訪問DCHP伺服器IP。

```
LEAF-1-VPC# ping 10.10.10.150 source-interface loopback 100 vrf tenant-a
PING 10.10.10.150 (10.10.10.150): 56 data bytes
64 bytes from 10.10.10.150: icmp_seq=0 ttl=126 time=0.965 ms
64 bytes from 10.10.10.150: icmp_seq=1 ttl=126 time=0.57 ms
64 bytes from 10.10.10.150: icmp_seq=2 ttl=126 time=0.488 ms
64 bytes from 10.10.10.150: icmp_seq=3 ttl=126 time=0.524 ms
64 bytes from 10.10.10.150: icmp_seq=4 ttl=126 time=0.502 ms

--- 10.10.10.150 ping statistics ---
```

步驟 11.檢驗DHCP中繼代理的狀態。

```
LEAF-1-VPC# show ip dhcp status
Current CLI Operation: show ip dhcp status
Last CLI Operation: DME: ip dhcp relay information option vpn enable
Last CLI Operation Status: SUCCESS
```

步驟 12.驗證選項82（例如vpn選項）和中繼代理下的正確中繼IP地址。

```
LEAF-1-VPC# show ip dhcp relay
DHCP relay service is enabled  <<<<<<
Insertion of option 82 is enabled  <<<<<<<
Insertion of option 82 customize circuitid is disabled
TLV format in CircuitId and RemoteId suboptions is enabled
Insertion of VPN suboptions is enabled  <<<<<<<
Insertion of cisco suboptions is disabled
Global smart-relay is disabled
Relay Trusted functionality is disabled
Relay Trusted Port is Globally disabled
V4 Relay Source Address HSRP is Globally disabled
Server-ID-override-disable is disabled

Smart-relay is enabled on the following interfaces:
-----------------------------------------------------


Subnet-broadcast is enabled on the following interfaces:
-----------------------------------------------------


Relay Trusted Port is enabled on the following interfaces:
-----------------------------------------------------


Relay Source Address HSRP is enabled on the following interfaces:
-------------------------------------------------------------------
```

```
Helper addresses are configured on the following interfaces:
 Interface        Relay Address     VRF Name
 -------------    -------------     --------
 Vlan10            10.10.10.150      <<<<<<<<<
```

步驟 13.檢驗已處理和已轉發的資料包的統計資訊。

```
LEAF-1-VPC# show ip dhcp global statistics
Packets processed 263162
Packets received through cfsoe 0
Packets forwarded 263161
Packets forwarded on cfsoe 0
Total packets dropped 0
Packets dropped from untrusted ports 0
Packets dropped due to MAC address check failure 0
Packets dropped due to Option 82 insertion failure 0
Packets dropped due to o/p intf unknown 0
Packets dropped which were unknown 0
Packets dropped due to no trusted ports 0
Packets dropped due to dhcp relay not enabled 0
Packets dropped due to no binding entry 0
Packets dropped due to interface error/no interface 0
Packets dropped due to max hops exceeded 0
Packets dropped due to Queue full 0
```

步驟 14.檢驗中繼資料包的統計資訊。

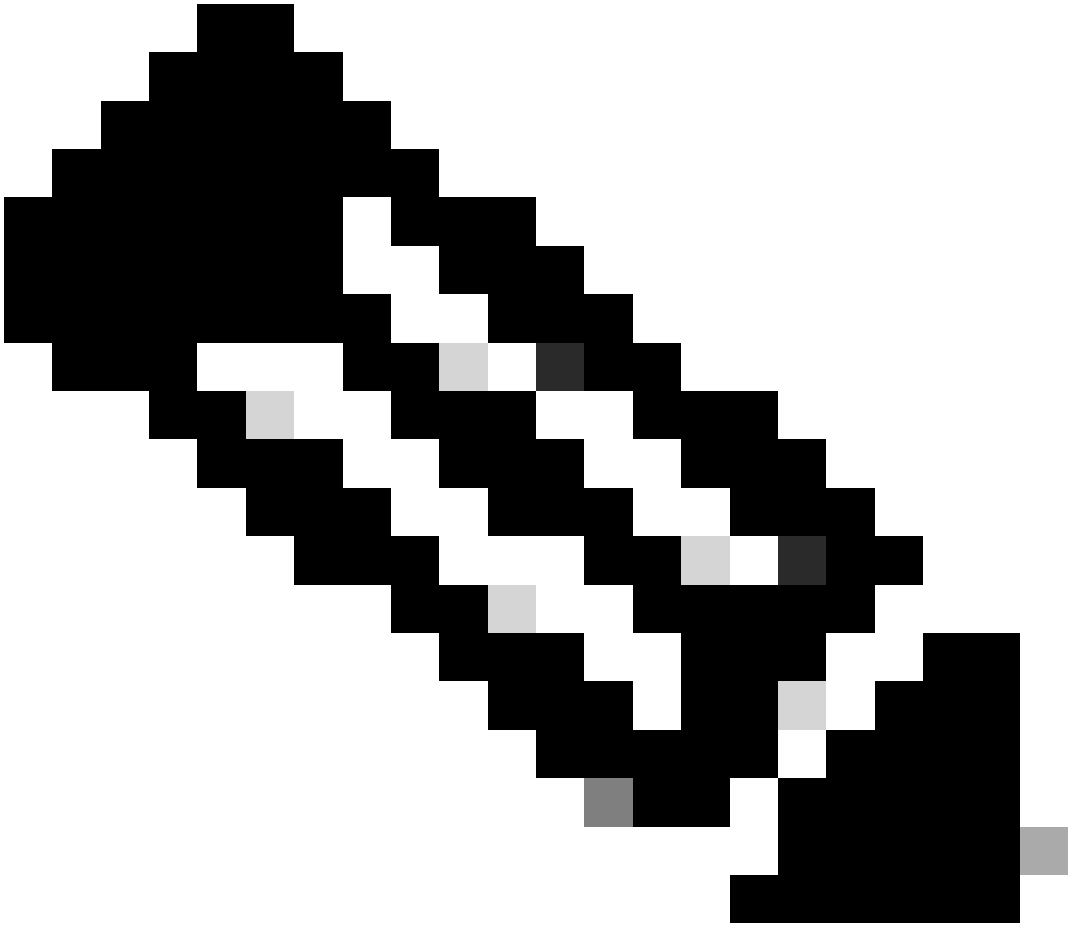
```
LEAF-1-VPC# show ip dhcp relay statistics
--------------------------------------------------------------------------------
Message Type              Rx              Tx           Drops
--------------------------------------------------------------------------------
Discover                   8               7               0
Offer                  29304           29304               0
Request(*)              5029            5029               0
Ack                     6535            6535               0
Release(*)            191482          191482               0
Decline                    0               0               0
Inform(*)                  3               3               0
Nack                   29281           29281               0
--------------------------------------------------------------------------------
Total                 261642          261641               0
--------------------------------------------------------------------------------

DHCP L3 FWD:
Total Packets Received                          :         0
Total Packets Forwarded                         :         0
Total Packets Dropped                           :         0
Non DHCP:
Total Packets Received                          :         0
Total Packets Forwarded                         :         0
Total Packets Dropped                           :         0
DROP:
DHCP Relay not enabled                          :         0
```

```
Invalid DHCP message type                       :         0
Interface error                                 :         0
Tx failure towards server                       :         0
Tx failure towards client                       :         0
Unknown output interface                        :         0
Unknown vrf or interface for server             :         0
Max hops exceeded                               :         0
Option 82 validation failed                     :         0
Packet Malformed                                :         0
DHCP Request dropped on MCT                     :         0
Relay Trusted port not configured               :         0
*  -  These counters will show correct value when switch
receives DHCP request packet with destination ip as broadcast
address. If request is unicast it will be HW switched
```

枝葉2-vPC DHCP

步驟 1.啟用功能DCHP。

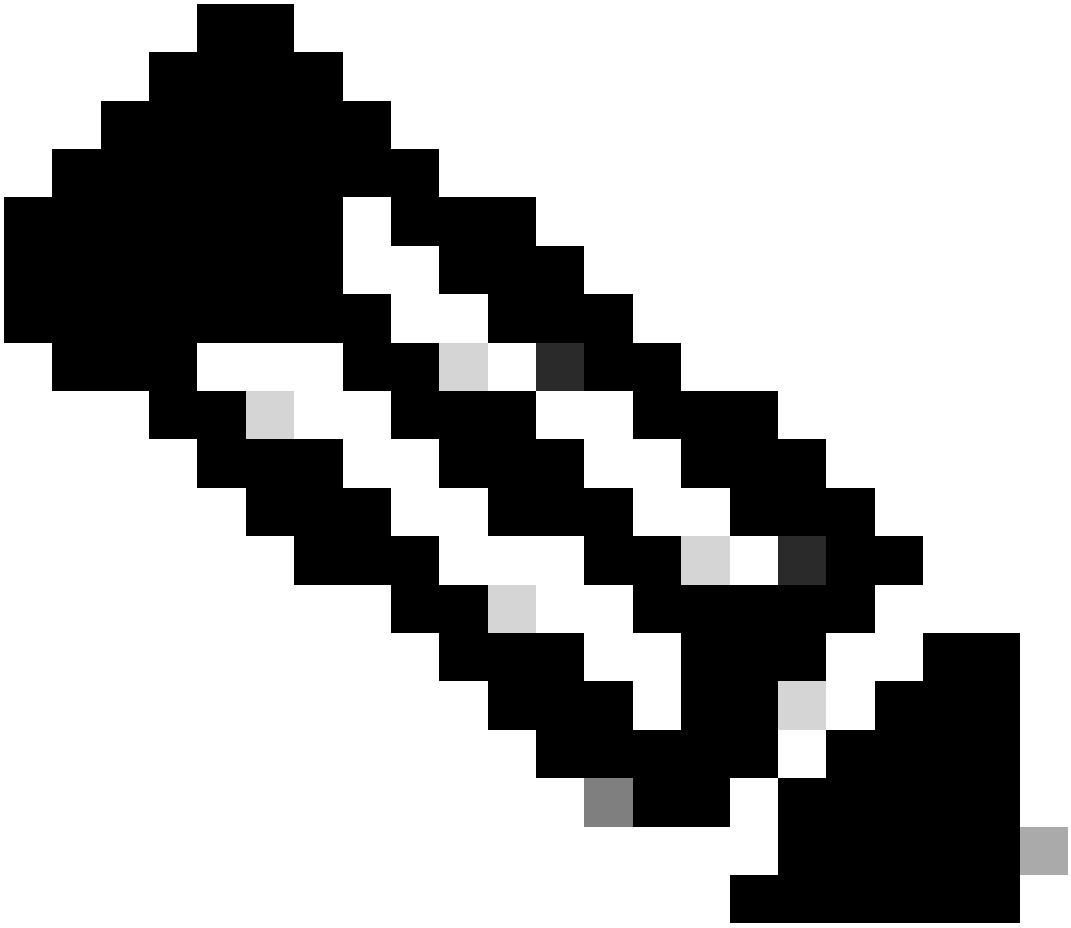
```
LEAF-2-VPC(config)# feature dhcp
```



注意：自NX-OS 7.x以來，DHCP伺服器和中繼代理命令service dhcp、ip dhcp relay和ipv6 dhcp relay預設處於啟用狀態。

步驟 2.應用命令「ip dhcp relay information option」。

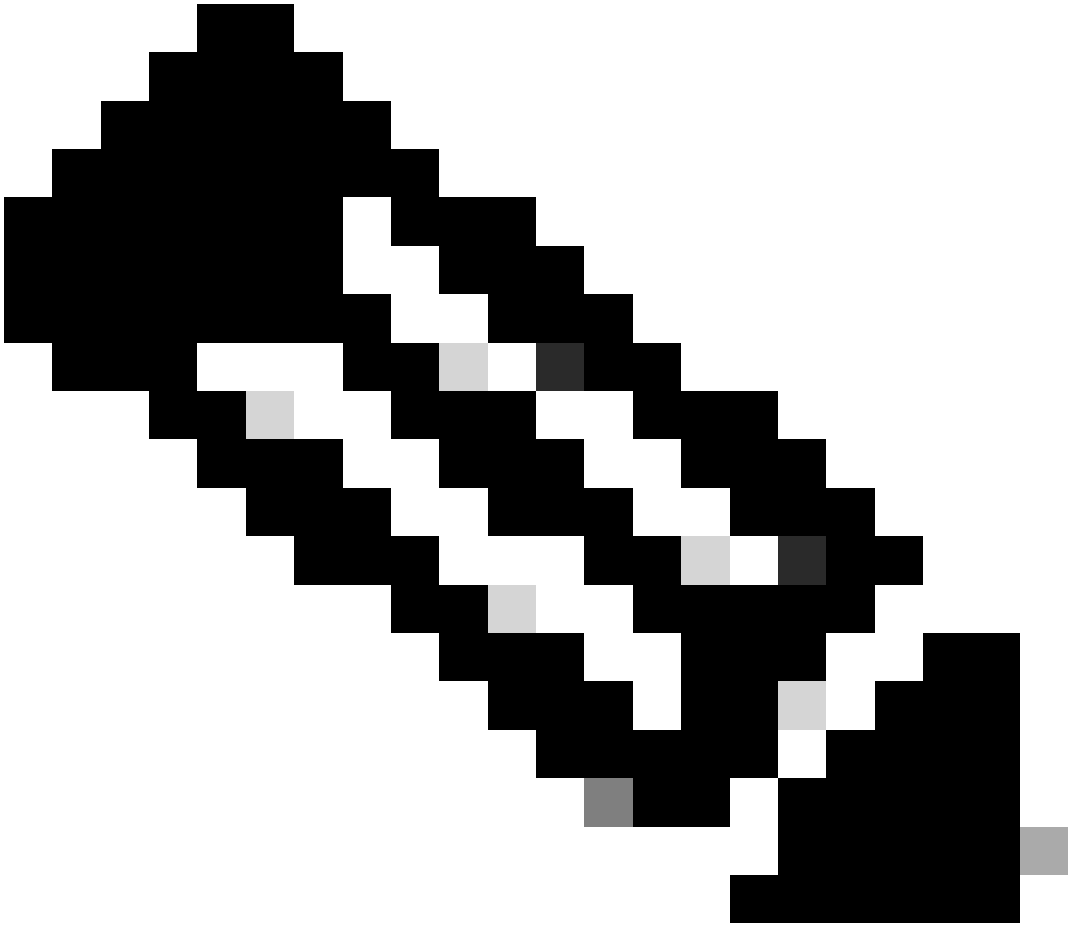
```
LEAF-2-VPC(config)# ip dhcp relay information option
```



注意：使用此命令，DHCP中繼代理可以插入和刪除選項82有關轉發資料包的資訊。

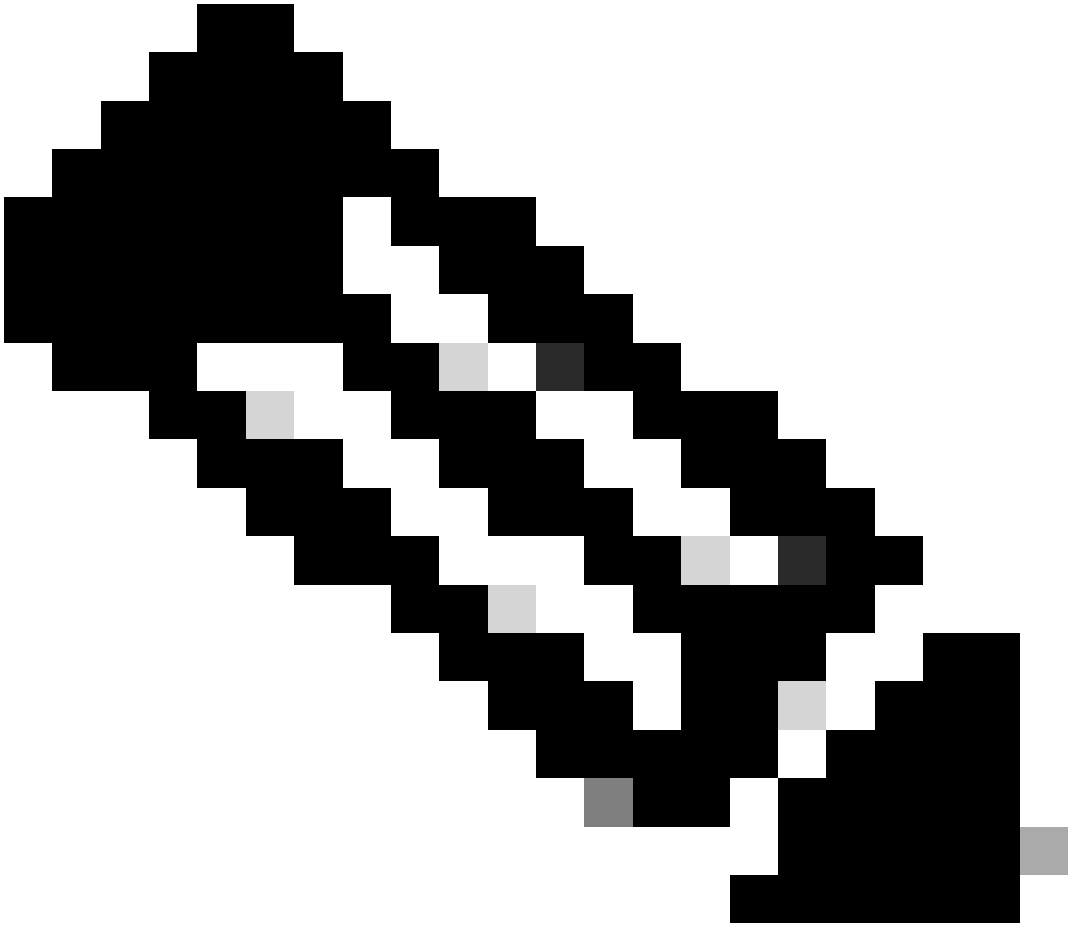
步驟 3.應用命令「ip dhcp relay information option vpn」。

```
LEAF-2-VPC(config)# ip dhcp relay information option vpn
```



注意：此命令用於啟用到達該DHCP伺服器所屬的不同VRF的DHCP中繼請求。

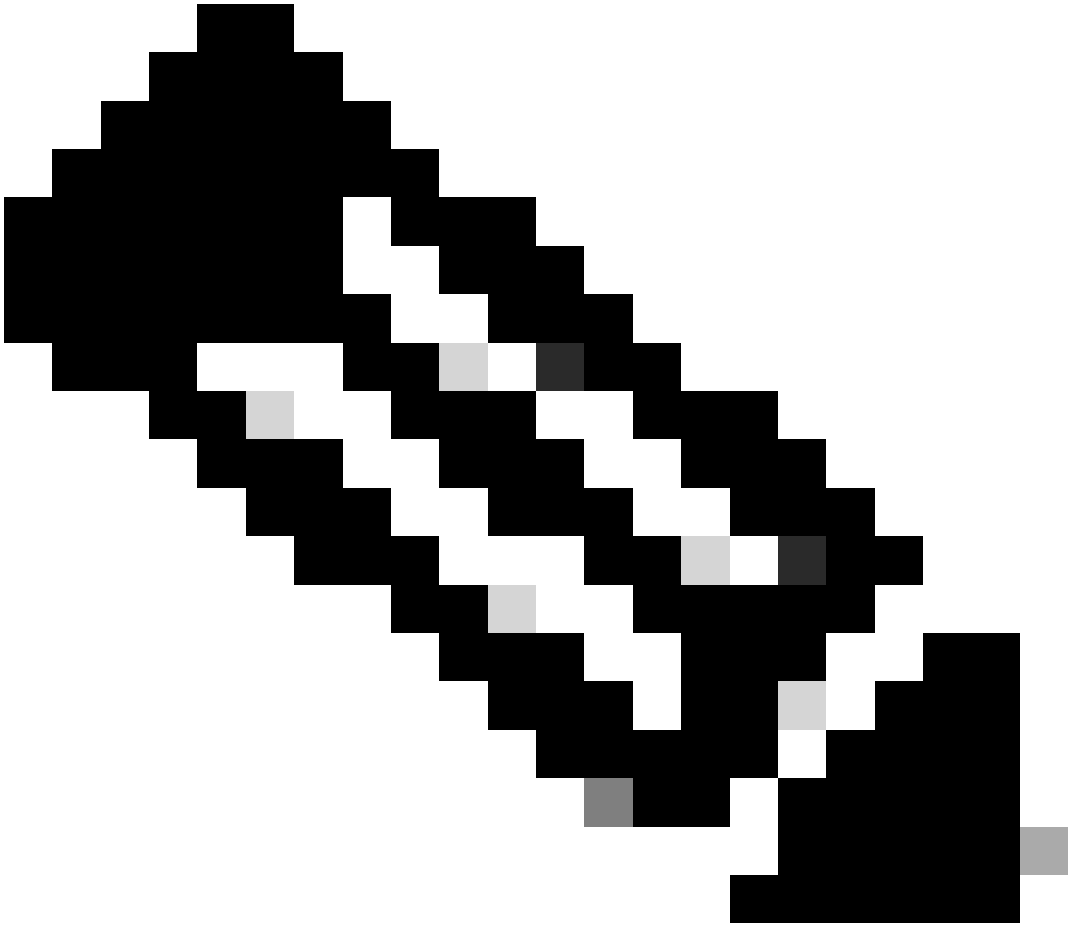
步驟 4.應用命令「ip dhcp relay address [DCHP server的ip地址]」。



注意：在本示例中，DCHP伺服器的IP地址為10.10.10.150。

```
LEAF-2-VPC(config)# interface vlan 10
LEAF-2-VPC(config-if)# ip dhcp relay address 10.10.10.150
```

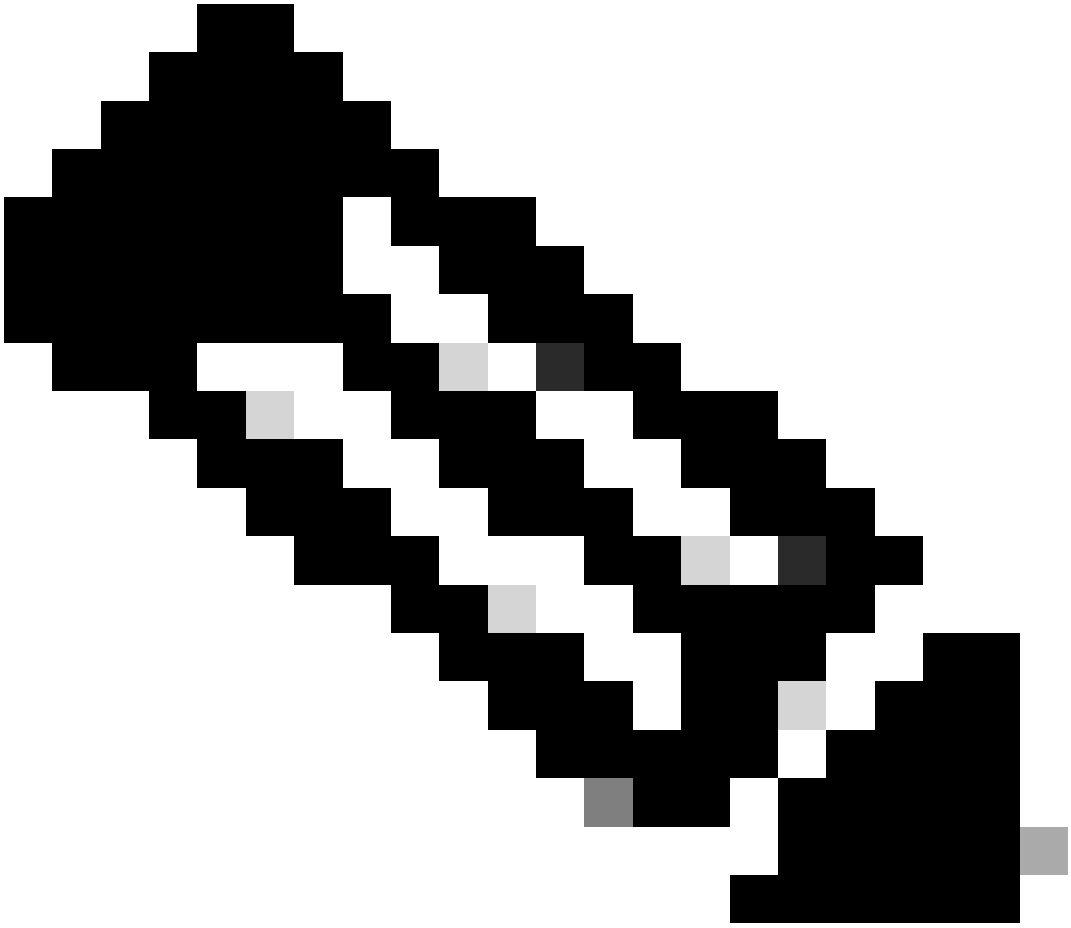
步驟 5.應用命令「ip dhcp relay source-interface [unique loopback]」。



注意：此命令配置DHCP中繼代理的源IP地址，以針對單播通訊處理Discover、Offer、Request和ACK，DHCP中繼代理將SVI的IP地址用作DHCP中繼代理的源IP地址。這是不需要的，因為此IP地址由多個VTEP共用，並且可能會發生DHCP資料包的黑洞。要避免這種情況，需要使用唯一的IP地址（使用環回介面）來區分每個VTEP。

```
LEAF-2-VPC(config)# interface vlan 10
LEAF-2-VPC(config-if)# ip dhcp relay source-interface loopback 100
```

步驟 6.在BGP內對應的VRF租戶中，使用字首清單和路由對映（包括環回介面的IP地址）直接進行路由重分配。



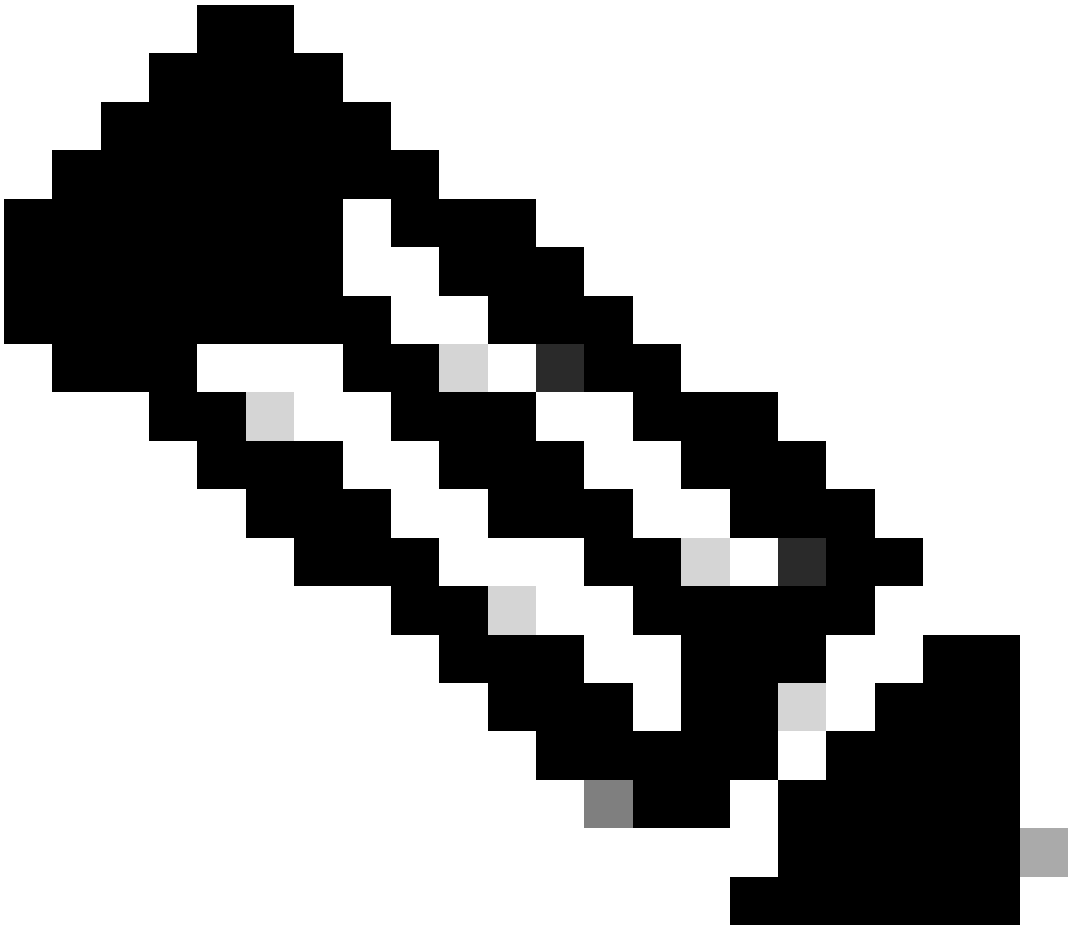
注意：此環回介面屬於SVI的租戶。

```
LEAF-2-VPC(config-if)# show running-config interface loopback 100
interface loopback100
  vrf member tenant-a
  ip address 172.16.10.10/32

LEAF-2-VPC(config)# ip prefix-list host_subnets seq 15 permit 172.16.10.10/32
LEAF-2-VPC(config)# route-map direct_routes_tenant-a permit 10
LEAF-2-VPC(config-route-map)# match ip address prefix-list host_subnets
LEAF-2-VPC(config-route-map)# router bgp 65000
LEAF-2-VPC(config-router)# vrf tenant-a
LEAF-2-VPC(config-router-vrf)# address-family ipv4 unicast
LEAF-2-VPC(config-router-vrf-af)# redistribute direct route-map direct_routes_tenant-a
```

步驟 7.使用命令show bgp l2vpn evpn [loopback IP] vrf [tenant vrf]驗證是否已在BGP L2VPN EVPN中向主幹通告環回介面的IP地址。

```
LEAF-2-VPC(config-if)# show bgp l2vpn evpn 172.16.10.10 vrf tenant-a
BGP routing table information for VRF default, address family L2VPN EVPN
Route Distinguisher: 192.168.4.4:4    (L3VNI 303030)
BGP routing table entry for [5]:[0]:[0]:[32]:[172.16.10.10]/224, version 49
5
Paths: (1 available, best #1)
Flags: (0x000002) (high32 00000000) on xmit-list, is not in l2rib/evpn

  Advertised path-id 1
  Path type: local, path is valid, is best path, no labeled nexthop
  Gateway IP: 0.0.0.0
  AS-Path: NONE, path locally originated
    192.168.13.2 (metric 0) from 0.0.0.0 (192.168.4.4)
      Origin incomplete, MED 0, localpref 100, weight 32768
      Received label 303030
      Extcommunity: RT:65000:303030 ENCAP:8 Router MAC:6026.aa85.9587

  Path-id 1 advertised to peers:
    192.168.0.11 <<<<< Spine
```

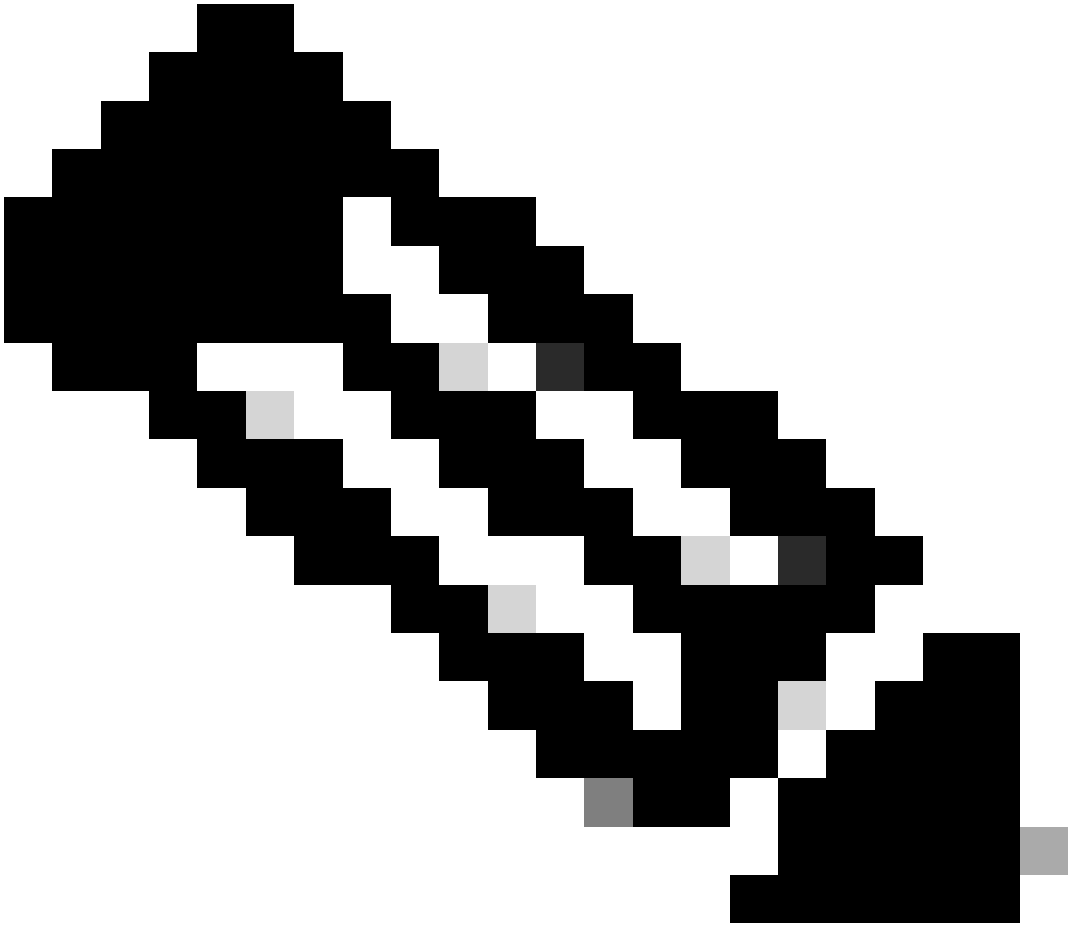
步驟 8.驗證環回介面的IP地址是否已注入DHCP伺服器所在的BGP L2VPN EVPN中。



注意：如果vPC中有Nexus交換機，請確認它們都獲取BGP L2VPN EVPN中環回介面的IP地址。

```
LEAF-2-VPC(config-if)# show bgp l2vpn evpn 172.16.10.10
BGP routing table information for VRF default, address family L2VPN EVPN
Route Distinguisher: 192.168.4.4:4    (L3VNI 303030)
BGP routing table entry for [5]:[0]:[0]:[32]:[172.16.10.10]/224, version 49
5
Paths: (1 available, best #1)
Flags: (0x000002) (high32 00000000) on xmit-list, is not in l2rib/evpn

  Advertised path-id 1
  Path type: local, path is valid, is best path, no labeled nexthop
  Gateway IP: 0.0.0.0
  AS-Path: NONE, path locally originated
    192.168.13.2 (metric 0) from 0.0.0.0 (192.168.4.4)
      Origin incomplete, MED 0, localpref 100, weight 32768
      Received label 303030
      Extcommunity: RT:65000:303030 ENCAP:8 Router MAC:6026.aa85.9587

  Path-id 1 advertised to peers:
    192.168.0.11
```

步驟 9.使用命令show ip route [DHCP server IP] vrf[tenvrf]驗證源租戶上是否存在DHCP伺服器的路由。



注意：要使用的路由條目必須從VxLAN到預設VRF。如果沒有可用的路由，請檢查VTEP在本機是否知道DCHP伺服器IP位址。

```
LEAF-2-VPC(config-if)# show running-config interface vlan 10
interface Vlan10
  no shutdown
  vrf member tenant-a
  no ip redirects
  ip address 10.10.10.1/24
  no ipv6 redirects
  fabric forwarding mode anycast-gateway
  ip dhcp relay address 10.10.10.150
  ip dhcp relay source-interface loopback100

LEAF-2-VPC(config-if)# show ip route 10.10.10.150 vrf tenant-a
10.10.10.150/32, ubest/mbest: 1/0, attached
    *via 10.10.10.150, Vlan10, [190/0], 01:01:28, hmm
```

步驟 10.使用命令ping [DHCP server IP] source-interface loopback [x] vrf [tenant vrf]驗證是否可使用環回介面和相應的VRF作為VRF源訪問DCHP伺服器IP。

```
LEAF-2-VPC(config-if)# ping 10.10.10.150 source-interface loopback 100 vrf tenant-a
PING 10.10.10.150 (10.10.10.150): 56 data bytes
64 bytes from 10.10.10.150: icmp_seq=0 ttl=127 time=0.928 ms
64 bytes from 10.10.10.150: icmp_seq=1 ttl=127 time=0.475 ms
64 bytes from 10.10.10.150: icmp_seq=2 ttl=127 time=0.455 ms
64 bytes from 10.10.10.150: icmp_seq=3 ttl=127 time=0.409 ms
64 bytes from 10.10.10.150: icmp_seq=4 ttl=127 time=0.465 ms

--- 10.10.10.150 ping statistics ---
```

步驟 11.檢驗DHCP中繼代理的狀態。

```
LEAF-2-VPC(config)# show ip dhcp status
Current CLI Operation: show ip dhcp status
Last CLI Operation: DME: ip dhcp relay information option vpn enable
Last CLI Operation Status: SUCCESS
```

步驟 12.驗證選項82（例如vpn選項）和中繼代理下的正確中繼IP地址。

```
LEAF-2-VPC(config)# show ip dhcp relay
DHCP relay service is enabled    <<<<<<<
Insertion of option 82 is enabled   <<<<<<<<<
Insertion of option 82 customize circuitid is disabled
TLV format in CircuitId and RemoteId suboptions is enabled
Insertion of VPN suboptions is enabled  <<<<<<<
Insertion of cisco suboptions is disabled
Global smart-relay is disabled
Relay Trusted functionality is disabled
Relay Trusted Port is Globally disabled
V4 Relay Source Address HSRP is Globally disabled
Server-ID-override-disable is disabled

Smart-relay is enabled on the following interfaces:
-------------------------------------------------------


Subnet-broadcast is enabled on the following interfaces:
-------------------------------------------------------


Relay Trusted Port is enabled on the following interfaces:
-------------------------------------------------------


Relay Source Address HSRP is enabled on the following interfaces:
-------------------------------------------------------------------
```

```
Helper addresses are configured on the following interfaces:
 Interface        Relay Address     VRF Name
 -------------    -------------     --------
 Vlan10            10.10.10.150 <<<<
```

步驟 13.檢驗已處理和已轉發的資料包的統計資訊。

```
LEAF-2-VPC(config)# show ip dhcp global statistics
Packets processed 103030
Packets received through cfsoe 0
Packets forwarded 103030
Packets forwarded on cfsoe 0
Total packets dropped 0
Packets dropped from untrusted ports 0
Packets dropped due to MAC address check failure 0
Packets dropped due to Option 82 insertion failure 0
Packets dropped due to o/p intf unknown 0
Packets dropped which were unknown 0
Packets dropped due to no trusted ports 0
Packets dropped due to dhcp relay not enabled 0
Packets dropped due to no binding entry 0
Packets dropped due to interface error/no interface 0
Packets dropped due to max hops exceeded 0
Packets dropped due to Queue full 0
```

