

# ASA: Ejemplo de configuración de DHCPv6 Relay y resolución de problemas

## Contenido

[Introducción](#)

[Prerequisites](#)

[Requirements](#)

[Componentes Utilizados](#)

[DHCPv6 con estado frente a DHCPv6 sin estado](#)

[Diagrama de la red](#)

[Tipos de mensajes DHCPv6 vs DHCPv4](#)

[Relay DHCPv6 sin información de estado](#)

[Configuración](#)

[Flujo de paquetes](#)

[Verificación](#)

[Depuraciones](#)

[Instantáneas Wireshark](#)

[DHCPv6 con estado](#)

[Configuración](#)

[Flujo de paquetes](#)

[Verificación](#)

[Depuraciones](#)

[Instantáneas Wireshark](#)

[Troubleshoot](#)

[Salidas de relé DHCP](#)

[Direcciones de lanzamiento](#)

[Depuraciones](#)

[Información Relacionada](#)

[Conversaciones relacionadas de la comunidad de soporte de Cisco](#)

## Introducción

El documento describe cómo configurar un Cisco Adaptive Security Appliance (ASA) como agente de relé DHCPv6 y también describe algunos aspectos básicos de la solución de problemas. En ASA Code versión 9.0 y posteriores, ASA admite

## Prerequisites

## Requirements

Cisco recomienda que tenga conocimiento sobre estos temas:

- Conceptos básicos de IPv6
- mecanismo de direccionamiento IPv6
- Flujo de paquetes DHCPv6
- conceptos de relé DHCP

## Componentes Utilizados

La información de este documento se basa en ASA 5500 Versión 9.1.2.

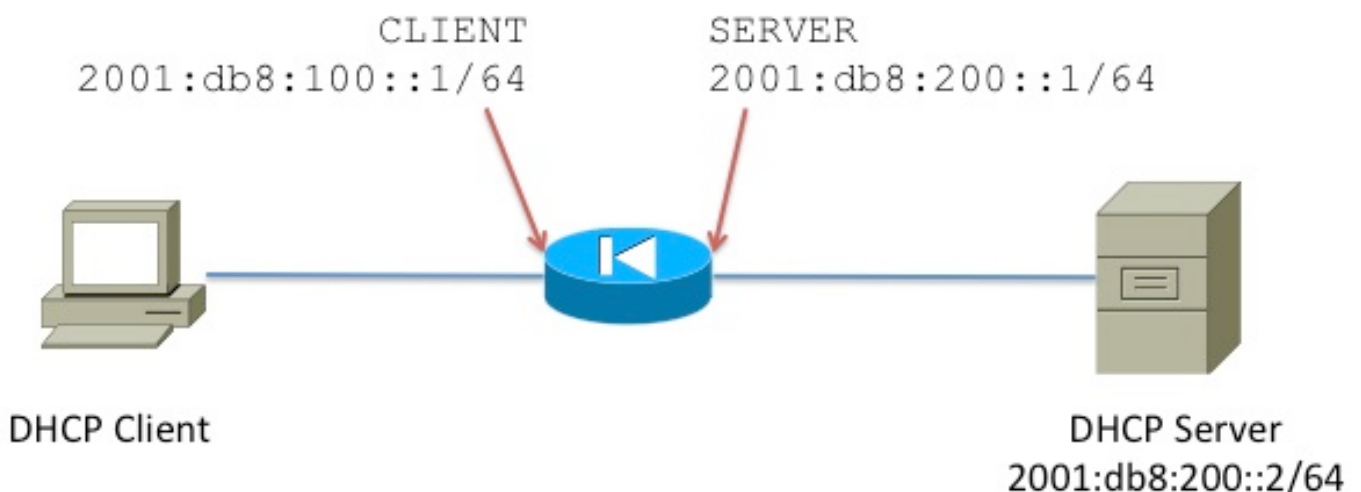
The information in this document was created from the devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If your network is live, make sure that you understand the potential impact of any command.

## DHCPv6 con estado frente a DHCPv6 sin estado

Si comprende los diferentes métodos de asignación de direcciones en IPv6, le ayuda a entender cómo funciona la función de relé DHCPv6 en el ASA. Consulte [Asignación dinámica de direcciones en IPv6 mediante SLAAC y DHCP](#) para obtener una introducción a la configuración automática de direcciones sin estado (SLAAC) y DHCPv6.

## Diagrama de la red

Esta configuración de ejemplo describe cómo configurar el ASA como agente relé DHCPv6. En esta configuración, **CLIENT** es la interfaz donde se conecta el cliente IPv6. **SERVER** es la interfaz a través de la cual se puede alcanzar el servidor DHCPv6 `2001:db8:200::2/64`.



