

Solución de problemas relacionados con DHCP en Nexus 9000

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Introducción

Este documento describe los pasos para verificar la configuración adecuada para un agente de retransmisión DHCP en un Nexus 9000.

Prerequisites

Requirements

Cisco NXOS® recomienda que conozca estos temas:

- DHCP
- ELAM
- Etanizador

Componentes Utilizados

Este documento está restringido a hardware específico como Nexus 9000

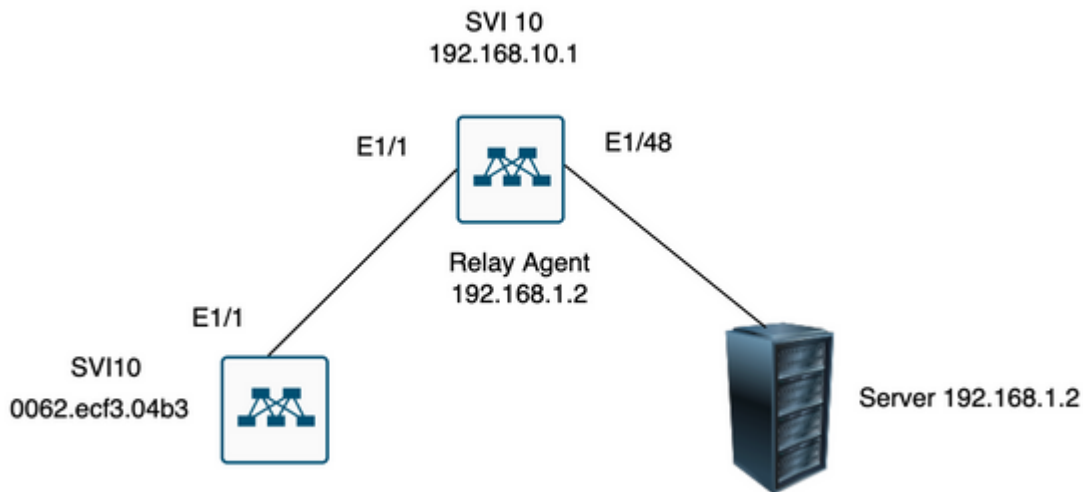
La información que contiene este documento se creó a partir de los dispositivos en un ambiente de laboratorio específico. Todos los dispositivos que se utilizan en este documento se pusieron en funcionamiento con una configuración verificada (predeterminada). Si tiene una red en vivo, asegúrese de entender el posible impacto de cualquier comando.

Antecedentes

Puede configurar el dispositivo para que ejecute un agente de retransmisión DHCP, que reenvía paquetes DHCP entre clientes y servidores. Esta característica es útil cuando los clientes y los servidores no están en la misma subred física. Los agentes de retransmisión reciben mensajes DHCP y, a continuación, generan un nuevo mensaje DHCP para enviarlo a otra interfaz.

Topología

Los switches Nexus funcionan como un relé DHCP para proporcionar una dirección IP al cliente desde el servidor.



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Verificación

1) Verifique la configuración del cliente (no se ha asignado ninguna dirección IP)

```
Client# show interface vlan 10
Vlan10 is up, line protocol is up, autostate enabled
Hardware is EtherSVI, address is 0062.ecf3.04b3
MTU 1500 bytes, BW 1000000 Kbit, DLY 10 usec,
reliability 255/255, txload 1/255, rxload 1/255
Encapsulation ARPA, loopback not set
Keepalive not supported
ARP type: ARPA
Last clearing of "show interface" counters never
L3 in Switched:
ucast: 0 pkts, 0 bytes
```

2) Verificar la configuración de DHCP

```
Switch1# show run dhcp
```

```
ip dhcp snooping
service dhcp
ip dhcp relay
ipv6 dhcp relay
```

```
interface Vlan10
 ip dhcp relay address 192.168.1.2
 ip dhcp snooping vlan 1,10
```

3) Compruebe la conectividad con el servidor

```
Switch1# ping 192.168.1.2
PING 192.168.1.2 (192.168.1.2): 56 data bytes
64 bytes from 192.168.1.2: icmp_seq=0 ttl=253 time=1.678 ms
64 bytes from 192.168.1.2: icmp_seq=1 ttl=253 time=1.329 ms
64 bytes from 192.168.1.2: icmp_seq=2 ttl=253 time=1.742 ms
64 bytes from 192.168.1.2: icmp_seq=3 ttl=253 time=1.382 ms
64 bytes from 192.168.1.2: icmp_seq=4 ttl=253 time=1.241 ms
--- 192.168.1.2 ping statistics ---
5 packets transmitted, 5 packets received, 0.00% packet loss
round-trip min/avg/max = 1.241/1.474/1.742 ms
Switch1#
```

```
Switch1# show ip route 192.168.1.2
IP Route Table for VRF "default"
 '*' denotes best ucast next-hop
 '**' denotes best mcast next-hop
 '[x/y]' denotes [preference/metric]
 '%<string>' in via output denotes VRF <string>
192.168.1.2/32, ubest/mbest: 1/0, attached
*via 192.168.1.2, Eth1/48, [250/0], 02:13:58, am
Switch1#
```

4) Avance para ver las estadísticas del DHCP y volver a comprobar que la información se ha enviado correctamente.

```
Switch1# show ip dhcp relay statistics interface vlan 10
```

```
-----
Message Type Rx Tx Drops
-----
```

```
Discover 1 1 0
Offer 1 1 0
Request(*) 1 1 0
Ack 1 1 0
Release(*) 0 0 0
Decline 0 0 0
Inform(*) 0 0 0
Nack 0 0 0
-----
```

```
Total 4 4 0
-----
```

```
DHCP server stats:
```

```
-----
Server Vrf Request Response
-----
```

192.168.1.2 2 2

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 show correct value when switch receives DHCP request packet with destination ip as broadcast address. If request is unicast it is being HW switched
Switch1#

Switch1# show ip dhcp global statistics

Packets processed 130
Packets received through cfsoe 0
Packets forwarded 24
Packets forwarded on cfsoe 0
Total packets dropped 106
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 106
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
Switch1#

Troubleshoot

1) Confirme que las estadísticas son correctas ejecutando un etanalizador.