步驟 14.檢驗中繼資料包的統計資訊。

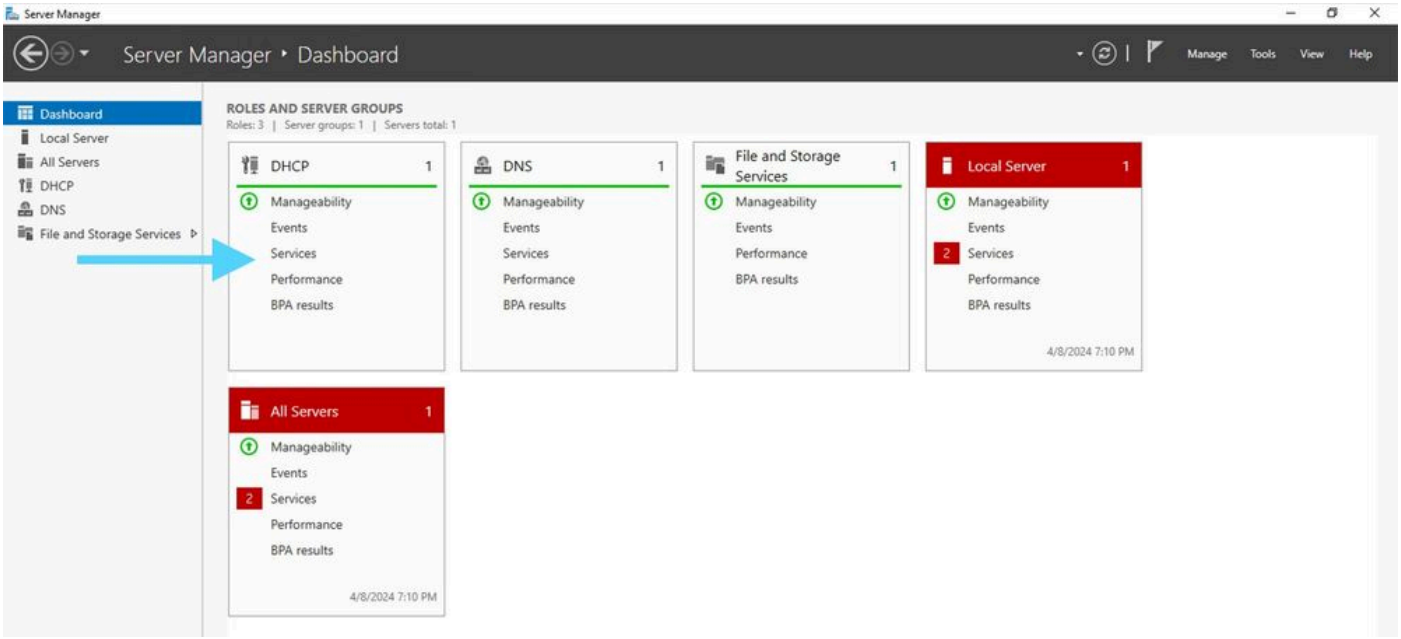
```
LEAF-2-VPC# show ip dhcp relay statistics
--------------------------------------------------------------------------------
Message Type              Rx              Tx           Drops
--------------------------------------------------------------------------------
Discover                29312           29311               0
Offer                  300001          300001               0
Request(*)              29324           29324               0
Ack                      1574            1574               0
Release(*)             191493          191493               0
Decline                     0               0               0
Inform(*)                1540            1540               0
Nack                   472890          472890               0
--------------------------------------------------------------------------------
Total                 1026134         1026133               0
--------------------------------------------------------------------------------

DHCP L3 FWD:
Total Packets Received                          :         0
Total Packets Forwarded                         :         0
Total Packets Dropped                           :         0
Non DHCP:
Total Packets Received                          :         0
Total Packets Forwarded                         :         0
Total Packets Dropped                           :         0
DROP:
DHCP Relay not enabled                          :         0
```

```
Invalid DHCP message type                          :         0
Interface error                                    :         0
Tx failure towards server                          :         0
Tx failure towards client                          :         0
Unknown output interface                           :         0
Unknown vrf or interface for server                :         0
Max hops exceeded                                  :         0
Option 82 validation failed                        :         0
Packet Malformed                                   :         0
DHCP Request dropped on MCT                        :         0
Relay Trusted port not configured                  :         0
*  -  These counters will show correct value when switch
receives DHCP request packet with destination ip as broadcast
address. If request is unicast it will be HW switched
```

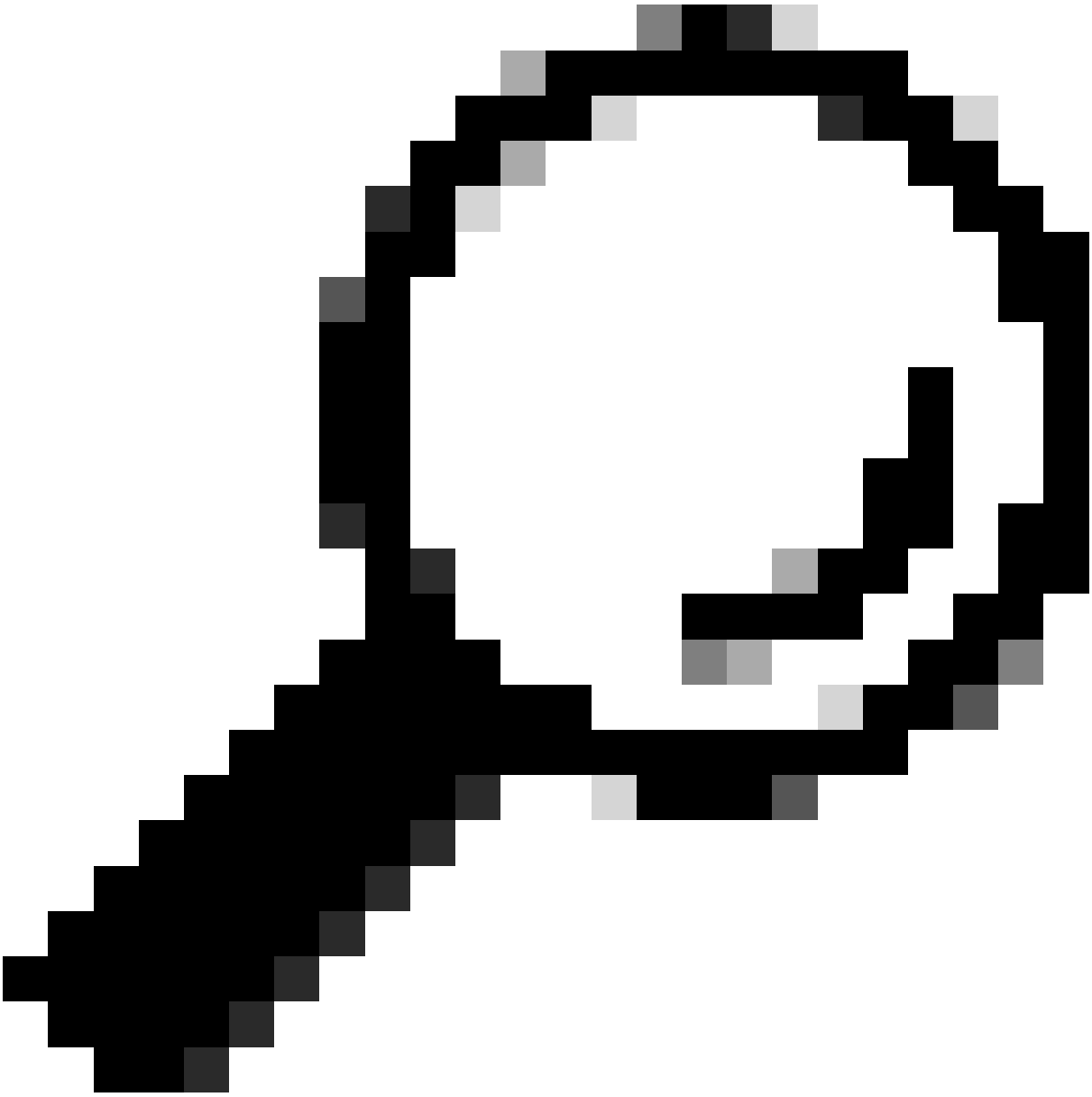
Windows Server 2022上的DHCP伺服器配置

主機的IP定址範圍配置。

步驟 1.開啟「伺服器管理員」，並確認儀表板的DCHP伺服器上沒有警報。

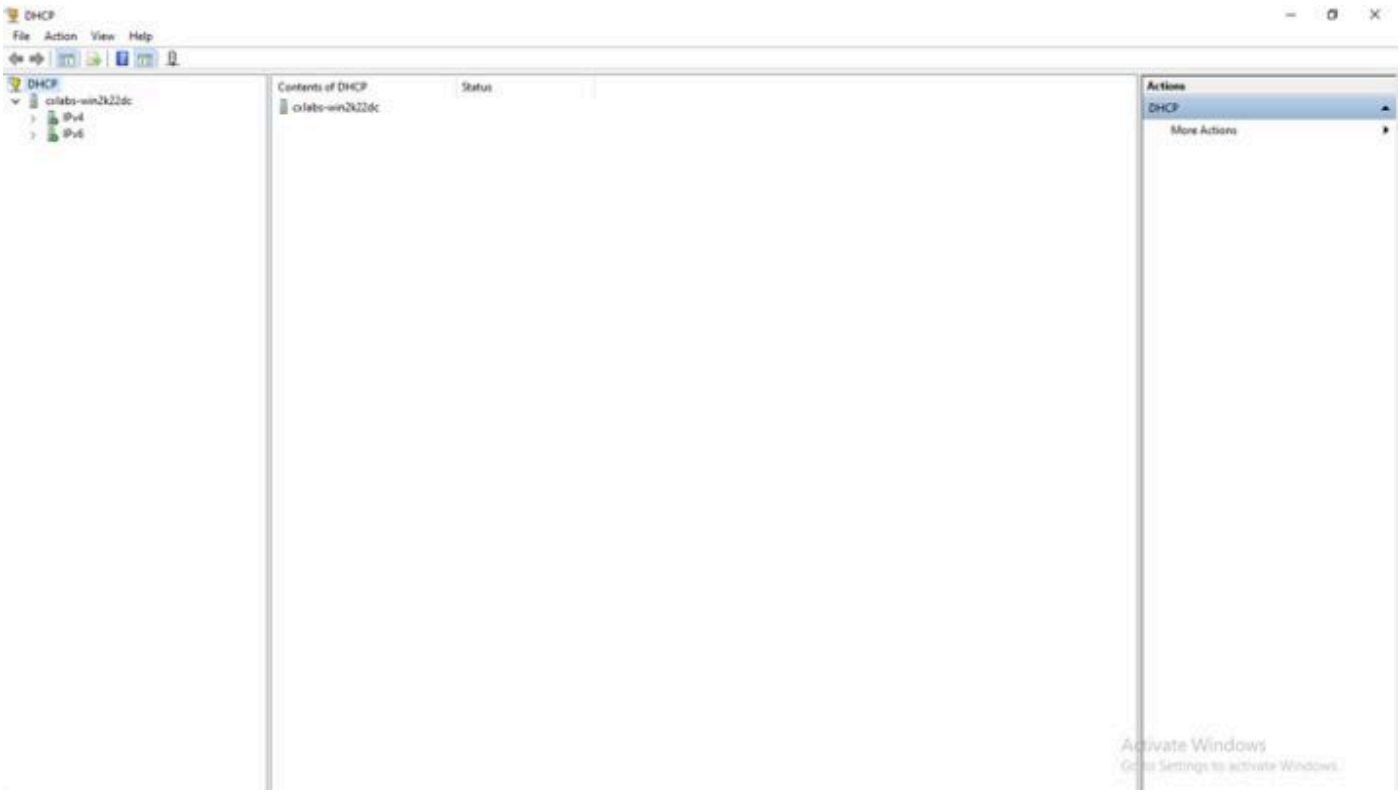


來自Windows Server 2022上的伺服器管理器的儀表板



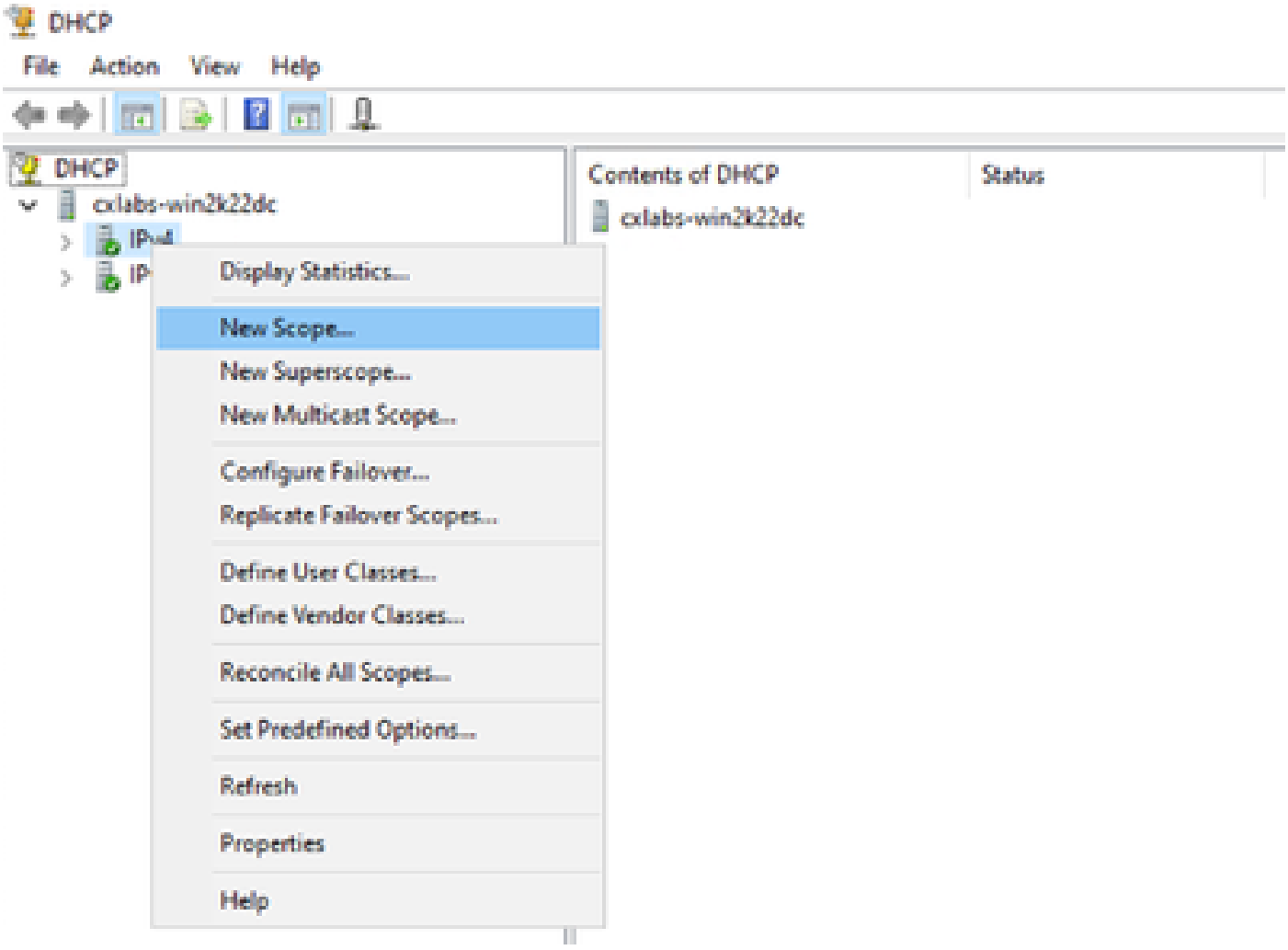
提示：連按兩下時，影像會放大。

步驟 2.打開DHCP Server應用程式。

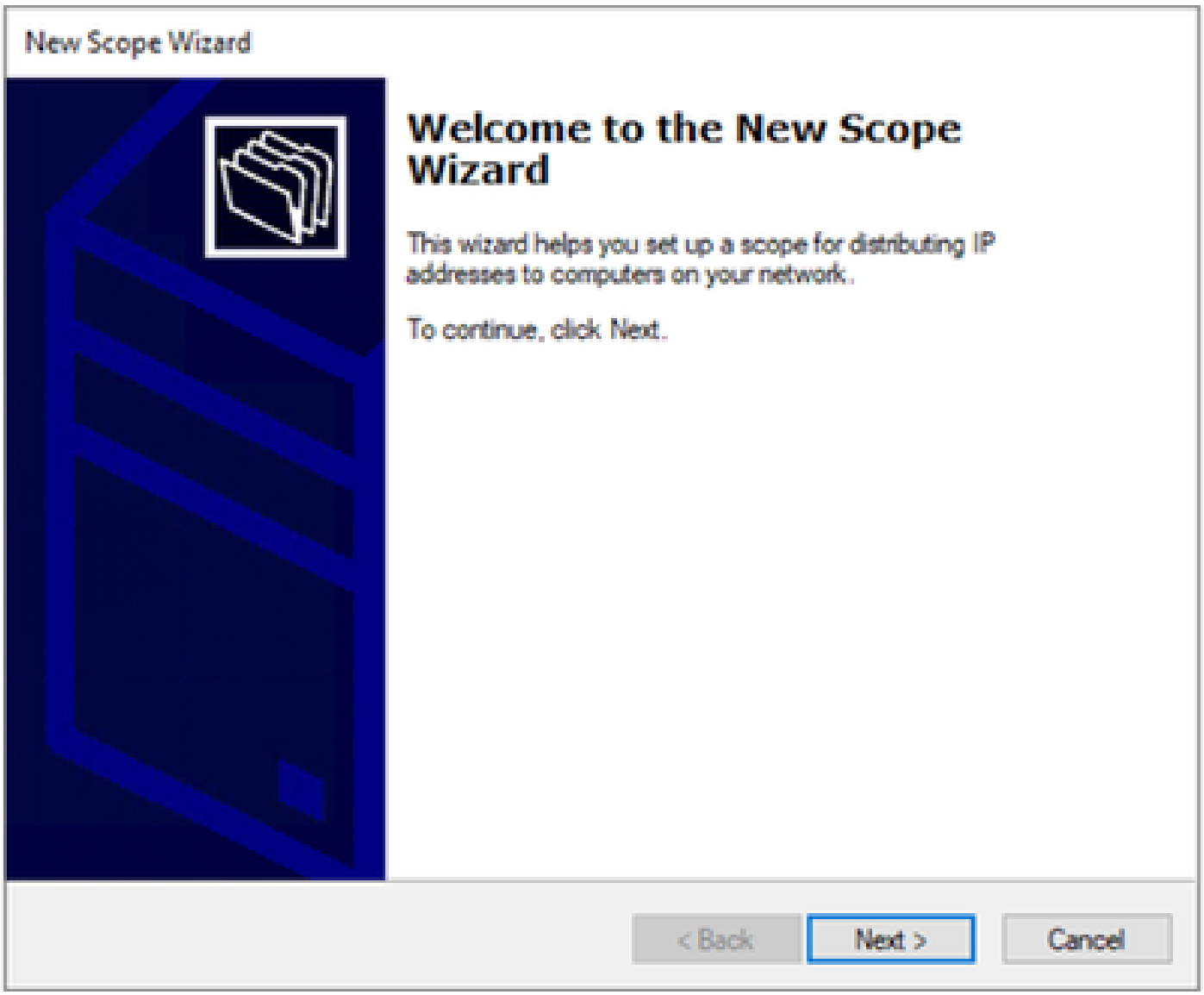


Windows Server 2022上的DHCP伺服器

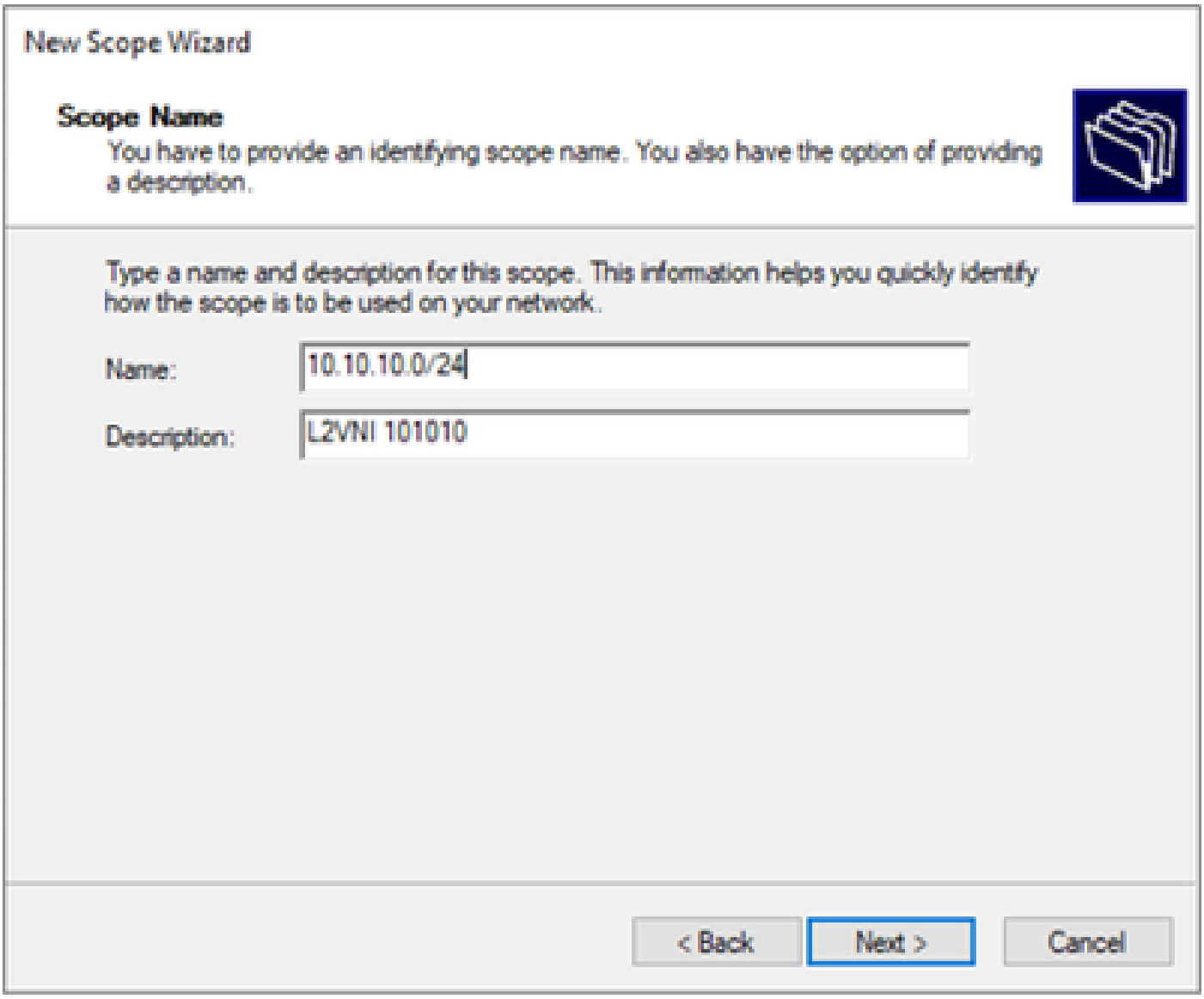
步驟 3. 按一下右鍵IPv4並按一下New Scope。



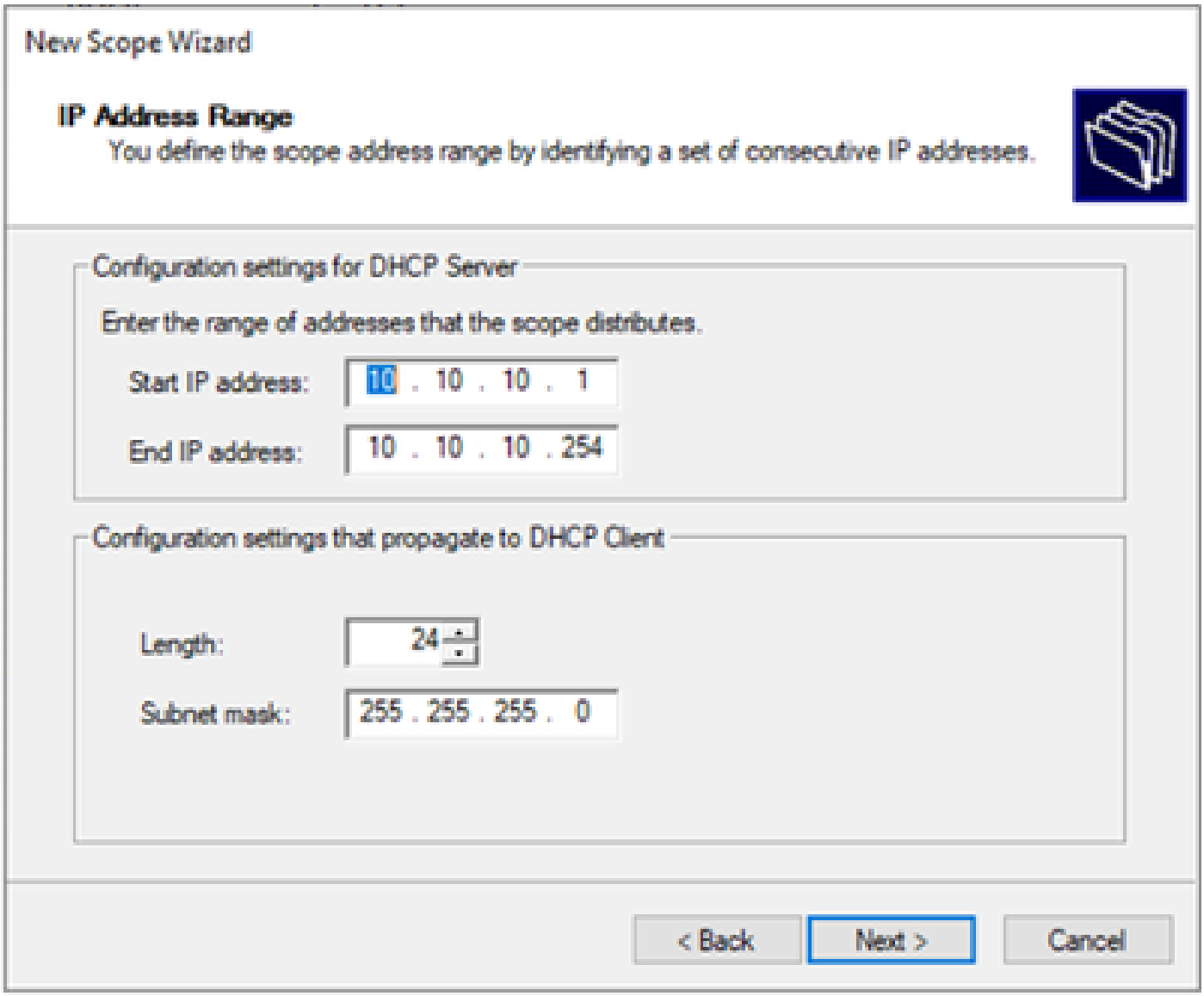
步驟 4.按「Next」（下一步）。



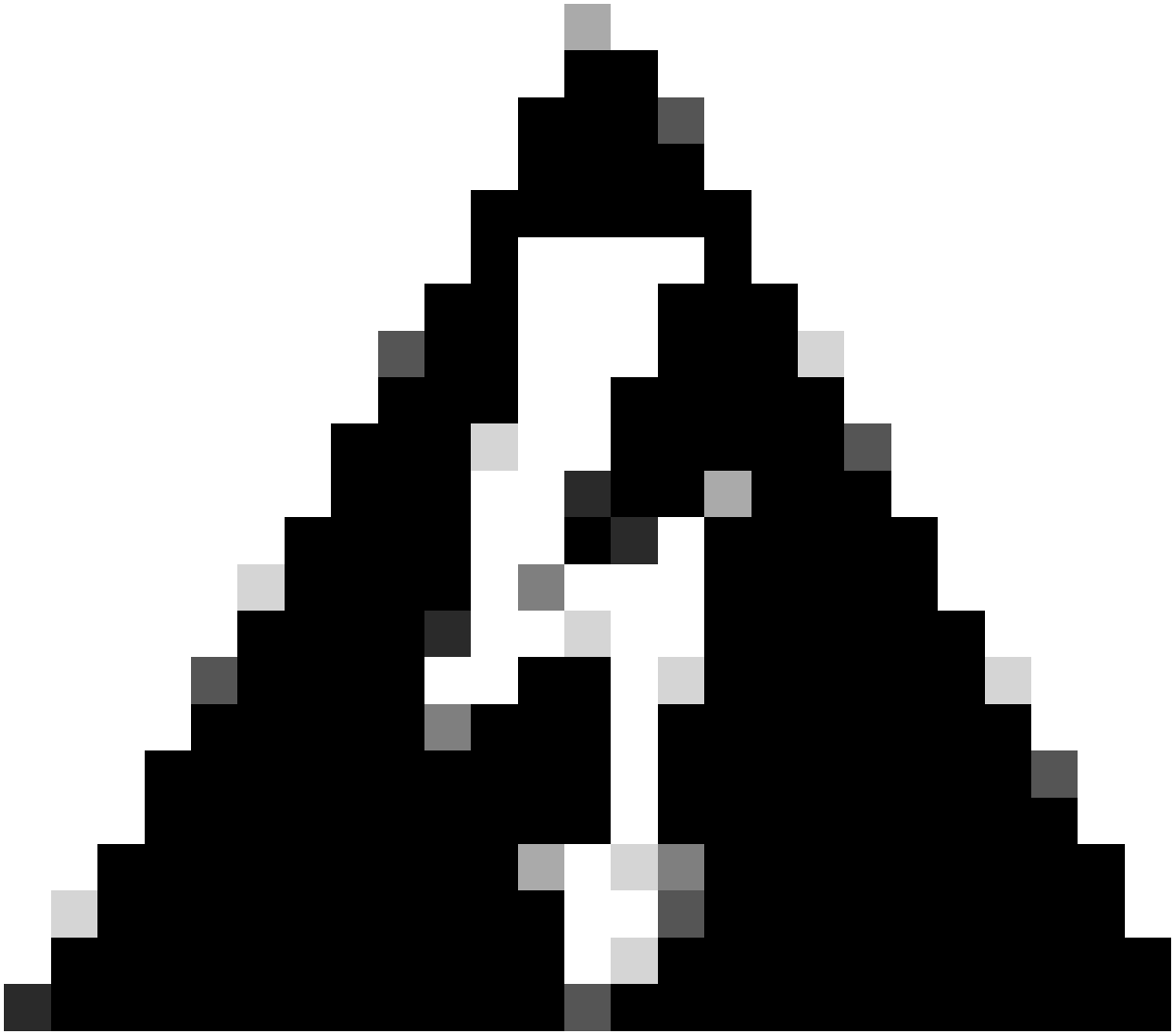
步驟 5.寫下名稱和說明。在本例中，名稱是屬於VLAN 10的子網，說明是L2VNI，作為L2VNI列在VLAN 10中。



步驟 6.配置IP地址範圍。這是主機的池。

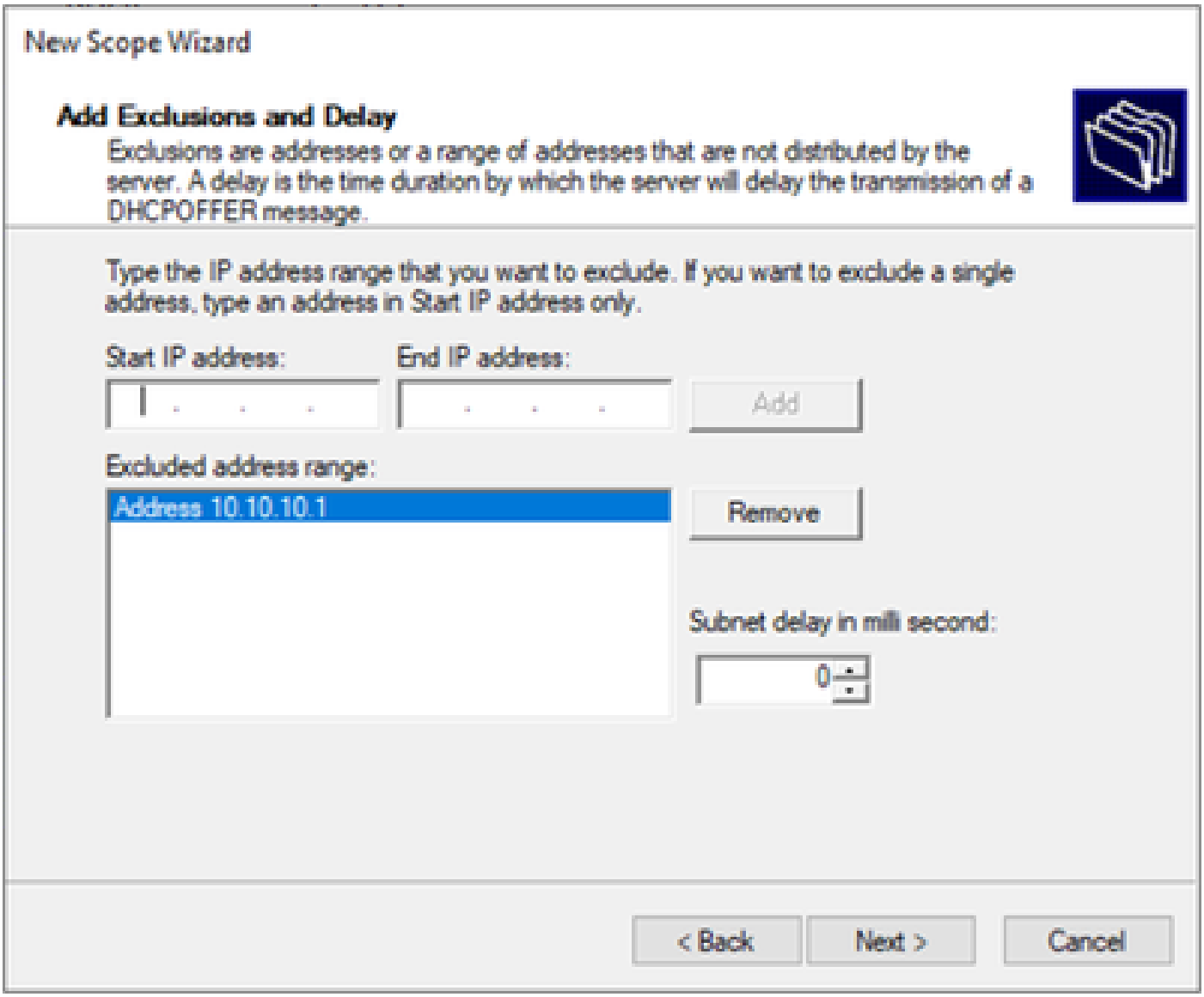


步驟 6.從VTEP中的SVI配置中排除共用IP地址。在本例中，介面VLAN 10的地址為IP.10.10.1/24。

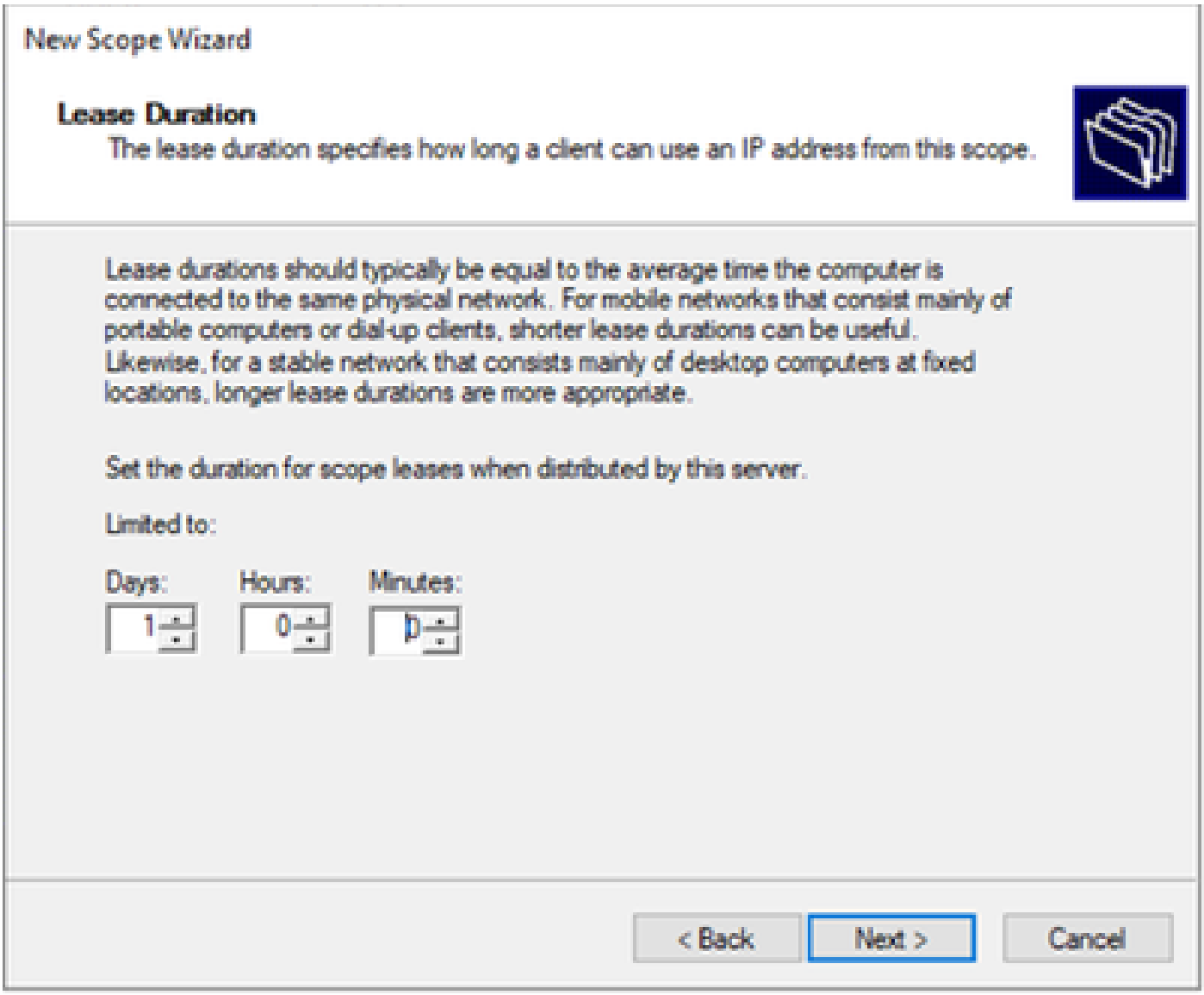


警告：未能從SVI（或預設網關）中排除IP地址會導致重複IP地址並影響流量傳輸。

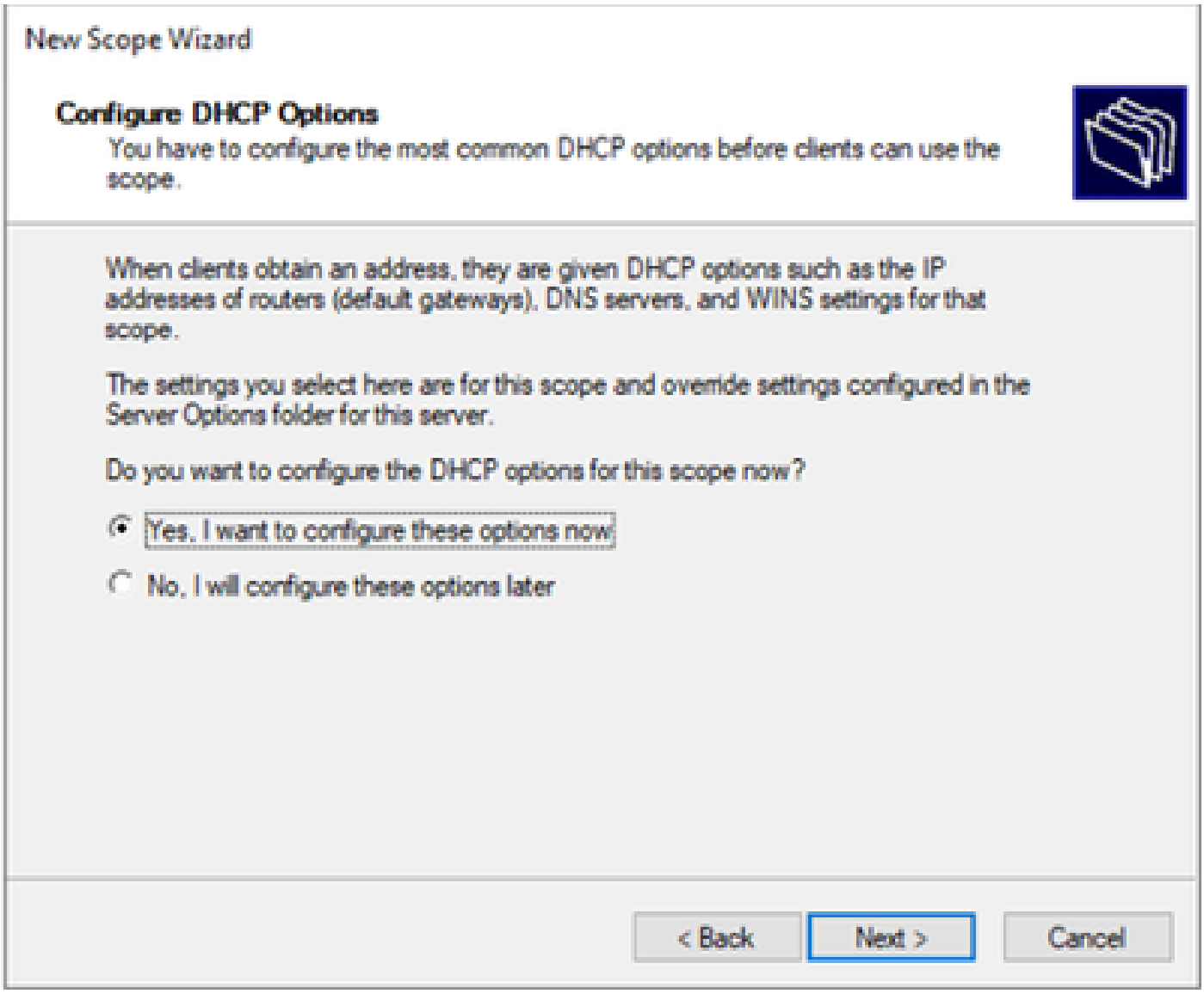
```
LEAF-1# show running-config interface vlan 10
<snip>
interface Vlan10
  no shutdown
  vrf member tenant-a
  no ip redirects
  ip address 10.10.10.1/24
  no ipv6 redirects
  fabric forwarding mode anycast-gateway
  ip dhcp relay address 10.10.10.150
  ip dhcp relay source-interface loopback100
```