## Tipos de mensajes DHCPv6 vs DHCPv4

DHCPv6 Message Type	DHCPv4 Message Type
Solicit (1)	DHCPDISCOVER
Advertise (2)	DHCPOFFER
Request (3), Renew (5), Rebind (6)	DHCPREQUEST
Reply (7)	DHCPACK / DHCPNAK
Release (8)	DHCPRELEASE
Information-Request (11)	DHCPINFORM
Decline (9)	DHCPDECLINE
Confirm (4)	none
Reconfigure (10)	DHCPFORCERENEW
Relay-Forw (12), Relay-Reply (13)	none

## Relay DHCPv6 sin información de estado

### Configuración

Esta es la configuración básica para la configuración de relé DHCPv6 sin estado en ASA:

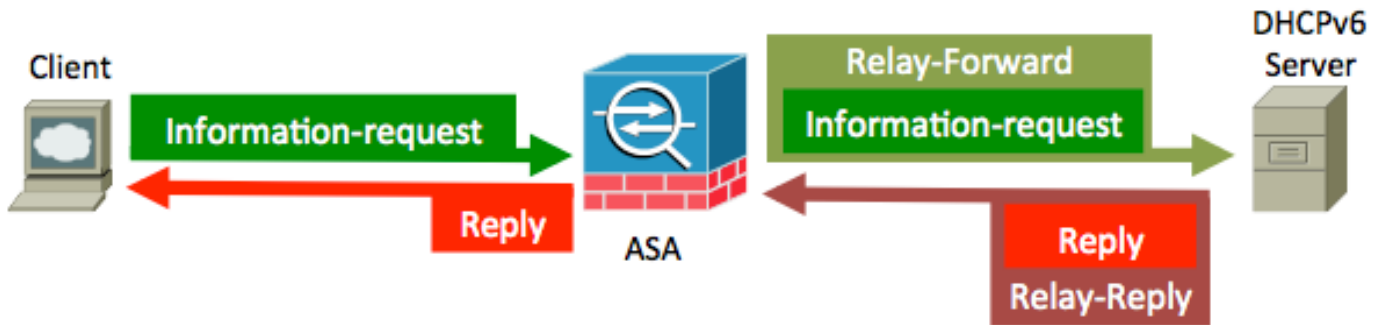
```
interface GigabitEthernet0/1
 nameif CLIENT
 security-level 100
 ipv6 address 2001:db8:100::1/64
 ipv6 enable
 ipv6 nd other-config-flag
!
interface GigabitEthernet0/0
 nameif SERVER
 security-level 0
 ipv6 address 2001:db8:200:1/64
 ipv6 enable
!
ipv6 dhcprelay server 2001:db8:200:2 inside
ipv6 dhcprelay enable outside
```

### Flujo de paquetes

Con DHCPv6 sin estado, aquí está el flujo de paquetes del cliente:



El ASA intercepta estos paquetes y los envuelve al formato de relé DHCP:



## Verificación

### Depuraciones

Si habilita **debug ipv6 dhcrelay** y **debug ipv6 dhcp**, el resultado pertinente se imprime en la pantalla. Este resultado se toma de un escenario en funcionamiento:

```
IPv6 DHCP: Received INFORMATION-REQUEST from fe80::c671:feff:fe93:b51a on CLIENT
```

```
IPv6 DHCP: detailed packet contents
src fe80::c671:feff:fe93:b51a (CLIENT)
dst ff02::1:2
type INFORMATION-REQUEST(11), xid 1588088
option ELAPSED-TIME(8), len 2
  elapsed-time 0
option CLIENTID(1), len 10
  00030001c471fe93b516
option ORO(6), len 6
  DNS-SERVERS,DOMAIN-LIST,UNKNOWN
```

```
IPv6 DHCP_RELAY: Relaying INFORMATION-REQUEST from fe80::c671:feff:fe93:b51a on CLIENT
IPv6 DHCP_RELAY: Creating relay binding for fe80::c671:feff:fe93:b51a at interface CLIENT
IPv6 DHCP_RELAY:   to 2001:db8:200::2 via 2001:db8:200::2 using SERVER
IPv6 DHCP: Sending RELAY-FORWARD to 2001:db8:200::2 on SERVER
```

```
IPv6 DHCP: detailed packet contents
src 2001:db8:200::1
dst 2001:db8:200::2 (SERVER)
type RELAY-FORWARD(12), hop 0
link 2001:db8:100::1
peer fe80::c671:feff:fe93:b51a
option RELAY-MSG(9), len 34
  type INFORMATION-REQUEST(11), xid 1588088
  option ELAPSED-TIME(8), len 2
    elapsed-time 0
```

```
option CLIENTID(1), len 10
  00030001c471fe93b516
option ORO(6), len 6
  DNS-SERVERS,DOMAIN-LIST,UNKNOWN
option INTERFACE-ID(18), len 4
  0x00000015
```

IPv6 DHCP: Received RELAY-REPLY from 2001:db8:200::2 on SERVER

IPv6 DHCP: detailed packet contents

```
src 2001:db8:200::2 (SERVER)
dst 2001:db8:200::1
type RELAY-REPLY(13), hop 0
link 2001:db8:100::1
peer fe80::c671:feff:fe93:b51a
option RELAY-MSG(9), len 67
type REPLY(7), xid 1588088
option SERVERID(2), len 10
  00030001002414a33c94
option CLIENTID(1), len 10
  00030001c471fe93b516
option DNS-SERVERS(23), len 16
  2001:db8:1000::1
option DOMAIN-LIST(24), len 11
  cisco.com
option INTERFACE-ID(18), len 4
  0x00000015
```

IPv6 DHCP\_RELAY: Relaying RELAY-REPLY from 2001:db8:200::2 on SERVER

IPv6 DHCP\_RELAY: relayed msg: REPLY

IPv6 DHCP\_RELAY: to fe80::c671:feff:fe93:b51a

IPv6 DHCP: Sending REPLY to fe80::c671:feff:fe93:b51a on CLIENT

IPv6 DHCP: detailed packet contents

```
src fe80::219:7ff:fe24:2e44
dst fe80::c671:feff:fe93:b51a (CLIENT)
type REPLY(7), xid 1588088
option SERVERID(2), len 10
  00030001002414a33c94
option CLIENTID(1), len 10
  00030001c471fe93b516
option DNS-SERVERS(23), len 16
  2001:db8:1000::1
option DOMAIN-LIST(24), len 11
  cisco.com
```

En el paquete de solicitud INFORMATION-REQUEST, el cliente sólo solicita **DNS-Server** y **Dominio**, lo que se espera dado que el cliente está configurado para DHCPv6 sin estado.