Switch1# ethanalyzer local interface inband display-filter bootp limit-captured-frames 0
Capturing on inband

```

2023-07-18 21:30:01.935789 0.0.0.0 -> 255.255.255.255 DHCP DHCP Discover - Transaction ID 0x64b6400b
2023-07-18 21:30:01.937789 192.168.10.1 -> 192.168.1.2 DHCP DHCP Discover - Transaction ID 0x64b6400b
2023-07-18 21:30:03.938596 192.168.1.2 -> 192.168.10.1 DHCP DHCP Offer - Transaction ID 0x64b6400b
2023-07-18 21:30:03.938659 192.168.1.2 -> 192.168.10.1 DHCP DHCP Offer - Transaction ID 0x64b6400b
2023-07-18 21:30:03.940103 192.168.10.1 -> 255.255.255.255 DHCP DHCP Offer - Transaction ID 0x64b6400b
2023-07-18 21:30:07.939208 0.0.0.0 -> 255.255.255.255 DHCP DHCP Request - Transaction ID 0x64b6400b
2023-07-18 21:30:07.941220 192.168.10.1 -> 192.168.1.2 DHCP DHCP Request - Transaction ID 0x64b6400b
2023-07-18 21:30:07.941848 192.168.1.2 -> 192.168.10.1 DHCP DHCP ACK - Transaction ID 0x64b6400b
2023-07-18 21:30:07.941897 192.168.1.2 -> 192.168.10.1 DHCP DHCP ACK - Transaction ID 0x64b6400b
2023-07-18 21:30:07.942693 192.168.10.1 -> 255.255.255.255 DHCP DHCP ACK - Transaction ID 0x64b6400b

```

2) Ethalyzer tiene una opción de detalle que proporciona información adicional incluyendo los encabezados del tráfico capturado.

```
ethalyzer local interface inband display-filter "((eth.addr==<MAC_address> and bootp ))" limit-capture
```

3) Agregar el indicador de detalle en la captura de ethalyzer proporciona más detalles sobre la comunicación entre el cliente y el servidor.

[1] El agente de retransmisión recibe una detección de DHCP del cliente como difusión:

El MAC de origen es el MAC del cliente: 00:62:ec:f3:04:b3

La dirección MAC de destino se difunde: ff:ff:ff:ff:ff:ff

Como el cliente no tiene una dirección IP, la IP de origen es 0.0.0.0

IP de origen: 0.0.0.0

IP de destino: 255 255 255 255

Puerto de origen: bootpc (68)

Puerto de destino: bootps (67)

Tipo de mensaje: Boot Request (1)

Tipo de mensaje DHCP = DHCP Discover

Frame 14 (358 bytes on wire, 358 bytes captured)

Arrival Time: Jul 19, 2023 21:53:29.339064000

[Time delta from previous captured frame: 0.096490000 seconds]

[Time delta from previous displayed frame: 2.618117000 seconds]

[Time since reference or first frame: 2.618117000 seconds]

Frame Number: 14

Frame Length: 358 bytes

Capture Length: 358 bytes

[Frame is marked: False]

[Protocols in frame: eth:vlan:ip:udp:bootp]

Ethernet II, Src: 00:62:ec:f3:04:b3 (00:62:ec:f3:04:b3), Dst: ff:ff:ff:ff:ff:ff (ff:ff:ff:ff:ff:ff)

Destination: ff:ff:ff:ff:ff:ff (ff:ff:ff:ff:ff:ff)

Address: ff:ff:ff:ff:ff:ff (ff:ff:ff:ff:ff:ff)

.... 1 = IG bit: Group address (multicast/broadcast)

.... .1. = LG bit: Locally administered address (this is NOT the factory default)

Source: 00:62:ec:f3:04:b3 (00:62:ec:f3:04:b3)

Address: 00:62:ec:f3:04:b3 (00:62:ec:f3:04:b3)

.... 0 = IG bit: Individual address (unicast)

.... .0. = LG bit: Globally unique address (factory default)

Type: 802.1Q Virtual LAN (0x8100)