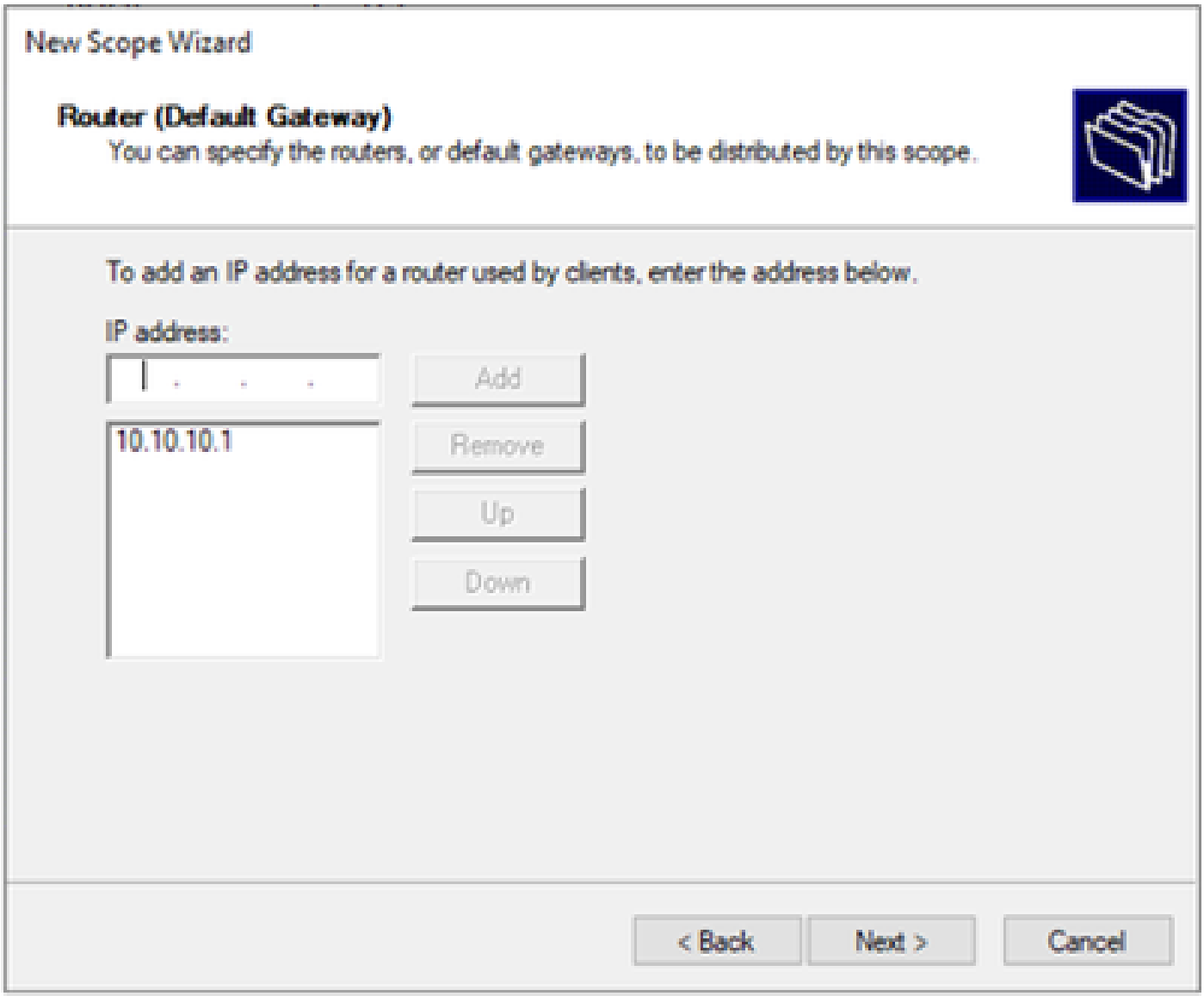
步驟 7.配置IP地址的租用期限。這是指主機在續約之前可以使用分配的IP地址的時間。



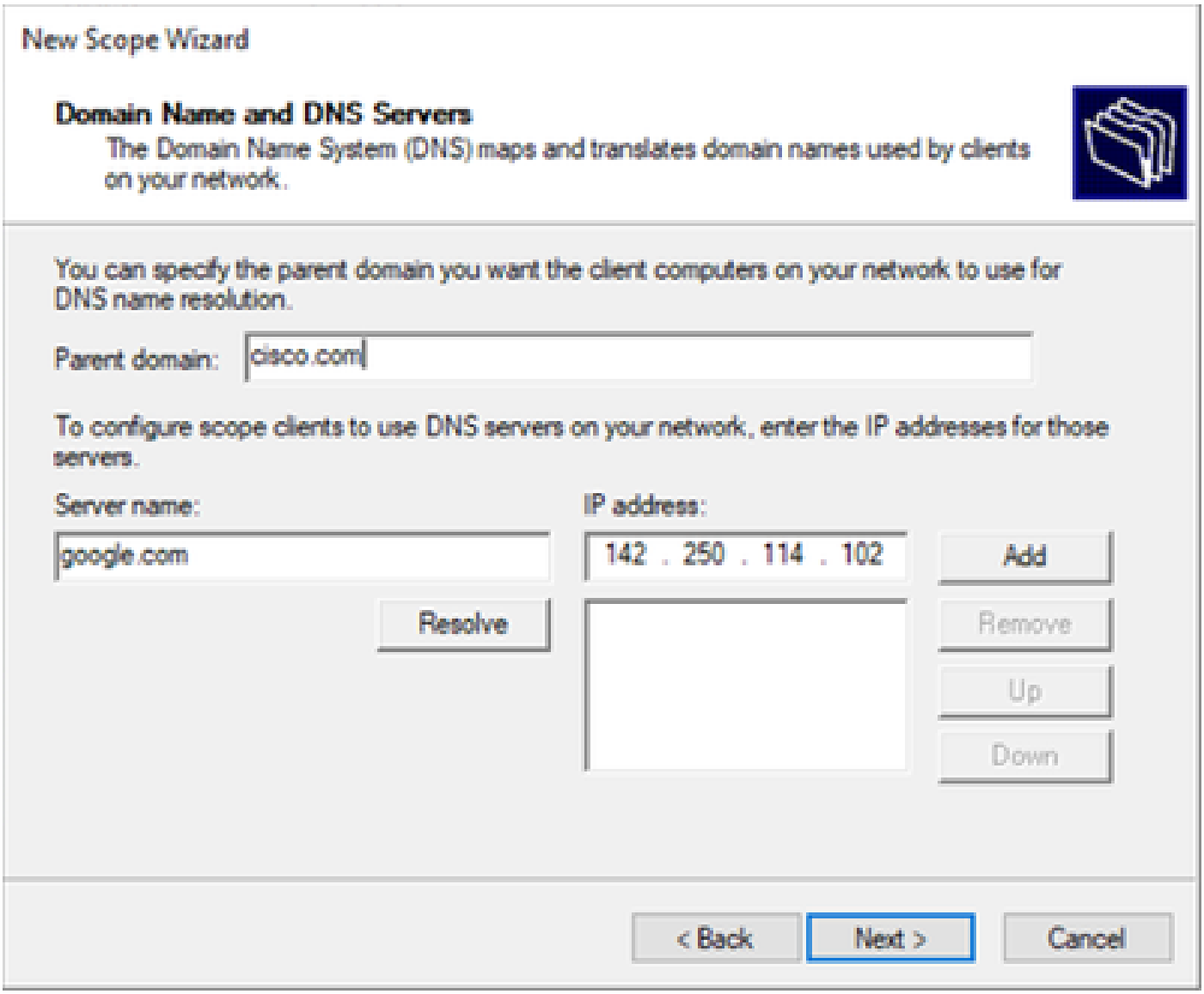
步驟 8.選擇Yes， I want to configure these options now。



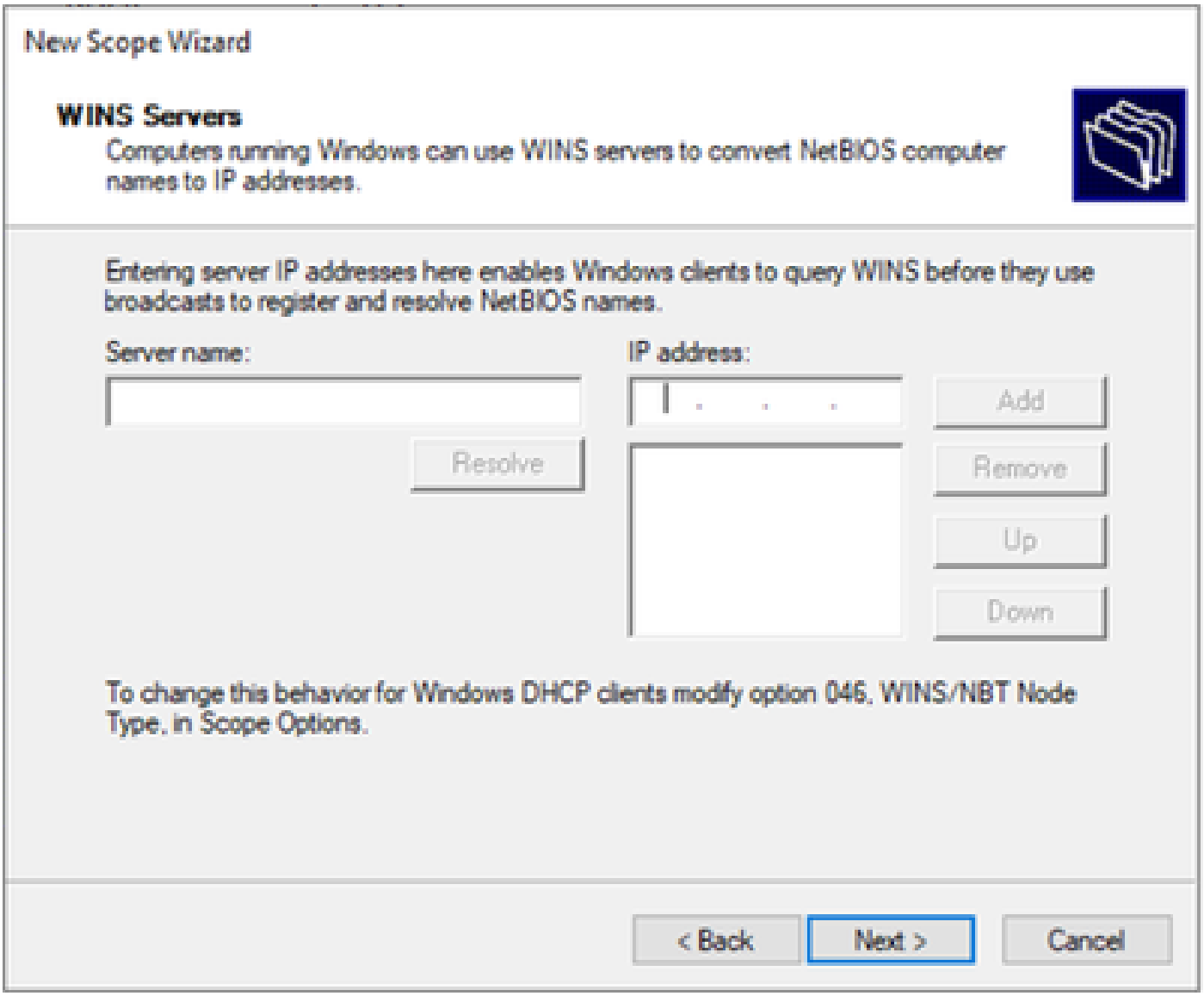
步驟 9.配置預設網關IP地址。



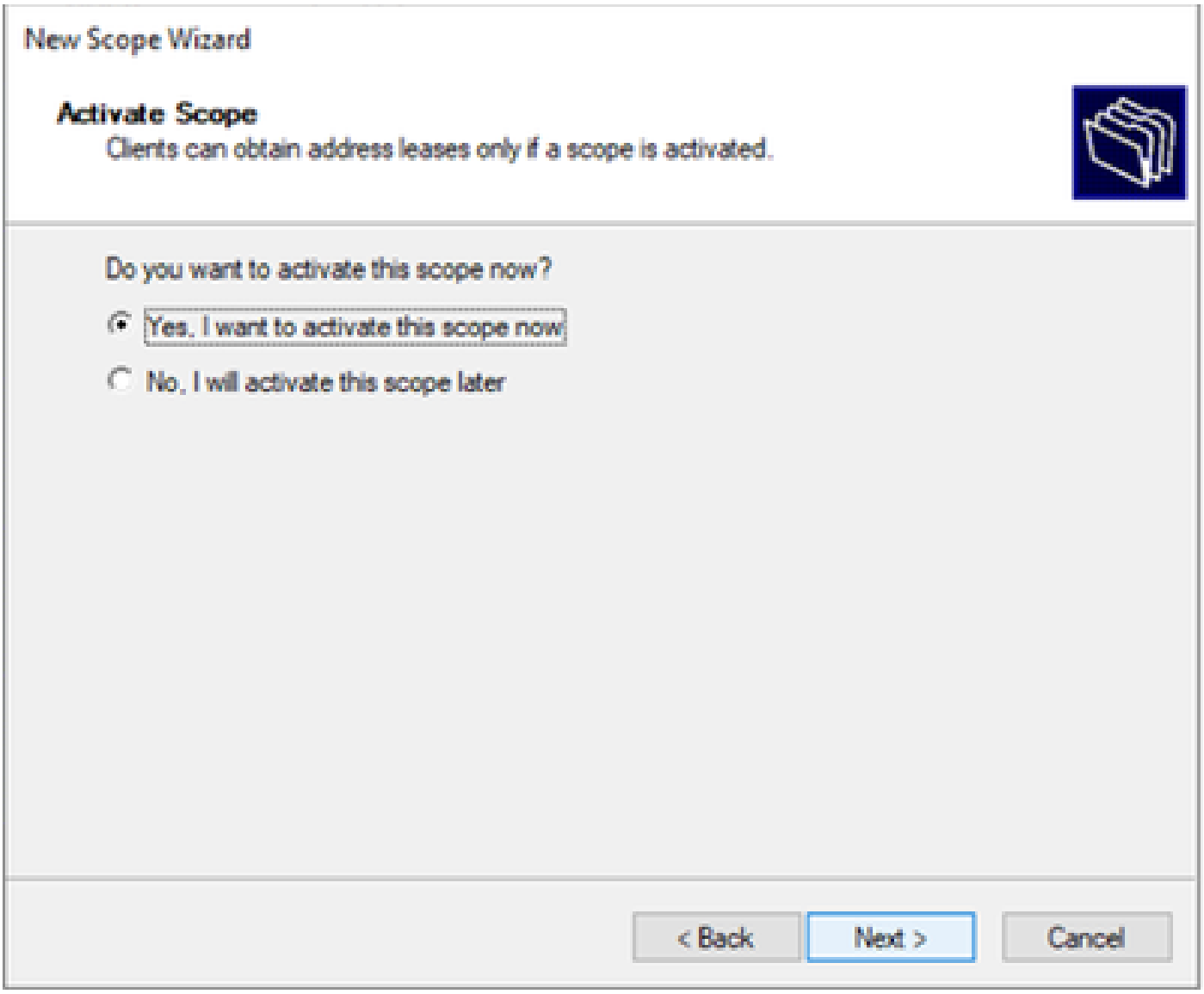
步驟 10.配置域名和DNS伺服器。



步驟 11.配置WINS伺服器（如果適用）。如果資訊未知，則可以跳過此步驟。

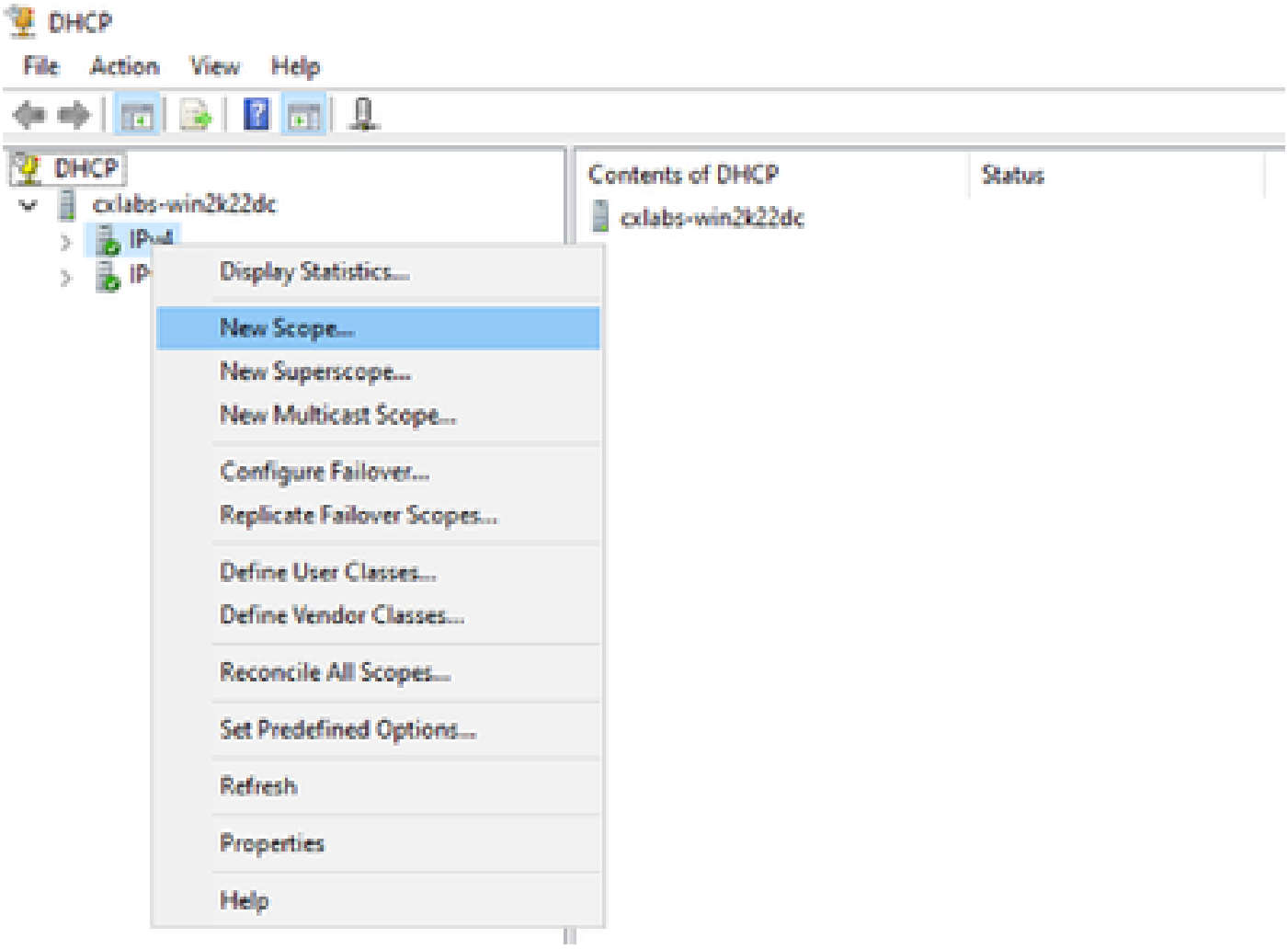


步驟 12.選擇Yes， I want to activate this scope now。



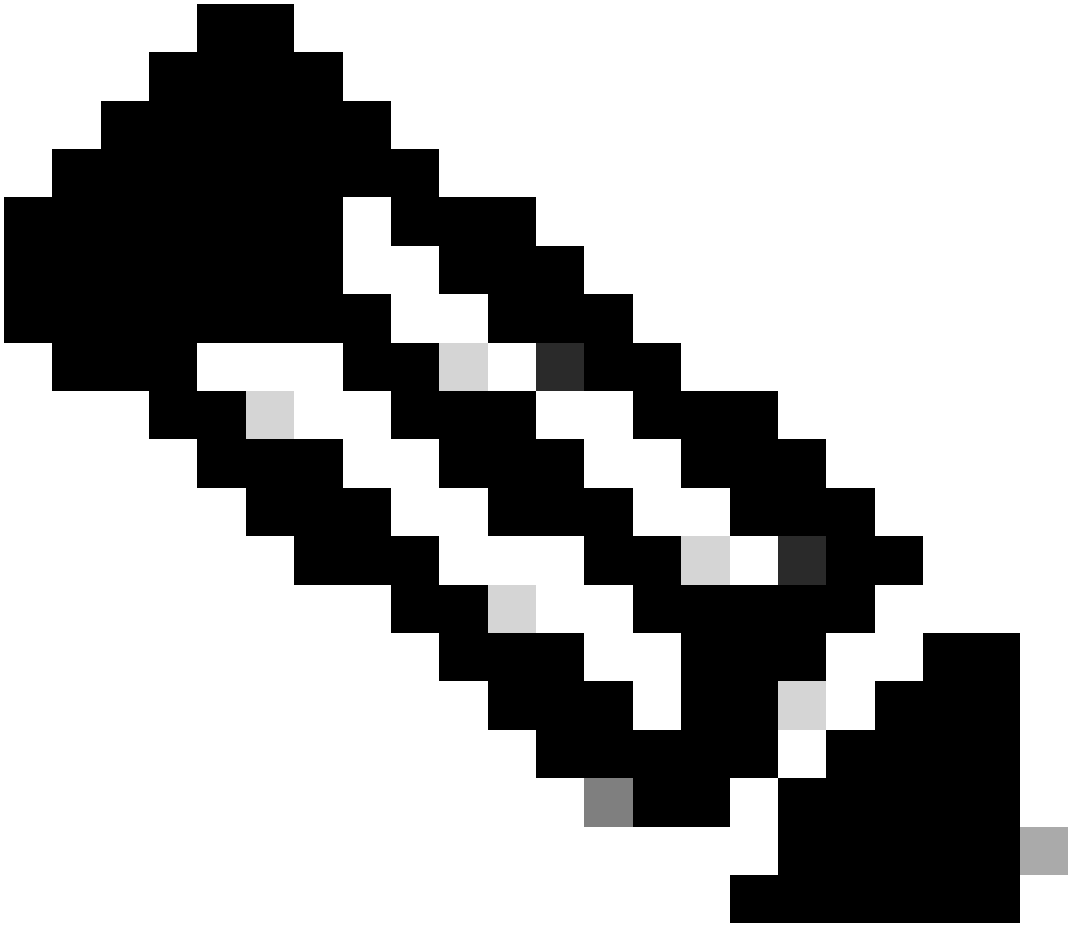
將SVI中環回的唯一IP地址的範圍配置為DCHP中繼代理。

步驟 1.按一下右鍵IPv4並選擇IPv4Scope。



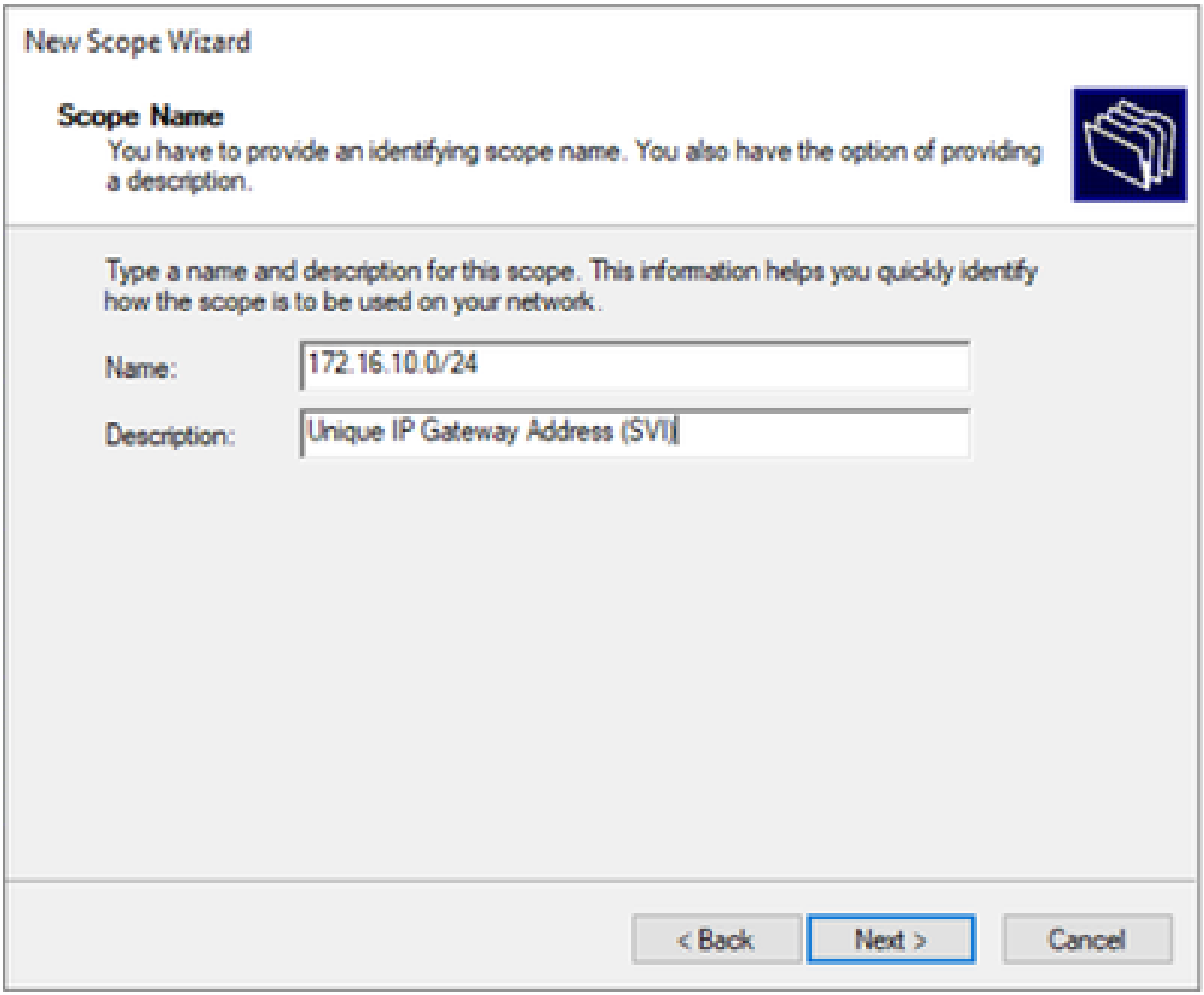
DCHP中的新作用域

步驟 2.寫下名稱和說明。在本示例中， name是用於具有環回地址的子網的子網。

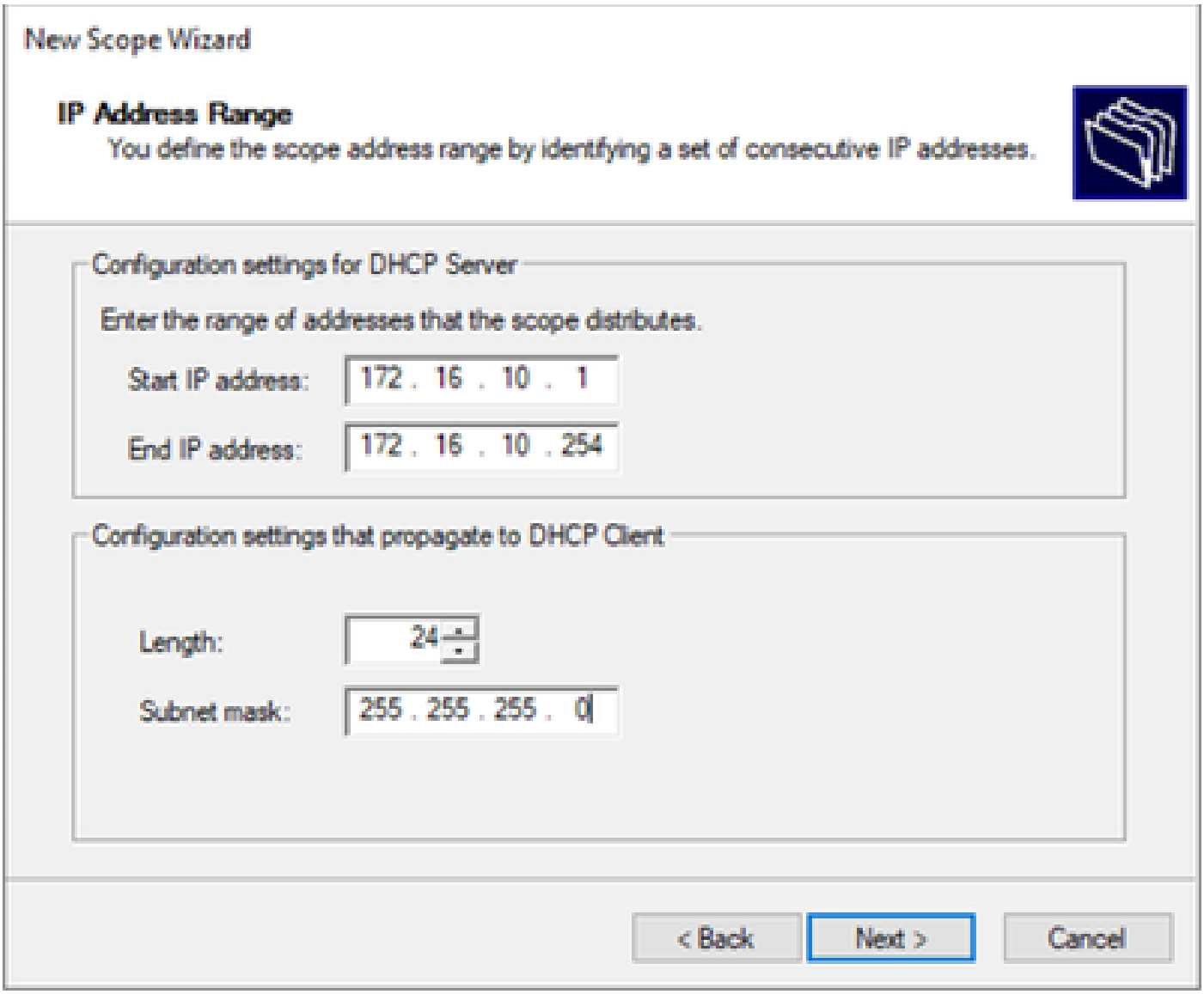


IPte：在VxLAN租戶的整個VxLAN交換矩陣中，環回使用環回唯一IP地址。這必須在BGP中的BGP L2VPN EVPN路由重分配中通告，BGP位於IPv4 address-famIPv4中相應租戶的VRF內

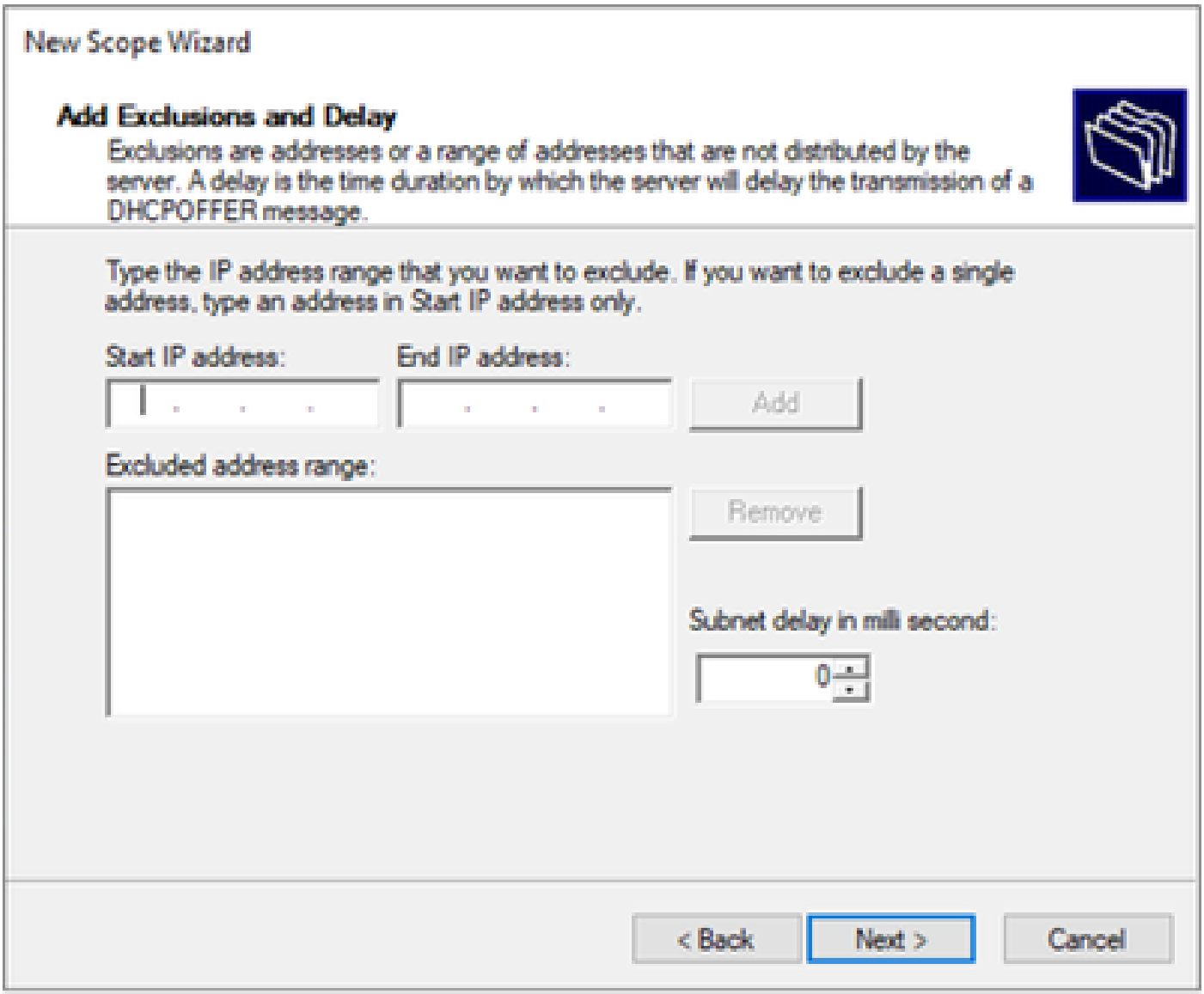
```
LEAF-1# show running-config interface loopback 100
<snip>
interface loopback100
  vrf member tenant-a
  ip address 172.16.10.8/32
```