## Instantáneas Wireshark

### Solicitud de cliente DHCP

No.	Time	Source	Destination	Protocol	Length	Identification	Info
1	0.000000	fe80::c671:feff:fe93:b51a	ff02::1:2	DHCPv6	100		Information-request XID: 0xfc3adf CID: 00030001c471fe93b516
2	0.005584	fe80::219:7ff:fe24:2e44	fe80::c671:feff:fe93:b51a	DHCPv6	133		Reply XID: 0xfc3adf CID: 00030001c471fe93b516

```

Payload length: 42
Next header: UDP (17)
Hop limit: 255
Source: fe80::c671:feff:fe93:b51a (fe80::c671:feff:fe93:b51a)
[Source SA MAC: c4:71:fe:93:b5:1a (c4:71:fe:93:b5:1a)]
Destination: ff02::1:2 (ff02::1:2)
[Source GeoIP: Unknown]
[Destination GeoIP: Unknown]
User Datagram Protocol, Src Port: dhcpv6-client (546), Dst Port: dhcpv6-server (547)
DHCPv6
  Message type: Information-request (11)
  Transaction ID: 0xfc3adf
  Elapsed time
    Option: Elapsed time (8)
    Length: 2
    Value: 0000
    Elapsed-time: 0 ms
  Client Identifier
    Option: Client Identifier (1)
    Length: 10
    Value: 00030001c471fe93b516
    DUID: 00030001c471fe93b516
    DUID Type: link-layer address (3)
    Hardware type: Ethernet (1)
    Link-layer address: c4:71:fe:93:b5:16
  Option Request
    Option: Option Request (6)
    Length: 6
    Value: 001700180020
    Requested option code: DNS recursive name server (23)
    Requested option code: Domain Search List (24)
    Requested option code: Lifetime (32)
  
```

Src. Address field set to link-local IPv6 address assigned to the sending interface.

Dst. Address set to link-local scope all-routers Multicast address (FF02::2).

UDP ports used for DHCPv6.

Requested options.

## Solicitud DHCP retransmitida por ASA

No.	Time	Source	Destination	Protocol	Length	Identification	Info
1	0.000000	2001:db8:200::1	2001:db8:200::2	DHCPv6	146		Relay-Forward L: 2001:db8:100::1 Information-request XID: 0xfc3adf CID: 00030001c471fe93b516
2	0.004836	2001:db8:200::2	2001:db8:200::1	DHCPv6	179		Relay-reply L: 2001:db8:100::1 Reply XID: 0xfc3adf CID: 00030001c471fe93b516

```

User Datagram Protocol, Src Port: dhcpv6-server (547), Dst Port: dhcpv6-server (547)
Ports used for DHCPv6 Relay
DHCPv6
  Message type: Relay-forward (12)
  Hopcount: 0
  Link address: 2001:db8:100::1 (2001:db8:100::1)
  Peer address: fe80::c671:feff:fe93:b51a (fe80::c671:feff:fe93:b51a)
  Relay Message
    Option: Relay Message (9)
    Length: 34
    Value: 0bf3c3adf008000200000001000a00030001c471fe93b516...
  DHCPv6
    Message type: Information-request (11)
    Transaction ID: 0xfc3adf
    Elapsed time
      Option: Elapsed time (8)
      Length: 2
      Value: 0000
      Elapsed-time: 0 ms
    Client Identifier
      Option: Client Identifier (1)
      Length: 10
      Value: 00030001c471fe93b516
      DUID: 00030001c471fe93b516
      DUID Type: link-layer address (3)
      Hardware type: Ethernet (1)
      Link-layer address: c4:71:fe:93:b5:16
    Option Request
      Option: Option Request (6)
      Length: 6
      Value: 001700180020
      Requested option code: DNS recursive name server (23)
      Requested option code: Domain Search List (24)
  
```

## Respuesta DHCP del servidor

No.	Time	Source	Destination	Protocol	Length	Identification	Info
1	0.000000	2001:db8:200::1	2001:db8:200::2	DHCPv6	146		Relay-Forw L: 2001:db8:100::1 Information-request XID: 0xfc3adf CID: 00030001
2	0.004836	2001:db8:200::2	2001:db8:200::1	DHCPv6	179		Relay-reply L: 2001:db8:100::1 Reply XID: 0xfc3adf CID: 00030001c471fe93b516

**DHCPv6**  
 Message type: Relay-reply (13)  
 Hopcount: 0  
 Link address: 2001:db8:100::1 (2001:db8:100::1)  
 Peer address: fe80::c671:feff:fe93:b51a (fe80::c671:feff:fe93:b51a)

**Relay Message**  
 Option: Relay Message (9)  
 Length: 67  
 Value: 07fc3adf0002000a00030001002414a33c940001000a0003...