802.1Q Virtual LAN, PRI: 0, CFI: 0, ID: 10

000. = Priority: 0
...0 = CFI: 0
.... 0000 0000 1010 = ID: 10
Type: IP (0x0800)
Internet Protocol, Src: 0.0.0.0 (0.0.0.0), Dst: 255.255.255.255 (255.255.255.255)
Version: 4
Header length: 20 bytes
Differentiated Services Field: 0x00 (DSCP 0x00: Default; ECN: 0x00)
0000 00.. = Differentiated Services Codepoint: Default (0x00)
.... ..0. = ECN-Capable Transport (ECT): 0
.... ...0 = ECN-CE: 0
Total Length: 340
Identification: 0x0000 (0)
Flags: 0x00
0.. = Reserved bit: Not Set
.0. = Do not fragment: Not Set
..0 = More fragments: Not Set
Fragment offset: 0
Time to live: 255
Protocol: UDP (0x11)
Header checksum: 0xba99 [correct]
[Good: True]
[Bad : False]
Source: 0.0.0.0 (0.0.0.0)
Destination: 255.255.255.255 (255.255.255.255)
User Datagram Protocol, Src Port: bootpc (68), Dst Port: bootps (67)
Source port: bootpc (68)
Destination port: bootps (67)
Length: 320
Checksum: 0x2bbb [validation disabled]
[Good Checksum: False]
[Bad Checksum: False]
Bootstrap Protocol
Message type: Boot Request (1)
Hardware type: Ethernet
Hardware address length: 6
Hops: 0
Transaction ID: 0x64b14fa7
Seconds elapsed: 0
Bootp flags: 0x8000 (Broadcast)
1... = Broadcast flag: Broadcast
.000 0000 0000 0000 = Reserved flags: 0x0000
Client IP address: 0.0.0.0 (0.0.0.0)
Your (client) IP address: 0.0.0.0 (0.0.0.0)
Next server IP address: 0.0.0.0 (0.0.0.0)
Relay agent IP address: 0.0.0.0 (0.0.0.0)
Client MAC address: 00:62:ec:f3:04:b3 (00:62:ec:f3:04:b3)
Client hardware address padding: 00000000000000000000
Server host name not given
Boot file name not given
Magic cookie: (OK)
Option: (t=53,l=1) DHCP Message Type = DHCP Discover
Option: (53) DHCP Message Type
Length: 1
Value: 01
Option: (t=61,l=18) Client identifier
Option: (61) Client identifier
Length: 18
Value: 0046444F3230323431435548566C616E3130
Option: (t=51,l=4) IP Address Lease Time = 2 hours
Option: (51) IP Address Lease Time
Length: 4

```
Value: 00001C20
Option: (t=60,l=19) Vendor class identifier = "Cisco NXOS® N9K-C9372PX-E"
Option: (60) Vendor class identifier
Length: 19
Value: 436973636F204E394B2D433933373250582D45
Option: (t=43,l=8) Vendor-Specific Information
Option: (43) Vendor-Specific Information
Length: 8
Value: F1060062ECF304AC
Option: (t=55,l=8) Parameter Request List
Option: (55) Parameter Request List
Length: 8
Value: 010306070C424396
1 = Subnet Mask
3 = Router
6 = Domain Name Server
7 = Log Server
12 = Host Name
66 = TFTP Server Name
67 = Bootfile name
150 = TFTP server address
End Option
Padding
Frame 15 (354 bytes on wire, 354 bytes captured)
Arrival Time: Jul 19, 2023 21:53:29.340263000
[Time delta from previous captured frame: 0.001199000 seconds]
[Time delta from previous displayed frame: 0.001199000 seconds]
[Time since reference or first frame: 2.619316000 seconds]
Frame Number: 15
Frame Length: 354 bytes
Capture Length: 354 bytes
[Frame is marked: False]
[Protocols in frame: eth:ip:udp:bootp]
Ethernet II, Src: 6c:31:0e:a3:0c:57 (6c:31:0e:a3:0c:57), Dst: c4:c6:03:09:cf:47 (c4:c6:03:09:cf:47)
Destination: c4:c6:03:09:cf:47 (c4:c6:03:09:cf:47)
Address: c4:c6:03:09:cf:47 (c4:c6:03:09:cf:47)
.... 0 .... = IG bit: Individual address (unicast)
.... 0. .... = LG bit: Globally unique address (factory default)
Source: 6c:31:0e:a3:0c:57 (6c:31:0e:a3:0c:57)
Address: 6c:31:0e:a3:0c:57 (6c:31:0e:a3:0c:57)
.... 0 .... = IG bit: Individual address (unicast)
.... 0. .... = LG bit: Globally unique address (factory default)
Type: IP (0x0800)
```

[2] El agente de retransmisión envía una detección mediante unidifusión al servidor.

La MAC de origen es la MAC de nexus: 6c:31:0e:a3:0c:57

El MAC de destino es un servidor DHCP MAC: c4:c6:03:09:cf:47

La IP de origen es la IP de Nexus en SVI10:192.168.10.1

La IP de destino es la IP del servidor DHCP: 192.168.1.2

Puerto de origen: bootps (67)

Puerto de destino: bootps (67)

Dirección MAC del cliente: 00:62:ec:f3:04:b3 <<<<<< La dirección MAC del cliente se incluye en el encabezado UDP/DHCP

Tipo de mensaje: Boot Request (1)

Tipo de mensaje DHCP = DHCP Discover

Frame 15 (354 bytes on wire, 354 bytes captured)

Arrival Time: Jul 19, 2023 21:53:29.340263000

[Time delta from previous captured frame: 0.001199000 seconds]
[Time delta from previous displayed frame: 0.001199000 seconds]
[Time since reference or first frame: 2.619316000 seconds]
Frame Number: 15
Frame Length: 354 bytes
Capture Length: 354 bytes
[Frame is marked: False]
[Protocols in frame: eth:ip:udp:bootp]
Ethernet II, Src: 6c:31:0e:a3:0c:57 (6c:31:0e:a3:0c:57), Dst: c4:c6:03:09:cf:47 (c4:c6:03:09:cf:47)
Destination: c4:c6:03:09:cf:47 (c4:c6:03:09:cf:47)
Address: c4:c6:03:09:cf:47 (c4:c6:03:09:cf:47)
.... 0 = IG bit: Individual address (unicast)
.... 0. = LG bit: Globally unique address (factory default)
Source: 6c:31:0e:a3:0c:57 (6c:31:0e:a3:0c:57)
Address: 6c:31:0e:a3:0c:57 (6c:31:0e:a3:0c:57)
.... 0 = IG bit: Individual address (unicast)
.... 0. = LG bit: Globally unique address (factory default)
Type: IP (0x0800)

Internet Protocol, Src: 192.168.10.1 (192.168.10.1), Dst: 192.168.1.2 (192.168.1.2)
Version: 4
Header length: 20 bytes
Differentiated Services Field: 0x00 (DSCP 0x00: Default; ECN: 0x00)
0000 00.. = Differentiated Services Codepoint: Default (0x00)
.... 0. = ECN-Capable Transport (ECT): 0
.... 0 = ECN-CE: 0
Total Length: 340
Identification: 0xefab (61355)
Flags: 0x00
0.. = Reserved bit: Not Set
.0. = Do not fragment: Not Set
..0 = More fragments: Not Set
Fragment offset: 0
Time to live: 255
Protocol: UDP (0x11)
Header checksum: 0x3e99 [correct]
[Good: True]
[Bad : False]
Source: 192.168.10.1 (192.168.10.1)
Destination: 192.168.1.2 (192.168.1.2)
User Datagram Protocol, Src Port: bootps (67), Dst Port: bootps (67)
Source port: bootps (67)
Destination port: bootps (67)
Length: 320
Checksum: 0xd4bc [validation disabled]
[Good Checksum: False]
[Bad Checksum: False]
Bootstrap Protocol
Message type: Boot Request (1)
Hardware type: Ethernet
Hardware address length: 6
Hops: 1
Transaction ID: 0x64b14fa7
Seconds elapsed: 0
Bootp flags: 0x8000 (Broadcast)
1... = Broadcast flag: Broadcast
.000 0000 0000 0000 = Reserved flags: 0x0000
Client IP address: 0.0.0.0 (0.0.0.0)
Your (client) IP address: 0.0.0.0 (0.0.0.0)
Next server IP address: 0.0.0.0 (0.0.0.0)
Relay agent IP address: 192.168.10.1 (192.168.10.1)