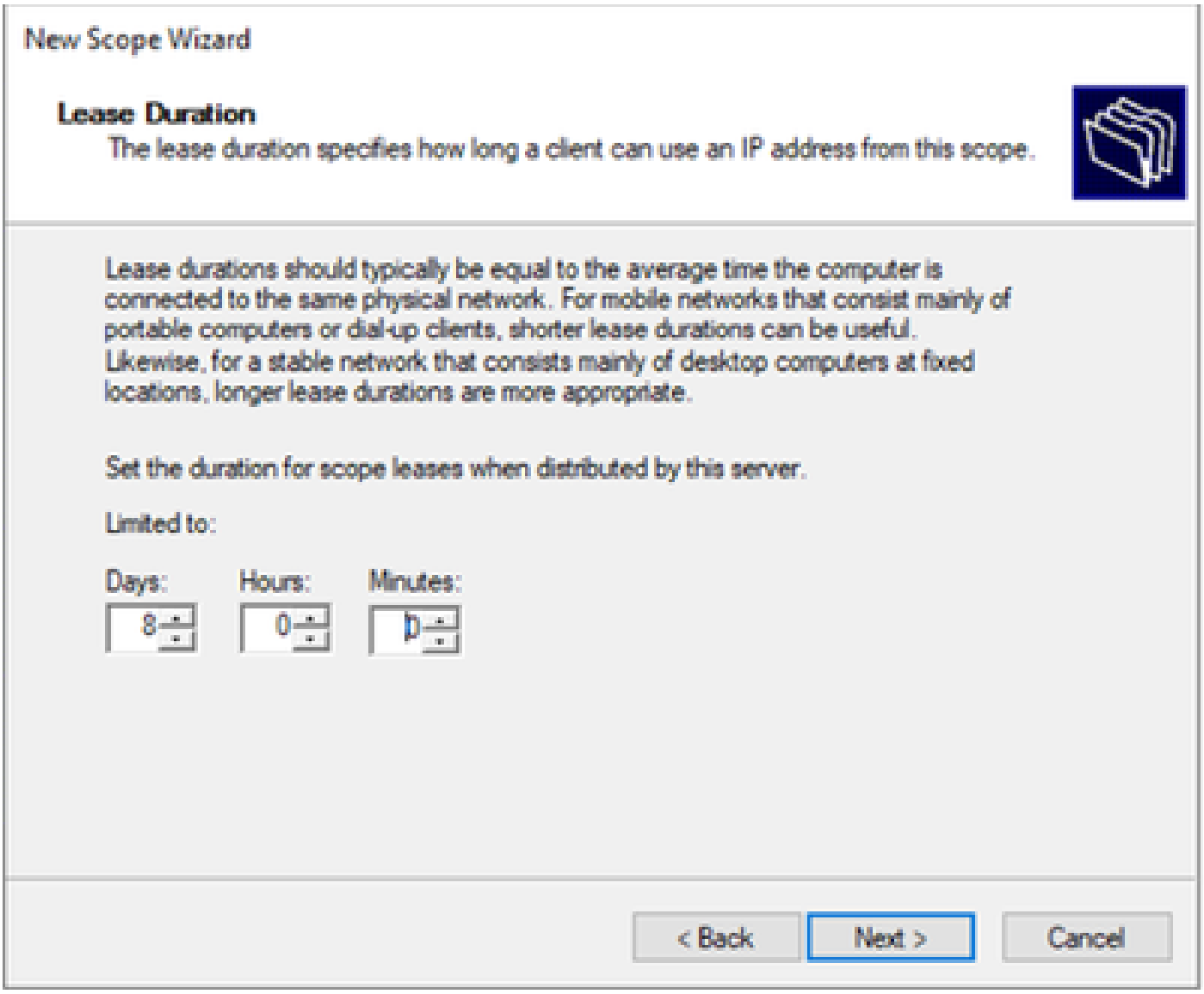
步驟 3. 配置IP地址範圍IP。這是環回的池。



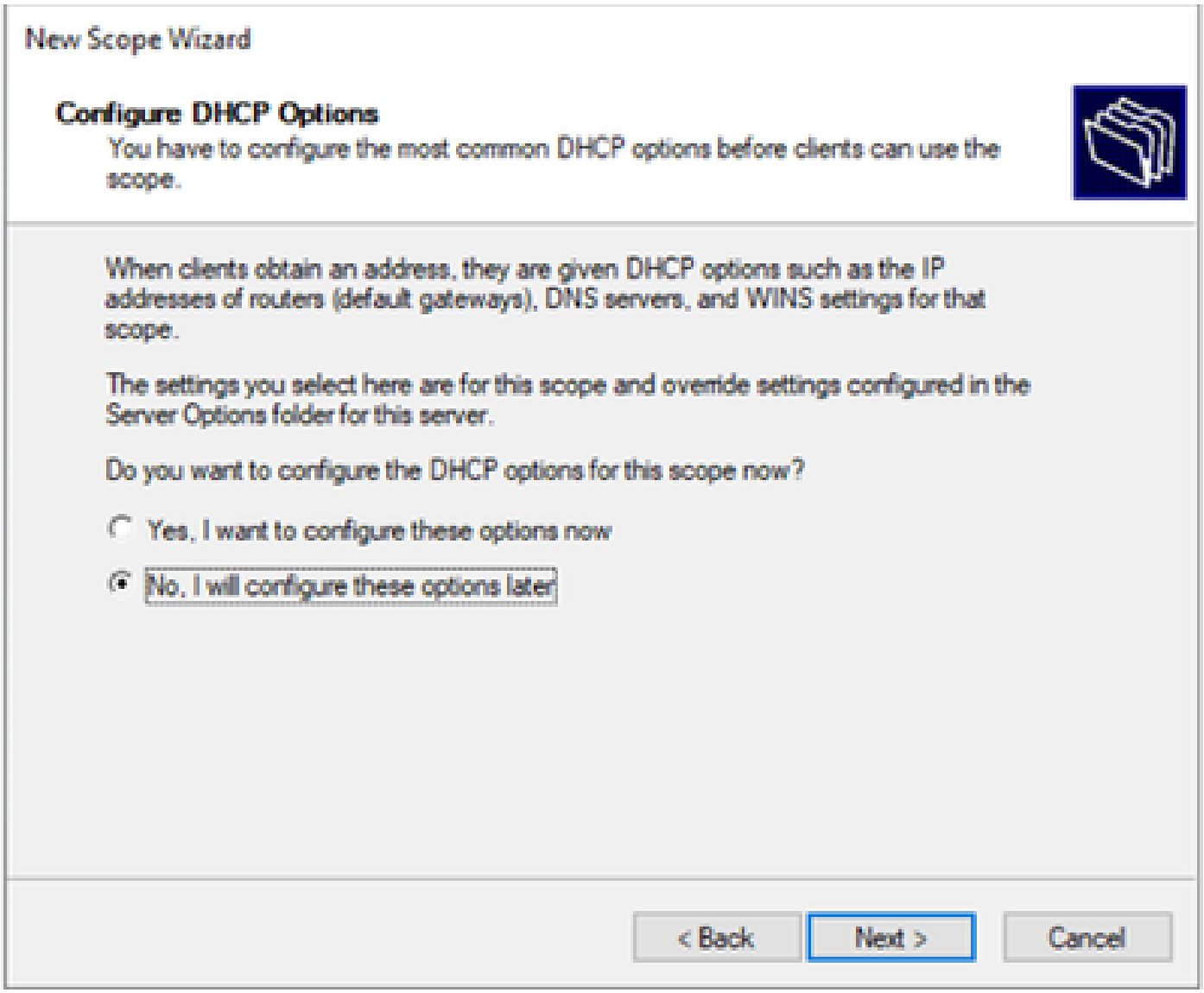
步驟 4.配置排除（可選，因為DHCP伺服器租用的是屬於此子網的IP地址）。



步驟 5.跳過租用期限，然後按一下下一步。

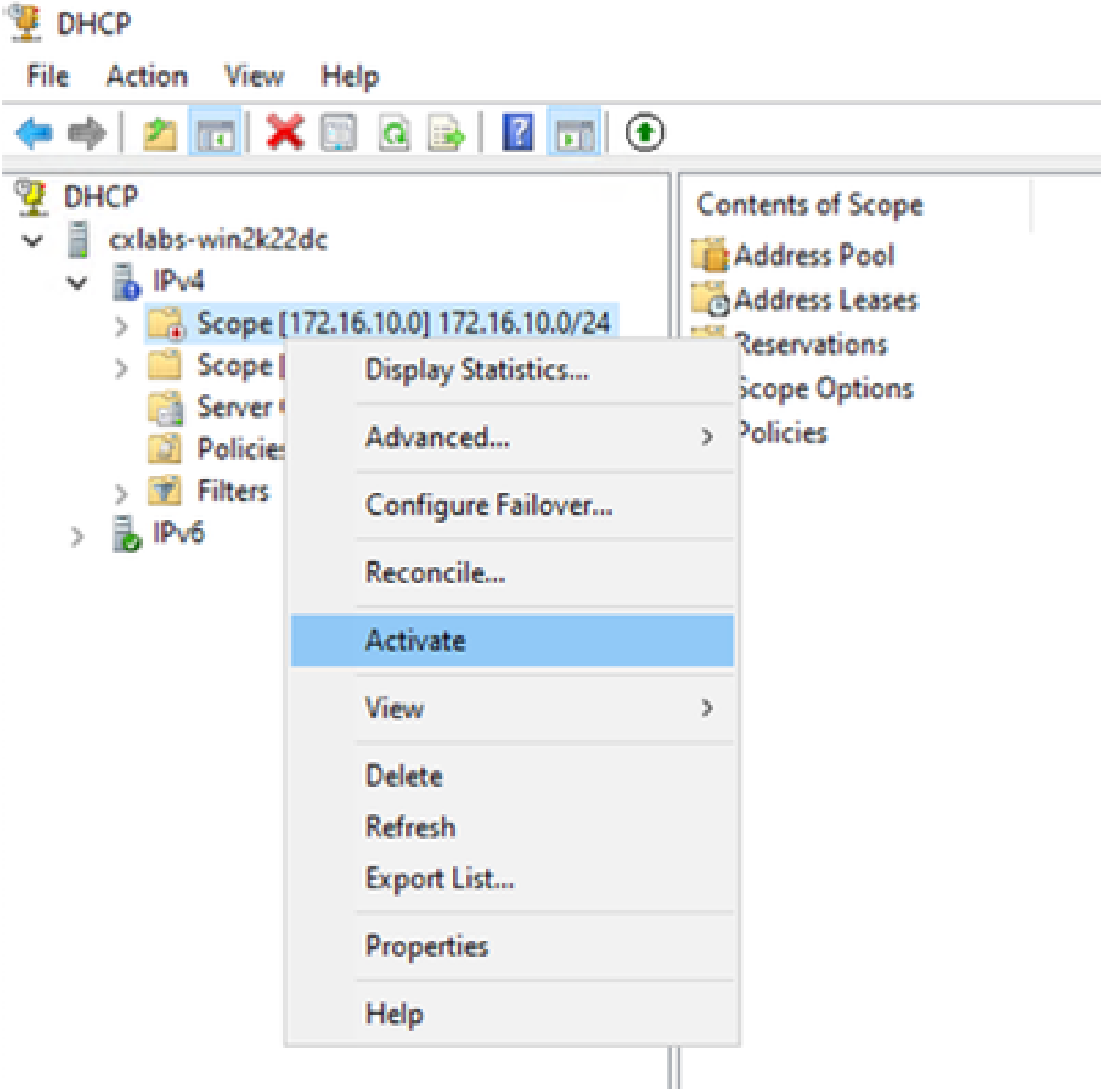


步驟 6.選擇No， I will configure these options later。



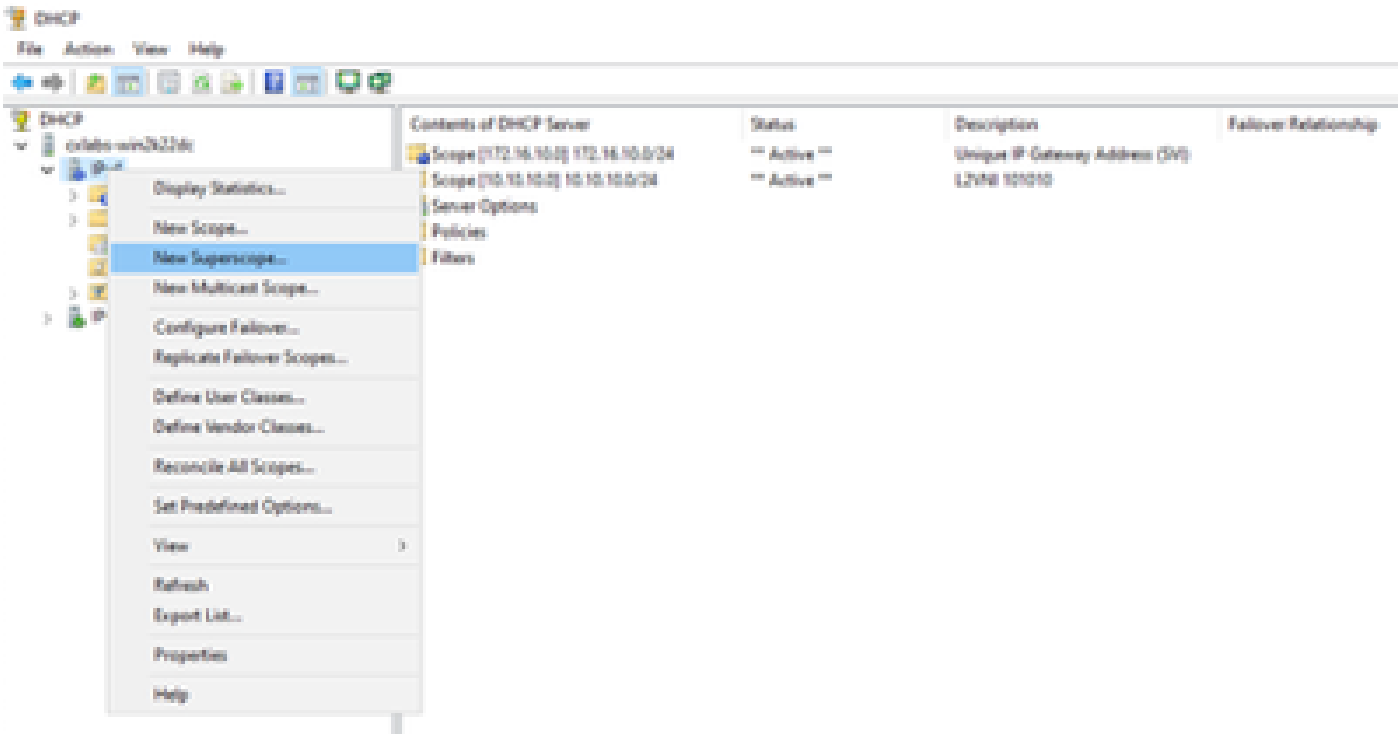
步驟 7.按一下「Finish」（結束）。

步驟 8.在建立的範圍上按一下滑鼠右鍵，然後選取啟動。

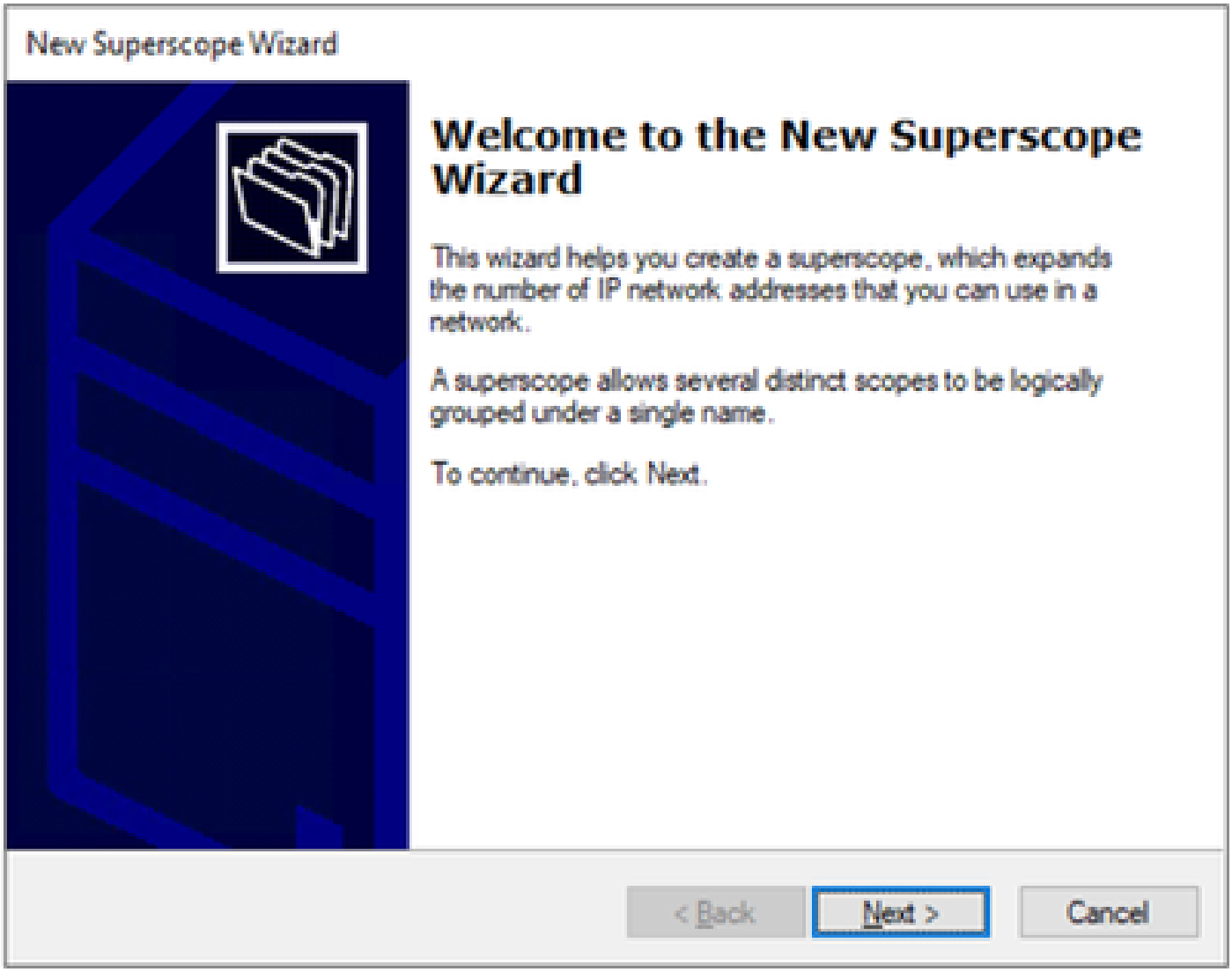


為VxLAN交換矩陣配置超級作用域。

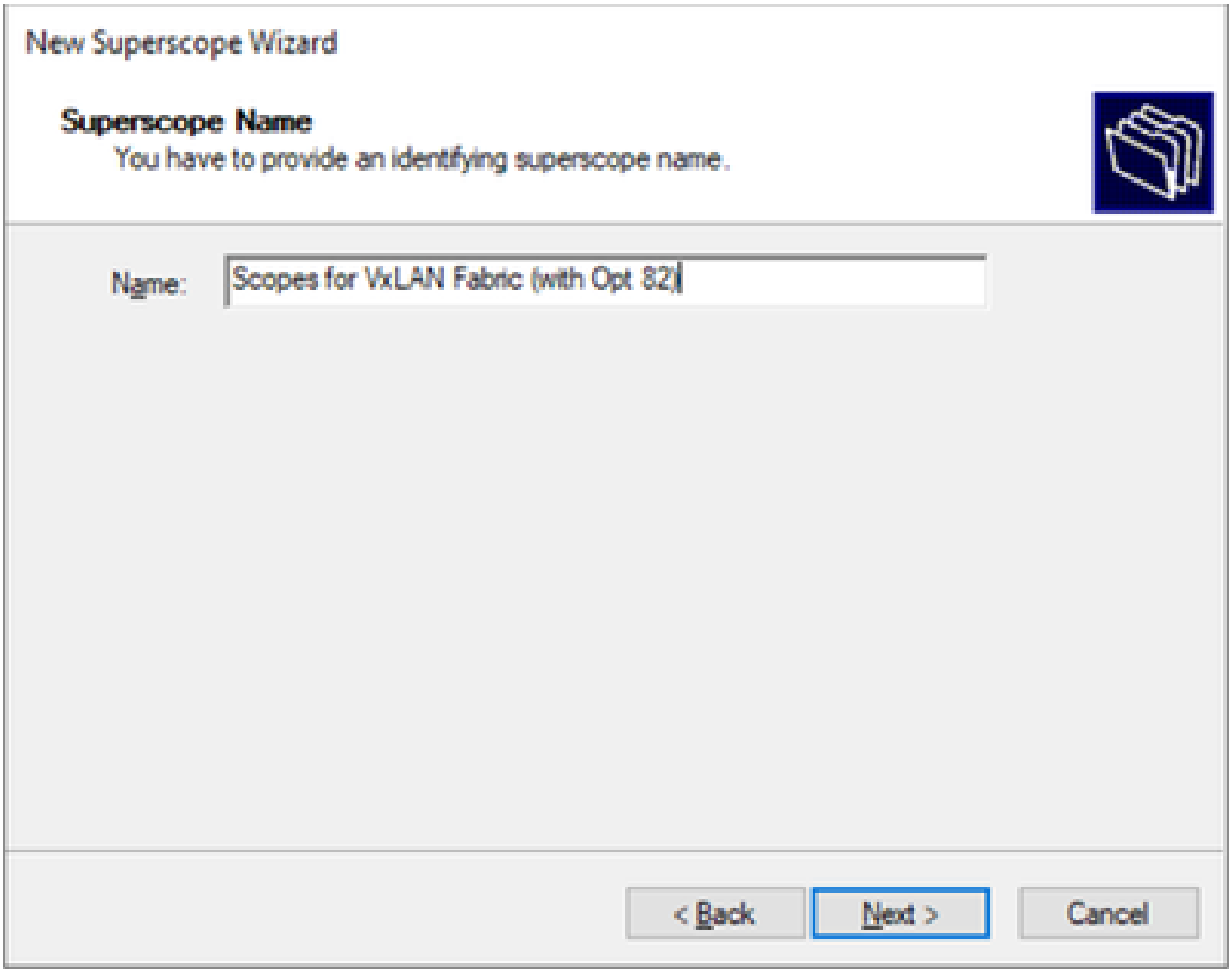
步驟 1.按一下右鍵IPv4並選擇New Superscope。



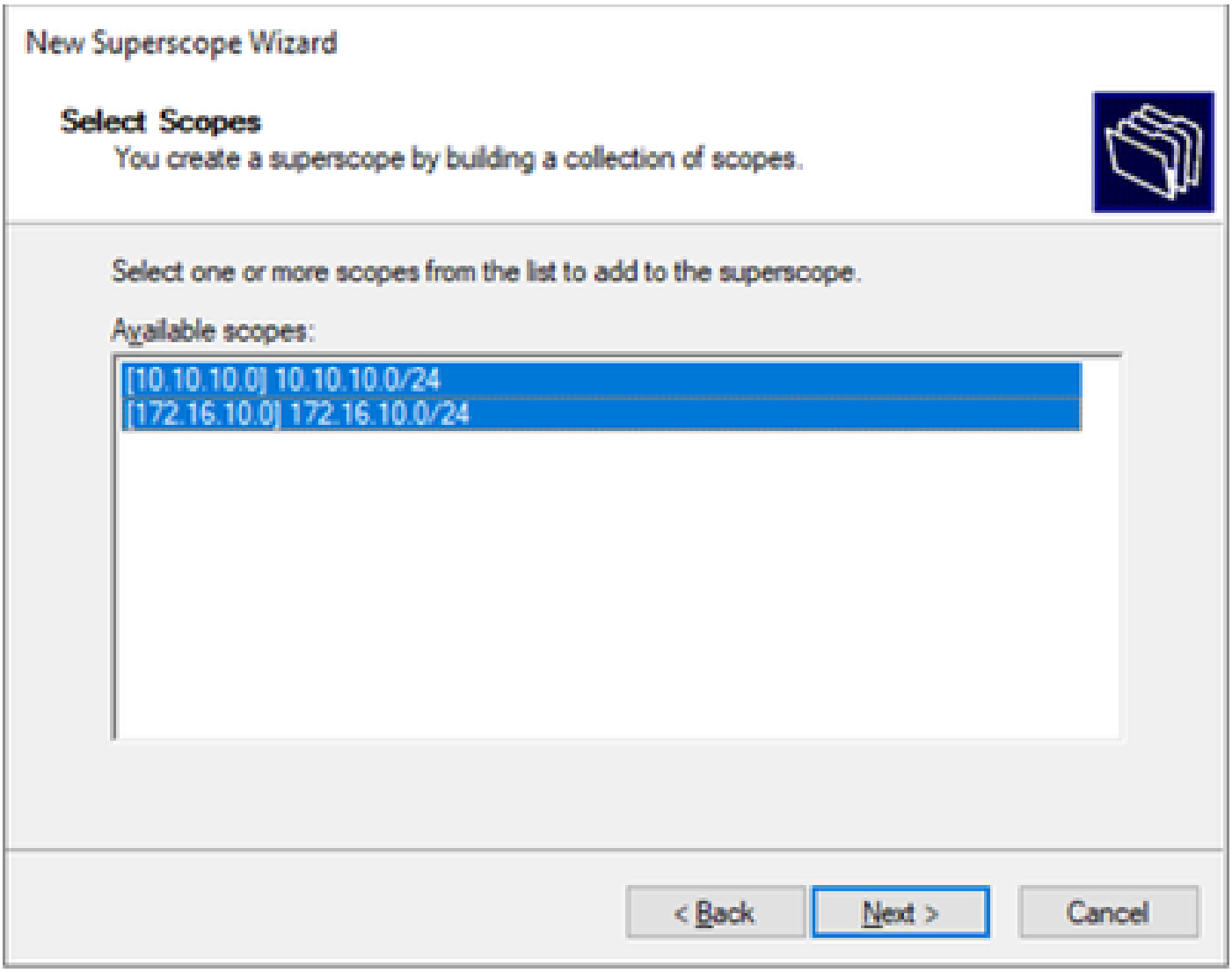
步驟 2.按「Next」（下一步）。



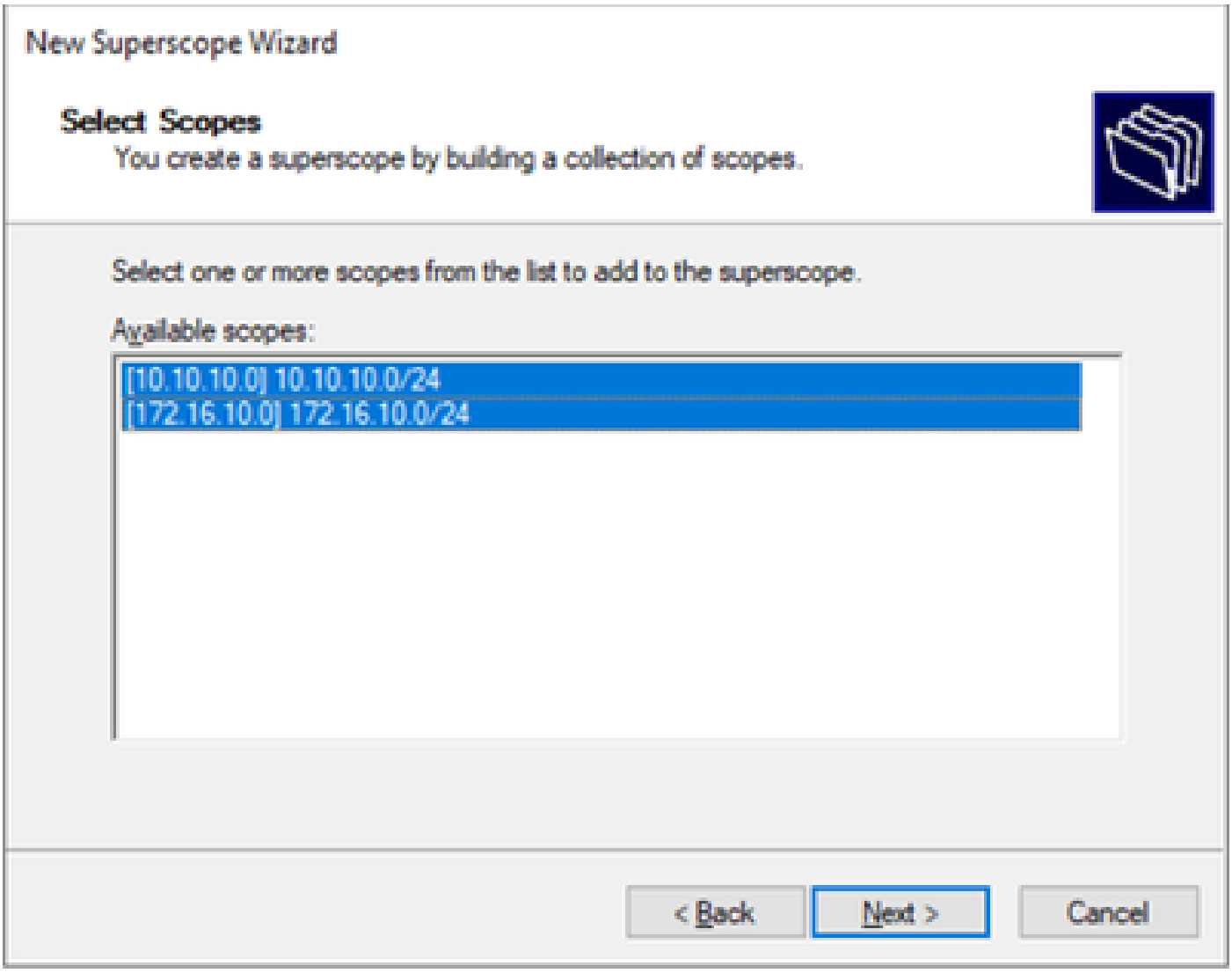
步驟 3.寫入超級領域名稱。



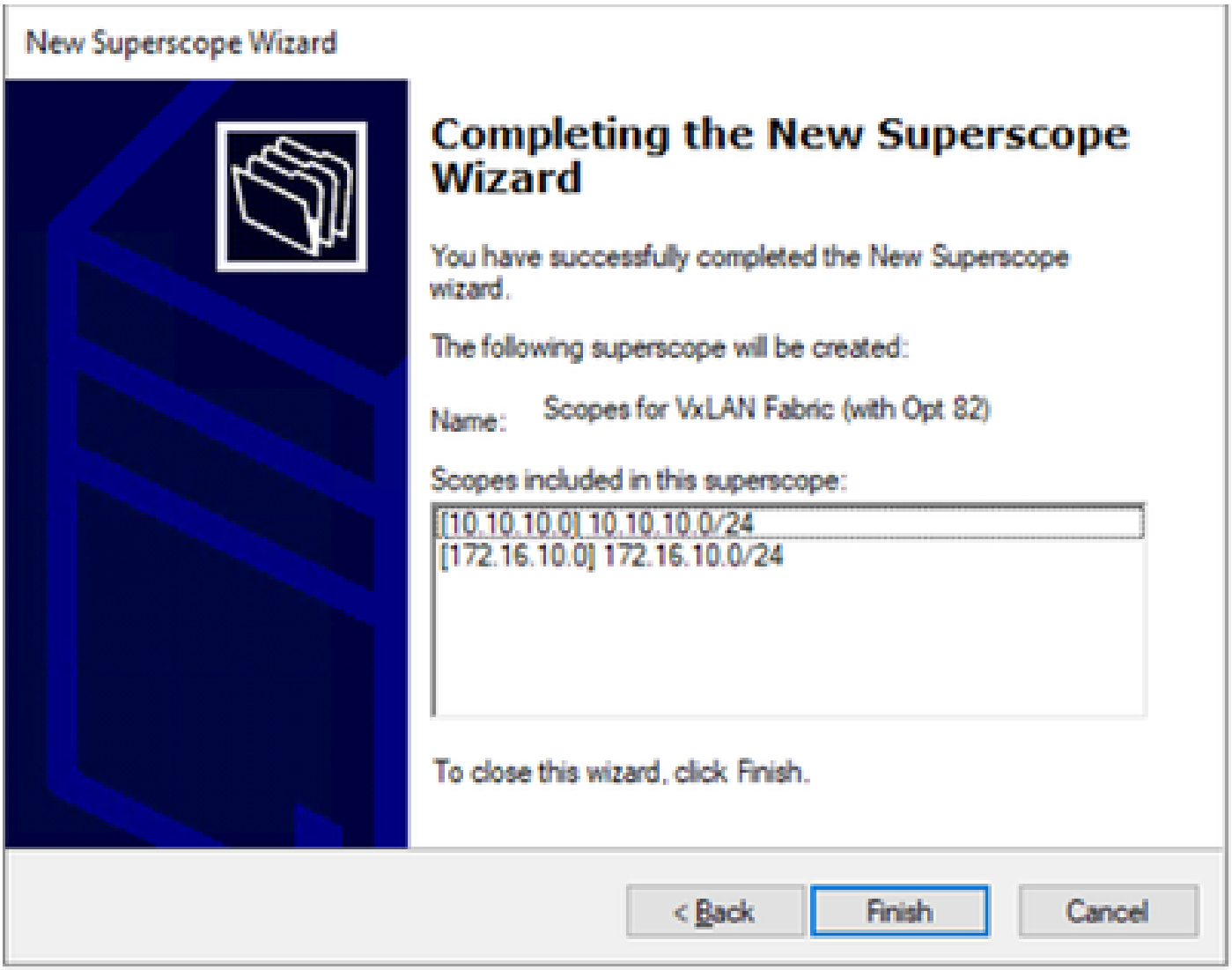
步驟 4.選擇屬於VxLAN交換矩陣的所有作用域。



步驟 5.選擇屬於VxLAN交換矩陣的所有作用域。

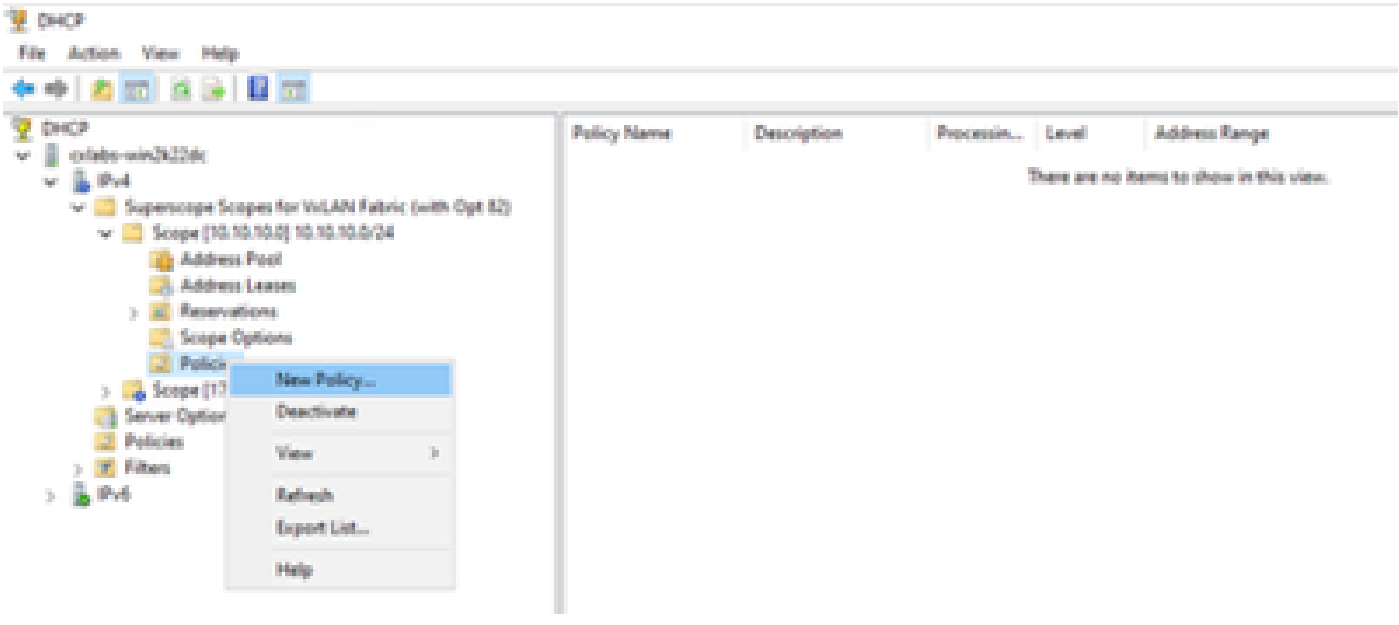


步驟 6.驗證是否所有VxLAN交換矩陣超級作用域都已就位，然後按一下完成。

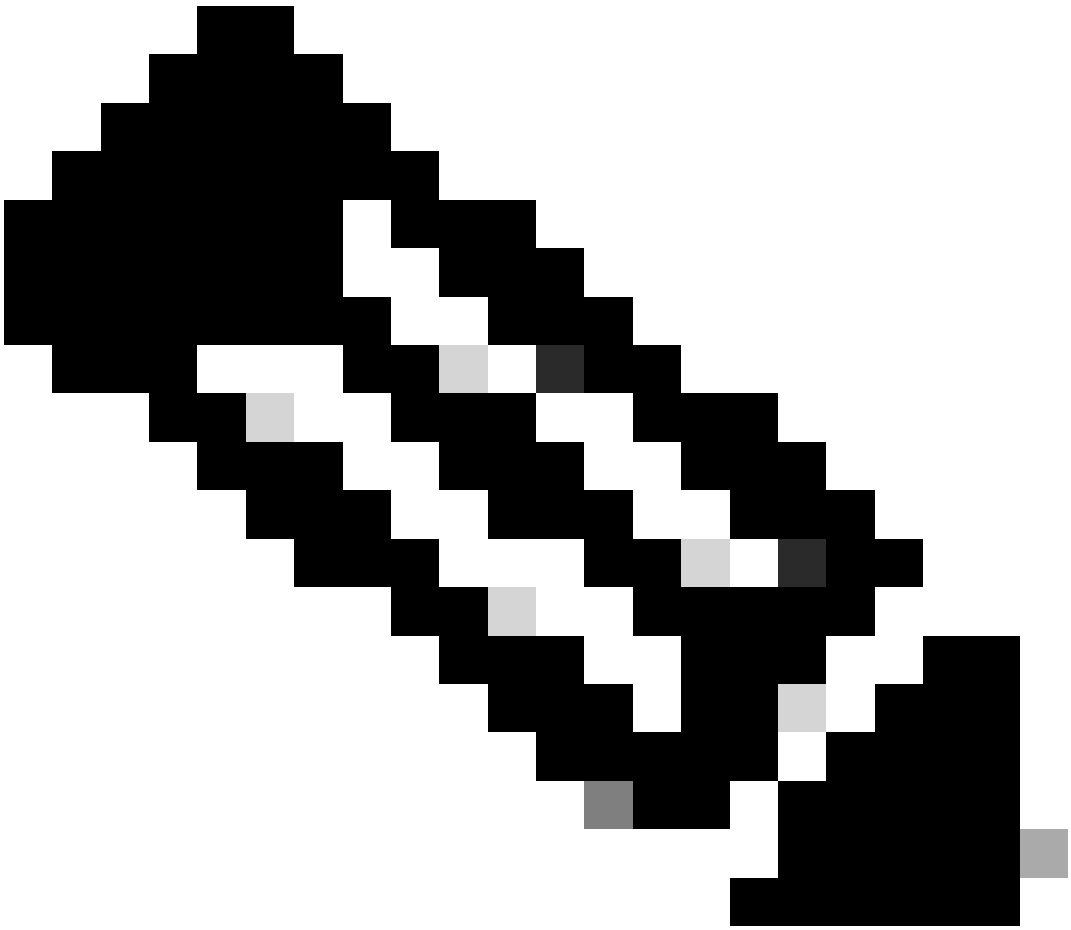


在主機範圍內配置選項82。

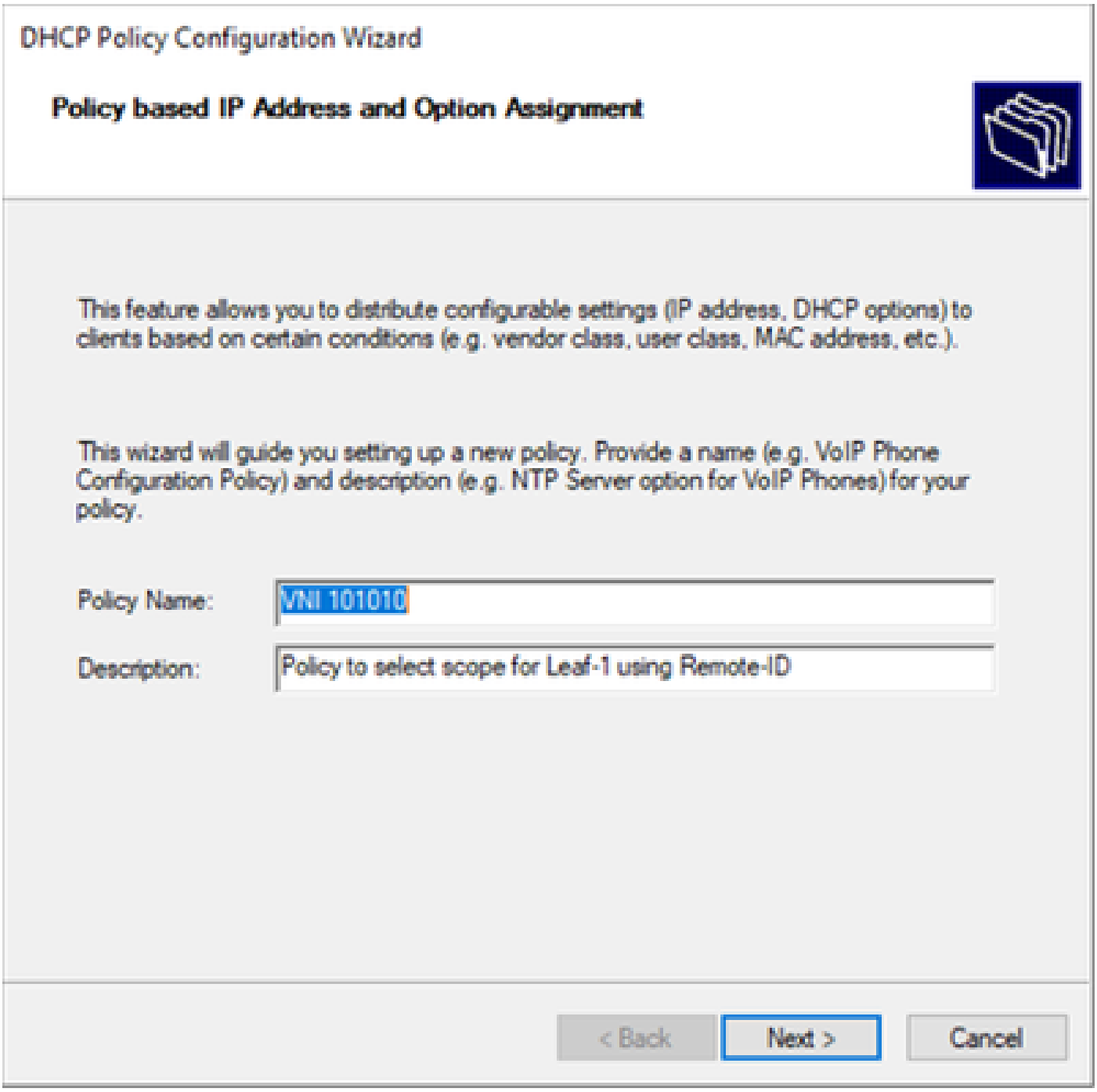
步驟 1.按一下右鍵主機範圍內的策略（最後一個選項），然後按一下New Policy。