**DHCPv6**  
 Message type: Reply (7)  
 Transaction ID: 0xfc3adf

**Server Identifier**  
 Option: Server Identifier (2)  
 Length: 10  
 Value: 00030001002414a33c94  
 DUID: 00030001002414a33c94  
 DUID Type: link-layer address (3)  
 Hardware type: Ethernet (1)  
 Link-layer address: 00:24:14:a3:3c:94

**Client Identifier**  
**DNS recursive name server**  
 Option: DNS recursive name server (23)  
 Length: 16  
 Value: 20010db81000000000000000000000001  
 DNS server address: 2001:db8:1000::1 (2001:db8:1000::1) **DNS Server Provided by DHCPv6 Server**

**Domain Search List**  
 Option: Domain Search List (24)  
 Length: 11  
 Value: 05636973636f03636fd00  
 DNS Domain Search List  
 Domain: cisco.com **Domain name**

## Respuesta reenviada al cliente

No.	Time	Source	Destination	Protocol	Length	Identification	Info
1	0.000000	fe80::c671:feff:fe93:b51a	ff02::1:2	DHCPv6	100		Information-request XID: 0xfc3adf CID: 00030001c471fe93b516
2	0.005584	fe80::219:7ff:fe24:2e44	fe80::c671:feff:fe93:b51a	DHCPv6	133		Reply XID: 0xfc3adf CID: 00030001c471fe93b516

**Internet Protocol Version 6, Src: fe80::219:7ff:fe24:2e44 (fe80::219:7ff:fe24:2e44), Dst: fe80::c671:feff:fe93:b51a (fe80::c671:feff:fe93:b51a)**  
**User Datagram Protocol, Src Port: dhcpv6-server (547), Dst Port: dhcpv6-client (546)** **Ports used to reply clients**

**DHCPv6**  
 Message type: Reply (7)  
 Transaction ID: 0xfc3adf

**Server Identifier**  
 Option: Server Identifier (2)  
 Length: 10  
 Value: 00030001002414a33c94  
 DUID: 00030001002414a33c94  
 DUID Type: link-layer address (3)  
 Hardware type: Ethernet (1)  
 Link-layer address: 00:24:14:a3:3c:94

**Client Identifier**  
 Option: Client Identifier (1)  
 Length: 10  
 Value: 00030001c471fe93b516  
 DUID: 00030001c471fe93b516  
 DUID Type: link-layer address (3)  
 Hardware type: Ethernet (1)  
 Link-layer address: c4:71:fe:93:b5:16

**DNS recursive name server**  
 Option: DNS recursive name server (23)  
 Length: 16  
 Value: 20010db81000000000000000000000001  
 DNS server address: 2001:db8:1000::1 (2001:db8:1000::1) **Information forwarded to client**

**Domain Search List**  
 Option: Domain Search List (24)  
 Length: 11  
 Value: 05636973636f03636fd00  
 DNS Domain Search List  
 Domain: cisco.com

## DHCPv6 con estado

### Configuración

Esta es la configuración básica para la configuración de relé DHCPv6 con estado en el ASA:

```

interface GigabitEthernet0/1
  nameif CLIENT
  security-level 100
  ipv6 address 2001:db8:100::1/64
  ipv6 enable
!
interface GigabitEthernet0/0
  nameif SERVER
  security-level 0
  ipv6 address 2001:db8:200:1/64
  ipv6 enable
  
```

```

!
ipv6 dhcprelay server 2001:db8:200:2 inside
ipv6 dhcprelay enable outside

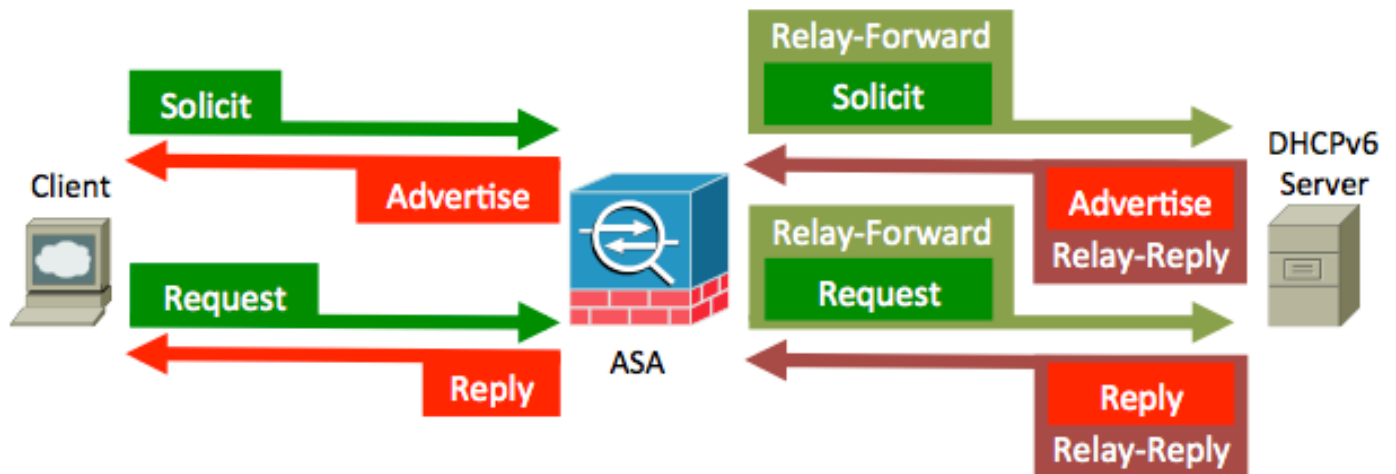
```