Client MAC address: 00:62:ec:f3:04:b3 (00:62:ec:f3:04:b3)
Client hardware address padding: 00000000000000000000
Server host name not given
Boot file name not given
Magic cookie: (OK)
Option: (t=53,l=1) DHCP Message Type = DHCP Discover
Option: (53) DHCP Message Type
Length: 1
Value: 01
Option: (t=61,l=18) Client identifier
Option: (61) Client identifier
Length: 18
Value: 0046444F3230323431435548566C616E3130
Option: (t=51,l=4) IP Address Lease Time = 2 hours
Option: (51) IP Address Lease Time
Length: 4
Value: 00001C20
Option: (t=60,l=19) Vendor class identifier = "Cisco NXOS® N9K-C9372PX-E"
Option: (60) Vendor class identifier
Length: 19
Value: 436973636F204E394B2D433933373250582D45
Option: (t=43,l=8) Vendor-Specific Information
Option: (43) Vendor-Specific Information
Length: 8
Value: F1060062ECF304AC
Option: (t=55,l=8) Parameter Request List
Option: (55) Parameter Request List
Length: 8
Value: 010306070C424396
1 = Subnet Mask
3 = Router
6 = Domain Name Server
7 = Log Server
12 = Host Name
66 = TFTP Server Name
67 = Bootfile name
150 = TFTP server address
End Option
Padding

[3] El servidor responde la oferta de unidifusión al agente de retransmisión.

El MAC de origen es DHCP Server MAC: c4:c6:03:09:cf:47

El MAC de destino es Nexus MAC: 6c:31:0e:a3:0c:57

La IP de origen es el servidor DHCP: 192.168.1.2

IP de destino de Nexus IP en SVI10: 192.168.10.1

Puerto de origen: bootps (67)

Puerto de destino: bootps (67)

Tipo de mensaje: Respuesta de inicio (2)

Su dirección IP (cliente): 192.168.10.19 (192.168.10.19) <<<<< Este paquete de oferta incluye la dirección IP que se asignará al cliente

Dirección MAC del cliente: 00:62:ec:f3:04:b3 (00:62:ec:f3:04:b3) <<<< dirección MAC del cliente

Tipo de mensaje DHCP = Oferta DHCP

Frame 27 (348 bytes on wire, 348 bytes captured)

Arrival Time: Jul 19, 2023 21:53:31.340920000

[Time delta from previous captured frame: 0.097549000 seconds]

[Time delta from previous displayed frame: 2.000657000 seconds]

[Time since reference or first frame: 4.619973000 seconds]

Frame Number: 27

Frame Length: 348 bytes
Capture Length: 348 bytes
[Frame is marked: False]
[Protocols in frame: eth:ip:udp:bootp]
Ethernet II, Src: c4:c6:03:09:cf:47 (c4:c6:03:09:cf:47), Dst: 6c:31:0e:a3:0c:57 (6c:31:0e:a3:0c:57)
Destination: 6c:31:0e:a3:0c:57 (6c:31:0e:a3:0c:57)
Address: 6c:31:0e:a3:0c:57 (6c:31:0e:a3:0c:57)
.... 0 = IG bit: Individual address (unicast)
.... 0. = LG bit: Globally unique address (factory default)
Source: c4:c6:03:09:cf:47 (c4:c6:03:09:cf:47)
Address: c4:c6:03:09:cf:47 (c4:c6:03:09:cf:47)
.... 0 = IG bit: Individual address (unicast)
.... 0. = LG bit: Globally unique address (factory default)
Type: IP (0x0800)
Internet Protocol, Src: 192.168.1.2 (192.168.1.2), Dst: 192.168.10.1 (192.168.10.1)
Version: 4
Header length: 20 bytes
Differentiated Services Field: 0x00 (DSCP 0x00: Default; ECN: 0x00)
0000 00.. = Differentiated Services Codepoint: Default (0x00)
.... 0. = ECN-Capable Transport (ECT): 0
.... 0 = ECN-CE: 0
Total Length: 334
Identification: 0x0014 (20)
Flags: 0x00
0.. = Reserved bit: Not Set
.0. = Do not fragment: Not Set
..0 = More fragments: Not Set
Fragment offset: 0
Time to live: 254
Protocol: UDP (0x11)
Header checksum: 0x2f37 [correct]
[Good: True]
[Bad : False]
Source: 192.168.1.2 (192.168.1.2)
Destination: 192.168.10.1 (192.168.10.1)
User Datagram Protocol, Src Port: bootps (67), Dst Port: bootps (67)
Source port: bootps (67)
Destination port: bootps (67)
Length: 314
Checksum: 0x0500 [validation disabled]
[Good Checksum: False]
[Bad Checksum: False]
Bootstrap Protocol
Message type: Boot Reply (2)
Hardware type: Ethernet
Hardware address length: 6
Hops: 0
Transaction ID: 0x64b14fa7
Seconds elapsed: 0
Bootp flags: 0x8000 (Broadcast)
1... = Broadcast flag: Broadcast
.000 0000 0000 0000 = Reserved flags: 0x0000
Client IP address: 0.0.0.0 (0.0.0.0)
Your (client) IP address: 192.168.10.19 (192.168.10.19)
Next server IP address: 0.0.0.0 (0.0.0.0)
Relay agent IP address: 192.168.10.1 (192.168.10.1)
Client MAC address: 00:62:ec:f3:04:b3 (00:62:ec:f3:04:b3)
Client hardware address padding: 00000000000000000000
Server host name not given
Boot file name not given
Magic cookie: (OK)
Option: (t=53,l=1) DHCP Message Type = DHCP Offer

Option: (53) DHCP Message Type
Length: 1
Value: 02
Option: (t=61,l=18) Client identifier
Option: (61) Client identifier
Length: 18
Value: 0046444F3230323431435548566C616E3130
Option: (t=54,l=4) DHCP Server Identifier = 192.168.1.2
Option: (54) DHCP Server Identifier
Length: 4
Value: C0A80102
Option: (t=51,l=4) IP Address Lease Time = 1 day
Option: (51) IP Address Lease Time
Length: 4
Value: 00015180
Option: (t=58,l=4) Renewal Time Value = 12 hours
Option: (58) Renewal Time Value
Length: 4
Value: 0000A8C0
Option: (t=59,l=4) Rebinding Time Value = 21 hours
Option: (59) Rebinding Time Value
Length: 4
Value: 00012750
Option: (t=1,l=4) Subnet Mask = 255.255.255.0
Option: (1) Subnet Mask
Length: 4
Value: FFFFFFF0
Option: (t=3,l=4) Router = 192.168.1.2
Option: (3) Router
Length: 4
Value: C0A80102
Option: (t=6,l=4) Domain Name Server = 8.8.8.8
Option: (6) Domain Name Server
Length: 4
Value: 08080808
End Option

[4] El agente de retransmisión reenvía la oferta de DHCP desde el servidor DHCP mediante difusión; este paquete de difusión lo recibe la subred, pero incluye la dirección MAC del cliente, por lo que solo el propietario de la dirección MAC procesa este paquete.