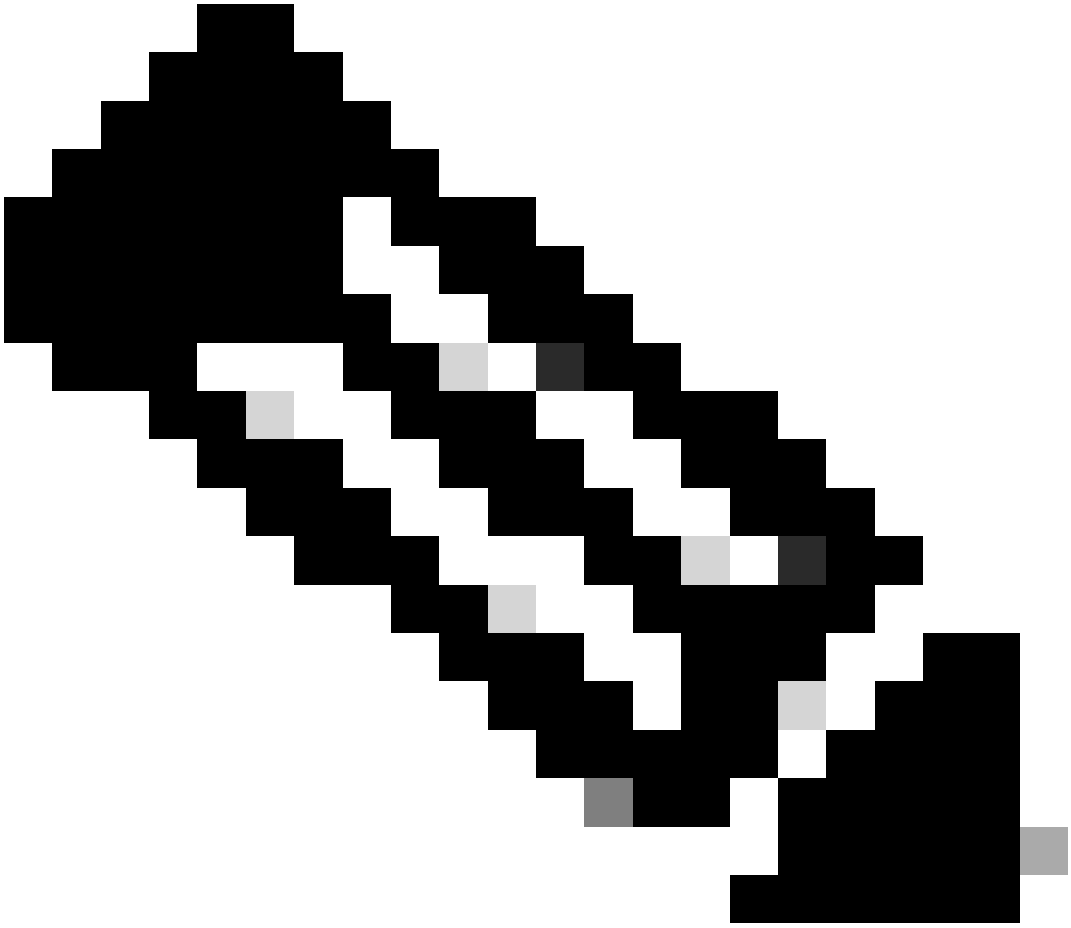
步驟 2.寫下名稱和說明，然後按一下Next。



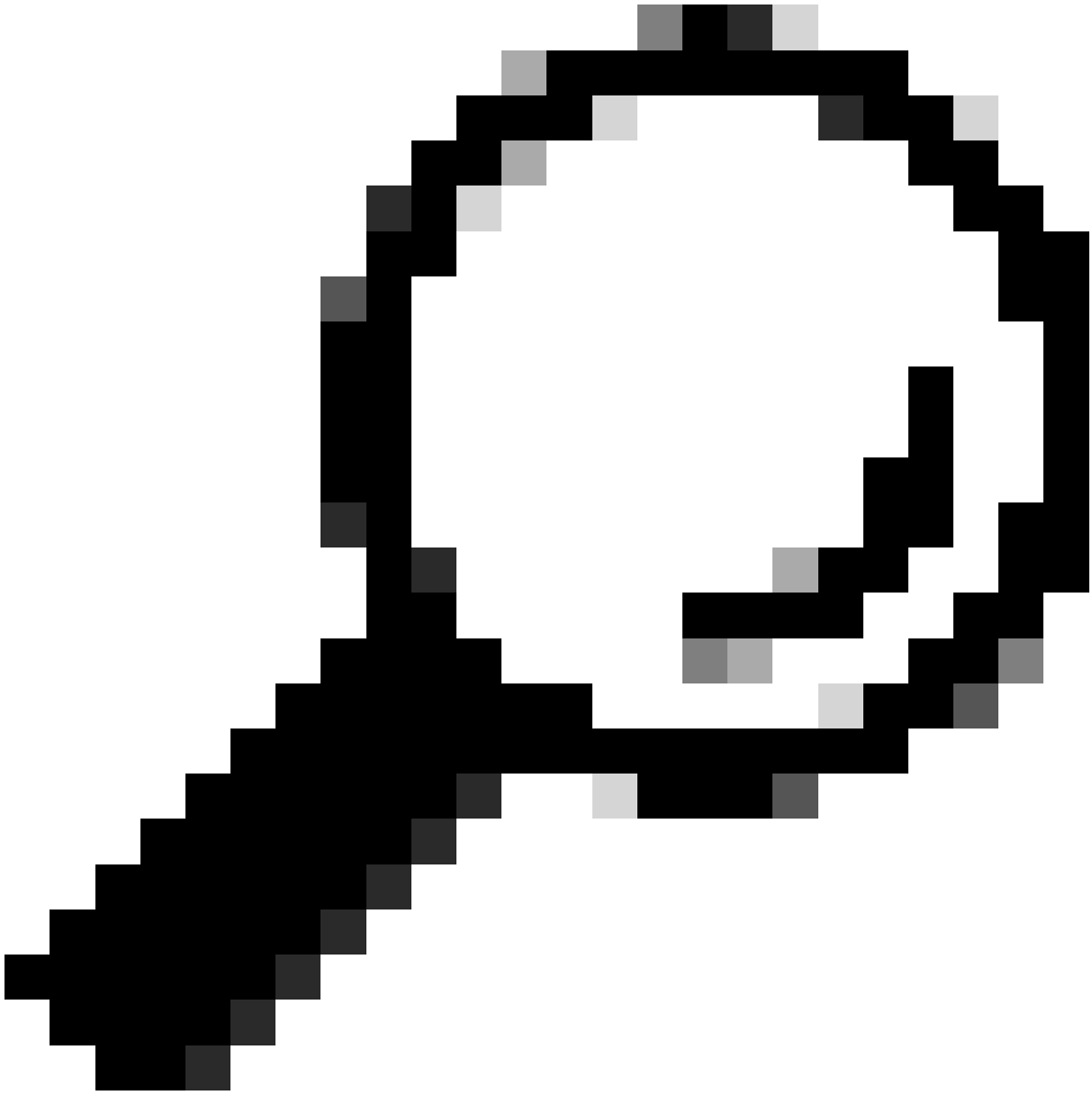
注意：在本示例中，建立策略是為了為VNI 101010 basedVNI Remote-ID（選項82的引數）的枝葉1中的主機選擇IP編址paIPicorly。



步驟 3.按一下Add。在Criteria中選擇Relay Agent Information。在運算子中，選擇等於。然後選擇Agent Remote ID並鍵入值。按一下OK，然後按一下Next。

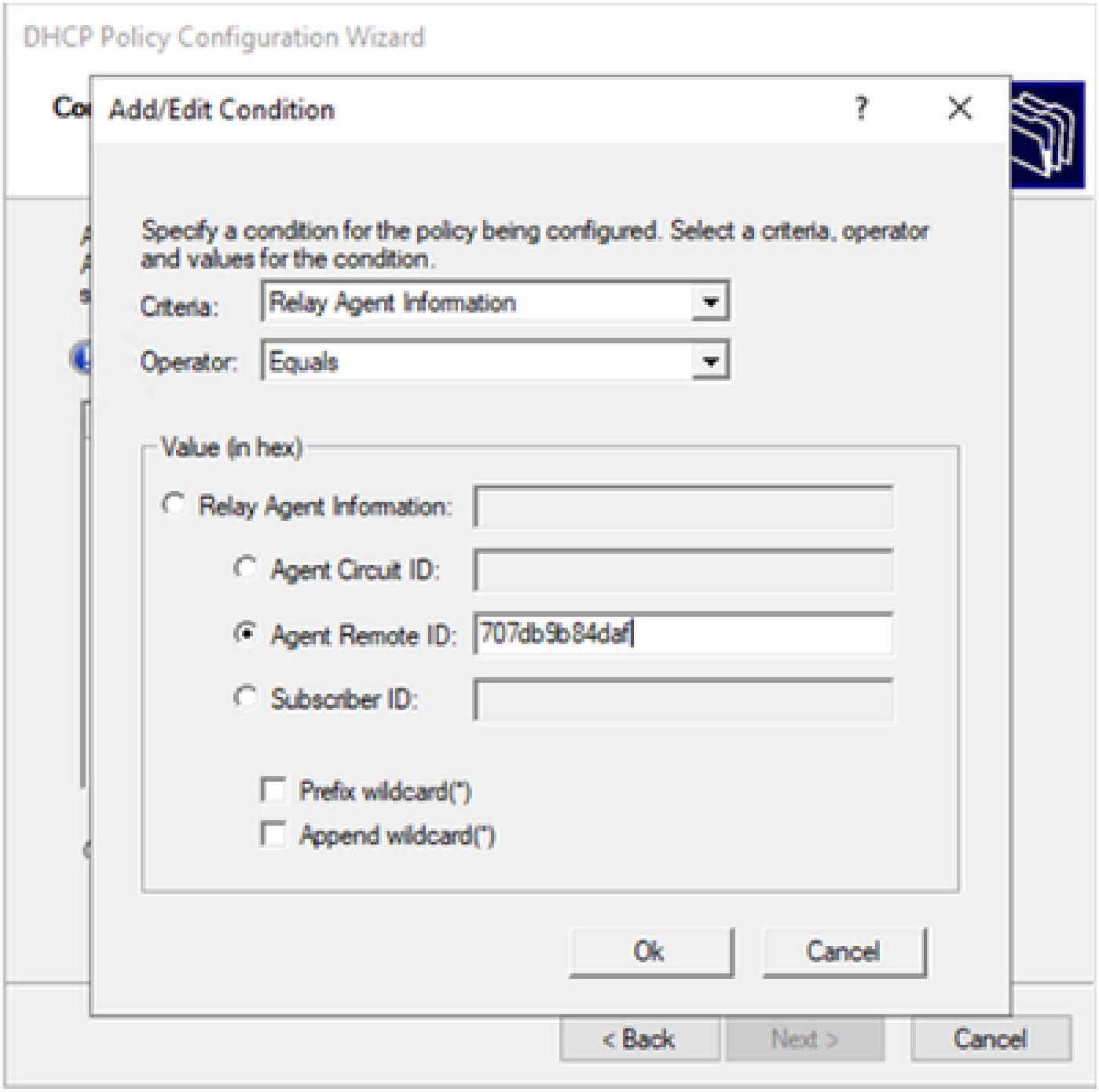


註：遠端ID是從SVII關聯的SVI的MAC地址獲取的。

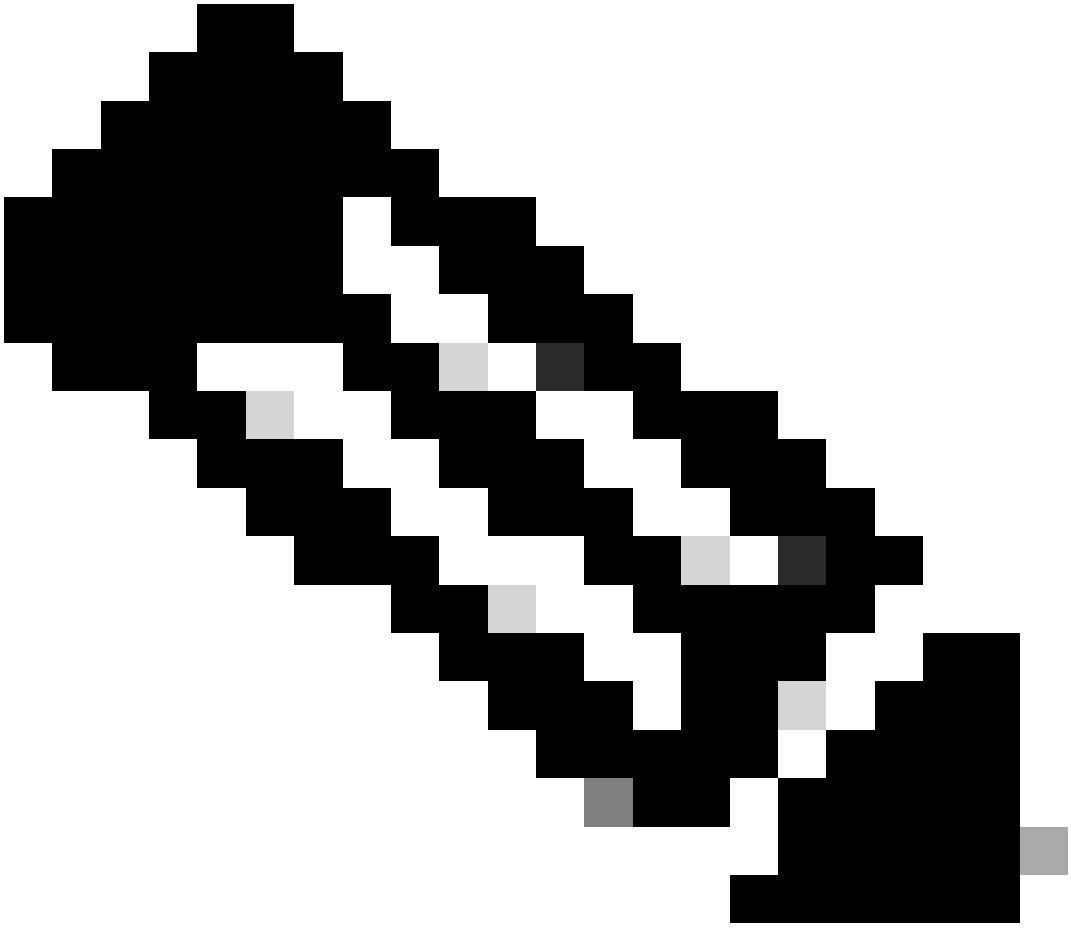


提示：透過增加更多條件並選擇OR而不是AND，可以將策略應用於多個遠端ID（或VTEP）。

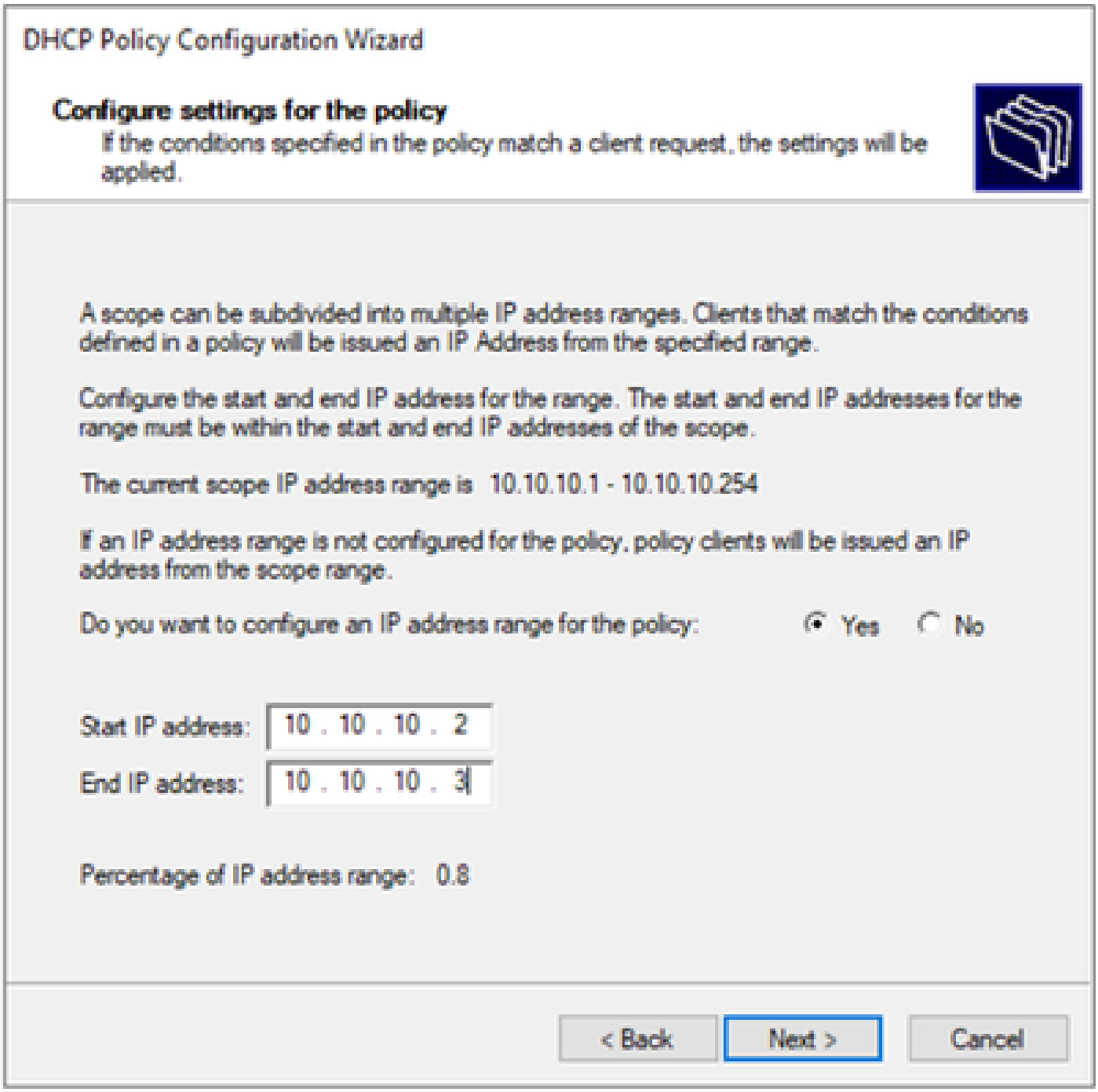
```
LEAF-1# show interface vlan 10
Vlan10 is up, line protocol is up, autostate enabled
  Hardware is EtherSVI, address is  707d.b9b8.4daf <<<<
  Internet Address is 10.10.10.1/24
 <snip>
```



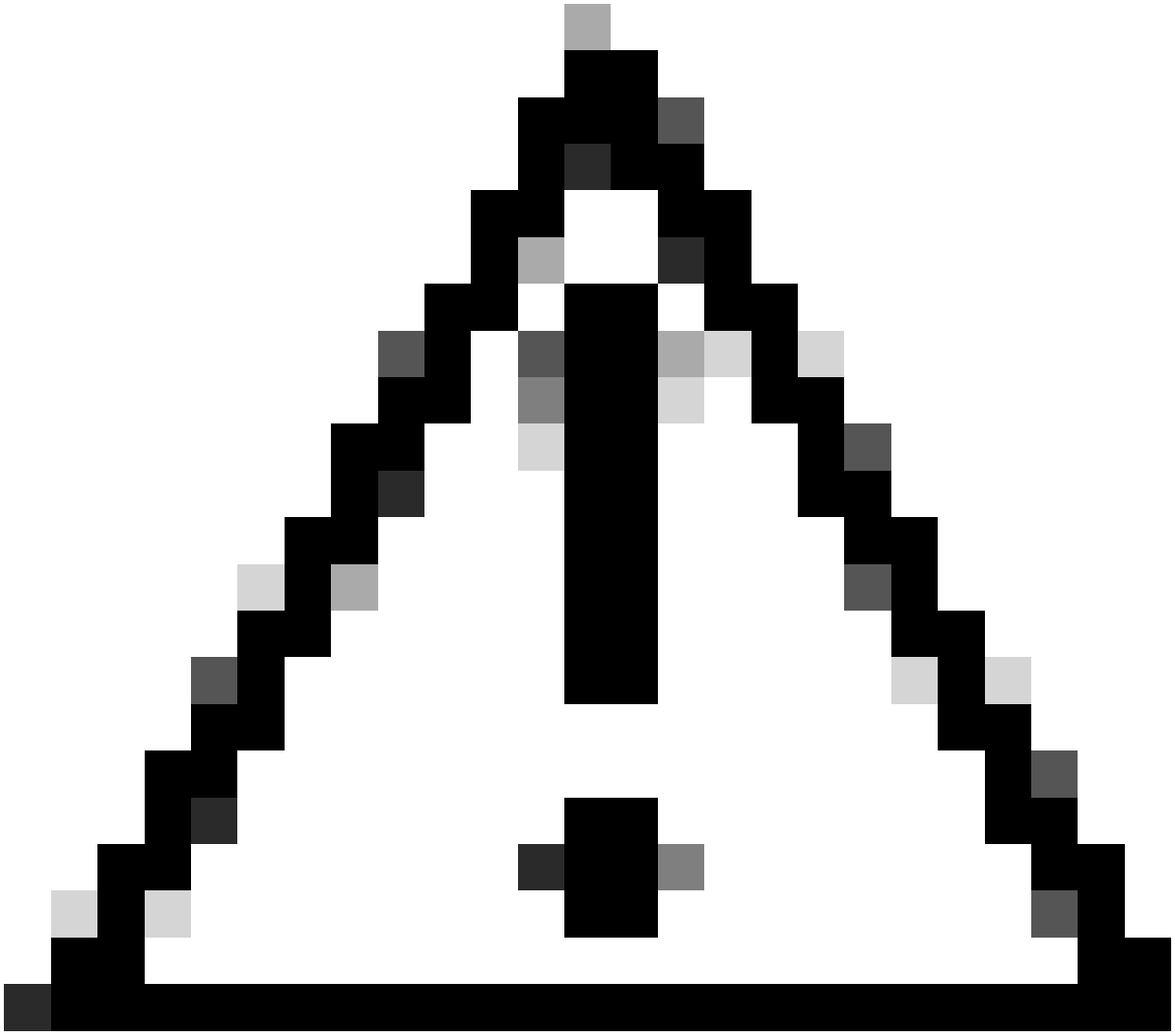
步驟 4.對透過ID選擇的VTEP配置現有IP可以使用的IP地址，然後按一下Next。



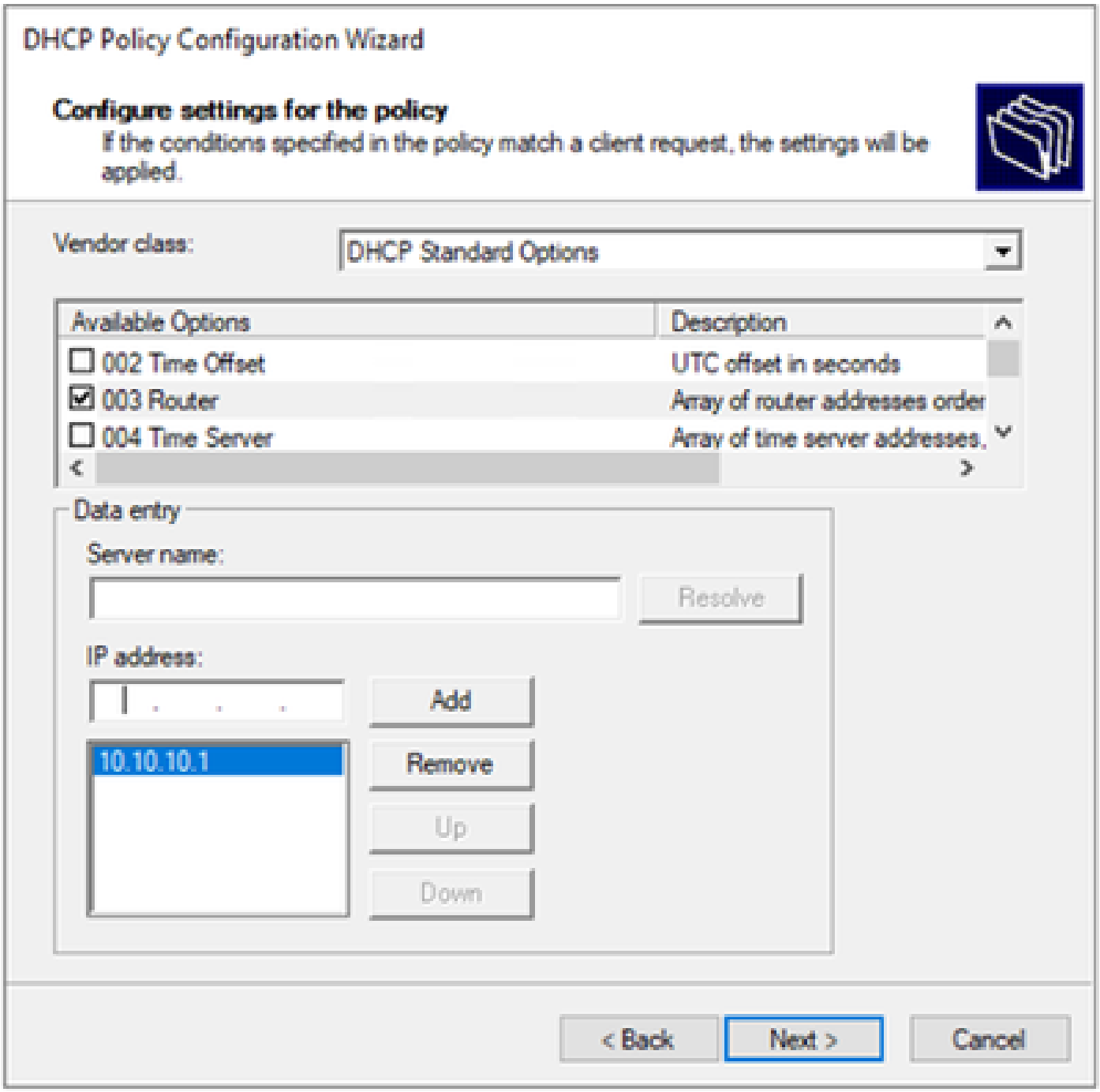
注意：在本示例中，只有一個虛擬機器連線到Leaf-1，因此只有一個IP地址需要IPd。此處增加第二個IP地址，以防另一台主機連線。



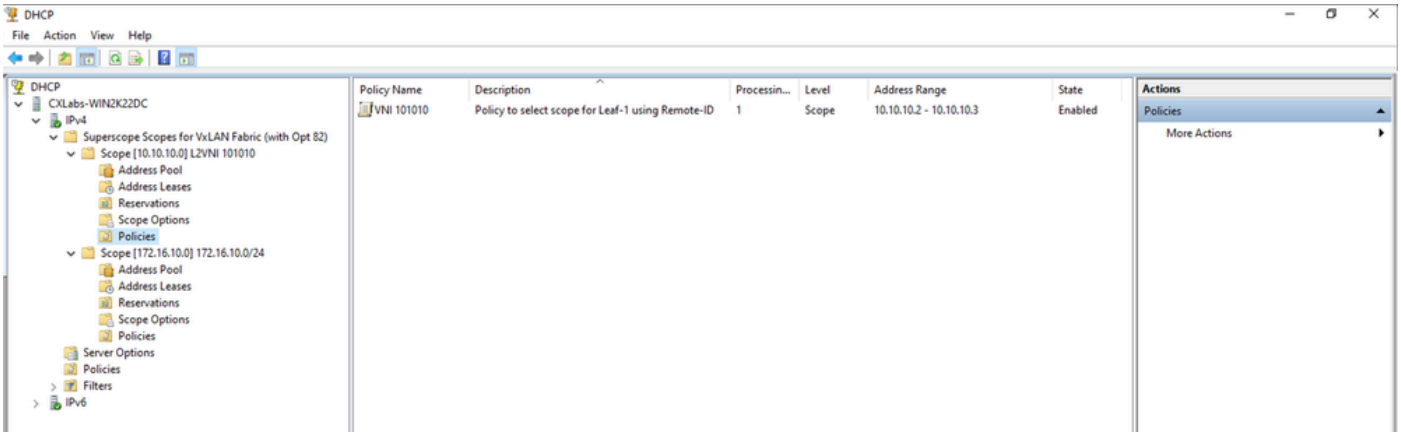
步驟 5.選擇DCHP Standard Option下003路由器左側的框。然後寫下屬於此策略的主機的預設網關的IP地址，然後按Add。按「Next」（下一步）。



注意：您可以選取多個選項，但是如果您不確定要輸入哪個值，請不要這樣做。配置不一致或錯誤可能導致意外行為。



步驟 6.檢查策略條件並按一下Finish。

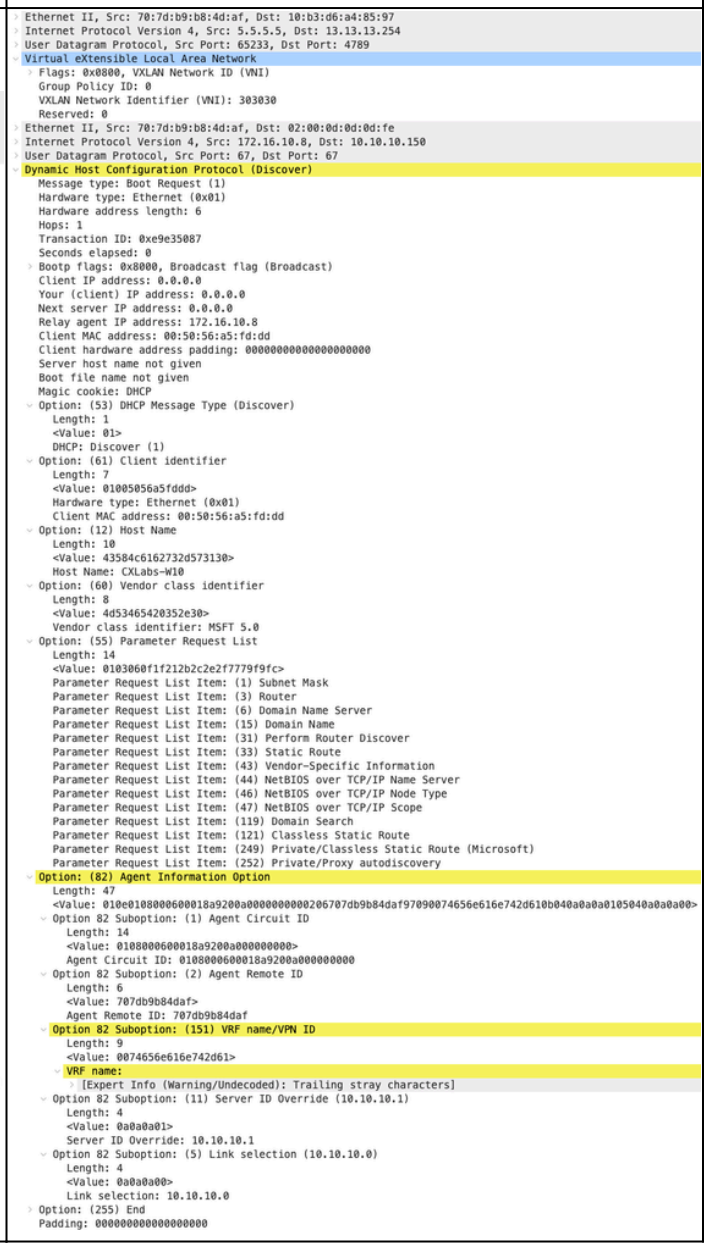


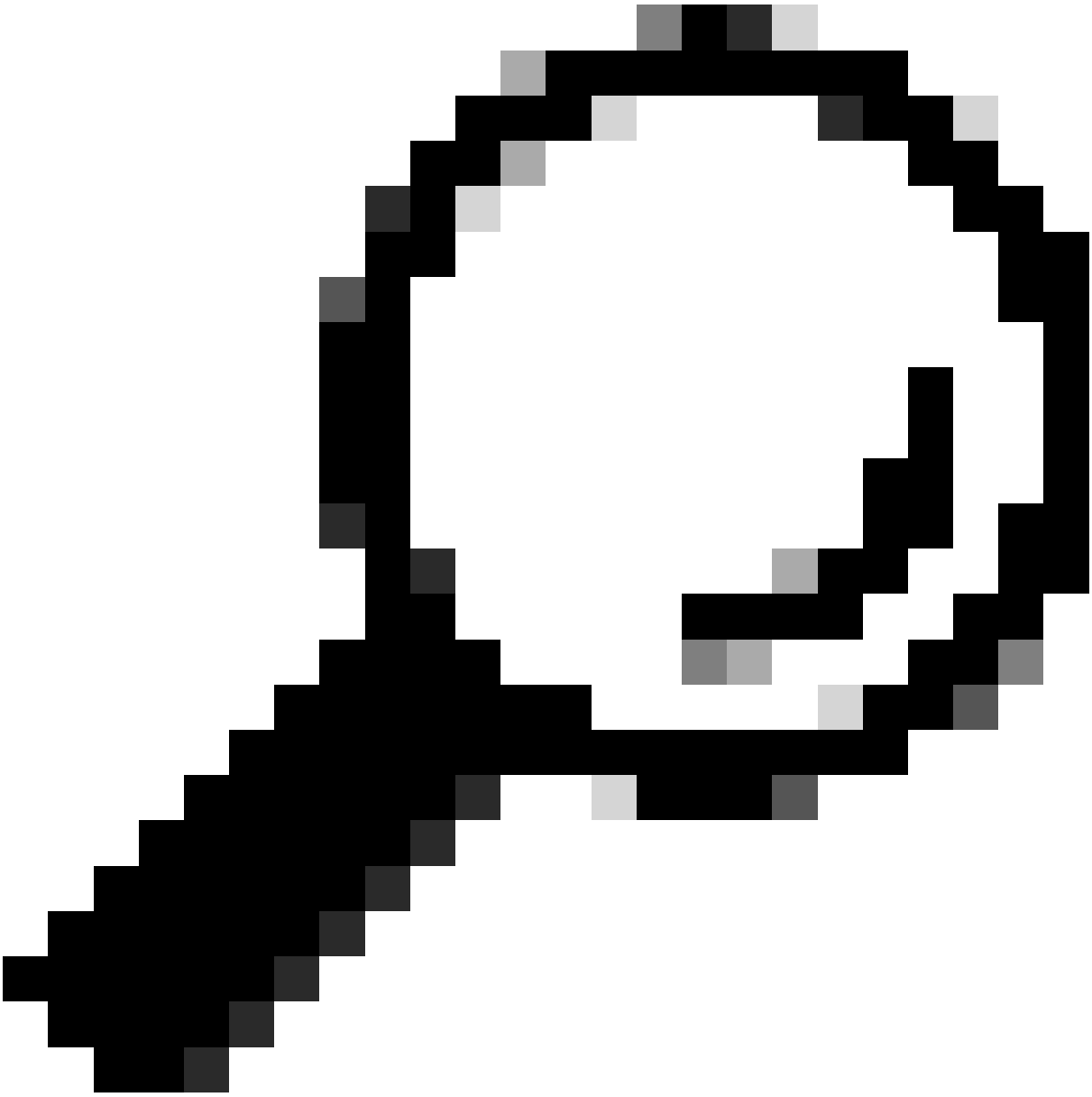
DCHP資料包在VxLAN交換矩陣中從頭到尾進行遍歷。

發現由HOST-1傳送

```
> Ethernet II, Src: 00:50:56:a5:fd:dd, Dst: ff:ff:ff:ff:ff:ff
> Internet Protocol Version 4, Src: 0.0.0.0, Dst: 255.255.255.255
> User Datagram Protocol, Src Port: 68, Dst Port: 67
v Dynamic Host Configuration Protocol (Discover)
    Message type: Boot Request (1)
    Hardware type: Ethernet (0x01)
    Hardware address length: 6
    Hops: 0
    Transaction ID: 0xe9e35087
    Seconds elapsed: 0
  v Bootp flags: 0x8000, Broadcast flag (Broadcast)
      1... .... .... .... = Broadcast flag: Broadcast
      .000 0000 0000 0000 = Reserved flags: 0x0000
    Client IP address: 0.0.0.0
    Your (client) IP address: 0.0.0.0
    Next server IP address: 0.0.0.0
    Relay agent IP address: 0.0.0.0
    Client MAC address: 00:50:56:a5:fd:dd
    Client hardware address padding: 00000000000000000000
    Server host name not given
    Boot file name not given
    Magic cookie: DHCP
  v Option: (53) DHCP Message Type (Discover)
      Length: 1
      <Value: 01>
      DHCP: Discover (1)
  v Option: (61) Client identifier
      Length: 7
      <Value: 01005056a5fddd>
      Hardware type: Ethernet (0x01)
      Client MAC address: 00:50:56:a5:fd:dd
  v Option: (12) Host Name
      Length: 10
      <Value: 43584c6162732d573130>
      Host Name: CXLabs-W10
  v Option: (60) Vendor class identifier
      Length: 8
      <Value: 4d53465420352e30>
      Vendor class identifier: MSFT 5.0
  v Option: (55) Parameter Request List
      Length: 14
      <Value: 0103060f1f212b2c2e2f7779f9fc>
      Parameter Request List Item: (1) Subnet Mask
      Parameter Request List Item: (3) Router
      Parameter Request List Item: (6) Domain Name Server
      Parameter Request List Item: (15) Domain Name
      Parameter Request List Item: (31) Perform Router Discover
      Parameter Request List Item: (33) Static Route
      Parameter Request List Item: (43) Vendor-Specific Information
      Parameter Request List Item: (44) NetBIOS over TCP/IP Name Server
      Parameter Request List Item: (46) NetBIOS over TCP/IP Node Type
      Parameter Request List Item: (47) NetBIOS over TCP/IP Scope
      Parameter Request List Item: (119) Domain Search
      Parameter Request List Item: (121) Classless Static Route
      Parameter Request List Item: (249) Private/Classless Static Route (Microsoft)
      Parameter Request List Item: (252) Private/Proxy autodiscovery
  v Option: (255) End
      Option End: 255
    Padding: 000000000000000000
```