## Flujo de paquetes

Con el stateful DHCPv6, aquí está el flujo de paquetes del cliente:



El ASA intercepta estos paquetes y los envuelve al formato de relé DHCP:



## Verificación

### Depuraciones

```
IPv6 DHCP: Received SOLICIT from fe80::c671:feff:fe93:b51a on CLIENT
```

```

IPv6 DHCP: detailed packet contents
src fe80::c671:feff:fe93:b51a (CLIENT)
dst ff02::1:2
type SOLICIT(1), xid 2490681
option ELAPSED-TIME(8), len 2
elapsed-time 0
option CLIENTID(1), len 10
00030001c471fe93b516
option ORO(6), len 4
DNS-SERVERS,DOMAIN-LIST
option IA-NA(3), len 12
IAID 0x00040001, T1 0, T2 0

```

```
IPv6 DHCP_RELAY: Relaying SOLICIT from fe80::c671:feff:fe93:b51a on CLIENT
```



IPv6 DHCP\_RELAY: Creating relay binding for fe80::c671:feff:fe93:b51a at interface CLIENT

IPv6 DHCP\_RELAY: to 2001:db8:200::2 via 2001:db8:200::2 using SERVER

IPv6 DHCP: Sending RELAY-FORWARD to 2001:db8:200::2 on SERVER

IPv6 DHCP: detailed packet contents

```
src 2001:db8:200::1
dst 2001:db8:200::2 (SERVER)
type RELAY-FORWARD(12), hop 0
link 2001:db8:100::1
peer fe80::c671:feff:fe93:b51a
option RELAY-MSG(9), len 48
type SOLICIT(1), xid 2490681
option ELAPSED-TIME(8), len 2
  elapsed-time 0
option CLIENTID(1), len 10
  00030001c471fe93b516
option ORO(6), len 4
  DNS-SERVERS,DOMAIN-LIST
option IA-NA(3), len 12
  IAID 0x00040001, T1 0, T2 0
option INTERFACE-ID(18), len 4
  0x00000015
```

IPv6 DHCP: Received RELAY-REPLY from 2001:db8:200::2 on SERVER

IPv6 DHCP: detailed packet contents

```
src 2001:db8:200::2 (SERVER)
dst 2001:db8:200::1
type RELAY-REPLY(13), hop 0
link 2001:db8:100::1
peer fe80::c671:feff:fe93:b51a
option RELAY-MSG(9), len 111
type ADVERTISE(2), xid 2490681
option SERVERID(2), len 10
  00030001002414a33c94
option CLIENTID(1), len 10
  00030001c471fe93b516
option IA-NA(3), len 40
  IAID 0x00040001, T1 43200, T2 69120
option IAADDR(5), len 24
  IPv6 address 2001:db8:300:0:48ae:5f5d:8290:e926
  preferred INFINITY, valid INFINITY
option DNS-SERVERS(23), len 16
  2001:db8:1000::1
option DOMAIN-LIST(24), len 11
  cisco.com
option INTERFACE-ID(18), len 4
  0x00000015
```

IPv6 DHCP\_RELAY: Relaying RELAY-REPLY from 2001:db8:200::2 on SERVER

IPv6 DHCP\_RELAY: relayed msg: ADVERTISE

IPv6 DHCP\_RELAY: to fe80::c671:feff:fe93:b51a

IPv6 DHCP: Sending ADVERTISE to fe80::c671:feff:fe93:b51a on CLIENT

IPv6 DHCP: detailed packet contents

```
src fe80::219:7ff:fe24:2e44
dst fe80::c671:feff:fe93:b51a (CLIENT)
type ADVERTISE(2), xid 2490681
option SERVERID(2), len 10
  00030001002414a33c94
option CLIENTID(1), len 10
  00030001c471fe93b516
option IA-NA(3), len 40
  IAID 0x00040001, T1 43200, T2 69120
option IAADDR(5), len 24
  IPv6 address 2001:db8:300:0:48ae:5f5d:8290:e926
```

```
    preferred INFINITY, valid INFINITY
option DNS-SERVERS(23), len 16
2001:db8:1000::1
option DOMAIN-LIST(24), len 11
cisco.com
```

IPv6 DHCP: Received REQUEST from fe80::c671:feff:fe93:b51a on CLIENT

IPv6 DHCP: detailed packet contents

```
src fe80::c671:feff:fe93:b51a (CLIENT)
dst ff02::1:2
type REQUEST(3), xid 2492842
option ELAPSED-TIME(8), len 2
elapsed-time 0
option CLIENTID(1), len 10
00030001c471fe93b516
option ORO(6), len 4
DNS-SERVERS,DOMAIN-LIST
option SERVERID(2), len 10
00030001002414a33c94
option IA-NA(3), len 40
IAID 0x00040001, T1 0, T2 0
option IAADDR(5), len 24
    IPv6 address 2001:db8:300:0:48ae:5f5d:8290:e926
    preferred INFINITY, valid INFINITY
```