La MAC de origen es la MAC de nexus: 6c:31:0e:a3:0c:57

La dirección MAC de destino se difunde: ff:ff:ff:ff:ff

La IP de origen es la IP de Nexus en SVI10:192.168.10.1

La IP de destino es la dirección de difusión: 255.255.255.255

Puerto de origen: bootps (67)

Puerto de destino: bootpc (68)

Tipo de mensaje: Respuesta de inicio (2)

Su dirección IP (cliente): 192.168.10.19

Dirección MAC del cliente: 00:62:ec:f3:04:b3

Tipo de mensaje DHCP = Oferta DHCP

Frame 28 (348 bytes on wire, 348 bytes captured)

Arrival Time: Jul 19, 2023 21:53:31.341325000

[Time delta from previous captured frame: 0.000405000 seconds]

[Time delta from previous displayed frame: 0.000405000 seconds]

[Time since reference or first frame: 4.620378000 seconds]

Frame Number: 28

Frame Length: 348 bytes
Capture Length: 348 bytes
[Frame is marked: False]
[Protocols in frame: eth:ip:udp:bootp]
Ethernet II, Src: 6c:31:0e:a3:0c:57 (6c:31:0e:a3:0c:57), Dst: ff:ff:ff:ff:ff:ff (ff:ff:ff:ff:ff:ff)
Destination: ff:ff:ff:ff:ff:ff (ff:ff:ff:ff:ff:ff)
Address: ff:ff:ff:ff:ff:ff (ff:ff:ff:ff:ff:ff)
.... 1. = IG bit: Group address (multicast/broadcast)
.... 1. = LG bit: Locally administered address (this is NOT the factory default)
Source: 6c:31:0e:a3:0c:57 (6c:31:0e:a3:0c:57)
Address: 6c:31:0e:a3:0c:57 (6c:31:0e:a3:0c:57)
.... 0. = IG bit: Individual address (unicast)
.... 0. = LG bit: Globally unique address (factory default)
Type: IP (0x0800)
Internet Protocol, Src: 192.168.10.1 (192.168.10.1), Dst: 255.255.255.255 (255.255.255.255)
Version: 4
Header length: 20 bytes
Differentiated Services Field: 0x00 (DSCP 0x00: Default; ECN: 0x00)
0000 00.. = Differentiated Services Codepoint: Default (0x00)
.... 0. = ECN-Capable Transport (ECT): 0
.... 0 = ECN-CE: 0
Total Length: 334
Identification: 0x1400 (5120)
Flags: 0x00
0.. = Reserved bit: Not Set
.0. = Do not fragment: Not Set
..0 = More fragments: Not Set
Fragment offset: 0
Time to live: 255
Protocol: UDP (0x11)
Header checksum: 0xdbf5 [correct]
[Good: True]
[Bad : False]
Source: 192.168.10.1 (192.168.10.1)
Destination: 255.255.255.255 (255.255.255.255)
User Datagram Protocol, Src Port: bootps (67), Dst Port: bootpc (68)
Source port: bootps (67)
Destination port: bootpc (68)
Length: 314
Checksum: 0xc6a8 [validation disabled]
[Good Checksum: False]
[Bad Checksum: False]
Bootstrap Protocol
Message type: Boot Reply (2)
Hardware type: Ethernet
Hardware address length: 6
Hops: 1
Transaction ID: 0x64b14fa7
Seconds elapsed: 0
Bootp flags: 0x8000 (Broadcast)
1... = Broadcast flag: Broadcast
.000 0000 0000 0000 = Reserved flags: 0x0000
Client IP address: 0.0.0.0 (0.0.0.0)
Your (client) IP address: 192.168.10.19 (192.168.10.19)
Next server IP address: 0.0.0.0 (0.0.0.0)
Relay agent IP address: 192.168.10.1 (192.168.10.1)
Client MAC address: 00:62:ec:f3:04:b3 (00:62:ec:f3:04:b3)
Client hardware address padding: 00000000000000000000
Server host name not given
Boot file name not given
Magic cookie: (OK)
Option: (t=53,l=1) DHCP Message Type = DHCP Offer

Option: (53) DHCP Message Type
Length: 1
Value: 02
Option: (t=61,l=18) Client identifier
Option: (61) Client identifier
Length: 18
Value: 0046444F3230323431435548566C616E3130
Option: (t=54,l=4) DHCP Server Identifier = 192.168.1.2
Option: (54) DHCP Server Identifier
Length: 4
Value: C0A80102
Option: (t=51,l=4) IP Address Lease Time = 1 day
Option: (51) IP Address Lease Time
Length: 4
Value: 00015180
Option: (t=58,l=4) Renewal Time Value = 12 hours
Option: (58) Renewal Time Value
Length: 4
Value: 0000A8C0
Option: (t=59,l=4) Rebinding Time Value = 21 hours
Option: (59) Rebinding Time Value
Length: 4
Value: 00012750
Option: (t=1,l=4) Subnet Mask = 255.255.255.0
Option: (1) Subnet Mask
Length: 4
Value: FFFFFFF0
Option: (t=3,l=4) Router = 192.168.1.2
Option: (3) Router
Length: 4
Value: C0A80102
Option: (t=6,l=4) Domain Name Server = 8.8.8.8
Option: (6) Domain Name Server
Length: 4
Value: 08080808
End Option

[5] El agente de retransmisión recibe una solicitud del cliente y se transmite.