在LEAF-1上發現

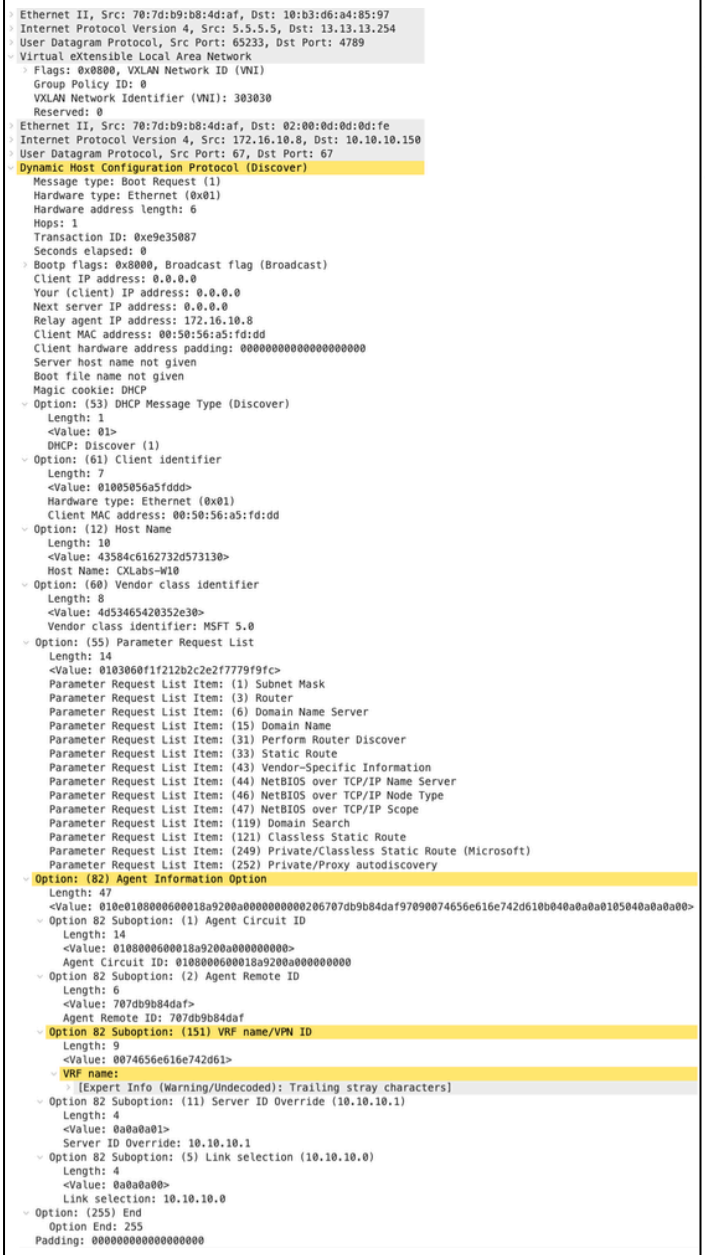
在LEAF-1上收到的發現	發現由LEAF-1傳送
	

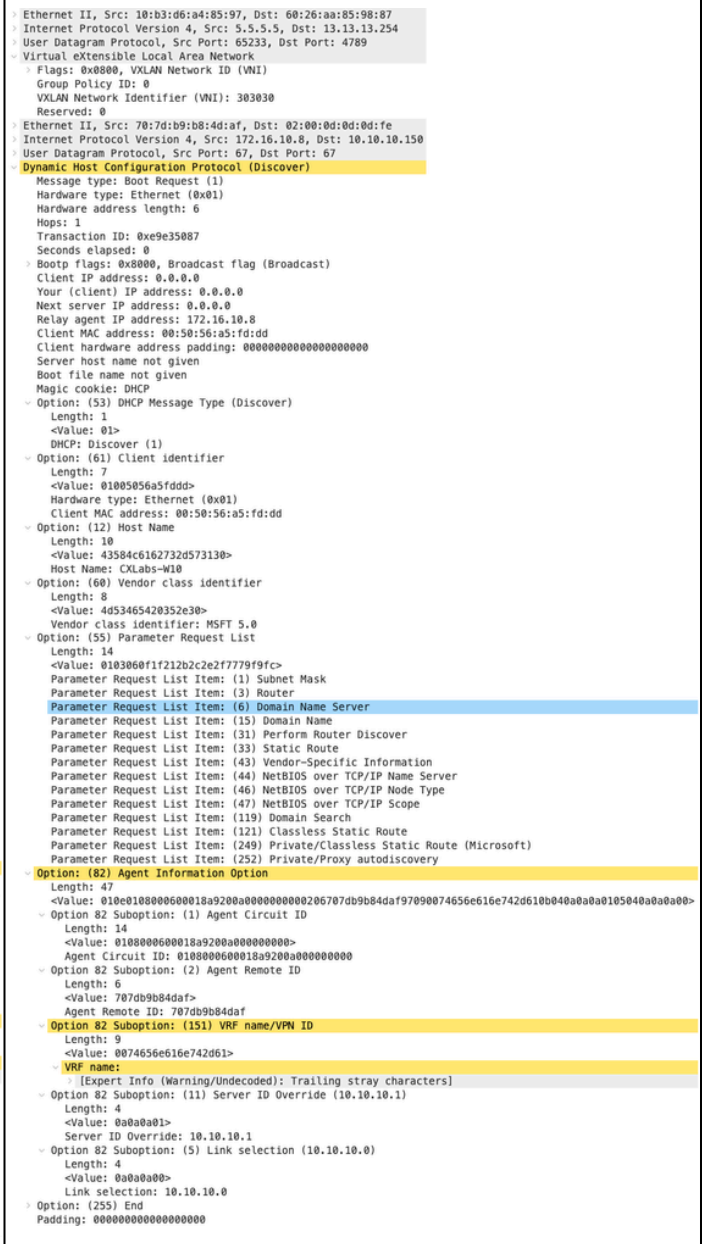


提示：連按兩下時，影像會放大。

脊柱上的發現

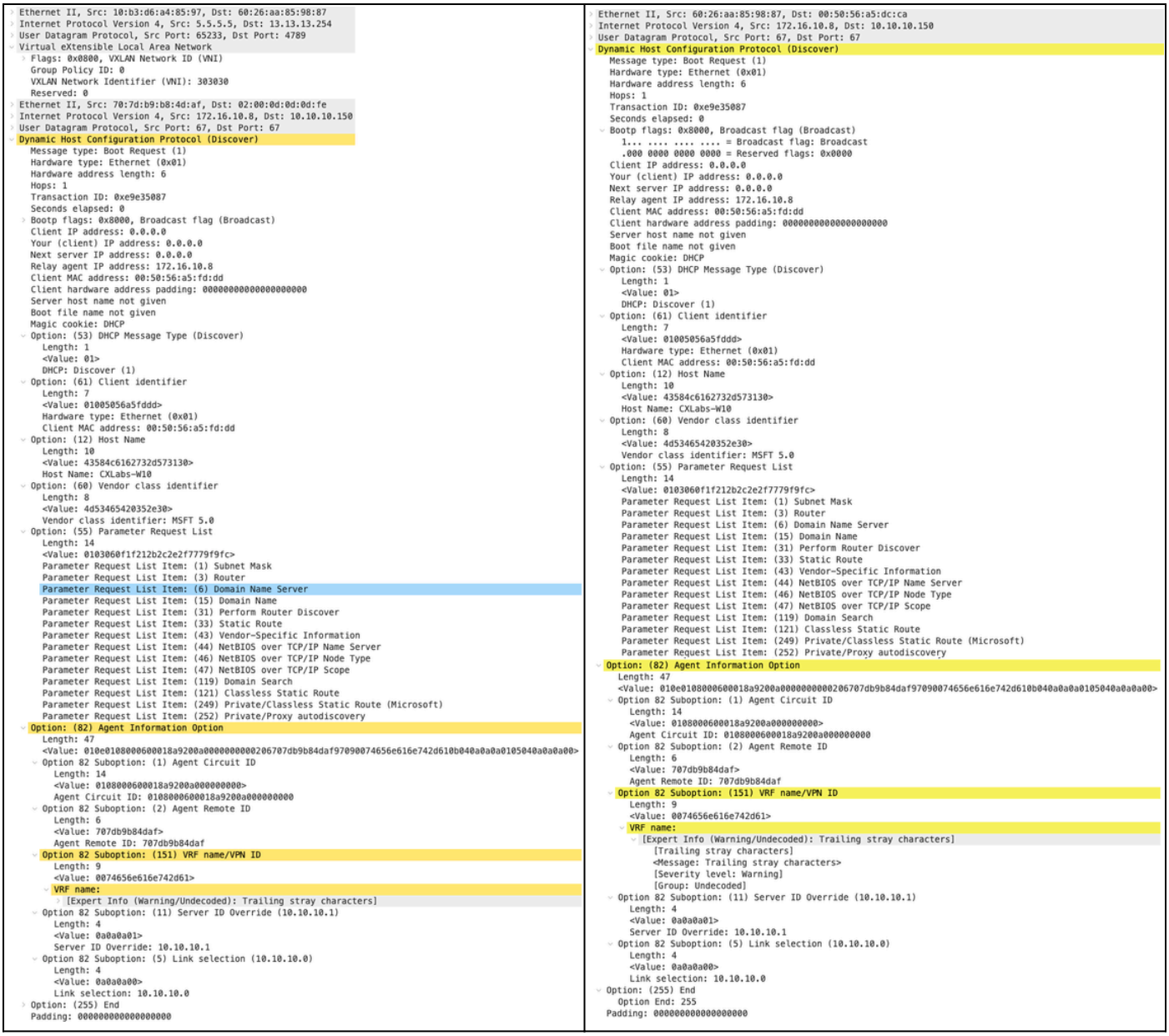
在主幹上收到發現	探索由SPINE傳送

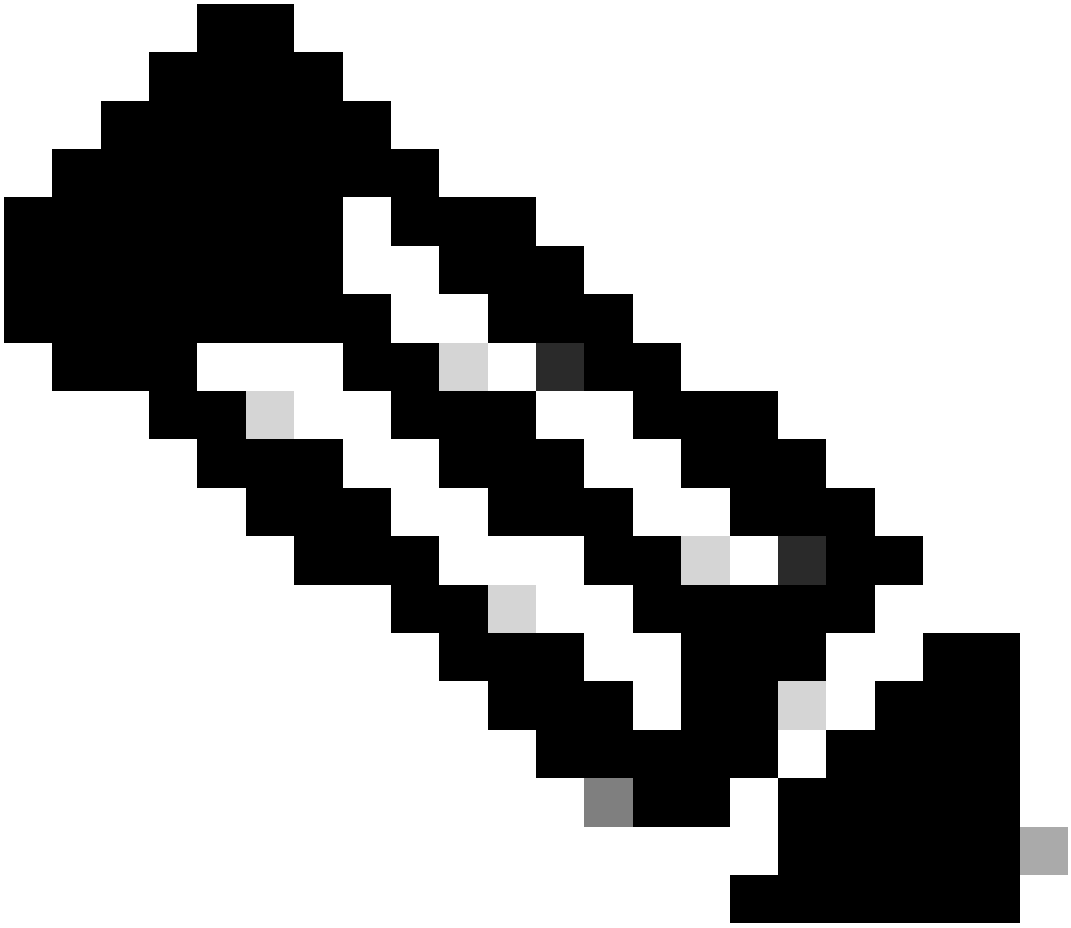




在LEAF-1-vPC上發現

在LEAF-1-vPC上收到的發現	由LEAF-1-vPC傳送的發現


Ethernet II, Src: 10:b3:d6:a4:85:97, Dst: 60:26:aa:85:98:87
Internet Protocol Version 4, Src: 5.5.5.5, Dst: 13.13.13.254
User Datagram Protocol, Src Port: 65233, Dst Port: 4789
Virtual eXtensible Local Area Network
Flags: 0x0800, VXLAN Network ID (VNI)
Group Policy ID: 0
VXLAN Network Identifier (VNI): 303030
Reserved: 0
Ethernet II, Src: 70:7d:b9:b8:4d:af, Dst: 02:00:0d:0d:0d:fe
Internet Protocol Version 4, Src: 172.16.10.8, Dst: 10.10.10.150
User Datagram Protocol, Src Port: 67, Dst Port: 67
Dynamic Host Configuration Protocol (Discover)
Message type: Boot Request (1)
Hardware type: Ethernet (0x01)
Hardware address length: 6
Hops: 1
Transaction ID: 0xe9e35087
Seconds elapsed: 0
Bootp flags: 0x8000, Broadcast flag (Broadcast)
Client IP address: 0.0.0.0
Your (client) IP address: 0.0.0.0
Next server IP address: 0.0.0.0
Relay agent IP address: 172.16.10.8
Client MAC address: 00:50:56:a5:fd:dd
Client hardware address padding: 00000000000000000000
Server host name not given
Boot file name not given
Magic cookie: DHCP
Option: (53) DHCP Message Type (Discover)
Length: 1
<Value: 01>
DHCP: Discover (1)
Option: (61) Client identifier
Length: 7
<Value: 01005056a5fddd>
Hardware type: Ethernet (0x01)
Client MAC address: 00:50:56:a5:fd:dd
Option: (12) Host Name
Length: 10
<Value: 43584c6162732d573130>
Host Name: CXLabs-W10
Option: (60) Vendor class identifier
Length: 8
<Value: 4d53465420352e30>
Vendor class identifier: MSFT 5.0
Option: (55) Parameter Request List
Length: 14
<Value: 0103060f1f212b2c2e2f7779f9fc>
Parameter Request List Item: (1) Subnet Mask
Parameter Request List Item: (3) Router
Parameter Request List Item: (6) Domain Name Server
Parameter Request List Item: (15) Domain Name
Parameter Request List Item: (31) Perform Router Discover
Parameter Request List Item: (33) Static Route
Parameter Request List Item: (43) Vendor-Specific Information
Parameter Request List Item: (44) NetBIOS over TCP/IP Name Server
Parameter Request List Item: (46) NetBIOS over TCP/IP Node Type
Parameter Request List Item: (47) NetBIOS over TCP/IP Scope
Parameter Request List Item: (119) Domain Search
Parameter Request List Item: (121) Classless Static Route
Parameter Request List Item: (249) Private/Classless Static Route (Microsoft)
Parameter Request List Item: (252) Private/Proxy autodiscovery
Option: (82) Agent Information Option
Length: 47
<Value: 010e0108000600018a9200a0000000000206707db9b84daf97090074656e616e742d610b040a0a0a0105040a0a0a00>
Option 82 Suboption: (1) Agent Circuit ID
Length: 14
<Value: 0108000600018a9200a000000000>
Agent Circuit ID: 0108000600018a9200a000000000
Option 82 Suboption: (2) Agent Remote ID
Length: 6
<Value: 707db9b84daf>
Agent Remote ID: 707db9b84daf
Option 82 Suboption: (151) VRF name/VPN ID
Length: 9
<Value: 0074656e616e742d61>
VRF name:
[Expert Info (Warning/Undecoded): Trailing stray characters]
Option 82 Suboption: (11) Server ID Override (10.10.10.1)
Length: 4
<Value: 0a0a0a01>
Server ID Override: 10.10.10.1
Option 82 Suboption: (5) Link selection (10.10.10.0)
Length: 4
<Value: 0a0a0a00>
Link selection: 10.10.10.0
Option: (255) End
Padding: 000000000000000000
Ethernet II, Src: 60:26:aa:85:98:87, Dst: 00:50:56:a5:dc:ca
Internet Protocol Version 4, Src: 172.16.10.8, Dst: 10.10.10.150
User Datagram Protocol, Src Port: 67, Dst Port: 67
Dynamic Host Configuration Protocol (Discover)
Message type: Boot Request (1)
Hardware type: Ethernet (0x01)
Hardware address length: 6
Hops: 1
Transaction ID: 0xe9e35087
Seconds elapsed: 0
Bootp flags: 0x8000, Broadcast flag (Broadcast)
1... .... = Broadcast flag: Broadcast
.000 0000 0000 0000 = Reserved flags: 0x0000
Client IP address: 0.0.0.0
Your (client) IP address: 0.0.0.0
Next server IP address: 0.0.0.0
Relay agent IP address: 172.16.10.8
Client MAC address: 00:50:56:a5:fd:dd
Client hardware address padding: 00000000000000000000
Server host name not given
Boot file name not given
Magic cookie: DHCP
Option: (53) DHCP Message Type (Discover)
Length: 1
<Value: 01>
DHCP: Discover (1)
Option: (61) Client identifier
Length: 7
<Value: 01005056a5fddd>
Hardware type: Ethernet (0x01)
Client MAC address: 00:50:56:a5:fd:dd
Option: (12) Host Name
Length: 10
<Value: 43584c6162732d573130>
Host Name: CXLabs-W10
Option: (60) Vendor class identifier
Length: 8
<Value: 4d53465420352e30>
Vendor class identifier: MSFT 5.0
Option: (55) Parameter Request List
Length: 14
<Value: 0103060f1f212b2c2e2f7779f9fc>
Parameter Request List Item: (1) Subnet Mask
Parameter Request List Item: (3) Router
Parameter Request List Item: (6) Domain Name Server
Parameter Request List Item: (15) Domain Name
Parameter Request List Item: (31) Perform Router Discover
Parameter Request List Item: (33) Static Route
Parameter Request List Item: (43) Vendor-Specific Information
Parameter Request List Item: (44) NetBIOS over TCP/IP Name Server
Parameter Request List Item: (46) NetBIOS over TCP/IP Node Type
Parameter Request List Item: (47) NetBIOS over TCP/IP Scope
Parameter Request List Item: (119) Domain Search
Parameter Request List Item: (121) Classless Static Route
Parameter Request List Item: (249) Private/Classless Static Route (Microsoft)
Parameter Request List Item: (252) Private/Proxy autodiscovery
Option: (82) Agent Information Option
Length: 47
<Value: 010e0108000600018a9200a0000000000206707db9b84daf97090074656e616e742d610b040a0a0a0105040a0a0a00>
Option 82 Suboption: (1) Agent Circuit ID
Length: 14
<Value: 0108000600018a9200a000000000>
Agent Circuit ID: 0108000600018a9200a000000000
Option 82 Suboption: (2) Agent Remote ID
Length: 6
<Value: 707db9b84daf>
Agent Remote ID: 707db9b84daf
Option 82 Suboption: (151) VRF name/VPN ID
Length: 9
<Value: 0074656e616e742d61>
VRF name:
[Expert Info (Warning/Undecoded): Trailing stray characters]
[Trailing stray characters]
<Message: Trailing stray characters>
[Severity level: Warning]
[Group: Undecoded]
Option 82 Suboption: (11) Server ID Override (10.10.10.1)
Length: 4
<Value: 0a0a0a01>
Server ID Override: 10.10.10.1
Option 82 Suboption: (5) Link selection (10.10.10.0)
Length: 4
<Value: 0a0a0a00>
Link selection: 10.10.10.0
Option: (255) End
Option End: 255
Padding: 000000000000000000

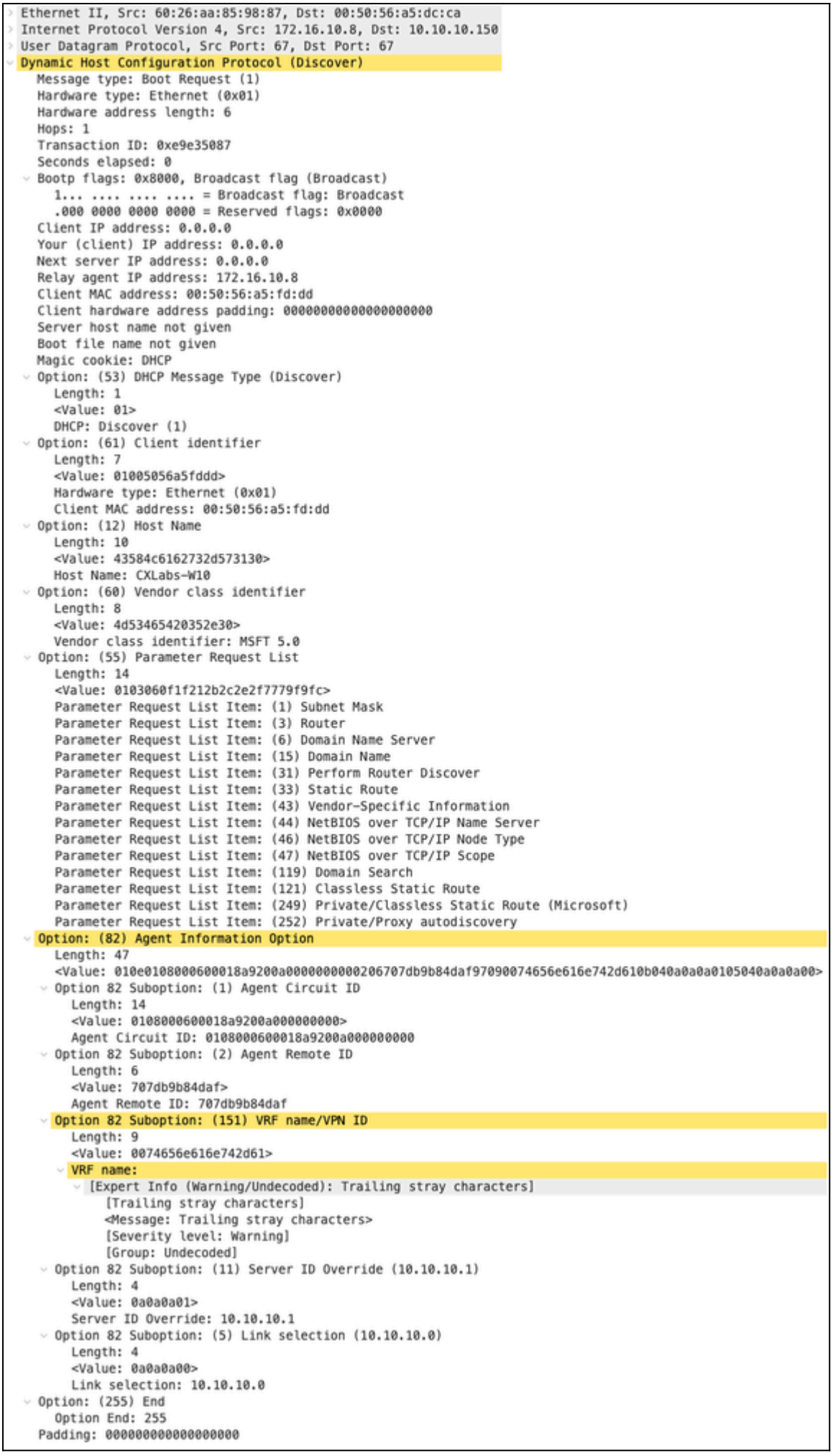


注意：LEAF-2-vPC接收Discovert資料包，但僅交換此資料包。目的MAC地址屬於DHCP伺服器。

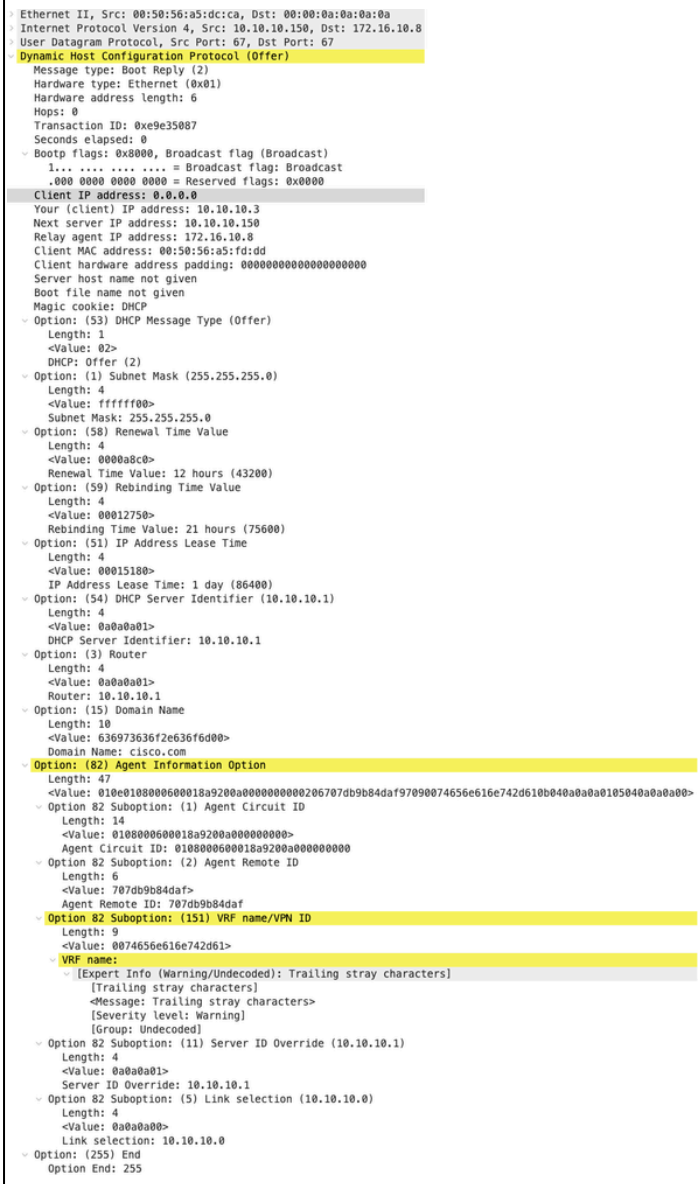
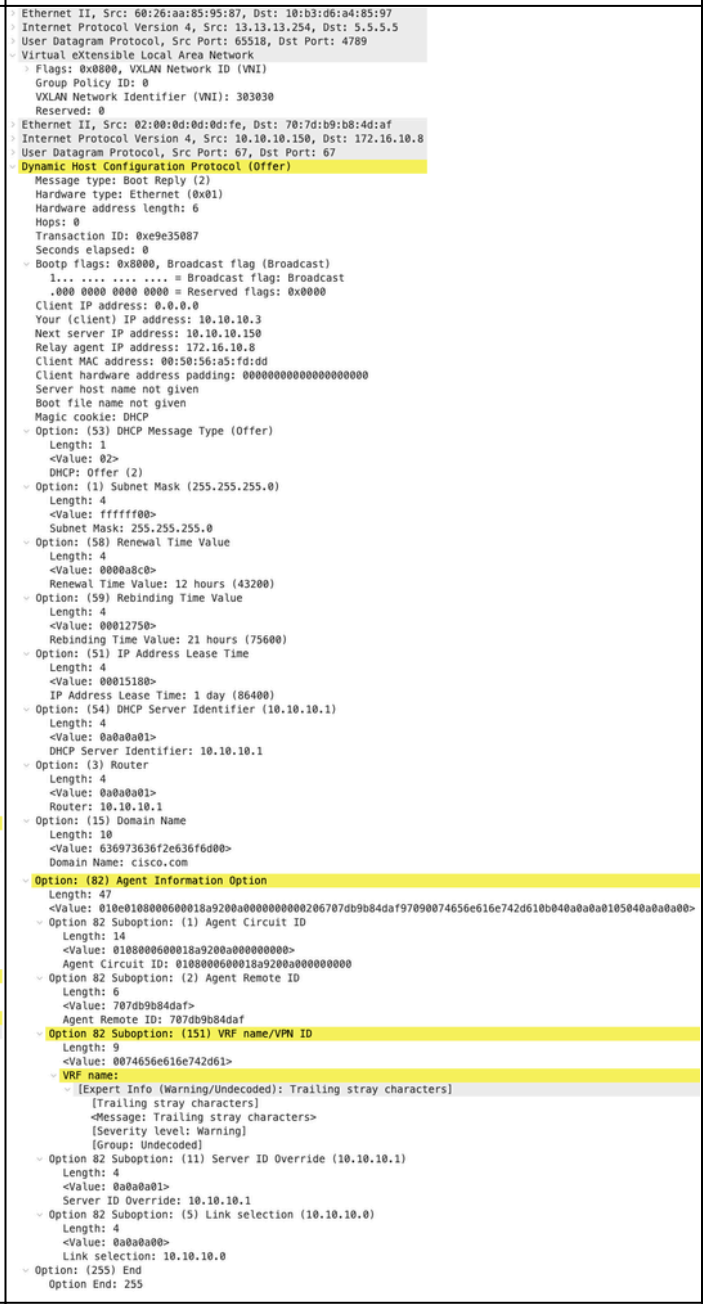
在DCHP伺服器上接收的發現

```
> Ethernet II, Src: 60:26:aa:85:98:87, Dst: 00:50:56:a5:dc:ca
> Internet Protocol Version 4, Src: 172.16.10.8, Dst: 10.10.10.150
> User Datagram Protocol, Src Port: 67, Dst Port: 67
v Dynamic Host Configuration Protocol (Discover)
    Message type: Boot Request (1)
    Hardware type: Ethernet (0x01)
    Hardware address length: 6
    Hops: 1
    Transaction ID: 0xe9e35087
    Seconds elapsed: 0
  v Bootp flags: 0x8000, Broadcast flag (Broadcast)
      1... .... .... .... = Broadcast flag: Broadcast
      .000 0000 0000 0000 = Reserved flags: 0x0000
    Client IP address: 0.0.0.0
    Your (client) IP address: 0.0.0.0
    Next server IP address: 0.0.0.0
    Relay agent IP address: 172.16.10.8
    Client MAC address: 00:50:56:a5:fd:dd
    Client hardware address padding: 00000000000000000000
    Server host name not given
    Boot file name not given
    Magic cookie: DHCP
  v Option: (53) DHCP Message Type (Discover)
      Length: 1
      <Value: 01>
      DHCP: Discover (1)
  v Option: (61) Client identifier
      Length: 7
      <Value: 01005056a5fddd>
      Hardware type: Ethernet (0x01)
      Client MAC address: 00:50:56:a5:fd:dd
  v Option: (12) Host Name
      Length: 10
      <Value: 43584c6162732d573130>
      Host Name: CXLabs-W10
  v Option: (60) Vendor class identifier
      Length: 8
      <Value: 4d53465420352e30>
      Vendor class identifier: MSFT 5.0
  v Option: (55) Parameter Request List
      Length: 14
      <Value: 0103060f1f212b2c2e2f7779f9fc>
      Parameter Request List Item: (1) Subnet Mask
      Parameter Request List Item: (3) Router
      Parameter Request List Item: (6) Domain Name Server
      Parameter Request List Item: (15) Domain Name
      Parameter Request List Item: (31) Perform Router Discover
      Parameter Request List Item: (33) Static Route
      Parameter Request List Item: (43) Vendor-Specific Information
      Parameter Request List Item: (44) NetBIOS over TCP/IP Name Server
      Parameter Request List Item: (46) NetBIOS over TCP/IP Node Type
      Parameter Request List Item: (47) NetBIOS over TCP/IP Scope
      Parameter Request List Item: (119) Domain Search
      Parameter Request List Item: (121) Classless Static Route
      Parameter Request List Item: (249) Private/Classless Static Route (Microsoft)
      Parameter Request List Item: (252) Private/Proxy autodiscovery
  v Option: (82) Agent Information Option
      Length: 47
      <Value: 010e0108000600018a9200a0000000000206707db9b84daf97090074656e616e742d610b040a0a0a0105040a0a0a00>
    v Option 82 Suboption: (1) Agent Circuit ID
        Length: 14
        <Value: 0108000600018a9200a000000000>
        Agent Circuit ID: 0108000600018a9200a000000000
    v Option 82 Suboption: (2) Agent Remote ID
        Length: 6
        <Value: 707db9b84daf>
        Agent Remote ID: 707db9b84daf
    v Option 82 Suboption: (151) VRF name/VPN ID
        Length: 9
        <Value: 0074656e616e742d61>
      v VRF name:
        v [Expert Info (Warning/Undecoded): Trailing stray characters]
            [Trailing stray characters]
            <Message: Trailing stray characters>
            [Severity level: Warning]
            [Group: Undecoded]
    v Option 82 Suboption: (11) Server ID Override (10.10.10.1)
        Length: 4
        <Value: 0a0a0a01>
        Server ID Override: 10.10.10.1
    v Option 82 Suboption: (5) Link selection (10.10.10.0)
        Length: 4
        <Value: 0a0a0a00>
        Link selection: 10.10.10.0
  v Option: (255) End
      Option End: 255
    Padding: 000000000000000000
```

由DCHP伺服器傳送的DCHP優惠


Ethernet II, Src: 60:26:aa:85:98:87, Dst: 00:50:56:a5:dc:ca
Internet Protocol Version 4, Src: 172.16.10.8, Dst: 10.10.10.150
User Datagram Protocol, Src Port: 67, Dst Port: 67
Dynamic Host Configuration Protocol (Discover)
Message type: Boot Request (1)
Hardware type: Ethernet (0x01)
Hardware address length: 6
Hops: 1
Transaction ID: 0xe9e35087
Seconds elapsed: 0
Bootp flags: 0x8000, Broadcast flag (Broadcast)
1... .... = Broadcast flag: Broadcast
.000 0000 0000 0000 = Reserved flags: 0x0000
Client IP address: 0.0.0.0
Your (client) IP address: 0.0.0.0
Next server IP address: 0.0.0.0
Relay agent IP address: 172.16.10.8
Client MAC address: 00:50:56:a5:fd:dd
Client hardware address padding: 00000000000000000000
Server host name not given
Boot file name not given
Magic cookie: DHCP
Option: (53) DHCP Message Type (Discover)
Length: 1
<Value: 01>
DHCP: Discover (1)
Option: (61) Client identifier
Length: 7
<Value: 01005056a5fddd>
Hardware type: Ethernet (0x01)
Client MAC address: 00:50:56:a5:fd:dd
Option: (12) Host Name
Length: 10
<Value: 43584c6162732d573130>
Host Name: CXLabs-W10
Option: (60) Vendor class identifier
Length: 8
<Value: 4d53465420352e30>
Vendor class identifier: MSFT 5.0
Option: (55) Parameter Request List
Length: 14
<Value: 0103060f1f212b2c2e2f7779f9fc>
Parameter Request List Item: (1) Subnet Mask
Parameter Request List Item: (3) Router
Parameter Request List Item: (6) Domain Name Server
Parameter Request List Item: (15) Domain Name
Parameter Request List Item: (31) Perform Router Discover
Parameter Request List Item: (33) Static Route
Parameter Request List Item: (43) Vendor-Specific Information
Parameter Request List Item: (44) NetBIOS over TCP/IP Name Server
Parameter Request List Item: (46) NetBIOS over TCP/IP Node Type
Parameter Request List Item: (47) NetBIOS over TCP/IP Scope
Parameter Request List Item: (119) Domain Search
Parameter Request List Item: (121) Classless Static Route
Parameter Request List Item: (249) Private/Classless Static Route (Microsoft)
Parameter Request List Item: (252) Private/Proxy autodiscovery
Option: (82) Agent Information Option
Length: 47
<Value: 010e0108000600018a9200a0000000000206707db9b84daf97090074656e616e742d610b040a0a0a0105040a0a0a00>
Option 82 Suboption: (1) Agent Circuit ID
Length: 14
<Value: 0108000600018a9200a000000000>
Agent Circuit ID: 0108000600018a9200a000000000
Option 82 Suboption: (2) Agent Remote ID
Length: 6
<Value: 707db9b84daf>
Agent Remote ID: 707db9b84daf
Option 82 Suboption: (151) VRF name/VPN ID
Length: 9
<Value: 0074656e616e742d61>
VRF name:
[Expert Info (Warning/Undecoded): Trailing stray characters]
[Trailing stray characters]
<Message: Trailing stray characters>
[Severity level: Warning]
[Group: Undecoded]
Option 82 Suboption: (11) Server ID Override (10.10.10.1)
Length: 4
<Value: 0a0a0a01>
Server ID Override: 10.10.10.1
Option 82 Suboption: (5) Link selection (10.10.10.0)
Length: 4
<Value: 0a0a0a00>
Link selection: 10.10.10.0
Option: (255) End
Option End: 255
Padding: 000000000000000000