IPv6 DHCP\_RELAY: Relaying REQUEST from fe80::c671:feff:fe93:b51a on CLIENT

IPv6 DHCP\_RELAY: to 2001:db8:200::2 via 2001:db8:200::2 using SERVER

IPv6 DHCP: Sending RELAY-FORWARD to 2001:db8:200::2 on SERVER

IPv6 DHCP: detailed packet contents

```
src 2001:db8:200::1
dst 2001:db8:200::2 (SERVER)
type RELAY-FORWARD(12), hop 0
link 2001:db8:100::1
peer fe80::c671:feff:fe93:b51a
option RELAY-MSG(9), len 90
type REQUEST(3), xid 2492842
option ELAPSED-TIME(8), len 2
elapsed-time 0
option CLIENTID(1), len 10
00030001c471fe93b516
option ORO(6), len 4
DNS-SERVERS,DOMAIN-LIST
option SERVERID(2), len 10
00030001002414a33c94
option IA-NA(3), len 40
IAID 0x00040001, T1 0, T2 0
option IAADDR(5), len 24
    IPv6 address 2001:db8:300:0:48ae:5f5d:8290:e926
    preferred INFINITY, valid INFINITY
option INTERFACE-ID(18), len 4
0x00000015
```

IPv6 DHCP: Received RELAY-REPLY from 2001:db8:200::2 on SERVER

IPv6 DHCP: detailed packet contents

```
src 2001:db8:200::2 (SERVER)
dst 2001:db8:200::1
type RELAY-REPLY(13), hop 0
link 2001:db8:100::1
peer fe80::c671:feff:fe93:b51a
option RELAY-MSG(9), len 111
type REPLY(7), xid 2492842
option SERVERID(2), len 10
00030001002414a33c94
option CLIENTID(1), len 10
```

```

00030001c471fe93b516
option IA-NA(3), len 40
  IAID 0x00040001, T1 43200, T2 69120
option IAADDR(5), len 24
  IPv6 address 2001:db8:300:0:48ae:5f5d:8290:e926
  preferred INFINITY, valid INFINITY
option DNS-SERVERS(23), len 16
  2001:db8:1000::1
option DOMAIN-LIST(24), len 11
  cisco.com
option INTERFACE-ID(18), len 4
  0x00000015
IPv6 DHCP_RELAY: Relaying RELAY-REPLY from 2001:db8:200::2 on SERVER
IPv6 DHCP_RELAY:   relayed msg: REPLY
IPv6 DHCP_RELAY:   to fe80::c671:feff:fe93:b51a
IPv6 DHCP: Sending REPLY to fe80::c671:feff:fe93:b51a on CLIENT

```

```

IPv6 DHCP: detailed packet contents
src fe80::219:7ff:fe24:2e44
dst fe80::c671:feff:fe93:b51a (CLIENT)
type REPLY(7), xid 2492842
option SERVERID(2), len 10
00030001002414a33c94
option CLIENTID(1), len 10
00030001c471fe93b516
option IA-NA(3), len 40
  IAID 0x00040001, T1 43200, T2 69120
option IAADDR(5), len 24
  IPv6 address 2001:db8:300:0:48ae:5f5d:8290:e926
  preferred INFINITY, valid INFINITY
option DNS-SERVERS(23), len 16
  2001:db8:1000::1
option DOMAIN-LIST(24), len 11
  cisco.com

```

## Instantáneas Wireshark

### SOLICITUD (1)

Un cliente DHCPv6 envía un mensaje Solicit para localizar los servidores DHCPv6.

The image shows a Wireshark capture of a DHCPv6 Solicit message. The packet list pane shows three packets: an Advertise message from the server to the client, a Request message from the client to the server, and a Reply message from the server to the client. The packet details pane is expanded to show the Solicit message structure:

- Message type: solicit (1)** - DHCPv6 client sends a solicit message. Transaction ID: 0x260139
- Elapsed time** - Option: Elapsed time (8), Length: 2, Value: 0000, Elapsed-time: 0 ms
- Client Identifier** - Option: Client Identifier (1), Length: 10, Value: 00030001c471fe93b516
  - DUID: 00030001c471fe93b516
  - DUID Type: link-layer address (3)
  - Hardware type: Ethernet (1)
  - Link-layer address: c4:71:fe:93:b5:16
- Option Request** - Option: option Request (6), Length: 4, Value: 00170018
  - Requested option code: DNS recursive name server (23)
  - Requested option code: Domain search List (24)
- Identity Association for Non-temporary Address** - Option: Identity Association for Non-temporary Address (3), Length: 12, Value: 0004000100000000000000000000
  - IAID: 00040001
  - T1: 0
  - T2: 0

Annotations in the image highlight the DUID and IAID fields, with explanatory text: "Each DHCP client and server has a DUID. DHCP servers use DUIDs to identify clients for the selection of configuration parameters and in the association of IAs with clients." and "The client is responsible for creating IAs and requesting that a server assign IPv6 address to IA."