El MAC de origen es el MAC del cliente: 00:62:ec:f3:04:b3

La dirección MAC de destino se difunde: ff:ff:ff:ff:ff

En este momento, el cliente aún no tiene una dirección IP, la IP de origen sigue siendo 0.0.0.0

IP de origen: 0.0.0.0

IP de destino: 255 255 255 255

Puerto de origen: bootpc (68)

Puerto de destino: bootps (67)

Tipo de mensaje: Boot Request (1) <<<< este mensaje es la solicitud del cliente para la dirección IP 192.168.10.19

Dirección IP solicitada = 192.168.10.19 <<<<<<<< cliente que solicita la IP asignada por el servidor DHCP

Tipo de mensaje DHCP = Solicitud DHCP

Frame 47 (370 bytes on wire, 370 bytes captured)

Arrival Time: Jul 19, 2023 21:53:35.342380000

[Time delta from previous captured frame: 0.097649000 seconds]

[Time delta from previous displayed frame: 4.001055000 seconds]

[Time since reference or first frame: 8.621433000 seconds]

Frame Number: 47

Frame Length: 370 bytes

Capture Length: 370 bytes

```
[Frame is marked: False]
[Protocols in frame: eth:vlan:ip:udp:bootp]
Ethernet II, Src: 00:62:ec:f3:04:b3 (00:62:ec:f3:04:b3), Dst: ff:ff:ff:ff:ff:ff (ff:ff:ff:ff:ff:ff)
Destination: ff:ff:ff:ff:ff:ff (ff:ff:ff:ff:ff:ff)
Address: ff:ff:ff:ff:ff:ff (ff:ff:ff:ff:ff:ff)
.... ..1 .... = IG bit: Group address (multicast/broadcast)
.... ..1. .... = LG bit: Locally administered address (this is NOT the factory default)
Source: 00:62:ec:f3:04:b3 (00:62:ec:f3:04:b3)
Address: 00:62:ec:f3:04:b3 (00:62:ec:f3:04:b3)
.... ..0 .... = IG bit: Individual address (unicast)
.... ..0. .... = LG bit: Globally unique address (factory default)
Type: 802.1Q Virtual LAN (0x8100)
802.1Q Virtual LAN, PRI: 0, CFI: 0, ID: 10
000. .... = Priority: 0
...0 .... = CFI: 0
.... 0000 0000 1010 = ID: 10
Type: IP (0x0800)
Internet Protocol, Src: 0.0.0.0 (0.0.0.0), Dst: 255.255.255.255 (255.255.255.255)
Version: 4
Header length: 20 bytes
Differentiated Services Field: 0x00 (DSCP 0x00: Default; ECN: 0x00)
0000 00.. = Differentiated Services Codepoint: Default (0x00)
.... ..0. = ECN-Capable Transport (ECT): 0
.... ...0 = ECN-CE: 0
Total Length: 352
Identification: 0x0000 (0)
Flags: 0x00
0.. = Reserved bit: Not Set
.0. = Do not fragment: Not Set
..0 = More fragments: Not Set
Fragment offset: 0
Time to live: 255
Protocol: UDP (0x11)
Header checksum: 0xba8d [correct]
[Good: True]
[Bad : False]
Source: 0.0.0.0 (0.0.0.0)
Destination: 255.255.255.255 (255.255.255.255)
User Datagram Protocol, Src Port: bootpc (68), Dst Port: bootps (67)
Source port: bootpc (68)
Destination port: bootps (67)
Length: 332
Checksum: 0xbaae [validation disabled]
[Good Checksum: False]
[Bad Checksum: False]
Bootstrap Protocol
Message type: Boot Request (1)
Hardware type: Ethernet
Hardware address length: 6
Hops: 0
Transaction ID: 0x64b14fa7
Seconds elapsed: 0
Bootp flags: 0x8000 (Broadcast)
1... .... = Broadcast flag: Broadcast
.000 0000 0000 0000 = Reserved flags: 0x0000
Client IP address: 0.0.0.0 (0.0.0.0)
Your (client) IP address: 0.0.0.0 (0.0.0.0)
Next server IP address: 0.0.0.0 (0.0.0.0)
Relay agent IP address: 0.0.0.0 (0.0.0.0)
Client MAC address: 00:62:ec:f3:04:b3 (00:62:ec:f3:04:b3)
Client hardware address padding: 00000000000000000000
Server host name not given
```

Boot file name not given
Magic cookie: (OK)
Option: (t=53,l=1) DHCP Message Type = DHCP Request
Option: (53) DHCP Message Type
Length: 1
Value: 03
Option: (t=61,l=18) Client identifier
Option: (61) Client identifier
Length: 18
Value: 0046444F3230323431435548566C616E3130
Option: (t=50,l=4) Requested IP Address = 192.168.10.19
Option: (50) Requested IP Address
Length: 4
Value: C0A80A13
Option: (t=51,l=4) IP Address Lease Time = 2 hours
Option: (51) IP Address Lease Time
Length: 4
Value: 00001C20
Option: (t=54,l=4) DHCP Server Identifier = 192.168.1.2
Option: (54) DHCP Server Identifier
Length: 4
Value: C0A80102
Option: (t=60,l=19) Vendor class identifier = "Cisco NXOS® N9K-C9372PX-E"
Option: (60) Vendor class identifier
Length: 19
Value: 436973636F204E394B2D433933373250582D45
Option: (t=43,l=8) Vendor-Specific Information
Option: (43) Vendor-Specific Information
Length: 8
Value: F1060062ECF304AC
Option: (t=55,l=8) Parameter Request List
Option: (55) Parameter Request List
Length: 8
Value: 010306070C424396
1 = Subnet Mask
3 = Router
6 = Domain Name Server
7 = Log Server
12 = Host Name
66 = TFTP Server Name
67 = Bootfile name
150 = TFTP server address
End Option
Padding

[6] El agente de retransmisión reenvía la solicitud DHCP del cliente al servidor DHCP.