LEAF-2-vPC上的DCHP優惠

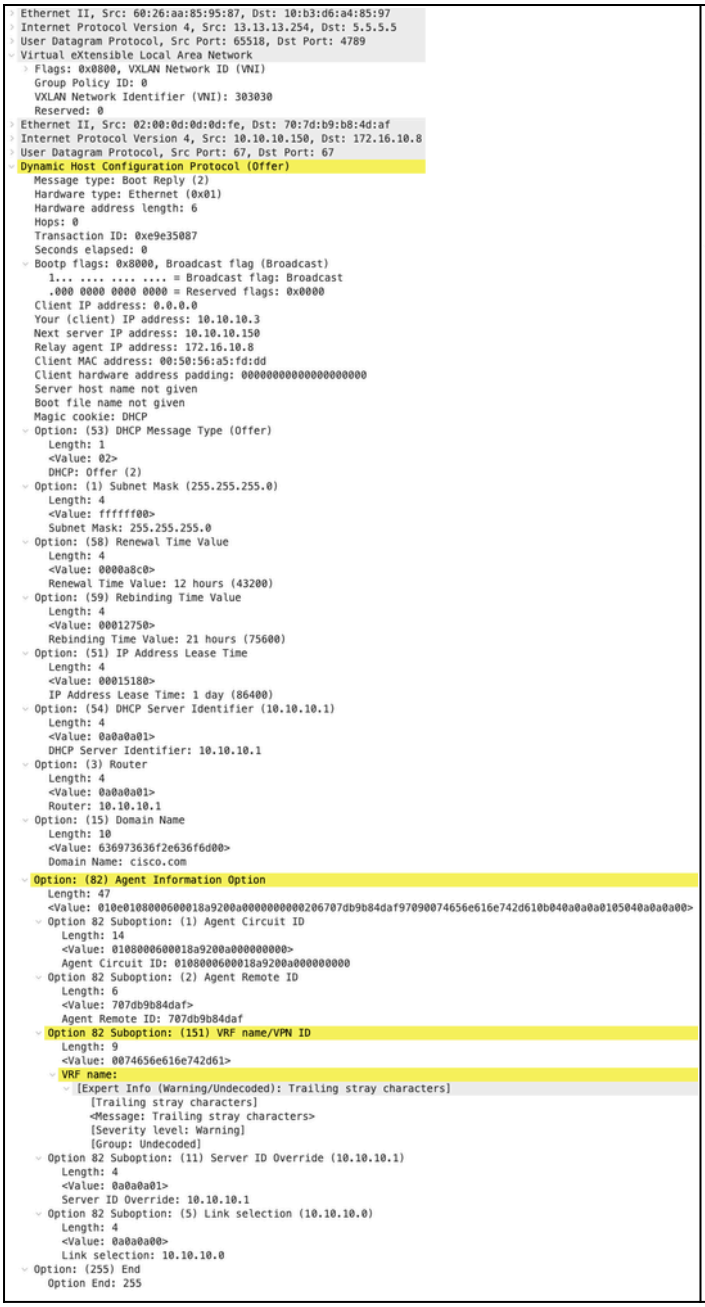
在LEAF-2-vPC上收到優惠	透過LEAF-2-vPC傳送優惠
	

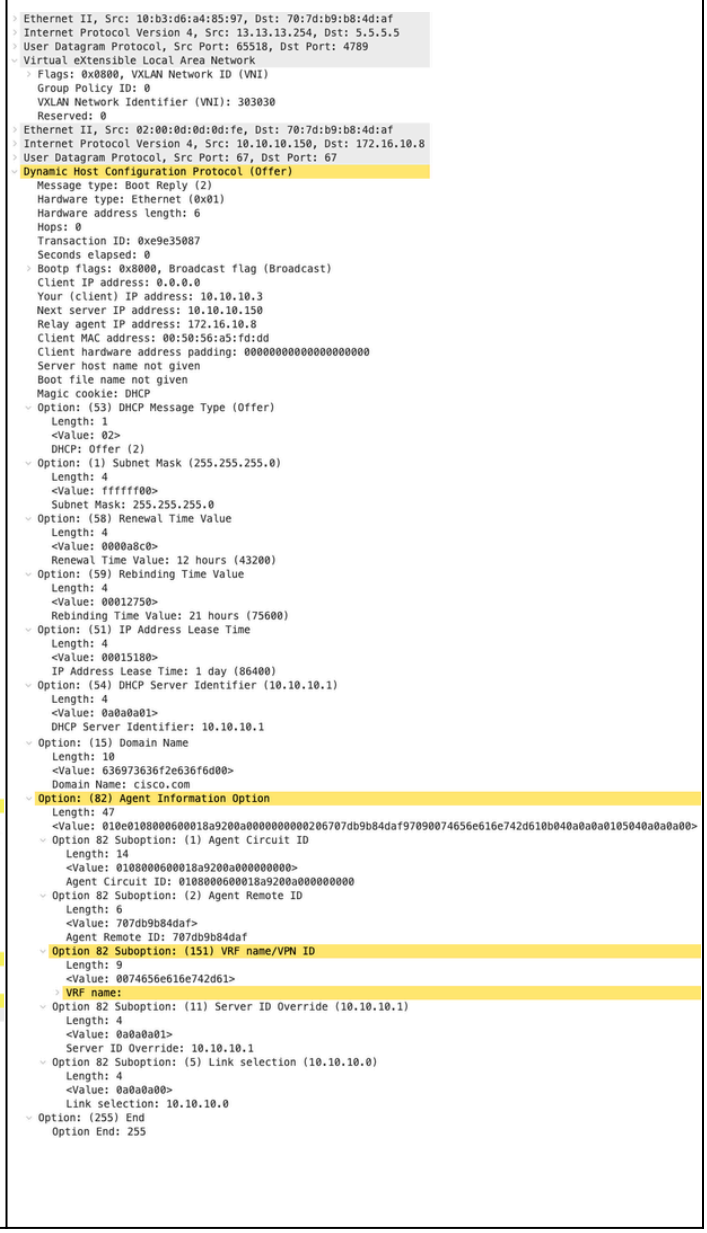
```
Ethernet II, Src: 00:50:56:a5:dc:ca, Dst: 00:00:0a:0a:0a:0a
Internet Protocol Version 4, Src: 10.10.10.150, Dst: 172.16.10.8
User Datagram Protocol, Src Port: 67, Dst Port: 67
Dynamic Host Configuration Protocol (Offer)
    Message type: Boot Reply (2)
    Hardware type: Ethernet (0x01)
    Hardware address length: 6
    Hops: 0
    Transaction ID: 0xe9e35087
    Seconds elapsed: 0
  Bootp flags: 0x8000, Broadcast flag (Broadcast)
      1... .... .... .... = Broadcast flag: Broadcast
      .000 0000 0000 0000 = Reserved flags: 0x0000
    Client IP address: 0.0.0.0
    Your (client) IP address: 10.10.10.3
    Next server IP address: 10.10.10.150
    Relay agent IP address: 172.16.10.8
    Client MAC address: 00:50:56:a5:fd:dd
    Client hardware address padding: 00000000000000000000
    Server host name not given
    Boot file name not given
    Magic cookie: DHCP
  Option: (53) DHCP Message Type (Offer)
      Length: 1
      <Value: 02>
      DHCP: Offer (2)
  Option: (1) Subnet Mask (255.255.255.0)
      Length: 4
      <Value: ffffff00>
      Subnet Mask: 255.255.255.0
  Option: (58) Renewal Time Value
      Length: 4
      <Value: 0000a8c0>
      Renewal Time Value: 12 hours (43200)
  Option: (59) Rebinding Time Value
      Length: 4
      <Value: 00012750>
      Rebinding Time Value: 21 hours (75600)
  Option: (51) IP Address Lease Time
      Length: 4
      <Value: 00015180>
      IP Address Lease Time: 1 day (86400)
  Option: (54) DHCP Server Identifier (10.10.10.1)
      Length: 4
      <Value: 0a0a0a01>
      DHCP Server Identifier: 10.10.10.1
  Option: (3) Router
      Length: 4
      <Value: 0a0a0a01>
      Router: 10.10.10.1
  Option: (15) Domain Name
      Length: 10
      <Value: 636973636f2e636f6d00>
      Domain Name: cisco.com
  Option: (82) Agent Information Option
      Length: 47
      <Value: 010e0108000600018a9200a000000000206707db9b84daf97090074656e616e742d610b040a0a0a0105040a0a0a00>
    Option 82 Suboption: (1) Agent Circuit ID
        Length: 14
        <Value: 0108000600018a9200a000000000>
        Agent Circuit ID: 0108000600018a9200a000000000
    Option 82 Suboption: (2) Agent Remote ID
        Length: 6
        <Value: 707db9b84daf>
        Agent Remote ID: 707db9b84daf
    Option 82 Suboption: (151) VRF name/VPN ID
        Length: 9
        <Value: 0074656e616e742d61>
      VRF name:
        [Expert Info (Warning/Undecoded): Trailing stray characters]
          [Trailing stray characters]
          <Message: Trailing stray characters>
          [Severity level: Warning]
          [Group: Undecoded]
    Option 82 Suboption: (11) Server ID Override (10.10.10.1)
        Length: 4
        <Value: 0a0a0a01>
        Server ID Override: 10.10.10.1
    Option 82 Suboption: (5) Link selection (10.10.10.0)
        Length: 4
        <Value: 0a0a0a00>
        Link selection: 10.10.10.0
  Option: (255) End
    Option End: 255
```

```
Ethernet II, Src: 60:26:aa:85:95:87, Dst: 10:b3:d6:a4:85:97
Internet Protocol Version 4, Src: 13.13.13.254, Dst: 5.5.5.5
User Datagram Protocol, Src Port: 65518, Dst Port: 4789
Virtual eXtensible Local Area Network
  Flags: 0x0800, VXLAN Network ID (VNI)
  Group Policy ID: 0
  VXLAN Network Identifier (VNI): 303030
  Reserved: 0
Ethernet II, Src: 02:00:0d:0d:0d:fe, Dst: 70:7d:b9:b8:4d:af
Internet Protocol Version 4, Src: 10.10.10.150, Dst: 172.16.10.8
User Datagram Protocol, Src Port: 67, Dst Port: 67
Dynamic Host Configuration Protocol (Offer)
  Message type: Boot Reply (2)
  Hardware type: Ethernet (0x01)
  Hardware address length: 6
  Hops: 0
  Transaction ID: 0xe9e35087
  Seconds elapsed: 0
  Bootp flags: 0x8000, Broadcast flag (Broadcast)
    1... .... .... .... = Broadcast flag: Broadcast
    .000 0000 0000 0000 = Reserved flags: 0x0000
  Client IP address: 0.0.0.0
  Your (client) IP address: 10.10.10.3
  Next server IP address: 10.10.10.150
  Relay agent IP address: 172.16.10.8
  Client MAC address: 00:50:56:a5:fd:dd
  Client hardware address padding: 00000000000000000000
  Server host name not given
  Boot file name not given
  Magic cookie: DHCP
  Option: (53) DHCP Message Type (Offer)
    Length: 1
    <Value: 02>
    DHCP: Offer (2)
  Option: (1) Subnet Mask (255.255.255.0)
    Length: 4
    <Value: ffffff00>
    Subnet Mask: 255.255.255.0
  Option: (58) Renewal Time Value
    Length: 4
    <Value: 0000a8c0>
    Renewal Time Value: 12 hours (43200)
  Option: (59) Rebinding Time Value
    Length: 4
    <Value: 00012750>
    Rebinding Time Value: 21 hours (75600)
  Option: (51) IP Address Lease Time
    Length: 4
    <Value: 00015180>
    IP Address Lease Time: 1 day (86400)
  Option: (54) DHCP Server Identifier (10.10.10.1)
    Length: 4
    <Value: 0a0a0a01>
    DHCP Server Identifier: 10.10.10.1
  Option: (3) Router
    Length: 4
    <Value: 0a0a0a01>
    Router: 10.10.10.1
  Option: (15) Domain Name
    Length: 10
    <Value: 636973636f2e636f6d00>
    Domain Name: cisco.com
  Option: (82) Agent Information Option
    Length: 47
    <Value: 010e0108000600018a9200a000000000206707db9b84daf97090074656e616e742d610b040a0a0a0105040a0a0a00>
  Option 82 Suboption: (1) Agent Circuit ID
    Length: 14
    <Value: 0108000600018a9200a000000000>
    Agent Circuit ID: 0108000600018a9200a000000000
  Option 82 Suboption: (2) Agent Remote ID
    Length: 6
    <Value: 707db9b84daf>
    Agent Remote ID: 707db9b84daf
  Option 82 Suboption: (151) VRF name/VPN ID
    Length: 9
    <Value: 0074656e616e742d61>
  VRF name:
    [Expert Info (Warning/Undecoded): Trailing stray characters]
      [Trailing stray characters]
      <Message: Trailing stray characters>
      [Severity level: Warning]
      [Group: Undecoded]
  Option 82 Suboption: (11) Server ID Override (10.10.10.1)
    Length: 4
    <Value: 0a0a0a01>
    Server ID Override: 10.10.10.1
  Option 82 Suboption: (5) Link selection (10.10.10.0)
    Length: 4
    <Value: 0a0a0a00>
    Link selection: 10.10.10.0
  Option: (255) End
    Option End: 255
```

DHCP提供vPC主幹

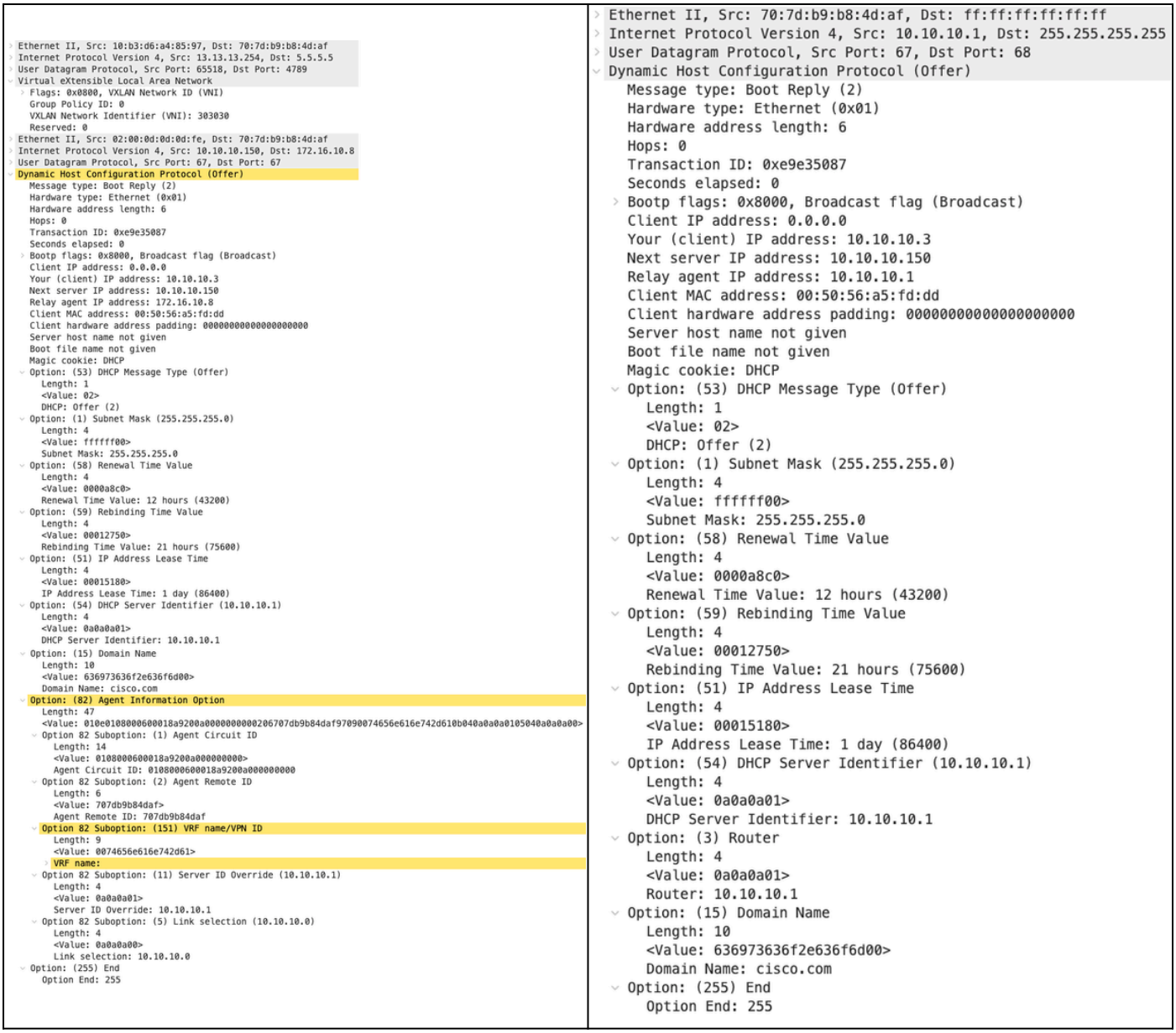
主幹上收到優惠	提供由SPINE傳送





LEAF-1上的DHCP提供

在LEAF-1上收到優惠	在LEAF-1上傳送優惠



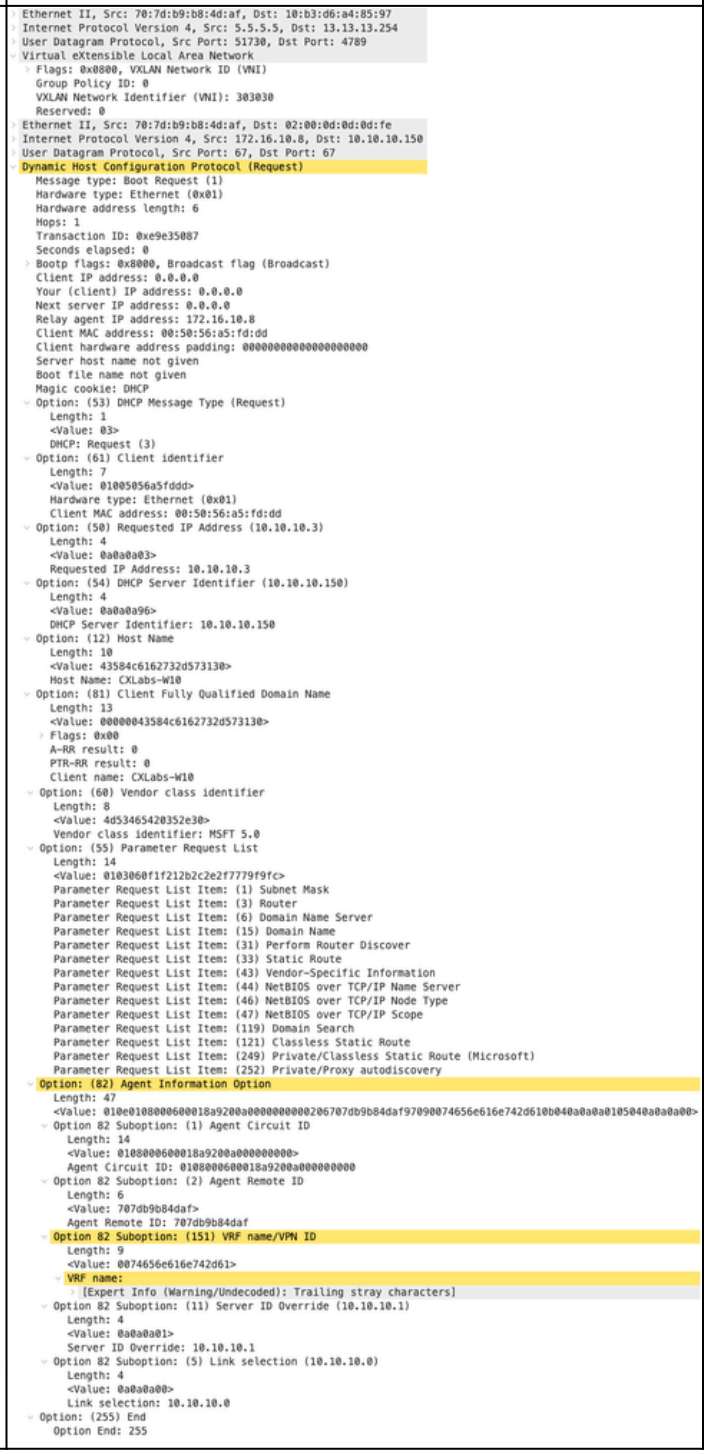
在HOST-1上接收的DHCP Offer

```
> Ethernet II, Src: 70:7d:b9:b8:4d:af, Dst: ff:ff:ff:ff:ff:ff
> Internet Protocol Version 4, Src: 10.10.10.1, Dst: 255.255.255.255
> User Datagram Protocol, Src Port: 67, Dst Port: 68
v Dynamic Host Configuration Protocol (Offer)
    Message type: Boot Reply (2)
    Hardware type: Ethernet (0x01)
    Hardware address length: 6
    Hops: 0
    Transaction ID: 0xe9e35087
    Seconds elapsed: 0
  > Bootp flags: 0x8000, Broadcast flag (Broadcast)
    Client IP address: 0.0.0.0
    Your (client) IP address: 10.10.10.3
    Next server IP address: 10.10.10.150
    Relay agent IP address: 10.10.10.1
    Client MAC address: 00:50:56:a5:fd:dd
    Client hardware address padding: 00000000000000000000
    Server host name not given
    Boot file name not given
    Magic cookie: DHCP
  v Option: (53) DHCP Message Type (Offer)
      Length: 1
      <Value: 02>
      DHCP: Offer (2)
  v Option: (1) Subnet Mask (255.255.255.0)
      Length: 4
      <Value: ffffff00>
      Subnet Mask: 255.255.255.0
  v Option: (58) Renewal Time Value
      Length: 4
      <Value: 0000a8c0>
      Renewal Time Value: 12 hours (43200)
  v Option: (59) Rebinding Time Value
      Length: 4
      <Value: 00012750>
      Rebinding Time Value: 21 hours (75600)
  v Option: (51) IP Address Lease Time
      Length: 4
      <Value: 00015180>
      IP Address Lease Time: 1 day (86400)
  v Option: (54) DHCP Server Identifier (10.10.10.1)
      Length: 4
      <Value: 0a0a0a01>
      DHCP Server Identifier: 10.10.10.1
  v Option: (3) Router
      Length: 4
      <Value: 0a0a0a01>
      Router: 10.10.10.1
  v Option: (15) Domain Name
      Length: 10
      <Value: 636973636f2e636f6d00>
      Domain Name: cisco.com
  v Option: (255) End
      Option End: 255
```

請求由HOST-1傳送

```
> Ethernet II, Src: 00:50:56:a5:fd:dd, Dst: ff:ff:ff:ff:ff:ff
> Internet Protocol Version 4, Src: 0.0.0.0, Dst: 255.255.255.255
> User Datagram Protocol, Src Port: 68, Dst Port: 67
v Dynamic Host Configuration Protocol (Request)
    Message type: Boot Request (1)
    Hardware type: Ethernet (0x01)
    Hardware address length: 6
    Hops: 0
    Transaction ID: 0xe9e35087
    Seconds elapsed: 0
  v Bootp flags: 0x8000, Broadcast flag (Broadcast)
      1... .... .... .... = Broadcast flag: Broadcast
      .000 0000 0000 0000 = Reserved flags: 0x0000
    Client IP address: 0.0.0.0
    Your (client) IP address: 0.0.0.0
    Next server IP address: 0.0.0.0
    Relay agent IP address: 0.0.0.0
    Client MAC address: 00:50:56:a5:fd:dd
    Client hardware address padding: 00000000000000000000
    Server host name not given
    Boot file name not given
    Magic cookie: DHCP
  v Option: (53) DHCP Message Type (Request)
      Length: 1
      <Value: 03>
      DHCP: Request (3)
  v Option: (61) Client identifier
      Length: 7
      <Value: 01005056a5fddd>
      Hardware type: Ethernet (0x01)
      Client MAC address: 00:50:56:a5:fd:dd
  v Option: (50) Requested IP Address (10.10.10.3)
      Length: 4
      <Value: 0a0a0a03>
      Requested IP Address: 10.10.10.3
  v Option: (54) DHCP Server Identifier (10.10.10.1)
      Length: 4
      <Value: 0a0a0a01>
      DHCP Server Identifier: 10.10.10.1
  v Option: (12) Host Name
      Length: 10
      <Value: 43584c6162732d573130>
      Host Name: CXLabs-W10
  v Option: (81) Client Fully Qualified Domain Name
      Length: 13
      <Value: 00000043584c6162732d573130>
    v Flags: 0x00
        0000 .... = Reserved flags: 0x0
        .... 0... = Server DDNS: Some server updates
        .... .0.. = Encoding: ASCII encoding
        .... ..0. = Server overrides: No override
        .... ...0 = Server: Client
      A-RR result: 0
      PTR-RR result: 0
      Client name: CXLabs-W10
  v Option: (60) Vendor class identifier
      Length: 8
      <Value: 4d53465420352e30>
      Vendor class identifier: MSFT 5.0
  v Option: (55) Parameter Request List
      Length: 14
      <Value: 0103060f1f212b2c2e2f7779f9fc>
      Parameter Request List Item: (1) Subnet Mask
      Parameter Request List Item: (3) Router
      Parameter Request List Item: (6) Domain Name Server
      Parameter Request List Item: (15) Domain Name
      Parameter Request List Item: (31) Perform Router Discover
      Parameter Request List Item: (33) Static Route
      Parameter Request List Item: (43) Vendor-Specific Information
      Parameter Request List Item: (44) NetBIOS over TCP/IP Name Server
      Parameter Request List Item: (46) NetBIOS over TCP/IP Node Type
      Parameter Request List Item: (47) NetBIOS over TCP/IP Scope
      Parameter Request List Item: (119) Domain Search
      Parameter Request List Item: (121) Classless Static Route
      Parameter Request List Item: (249) Private/Classless Static Route (Microsoft)
      Parameter Request List Item: (252) Private/Proxy autodiscovery
  v Option: (255) End
      Option End: 255
```

對LEAF-1的請求

在LEAF-1上收到的請求	請求由LEAF-1傳送
	

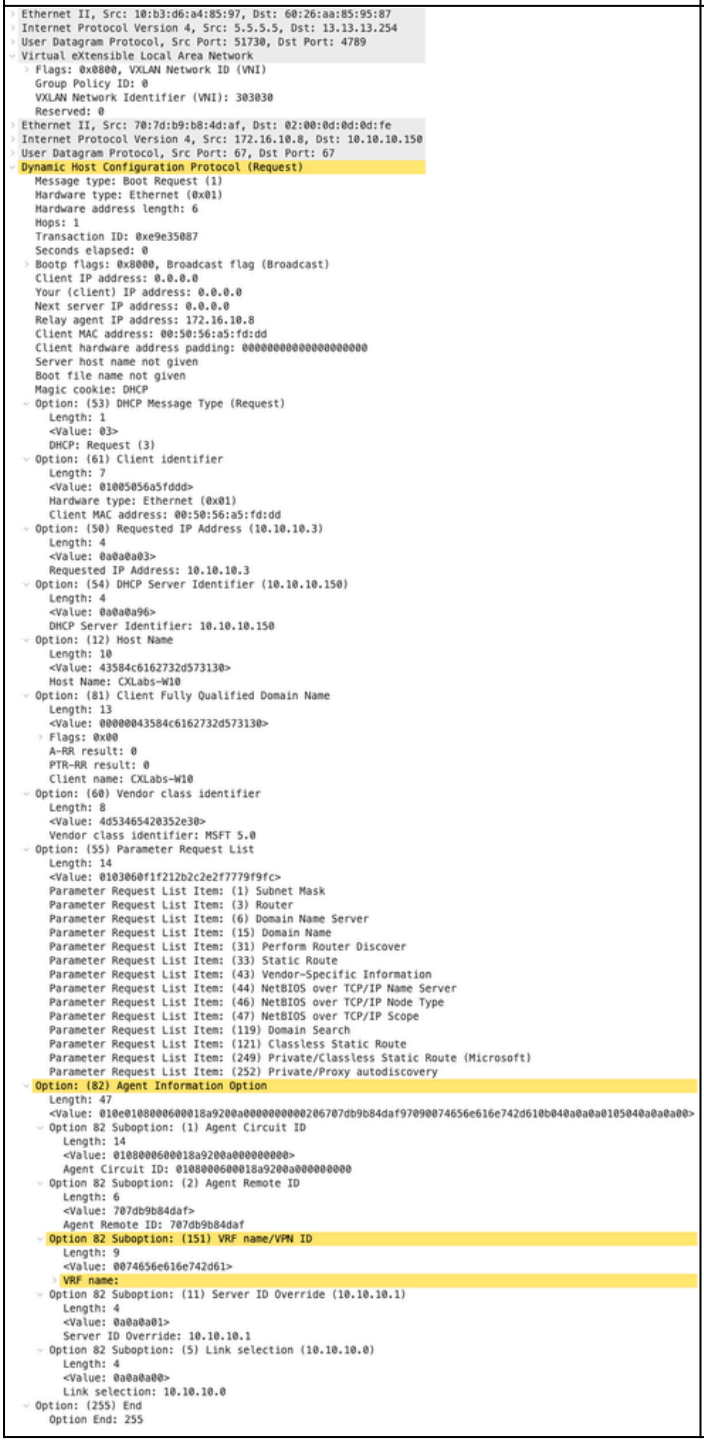
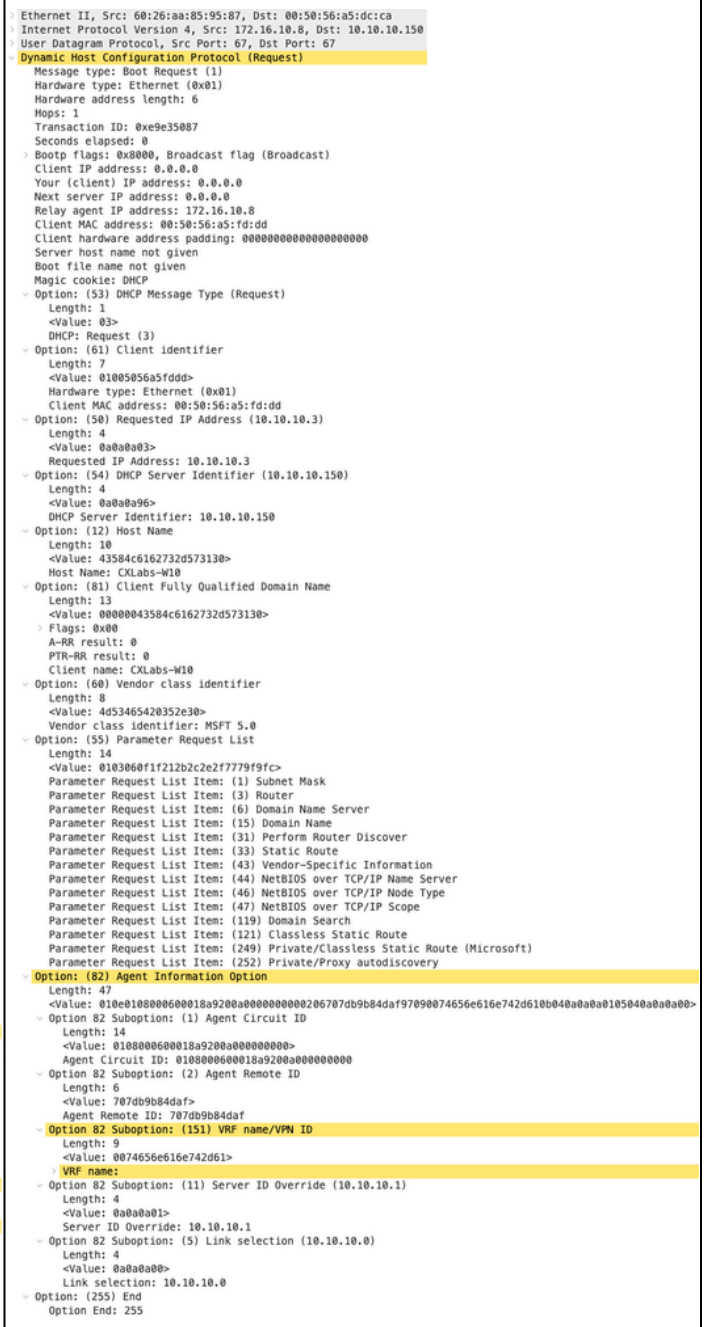
主幹上的請求

在主幹上收到請求	請求由SPINE傳送

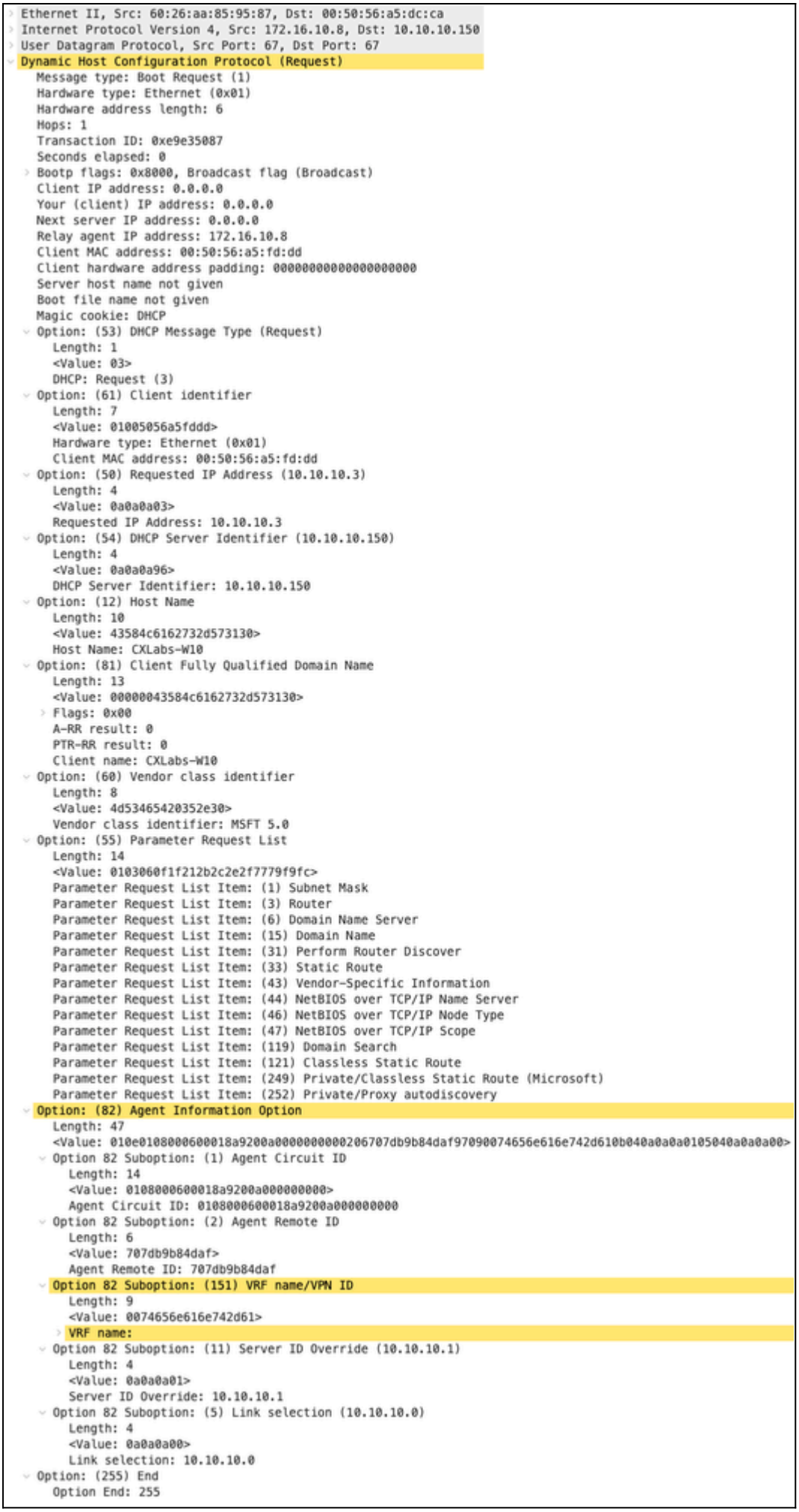
```
> Ethernet II, Src: 70:7d:b9:b8:4d:af, Dst: 10:b3:d6:a4:85:97
> Internet Protocol Version 4, Src: 5.5.5.5, Dst: 13.13.13.254
> User Datagram Protocol, Src Port: 51730, Dst Port: 4789
v Virtual eXtensible Local Area Network
  > Flags: 0x0800, VXLAN Network ID (VNI)
    Group Policy ID: 0
    VXLAN Network Identifier (VNI): 303030
    Reserved: 0
> Ethernet II, Src: 70:7d:b9:b8:4d:af, Dst: 02:00:0d:0d:0d:fe
> Internet Protocol Version 4, Src: 172.16.10.8, Dst: 10.10.10.150
> User Datagram Protocol, Src Port: 67, Dst Port: 67
v Dynamic Host Configuration Protocol (Request)
    Message type: Boot Request (1)
    Hardware type: Ethernet (0x01)
    Hardware address length: 6
    Hops: 1
    Transaction ID: 0xe9e35087
    Seconds elapsed: 0
  > Bootp flags: 0x8000, Broadcast flag (Broadcast)
    Client IP address: 0.0.0.0
    Your (client) IP address: 0.0.0.0
    Next server IP address: 0.0.0.0
    Relay agent IP address: 172.16.10.8
    Client MAC address: 00:50:56:a5:fd:dd
    Client hardware address padding: 00000000000000000000
    Server host name not given
    Boot file name not given
    Magic cookie: DHCP
  v Option: (53) DHCP Message Type (Request)
      Length: 1
      <Value: 03>
      DHCP: Request (3)
  v Option: (61) Client identifier
      Length: 7
      <Value: 01005056a5fddd>
      Hardware type: Ethernet (0x01)
      Client MAC address: 00:50:56:a5:fd:dd
  v Option: (50) Requested IP Address (10.10.10.3)
      Length: 4
      <Value: 0a0a0a03>
      Requested IP Address: 10.10.10.3
  v Option: (54) DHCP Server Identifier (10.10.10.150)
      Length: 4
      <Value: 0a0a0a96>
      DHCP Server Identifier: 10.10.10.150
  v Option: (12) Host Name
      Length: 10
      <Value: 43584c6162732d573130>
      Host Name: CXLabs-W10
  v Option: (81) Client Fully Qualified Domain Name
      Length: 13
      <Value: 00000043584c6162732d573130>
    > Flags: 0x00
      A-RR result: 0
      PTR-RR result: 0
      Client name: CXLabs-W10
  v Option: (60) Vendor class identifier
      Length: 8
      <Value: 4d53465420352e30>
      Vendor class identifier: MSFT 5.0
  v Option: (55) Parameter Request List
      Length: 14
      <Value: 0103060f1f212b2c2e2f7779f9fc>
      Parameter Request List Item: (1) Subnet Mask
      Parameter Request List Item: (3) Router
      Parameter Request List Item: (6) Domain Name Server
      Parameter Request List Item: (15) Domain Name
      Parameter Request List Item: (31) Perform Router Discover
      Parameter Request List Item: (33) Static Route
      Parameter Request List Item: (43) Vendor-Specific Information
      Parameter Request List Item: (44) NetBIOS over TCP/IP Name Server
      Parameter Request List Item: (46) NetBIOS over TCP/IP Node Type
      Parameter Request List Item: (47) NetBIOS over TCP/IP Scope
      Parameter Request List Item: (119) Domain Search
      Parameter Request List Item: (121) Classless Static Route
      Parameter Request List Item: (249) Private/Classless Static Route (Microsoft)
      Parameter Request List Item: (252) Private/Proxy autodiscovery
  v Option: (82) Agent Information Option
      Length: 47
      <Value: 010e0108000600018a9200a0000000000206707db9b84daf97090074656e616e742d610b040a0a0a0105040a0a0a00>
    v Option 82 Suboption: (1) Agent Circuit ID
        Length: 14
        <Value: 0108000600018a9200a000000000>
        Agent Circuit ID: 0108000600018a9200a000000000
    v Option 82 Suboption: (2) Agent Remote ID
        Length: 6
        <Value: 707db9b84daf>
        Agent Remote ID: 707db9b84daf
    v Option 82 Suboption: (151) VRF name/VPN ID
        Length: 9
        <Value: 0074656e616e742d61>
      v VRF name:
          [Expert Info (Warning/Undecoded): Trailing stray characters]
    v Option 82 Suboption: (11) Server ID Override (10.10.10.1)
        Length: 4
        <Value: 0a0a0a01>
        Server ID Override: 10.10.10.1
    v Option 82 Suboption: (5) Link selection (10.10.10.0)
        Length: 4
        <Value: 0a0a0a00>
        Link selection: 10.10.10.0
  v Option: (255) End
      Option End: 255
```

```
> Ethernet II, Src: 10:b3:d6:a4:85:97, Dst: 60:26:aa:85:95:87
> Internet Protocol Version 4, Src: 5.5.5.5, Dst: 13.13.13.254
> User Datagram Protocol, Src Port: 51730, Dst Port: 4789
v Virtual eXtensible Local Area Network
  > Flags: 0x0800, VXLAN Network ID (VNI)
    Group Policy ID: 0
    VXLAN Network Identifier (VNI): 303030
    Reserved: 0
> Ethernet II, Src: 70:7d:b9:b8:4d:af, Dst: 02:00:0d:0d:0d:fe
> Internet Protocol Version 4, Src: 172.16.10.8, Dst: 10.10.10.150
> User Datagram Protocol, Src Port: 67, Dst Port: 67
v Dynamic Host Configuration Protocol (Request)
    Message type: Boot Request (1)
    Hardware type: Ethernet (0x01)
    Hardware address length: 6
    Hops: 1
    Transaction ID: 0xe9e35087
    Seconds elapsed: 0
  > Bootp flags: 0x8000, Broadcast flag (Broadcast)
    Client IP address: 0.0.0.0
    Your (client) IP address: 0.0.0.0
    Next server IP address: 0.0.0.0
    Relay agent IP address: 172.16.10.8
    Client MAC address: 00:50:56:a5:fd:dd
    Client hardware address padding: 00000000000000000000
    Server host name not given
    Boot file name not given
    Magic cookie: DHCP
  v Option: (53) DHCP Message Type (Request)
      Length: 1
      <Value: 03>
      DHCP: Request (3)
  v Option: (61) Client identifier
      Length: 7
      <Value: 01005056a5fddd>
      Hardware type: Ethernet (0x01)
      Client MAC address: 00:50:56:a5:fd:dd
  v Option: (50) Requested IP Address (10.10.10.3)
      Length: 4
      <Value: 0a0a0a03>
      Requested IP Address: 10.10.10.3
  v Option: (54) DHCP Server Identifier (10.10.10.150)
      Length: 4
      <Value: 0a0a0a96>
      DHCP Server Identifier: 10.10.10.150
  v Option: (12) Host Name
      Length: 10
      <Value: 43584c6162732d573130>
      Host Name: CXLabs-W10
  v Option: (81) Client Fully Qualified Domain Name
      Length: 13
      <Value: 00000043584c6162732d573130>
    > Flags: 0x00
      A-RR result: 0
      PTR-RR result: 0
      Client name: CXLabs-W10
  v Option: (60) Vendor class identifier
      Length: 8
      <Value: 4d53465420352e30>
      Vendor class identifier: MSFT 5.0
  v Option: (55) Parameter Request List
      Length: 14
      <Value: 0103060f1f212b2c2e2f7779f9fc>
      Parameter Request List Item: (1) Subnet Mask
      Parameter Request List Item: (3) Router
      Parameter Request List Item: (6) Domain Name Server
      Parameter Request List Item: (15) Domain Name
      Parameter Request List Item: (31) Perform Router Discover
      Parameter Request List Item: (33) Static Route
      Parameter Request List Item: (43) Vendor-Specific Information
      Parameter Request List Item: (44) NetBIOS over TCP/IP Name Server
      Parameter Request List Item: (46) NetBIOS over TCP/IP Node Type
      Parameter Request List Item: (47) NetBIOS over TCP/IP Scope
      Parameter Request List Item: (119) Domain Search
      Parameter Request List Item: (121) Classless Static Route
      Parameter Request List Item: (249) Private/Classless Static Route (Microsoft)
      Parameter Request List Item: (252) Private/Proxy autodiscovery
  v Option: (82) Agent Information Option
      Length: 47
      <Value: 010e0108000600018a9200a0000000000206707db9b84daf97090074656e616e742d610b040a0a0a0105040a0a0a00>
    v Option 82 Suboption: (1) Agent Circuit ID
        Length: 14
        <Value: 0108000600018a9200a000000000>
        Agent Circuit ID: 0108000600018a9200a000000000
    v Option 82 Suboption: (2) Agent Remote ID
        Length: 6
        <Value: 707db9b84daf>
        Agent Remote ID: 707db9b84daf
    v Option 82 Suboption: (151) VRF name/VPN ID
        Length: 9
        <Value: 0074656e616e742d61>
      > VRF name:
    v Option 82 Suboption: (11) Server ID Override (10.10.10.1)
        Length: 4
        <Value: 0a0a0a01>
        Server ID Override: 10.10.10.1
    v Option 82 Suboption: (5) Link selection (10.10.10.0)
        Length: 4
        <Value: 0a0a0a00>
        Link selection: 10.10.10.0
  v Option: (255) End
      Option End: 255
```