El ASA retransmite el mensaje Solicit (Solicitar).

```

Source          Destination      Protocol Length Identification  Info
2001:db8:200::1 2001:db8:200::2 DHCPv6 160 Relay-Forw L: 2001:db8:100::1 Solicit XID: 0x260139 CID: 00030001c471fe93b
2001:db8:200::2 2001:db8:200::1 DHCPv6 223 Relay-reply L: 2001:db8:100::1 Advertise XID: 0x260139 CID: 00030001c471fe93b
2001:db8:200::1 2001:db8:200::2 DHCPv6 202 Relay-Forw L: 2001:db8:100::1 Request XID: 0x2609aa CID: 00030001c471fe93b
2001:db8:200::2 2001:db8:200::1 DHCPv6 223 Relay-reply L: 2001:db8:100::1 Reply XID: 0x2609aa CID: 00030001c471fe93b5

Frame 1: 160 bytes on wire (1280 bits), 160 bytes captured (1280 bits)
Ethernet II, Src: Cisco_24:2e:44 (00:19:07:24:2e:44), Dst: Cisco_a3:3c:98 (00:24:14:a3:3c:98)
802.1Q Virtual LAN, PRI: 0, CFI: 0, ID: 901
Internet Protocol Version 6, Src: 2001:db8:200::1 (2001:db8:200::1), Dst: 2001:db8:200::2 (2001:db8:200::2)
User Datagram Protocol, Src Port: dhcpv6-server (547), Dst Port: dhcpv6-server (547)
DHCPv6
  Message type: Relay-forw (12)
    Hopcount: 0
    Link address: 2001:db8:100::1 (2001:db8:100::1)
    Peer address: fe80::c671:feff:fe93:b51a (fe80::c671:feff:fe93:b51a)
  Relay Message
    Option: Relay Message (9)
      Length: 48
      Value: 012601390008000200000001000a00030001c471fe93b516...
  DHCPv6
    Message type: solicit (1)
    Transaction ID: 0x260139
    Elapsed time
    Client Identifier
    Option Request
    Identity Association for Non-temporary Address
  Interface-ID

```

## ANUNCIO (2)

Un servidor envía un mensaje de anuncio para indicar que está disponible para el servicio DHCP, en respuesta a un mensaje de solicitud recibido de un cliente.

```

Source          Destination      Protocol Length Identification  Info
2001:db8:200::1 2001:db8:200::2 DHCPv6 160 Relay-forw L: 2001:db8:100::1 Solicit XID: 0x260139 CID: 00030001c471fe93b
2001:db8:200::2 2001:db8:200::1 DHCPv6 223 Relay-reply L: 2001:db8:100::1 Advertise XID: 0x260139 CID: 00030001c471fe93b
2001:db8:200::1 2001:db8:200::2 DHCPv6 202 Relay-Forw L: 2001:db8:100::1 Request XID: 0x2609aa CID: 00030001c471fe93b
2001:db8:200::2 2001:db8:200::1 DHCPv6 223 Relay-reply L: 2001:db8:100::1 Reply XID: 0x2609aa CID: 00030001c471fe93b5

Frame 2: 223 bytes on wire (1784 bits), 223 bytes captured (1784 bits)
Ethernet II, Src: Cisco_a3:3c:98 (00:24:14:a3:3c:98), Dst: Cisco_24:2e:44 (00:19:07:24:2e:44)
802.1Q Virtual LAN, PRI: 6, CFI: 0, ID: 901
Internet Protocol Version 6, Src: 2001:db8:200::2 (2001:db8:200::2), Dst: 2001:db8:200::1 (2001:db8:200::1)
User Datagram Protocol, Src Port: dhcpv6-server (547), Dst Port: dhcpv6-server (547)
DHCPv6
  Message type: Relay-reply (13)
    Hopcount: 0
    Link address: 2001:db8:100::1 (2001:db8:100::1)
    Peer address: fe80::c671:feff:fe93:b51a (fe80::c671:feff:fe93:b51a)
  Relay Message
    Option: Relay Message (9)
      Length: 111
      Value: 022601390002000a00030001002414a33c940001000a0003...
  DHCPv6
    Message type: Advertise (2)
      Transaction ID: 0x260139
      Server Identifier
      Client Identifier
      Identity Association for Non-temporary Address
      DNS recursive name server
      Domain Search List
  Interface-ID

```

```

Message type: Advertise (2)
Transaction ID: 0x260139
Server Identifier
Option: Server Identifier (2)
Length: 10
Value: 00030001002414a33c94
DUID: 00030001002414a33c94
DUID Type: Link-layer address (3)
Hardware type: Ethernet (1)
Link-layer address: 00:24:14:a3:3c:94
Client Identifier
Identity Association for Non-temporary Address
Option: Identity Association for Non-temporary Address (3)
Length: 40
Value: 000400010000a8c000010e000005001820010db803000000...
IAID: 00040001
T1: 43200
T2: 69120
IA Address
Option: IA Address (5)
Length: 24
Value: 20010db80300000048ae5f5d8290e926ffffffffffffffffffff
IPv6 address: 2001:db8:300:0:48ae:5f5d:8290:e926 (2001:db8:300:0:48ae:5f5d:8290:e926)
Preferred lifetime: infinity
Preferred lifetime: infinity
DNS recursive name server
Option: DNS recursive name server (23)
Length: 16
Value: 2001:db8:1:0000:0000:0000:0000:0000
DNS server address: 2001:db8:1000::1 (2001:db8:1000::1)
Domain Search List
Option: Domain Search List (24)
Length: 11
Value: 05636973636f03636fd00
DNS Domain Search List
Domain: cisco.com
Interface-ID

```

## SOLICITUD (3)

Un cliente envía un mensaje de solicitud para solicitar parámetros de configuración, que incluyen direcciones IP o prefijos delegados, de un servidor específico.