La MAC de origen es la MAC de nexus: 6c:31:0e:a3:0c:57

El MAC de destino es un servidor DHCP MAC: c4:c6:03:09:cf:47

La IP de origen es la IP de Nexus en SVI10:192.168.10.1

La IP de destino es la IP del servidor DHCP: 192.168.1.2

Puerto de origen: bootps (67)

Puerto de destino: bootps (67)

Tipo de mensaje: Boot Request (1)

Dirección IP solicitada = 192.168.10.19

Dirección MAC del cliente: 00:62:ec:f3:04:b3 <<<<<< La dirección MAC del cliente se incluye en el encabezado UDP/DHCP

Tipo de mensaje DHCP = Solicitud DHCP

Frame 48 (366 bytes on wire, 366 bytes captured)
Arrival Time: Jul 19, 2023 21:53:35.343718000
[Time delta from previous captured frame: 0.001338000 seconds]
[Time delta from previous displayed frame: 0.001338000 seconds]
[Time since reference or first frame: 8.622771000 seconds]
Frame Number: 48
Frame Length: 366 bytes
Capture Length: 366 bytes
[Frame is marked: False]
[Protocols in frame: eth:ip:udp:bootp]
Ethernet II, Src: 6c:31:0e:a3:0c:57 (6c:31:0e:a3:0c:57), Dst: c4:c6:03:09:cf:47 (c4:c6:03:09:cf:47)
Destination: c4:c6:03:09:cf:47 (c4:c6:03:09:cf:47)
Address: c4:c6:03:09:cf:47 (c4:c6:03:09:cf:47)
.... 0. = IG bit: Individual address (unicast)
.... 0. = LG bit: Globally unique address (factory default)
Source: 6c:31:0e:a3:0c:57 (6c:31:0e:a3:0c:57)
Address: 6c:31:0e:a3:0c:57 (6c:31:0e:a3:0c:57)
.... 0. = IG bit: Individual address (unicast)
.... 0. = LG bit: Globally unique address (factory default)
Type: IP (0x0800)
Internet Protocol, Src: 192.168.10.1 (192.168.10.1), Dst: 192.168.1.2 (192.168.1.2)
Version: 4
Header length: 20 bytes
Differentiated Services Field: 0x00 (DSCP 0x00: Default; ECN: 0x00)
0000 00.. = Differentiated Services Codepoint: Default (0x00)
.... 0. = ECN-Capable Transport (ECT): 0
.... 0. = ECN-CE: 0
Total Length: 352
Identification: 0xefac (61356)
Flags: 0x00
0.. = Reserved bit: Not Set
.0. = Do not fragment: Not Set
..0 = More fragments: Not Set
Fragment offset: 0
Time to live: 255
Protocol: UDP (0x11)
Header checksum: 0x3e8c [correct]
[Good: True]
[Bad : False]
Source: 192.168.10.1 (192.168.10.1)
Destination: 192.168.1.2 (192.168.1.2)
User Datagram Protocol, Src Port: bootps (67), Dst Port: bootps (67)
Source port: bootps (67)
Destination port: bootps (67)
Length: 332
Checksum: 0x63b0 [validation disabled]
[Good Checksum: False]
[Bad Checksum: False]
Bootstrap Protocol
Message type: Boot Request (1)
Hardware type: Ethernet
Hardware address length: 6
Hops: 1
Transaction ID: 0x64b14fa7
Seconds elapsed: 0
Bootp flags: 0x8000 (Broadcast)
1... = Broadcast flag: Broadcast
.000 0000 0000 0000 = Reserved flags: 0x0000
Client IP address: 0.0.0.0 (0.0.0.0)
Your (client) IP address: 0.0.0.0 (0.0.0.0)
Next server IP address: 0.0.0.0 (0.0.0.0)
Relay agent IP address: 192.168.10.1 (192.168.10.1)

Client MAC address: 00:62:ec:f3:04:b3 (00:62:ec:f3:04:b3)
Client hardware address padding: 00000000000000000000
Server host name not given
Boot file name not given
Magic cookie: (OK)
Option: (t=53,l=1) DHCP Message Type = DHCP Request
Option: (53) DHCP Message Type
Length: 1
Value: 03
Option: (t=61,l=18) Client identifier
Option: (61) Client identifier
Length: 18
Value: 0046444F3230323431435548566C616E3130
Option: (t=50,l=4) Requested IP Address = 192.168.10.19
Option: (50) Requested IP Address
Length: 4
Value: C0A80A13
Option: (t=51,l=4) IP Address Lease Time = 2 hours
Option: (51) IP Address Lease Time
Length: 4
Value: 00001C20
Option: (t=54,l=4) DHCP Server Identifier = 192.168.1.2
Option: (54) DHCP Server Identifier
Length: 4
Value: C0A80102
Option: (t=60,l=19) Vendor class identifier = "Cisco N9K-C9372PX-E"
Option: (60) Vendor class identifier
Length: 19
Value: 436973636F204E394B2D433933373250582D45
Option: (t=43,l=8) Vendor-Specific Information
Option: (43) Vendor-Specific Information
Length: 8
Value: F1060062ECF304AC
Option: (t=55,l=8) Parameter Request List
Option: (55) Parameter Request List
Length: 8
Value: 010306070C424396
1 = Subnet Mask
3 = Router
6 = Domain Name Server
7 = Log Server
12 = Host Name
66 = TFTP Server Name
67 = Bootfile name
150 = TFTP server address
End Option
Padding

[7] El servidor responde a la unidifusión (ACK) al agente de retransmisión.

El MAC de origen es DHCP Server MAC: c4:c6:03:09:cf:47

El MAC de destino es Nexus MAC: 6c:31:0e:a3:0c:57

La IP de origen es el servidor DHCP: 192.168.1.2

IP de destino de Nexus IP en SVI10: 192.168.10.1

Puerto de origen: bootps (67)

Puerto de destino: bootps (67)

Tipo de mensaje: Respuesta de inicio (2)