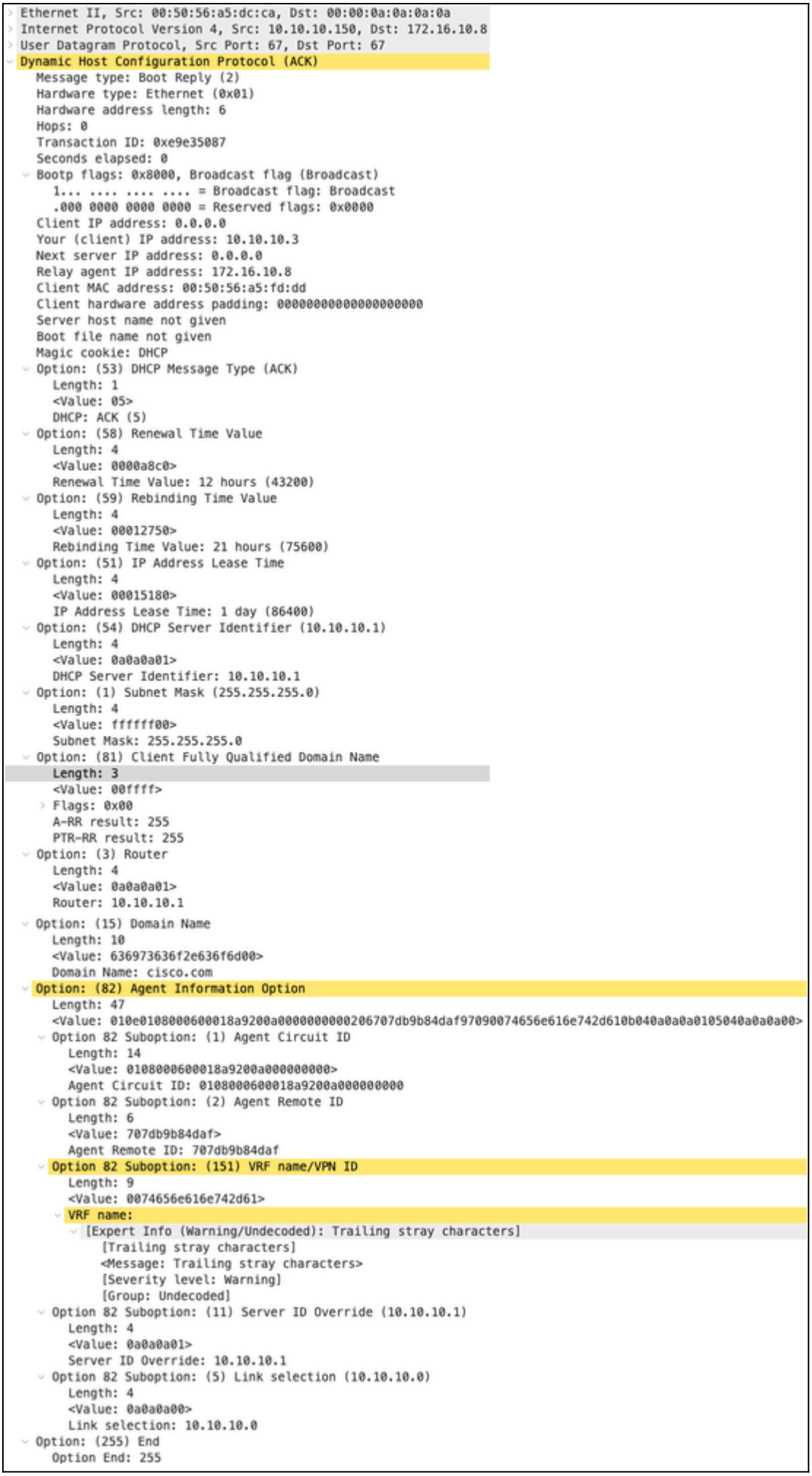
在LEAF-2-vPC上請求

在LEAF-2-vPC上請求接收PCd	請求透過vPCAF-2-vPC傳送
	

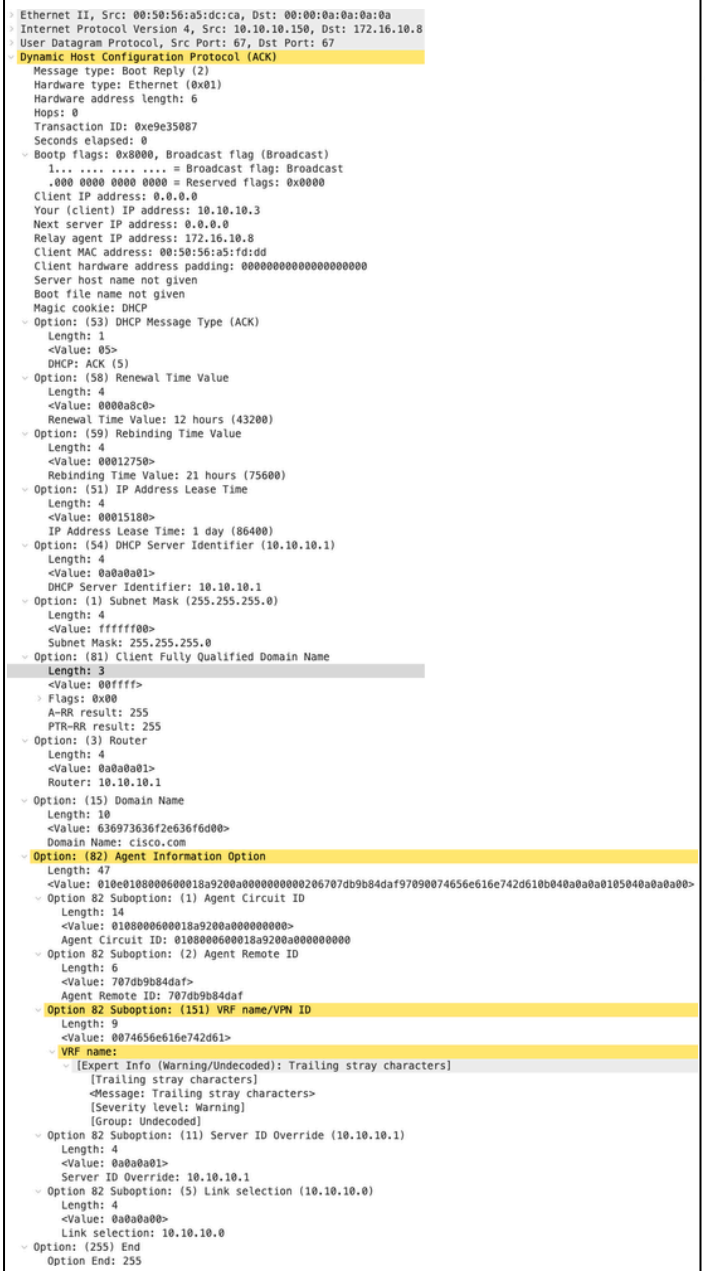
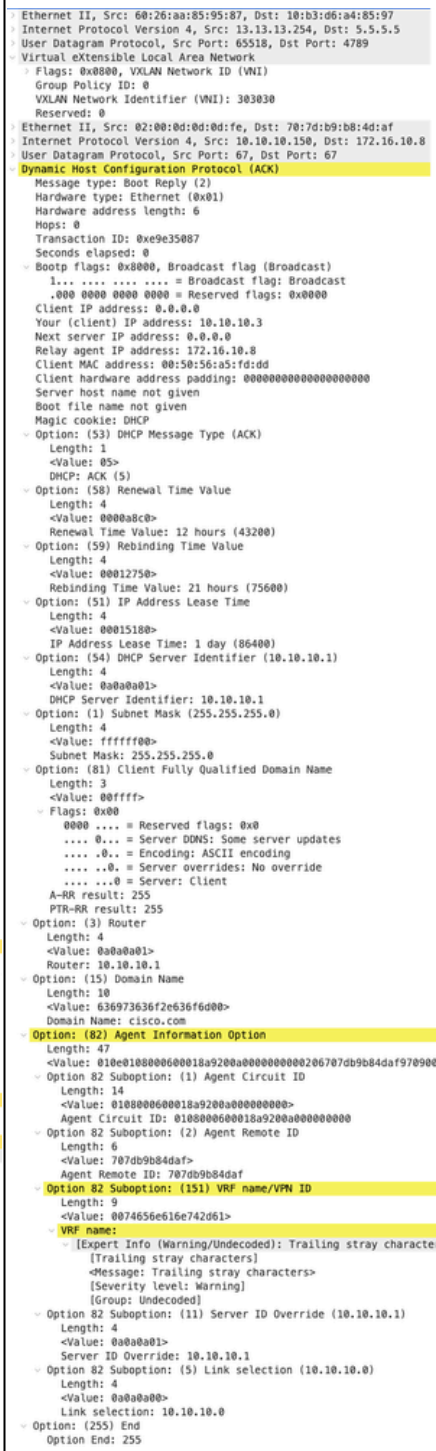
在DCHP伺服器上收到請求


Ethernet II, Src: 60:26:aa:85:95:87, Dst: 00:50:56:a5:dc:ca
Internet Protocol Version 4, Src: 172.16.10.8, Dst: 10.10.10.150
User Datagram Protocol, Src Port: 67, Dst Port: 67
Dynamic Host Configuration Protocol (Request)
Message type: Boot Request (1)
Hardware type: Ethernet (0x01)
Hardware address length: 6
Hops: 1
Transaction ID: 0xe9e35087
Seconds elapsed: 0
Bootp flags: 0x8000, Broadcast flag (Broadcast)
Client IP address: 0.0.0.0
Your (client) IP address: 0.0.0.0
Next server IP address: 0.0.0.0
Relay agent IP address: 172.16.10.8
Client MAC address: 00:50:56:a5:fd:dd
Client hardware address padding: 00000000000000000000
Server host name not given
Boot file name not given
Magic cookie: DHCP
Option: (53) DHCP Message Type (Request)
Length: 1
<Value: 03>
DHCP: Request (3)
Option: (61) Client identifier
Length: 7
<Value: 01005056a5fddd>
Hardware type: Ethernet (0x01)
Client MAC address: 00:50:56:a5:fd:dd
Option: (50) Requested IP Address (10.10.10.3)
Length: 4
<Value: 0a0a0a03>
Requested IP Address: 10.10.10.3
Option: (54) DHCP Server Identifier (10.10.10.150)
Length: 4
<Value: 0a0a0a96>
DHCP Server Identifier: 10.10.10.150
Option: (12) Host Name
Length: 10
<Value: 43584c6162732d573130>
Host Name: CXLabs-W10
Option: (81) Client Fully Qualified Domain Name
Length: 13
<Value: 00000043584c6162732d573130>
Flags: 0x00
A-RR result: 0
PTR-RR result: 0
Client name: CXLabs-W10
Option: (60) Vendor class identifier
Length: 8
<Value: 4d53465420352e30>
Vendor class identifier: MSFT 5.0
Option: (55) Parameter Request List
Length: 14
<Value: 0103060f1f212b2c2e2f7779f9fc>
Parameter Request List Item: (1) Subnet Mask
Parameter Request List Item: (3) Router
Parameter Request List Item: (6) Domain Name Server
Parameter Request List Item: (15) Domain Name
Parameter Request List Item: (31) Perform Router Discover
Parameter Request List Item: (33) Static Route
Parameter Request List Item: (43) Vendor-Specific Information
Parameter Request List Item: (44) NetBIOS over TCP/IP Name Server
Parameter Request List Item: (46) NetBIOS over TCP/IP Node Type
Parameter Request List Item: (47) NetBIOS over TCP/IP Scope
Parameter Request List Item: (119) Domain Search
Parameter Request List Item: (121) Classless Static Route
Parameter Request List Item: (249) Private/Classless Static Route (Microsoft)
Parameter Request List Item: (252) Private/Proxy autodiscovery
Option: (82) Agent Information Option
Length: 47
<Value: 010e0108000600018a9200a00000000000206707db9b84daf97090074656e616e742d610b040a0a0a0105040a0a0a00>
Option 82 Suboption: (1) Agent Circuit ID
Length: 14
<Value: 0108000600018a9200a000000000>
Agent Circuit ID: 0108000600018a9200a000000000
Option 82 Suboption: (2) Agent Remote ID
Length: 6
<Value: 707db9b84daf>
Agent Remote ID: 707db9b84daf
Option 82 Suboption: (151) VRF name/VPN ID
Length: 9
<Value: 0074656e616e742d61>
VRF name:
Option 82 Suboption: (11) Server ID Override (10.10.10.1)
Length: 4
<Value: 0a0a0a01>
Server ID Override: 10.10.10.1
Option 82 Suboption: (5) Link selection (10.10.10.0)
Length: 4
<Value: 0a0a0a00>
Link selection: 10.10.10.0
Option: (255) End
Option End: 255

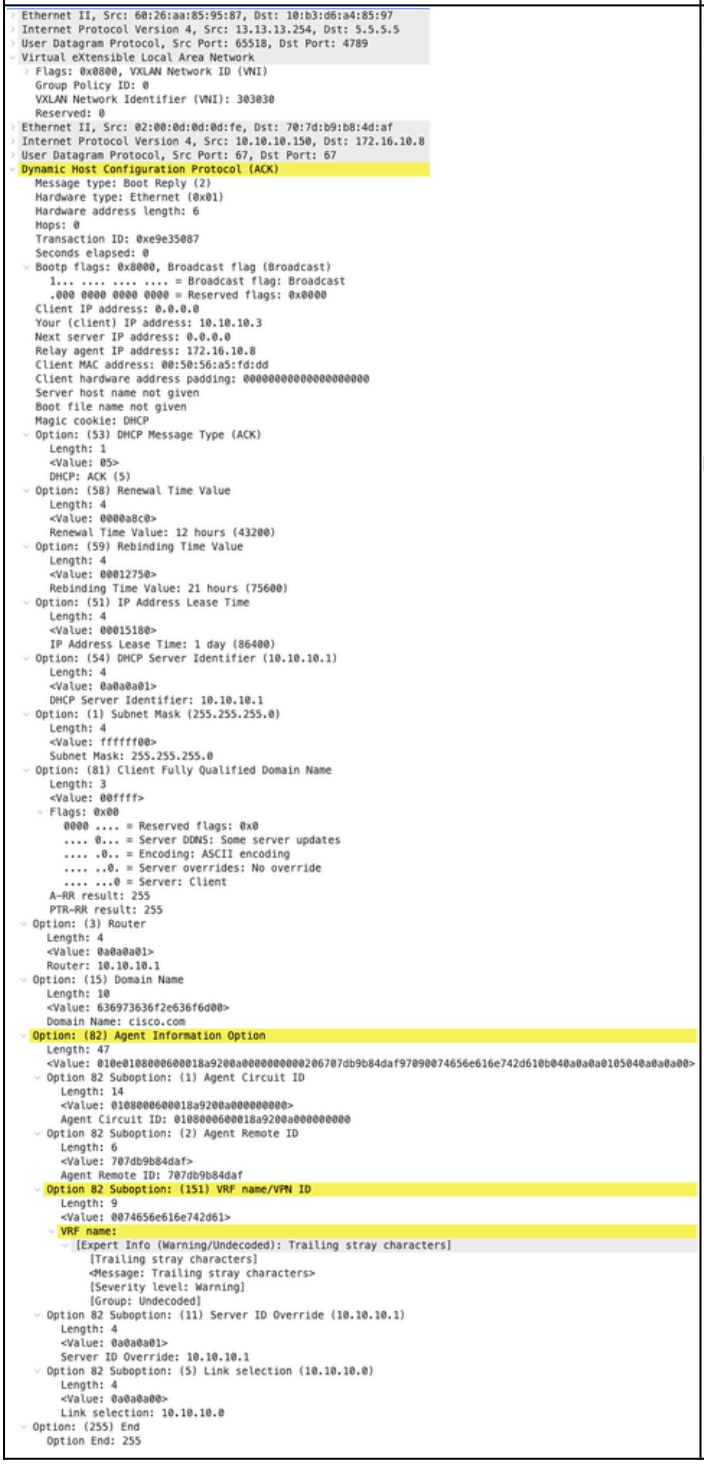
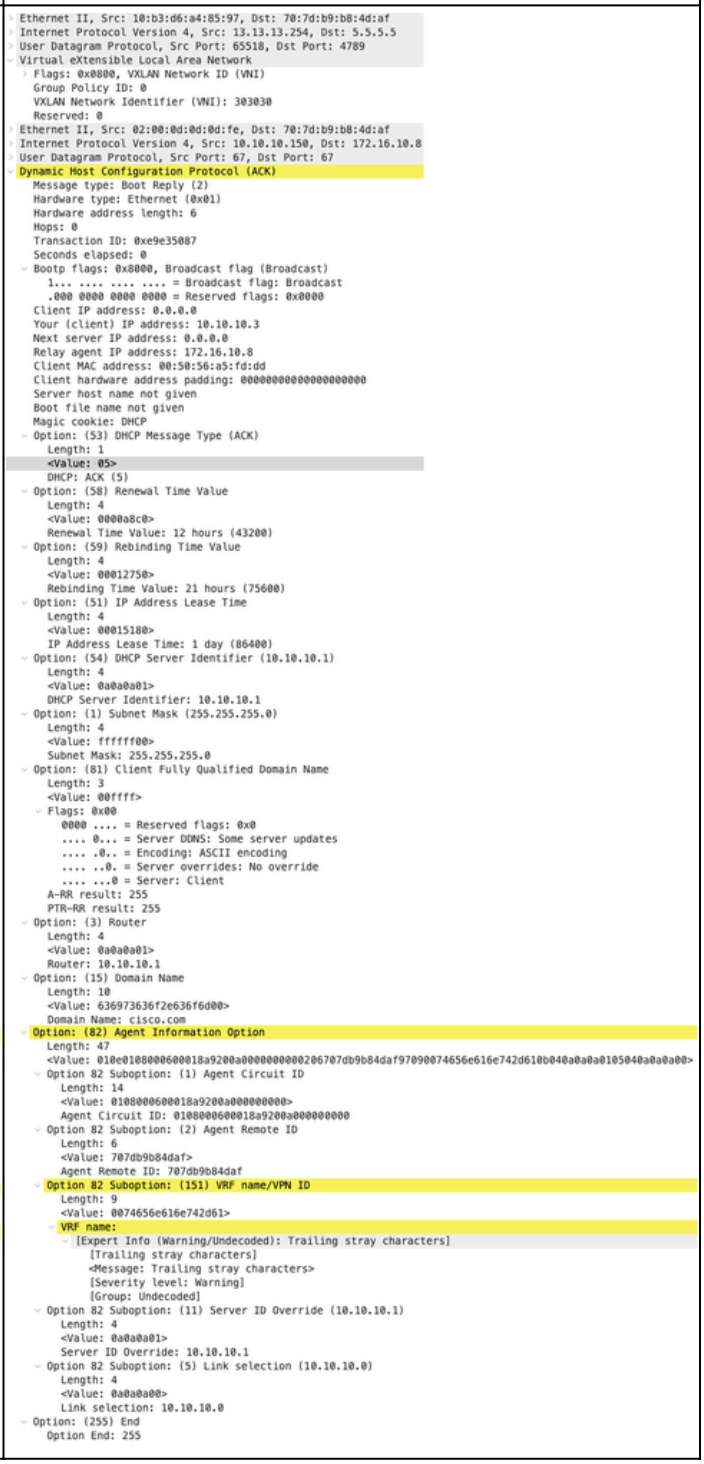
ACK由DCHP伺服器傳送


Ethernet II, Src: 00:50:56:a5:dc:ca, Dst: 00:00:0a:0a:0a:0a
Internet Protocol Version 4, Src: 10.10.10.150, Dst: 172.16.10.8
User Datagram Protocol, Src Port: 67, Dst Port: 67
Dynamic Host Configuration Protocol (ACK)
Message type: Boot Reply (2)
Hardware type: Ethernet (0x01)
Hardware address length: 6
Hops: 0
Transaction ID: 0xe9e35087
Seconds elapsed: 0
Bootp flags: 0x8000, Broadcast flag (Broadcast)
1... .... = Broadcast flag: Broadcast
.000 0000 0000 0000 = Reserved flags: 0x0000
Client IP address: 0.0.0.0
Your (client) IP address: 10.10.10.3
Next server IP address: 0.0.0.0
Relay agent IP address: 172.16.10.8
Client MAC address: 00:50:56:a5:fd:dd
Client hardware address padding: 00000000000000000000
Server host name not given
Boot file name not given
Magic cookie: DHCP
Option: (53) DHCP Message Type (ACK)
Length: 1
<Value: 05>
DHCP: ACK (5)
Option: (58) Renewal Time Value
Length: 4
<Value: 0000a8c0>
Renewal Time Value: 12 hours (43200)
Option: (59) Rebinding Time Value
Length: 4
<Value: 00012750>
Rebinding Time Value: 21 hours (75600)
Option: (51) IP Address Lease Time
Length: 4
<Value: 00015180>
IP Address Lease Time: 1 day (86400)
Option: (54) DHCP Server Identifier (10.10.10.1)
Length: 4
<Value: 0a0a0a01>
DHCP Server Identifier: 10.10.10.1
Option: (1) Subnet Mask (255.255.255.0)
Length: 4
<Value: ffffff00>
Subnet Mask: 255.255.255.0
Option: (81) Client Fully Qualified Domain Name
Length: 3
<Value: 00ffff>
Flags: 0x00
A-RR result: 255
PTR-RR result: 255
Option: (3) Router
Length: 4
<Value: 0a0a0a01>
Router: 10.10.10.1
Option: (15) Domain Name
Length: 10
<Value: 636973636f2e636f6d00>
Domain Name: cisco.com
Option: (82) Agent Information Option
Length: 47
<Value: 010e0108000600018a9200a0000000000206707db9b84daf97090074656e616e742d610b040a0a0a0105040a0a0a00>
Option 82 Suboption: (1) Agent Circuit ID
Length: 14
<Value: 0108000600018a9200a000000000>
Agent Circuit ID: 0108000600018a9200a000000000
Option 82 Suboption: (2) Agent Remote ID
Length: 6
<Value: 707db9b84daf>
Agent Remote ID: 707db9b84daf
Option 82 Suboption: (151) VRF name/VPN ID
Length: 9
<Value: 0074656e616e742d61>
VRF name:
[Expert Info (Warning/Undecoded): Trailing stray characters]
[Trailing stray characters]
<Message: Trailing stray characters>
[Severity level: Warning]
[Group: Undecoded]
Option 82 Suboption: (11) Server ID Override (10.10.10.1)
Length: 4
<Value: 0a0a0a01>
Server ID Override: 10.10.10.1
Option 82 Suboption: (5) Link selection (10.10.10.0)
Length: 4
<Value: 0a0a0a00>
Link selection: 10.10.10.0
Option: (255) End
Option End: 255

LEAF-2-vPC上的ACK

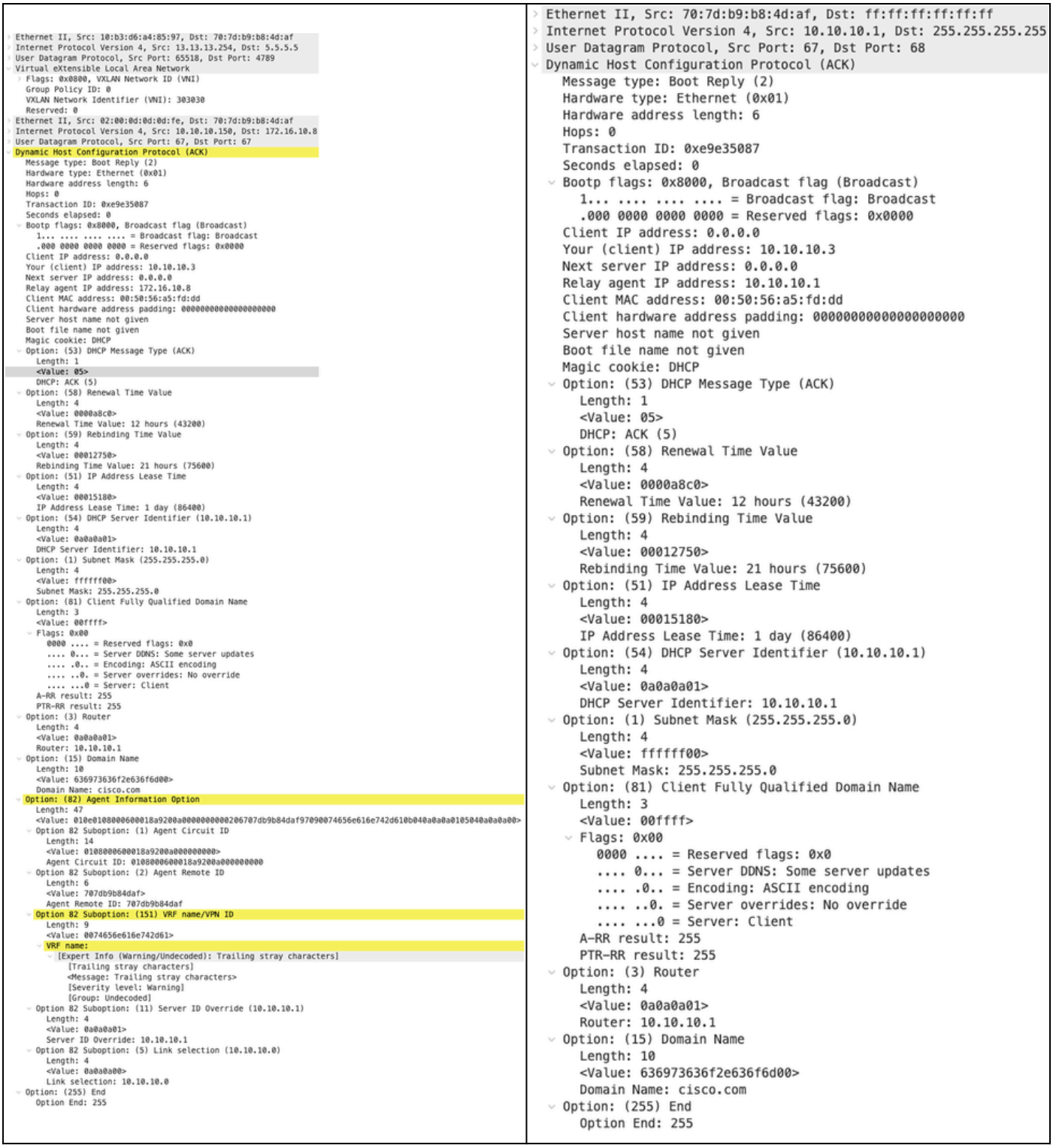
在LEAF-2-vPC上收到的ACK	LEAF-2-vPC傳送的ACK
	

脊柱上的ACK

脊柱上收到ACK	透過主幹傳送ACK
	

LEAF-1上的ACK

在LEAF-1上收到的ACK	ACK由LEAF-1傳送


Ethernet II, Src: 10:b3:d6:a4:85:97, Dst: 70:7d:b9:b8:4d:af
Internet Protocol Version 4, Src: 13.13.13.254, Dst: 5.5.5.5
User Datagram Protocol, Src Port: 65518, Dst Port: 4789
Virtual eXtensible Local Area Network
Flags: 0x0800, VXLAN Network ID (VNI)
Group Policy ID: 0
VXLAN Network Identifier (VNI): 303030
Reserved: 0
Ethernet II, Src: 02:00:0d:0d:0d:fe, Dst: 70:7d:b9:b8:4d:af
Internet Protocol Version 4, Src: 10.10.10.150, Dst: 172.16.10.8
User Datagram Protocol, Src Port: 67, Dst Port: 67
Dynamic Host Configuration Protocol (ACK)
Message type: Boot Reply (2)
Hardware type: Ethernet (0x01)
Hardware address length: 6
Hops: 0
Transaction ID: 0xe9e35087
Seconds elapsed: 0
Bootp flags: 0x8000, Broadcast flag (Broadcast)
1... .... = Broadcast flag: Broadcast
.000 0000 0000 0000 = Reserved flags: 0x0000
Client IP address: 0.0.0.0
Your (client) IP address: 10.10.10.3
Next server IP address: 0.0.0.0
Relay agent IP address: 172.16.10.8
Client MAC address: 00:50:56:a5:fd:dd
Client hardware address padding: 00000000000000000000
Server host name not given
Boot file name not given
Magic cookie: DHCP
Option: (53) DHCP Message Type (ACK)
Length: 1
<Value: 05>
DHCP: ACK (5)
Option: (58) Renewal Time Value
Length: 4
<Value: 0000a8c0>
Renewal Time Value: 12 hours (43200)
Option: (59) Rebinding Time Value
Length: 4
<Value: 00012750>
Rebinding Time Value: 21 hours (75600)
Option: (51) IP Address Lease Time
Length: 4
<Value: 00015180>
IP Address Lease Time: 1 day (86400)
Option: (54) DHCP Server Identifier (10.10.10.1)
Length: 4
<Value: 0a0a0a01>
DHCP Server Identifier: 10.10.10.1
Option: (1) Subnet Mask (255.255.255.0)
Length: 4
<Value: ffffff00>
Subnet Mask: 255.255.255.0
Option: (81) Client Fully Qualified Domain Name
Length: 3
<Value: 00ffff>
Flags: 0x00
0000 .... = Reserved flags: 0x0
.... 0... = Server DDNS: Some server updates
.... .0.. = Encoding: ASCII encoding
.... ..0. = Server overrides: No override
....0 = Server: Client
A-RR result: 255
PTR-RR result: 255
Option: (3) Router
Length: 4
<Value: 0a0a0a01>
Router: 10.10.10.1
Option: (15) Domain Name
Length: 10
<Value: 636973636f2e636f6d00>
Domain Name: cisco.com
Option: (82) Agent Information Option
Length: 47
<Value: 010e0108000600018a9200a000000000000206707db9b84daf97090074656e616e742d610b040a0a0a0105040a0a0a00>
Option 82 Suboption: (1) Agent Circuit ID
Length: 14
<Value: 0108000600018a9200a000000000>
Agent Circuit ID: 0108000600018a9200a000000000
Option 82 Suboption: (2) Agent Remote ID
Length: 6
<Value: 707db9b84daf>
Agent Remote ID: 707db9b84daf
Option 82 Suboption: (151) VRF name/VPN ID
Length: 9
<Value: 0074656e616e742d61>
VRF name:
[Expert Info (Warning/Undecoded): Trailing stray characters]
[Trailing stray characters]
<Message: Trailing stray characters>
[Severity level: Warning]
[Group: Undecoded]
Option 82 Suboption: (11) Server ID Override (10.10.10.1)
Length: 4
<Value: 0a0a0a01>
Server ID Override: 10.10.10.1
Option 82 Suboption: (5) Link selection (10.10.10.0)
Length: 4
<Value: 0a0a0a00>
Link selection: 10.10.10.0
Option: (255) End
Option End: 255
Ethernet II, Src: 70:7d:b9:b8:4d:af, Dst: ff:ff:ff:ff:ff:ff
Internet Protocol Version 4, Src: 10.10.10.1, Dst: 255.255.255.255
User Datagram Protocol, Src Port: 67, Dst Port: 68
Dynamic Host Configuration Protocol (ACK)
Message type: Boot Reply (2)
Hardware type: Ethernet (0x01)
Hardware address length: 6
Hops: 0
Transaction ID: 0xe9e35087
Seconds elapsed: 0
Bootp flags: 0x8000, Broadcast flag (Broadcast)
1... .... = Broadcast flag: Broadcast
.000 0000 0000 0000 = Reserved flags: 0x0000
Client IP address: 0.0.0.0
Your (client) IP address: 10.10.10.3
Next server IP address: 0.0.0.0
Relay agent IP address: 10.10.10.1
Client MAC address: 00:50:56:a5:fd:dd
Client hardware address padding: 00000000000000000000
Server host name not given
Boot file name not given
Magic cookie: DHCP
Option: (53) DHCP Message Type (ACK)
Length: 1
<Value: 05>
DHCP: ACK (5)
Option: (58) Renewal Time Value
Length: 4
<Value: 0000a8c0>
Renewal Time Value: 12 hours (43200)
Option: (59) Rebinding Time Value
Length: 4
<Value: 00012750>
Rebinding Time Value: 21 hours (75600)
Option: (51) IP Address Lease Time
Length: 4
<Value: 00015180>
IP Address Lease Time: 1 day (86400)
Option: (54) DHCP Server Identifier (10.10.10.1)
Length: 4
<Value: 0a0a0a01>
DHCP Server Identifier: 10.10.10.1
Option: (1) Subnet Mask (255.255.255.0)
Length: 4
<Value: ffffff00>
Subnet Mask: 255.255.255.0
Option: (81) Client Fully Qualified Domain Name
Length: 3
<Value: 00ffff>
Flags: 0x00
0000 .... = Reserved flags: 0x0
.... 0... = Server DDNS: Some server updates
.... .0.. = Encoding: ASCII encoding
.... ..0. = Server overrides: No override
....0 = Server: Client
A-RR result: 255
PTR-RR result: 255
Option: (3) Router
Length: 4
<Value: 0a0a0a01>
Router: 10.10.10.1
Option: (15) Domain Name
Length: 10
<Value: 636973636f2e636f6d00>
Domain Name: cisco.com
Option: (255) End
Option End: 255

主機1上的ACK

```
> Ethernet II, Src: 70:7d:b9:b8:4d:af, Dst: ff:ff:ff:ff:ff:ff
> Internet Protocol Version 4, Src: 10.10.10.1, Dst: 255.255.255.255
> User Datagram Protocol, Src Port: 67, Dst Port: 68
v Dynamic Host Configuration Protocol (ACK)
    Message type: Boot Reply (2)
    Hardware type: Ethernet (0x01)
    Hardware address length: 6
    Hops: 0
    Transaction ID: 0xe9e35087
    Seconds elapsed: 0
  v Bootp flags: 0x8000, Broadcast flag (Broadcast)
      1... .... .... .... = Broadcast flag: Broadcast
      .000 0000 0000 0000 = Reserved flags: 0x0000
    Client IP address: 0.0.0.0
    Your (client) IP address: 10.10.10.3
    Next server IP address: 0.0.0.0
    Relay agent IP address: 10.10.10.1
    Client MAC address: 00:50:56:a5:fd:dd
    Client hardware address padding: 00000000000000000000
    Server host name not given
    Boot file name not given
    Magic cookie: DHCP
  v Option: (53) DHCP Message Type (ACK)
      Length: 1
      <Value: 05>
      DHCP: ACK (5)
  v Option: (58) Renewal Time Value
      Length: 4
      <Value: 0000a8c0>
      Renewal Time Value: 12 hours (43200)
  v Option: (59) Rebinding Time Value
      Length: 4
      <Value: 00012750>
      Rebinding Time Value: 21 hours (75600)
  v Option: (51) IP Address Lease Time
      Length: 4
      <Value: 00015180>
      IP Address Lease Time: 1 day (86400)
  v Option: (54) DHCP Server Identifier (10.10.10.1)
      Length: 4
      <Value: 0a0a0a01>
      DHCP Server Identifier: 10.10.10.1
  v Option: (1) Subnet Mask (255.255.255.0)
      Length: 4
      <Value: ffffff00>
      Subnet Mask: 255.255.255.0
  v Option: (81) Client Fully Qualified Domain Name
      Length: 3
      <Value: 00ffff>
    v Flags: 0x00
        0000 .... = Reserved flags: 0x0
        .... 0... = Server DDNS: Some server updates
        .... .0.. = Encoding: ASCII encoding
        .... ..0. = Server overrides: No override
        .... ...0 = Server: Client
      A-RR result: 255
      PTR-RR result: 255
  v Option: (3) Router
      Length: 4
      <Value: 0a0a0a01>
      Router: 10.10.10.1
  v Option: (15) Domain Name
      Length: 10
      <Value: 636973636f2e636f6d00>
      Domain Name: cisco.com
  v Option: (255) End
      Option End: 255
```

相關資訊

設定VXLAN BGP EVPN

配置VXLAN

排除Nexus 9000上的DHCP相關問題

Cisco Nexus 9000系列NX-OS VXLAN配置指南，版本10.4(x)

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）。