Su dirección IP (cliente): 192.168.10.19

Dirección MAC del cliente: 00:62:ec:f3:04:b3

Tipo de mensaje DHCP = DHCP ACK <<< Esta es la ACK del servidor

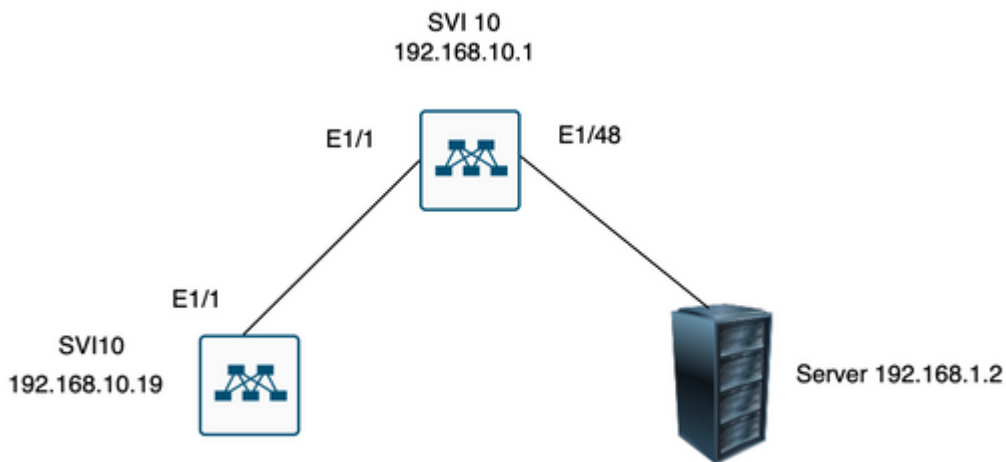
Frame 49 (348 bytes on wire, 348 bytes captured)
Arrival Time: Jul 19, 2023 21:53:35.344310000
[Time delta from previous captured frame: 0.000592000 seconds]
[Time delta from previous displayed frame: 0.000592000 seconds]
[Time since reference or first frame: 8.623363000 seconds]
Frame Number: 49
Frame Length: 348 bytes
Capture Length: 348 bytes
[Frame is marked: False]
[Protocols in frame: eth:ip:udp:bootp]
Ethernet II, Src: c4:c6:03:09:cf:47 (c4:c6:03:09:cf:47), Dst: 6c:31:0e:a3:0c:57 (6c:31:0e:a3:0c:57)
Destination: 6c:31:0e:a3:0c:57 (6c:31:0e:a3:0c:57)
Address: 6c:31:0e:a3:0c:57 (6c:31:0e:a3:0c:57)
.... 0 = IG bit: Individual address (unicast)
.... 0. = LG bit: Globally unique address (factory default)
Source: c4:c6:03:09:cf:47 (c4:c6:03:09:cf:47)
Address: c4:c6:03:09:cf:47 (c4:c6:03:09:cf:47)
.... 0 = IG bit: Individual address (unicast)
.... 0. = LG bit: Globally unique address (factory default)
Type: IP (0x0800)
Internet Protocol, Src: 192.168.1.2 (192.168.1.2), Dst: 192.168.10.1 (192.168.10.1)
Version: 4
Header length: 20 bytes
Differentiated Services Field: 0x00 (DSCP 0x00: Default; ECN: 0x00)
0000 00.. = Differentiated Services Codepoint: Default (0x00)
.... 0. = ECN-Capable Transport (ECT): 0
.... 0 = ECN-CE: 0
Total Length: 334
Identification: 0x0015 (21)
Flags: 0x00
0.. = Reserved bit: Not Set
.0. = Do not fragment: Not Set
..0 = More fragments: Not Set
Fragment offset: 0
Time to live: 254
Protocol: UDP (0x11)
Header checksum: 0x2f36 [correct]
[Good: True]
[Bad : False]
Source: 192.168.1.2 (192.168.1.2)
Destination: 192.168.10.1 (192.168.10.1)
User Datagram Protocol, Src Port: bootps (67), Dst Port: bootps (67)
Source port: bootps (67)
Destination port: bootps (67)
Length: 314
Checksum: 0x0200 [validation disabled]
[Good Checksum: False]
[Bad Checksum: False]
Bootstrap Protocol
Message type: Boot Reply (2)
Hardware type: Ethernet
Hardware address length: 6
Hops: 0
Transaction ID: 0x64b14fa7
Seconds elapsed: 0
Bootp flags: 0x8000 (Broadcast)
1... .. = Broadcast flag: Broadcast
.000 0000 0000 0000 = Reserved flags: 0x0000
Client IP address: 0.0.0.0 (0.0.0.0)
Your (client) IP address: 192.168.10.19 (192.168.10.19)
Next server IP address: 0.0.0.0 (0.0.0.0)

Relay agent IP address: 192.168.10.1 (192.168.10.1)
Client MAC address: 00:62:ec:f3:04:b3 (00:62:ec:f3:04:b3)
Client hardware address padding: 00000000000000000000
Server host name not given
Boot file name not given
Magic cookie: (OK)
Option: (t=53,l=1) DHCP Message Type = DHCP ACK
Option: (53) DHCP Message Type
Length: 1
Value: 05
Option: (t=61,l=18) Client identifier
Option: (61) Client identifier
Length: 18
Value: 0046444F3230323431435548566C616E3130
Option: (t=54,l=4) DHCP Server Identifier = 192.168.1.2
Option: (54) DHCP Server Identifier
Length: 4
Value: C0A80102
Option: (t=51,l=4) IP Address Lease Time = 1 day
Option: (51) IP Address Lease Time
Length: 4
Value: 00015180
Option: (t=58,l=4) Renewal Time Value = 12 hours
Option: (58) Renewal Time Value
Length: 4
Value: 0000A8C0
Option: (t=59,l=4) Rebinding Time Value = 21 hours
Option: (59) Rebinding Time Value
Length: 4
Value: 00012750
Option: (t=1,l=4) Subnet Mask = 255.255.255.0
Option: (1) Subnet Mask
Length: 4
Value: FFFFFFF0
Option: (t=3,l=4) Router = 192.168.1.2
Option: (3) Router
Length: 4
Value: C0A80102
Option: (t=6,l=4) Domain Name Server = 8.8.8.8
Option: (6) Domain Name Server
Length: 4
Value: 08080808
End Option

En este momento, el cliente comienza a utilizar la dirección IP y confirma que se ha asignado al cliente.

```
Client# show interface vlan 10
Vlan10 is up, line protocol is up, autostate enabled
Hardware is EtherSVI, address is 0062.ecf3.04b3
Internet Address is 192.168.10.19/24 <<<<<< It is using the IP address
MTU 1500 bytes, BW 1000000 Kbit, DLY 10 usec,
reliability 255/255, txload 1/255, rxload 1/255
Encapsulation ARPA, loopback not set
Keepalive not supported
ARP type: ARPA
Last clearing of "show interface" counters never
```

L3 in Switched:
ucast: 0 pkts, 0 bytes
Client#



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Información Relacionada

[Configuración de DHCP](#)

[Etanizador](#)

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