Source	Destination	Protocol	Length	Identification	Info
fe80::c671:feff:fe93:b51a	ff02::1:2	DHCPv6	114		solicit XID: 0x260139 CID: 00030001c471fe93b516
fe80::219:7ff:fa24:2e44	fe80::c671:feff:fe93:b51a	DHCPv6	177		Advertise XID: 0x260139 CID: 00030001c471fe93b516 IAA: 2001:db8:300:0:48ae:5f5d:8290:e926
fe80::c671:feff:fe93:b51a	ff02::1:2	DHCPv6	156		Request XID: 0x2609aa CID: 00030001c471fe93b516 IAA: 2001:db8:300:0:48ae:5f5d:8290:e926

```

User Datagram Protocol, Src Port: dhcpv6-client (546), Dst Port: dhcpv6-server (547)
DHCPv6
  Message type: Request (3)
  Transaction ID: 0x2609aa
  Elapsed time
    Option: Elapsed time (8)
    Length: 2
    Value: 0000
    Elapsed-time: 0 ms
  Client Identifier
  Option Request
    Option: Option Request (6)
    Length: 4
    Value: 00170018
    Requested option code: DNS recursive name server (23)
    Requested option code: Domain Search List (24)
  Server Identifier
  Identity Association for Non-temporary Address
    Option: Identity Association for Non-temporary Address (3)
    Length: 40
    Value: 000400010000000000000000000000005001820010db803000000...
    IAID: 00040001
    T1: 0
    T2: 0
  IA Address
    Option: IA Address (5)
    Length: 24
    Value: 20010db803000000048ae5f5d8290e926ffffffffffffffff
    IPv6 address: 2001:db8:300:0:48ae:5f5d:8290:e926 (2001:db8:300:0:48ae:5f5d:8290:e926)
    Preferred lifetime: infinity
    Preferred lifetime: infinity
  
```

Client request for IPv6 Address, DNS Server, Domain name.

## RESPUESTA (7)

Un servidor envía un mensaje de respuesta que contiene las direcciones asignadas y los parámetros de configuración en respuesta a un mensaje de solicitud, solicitud, renovación o reenlace recibido de un cliente. Un servidor envía un mensaje de respuesta que contiene parámetros de configuración en respuesta a un mensaje de solicitud de información. Un servidor envía un mensaje de respuesta en respuesta a un mensaje de confirmación que confirma o niega que las direcciones asignadas al cliente son apropiadas al link al que está conectado el cliente. Un servidor envía un mensaje de respuesta para acusar recibo de un mensaje de liberación o rechazo.

Source	Destination	Protocol	Length	Identification	Info
2001:db8:2000::1	2001:db8:2000::2	DHCPv6	160		Relay-forw L: 2001:db8:1000::1 solicit XID: 0x260139 CID: 00030001c471fe93b516
2001:db8:2000::2	2001:db8:2000::1	DHCPv6	223		Relay-reply L: 2001:db8:1000::1 Advertise XID: 0x260139 CID: 00030001c471fe93b516
2001:db8:2000::1	2001:db8:2000::2	DHCPv6	202		Relay-Forw L: 2001:db8:1000::1 Request XID: 0x2609aa CID: 00030001c471fe93b516
2001:db8:2000::2	2001:db8:2000::1	DHCPv6	223		Relay-reply L: 2001:db8:1000::1 Reply XID: 0x2609aa CID: 00030001c471fe93b516

```

DHCPv6
  Message type: Reply (7)
  Transaction ID: 0x2609aa
  Server Identifier
  Client Identifier
  Identity Association for Non-temporary Address
    Option: Identity Association for Non-temporary Address (3)
    Length: 40
    Value: 000400010000a8c000010e000005001820010db803000000...
    IAID: 00040001
    T1: 43200
    T2: 69120
  IA Address
    Option: IA Address (5)
    Length: 24
    Value: 20010db803000000048ae5f5d8290e926ffffffffffffffff
    IPv6 address: 2001:db8:300:0:48ae:5f5d:8290:e926 (2001:db8:300:0:48ae:5f5d:8290:e926)
    Preferred lifetime: infinity
    Preferred lifetime: infinity
  DNS recursive name server
    Option: DNS recursive name server (23)
    Length: 16
    Value: 20010db81000000000000000000000001
    DNS server address: 2001:db8:1000::1 (2001:db8:1000::1)
  Domain Search List
    Option: Domain Search List (24)
    Length: 11
    Value: 05636973636f03636f6d00
    DNS Domain Search List
    Domain: cisco.com
  
```

## Troubleshoot

Confirme la conectividad con el servidor DHCPv6.

```
ciscoasa# show ipv6 neighbor
```

```
IPv6 Address
```

```
Age Link-layer Addr State Interface
```

2001:db8:200::2

0 0024.14a3.3c98 REACH SERVER

Confirme que recibe paquetes del cliente cuando solicita una dirección IPv6. El paquete enviado por el cliente dependerá de la configuración de asignación de dirección (es decir, stateful vs stateless).

Cuando el cliente inicia el proceso DHCPv6, envía un mensaje de solicitud de router para detectar la presencia de routers IPv6 en el link. Envía un mensaje de solicitud de router multicast para solicitar a los routers IPv6 que respondan. En el encabezado Ethernet del mensaje de solicitud del router, se muestran los campos siguientes:

- El campo Dirección de origen es la dirección MAC del host que solicita la dirección IPv6.
- El campo Destination Address (Dirección de destino) se establece en 33-33-00-00-00-02.

En el encabezado IPv6 del mensaje de solicitud del router, se muestran estos campos.

- El campo Dirección de origen se establece en una dirección IPv6 local de link asignada a la interfaz de envío o en la dirección no especificada de IPv6 (::).
- El campo Destination Address (Dirección de destino) se establece en el alcance local del link all-routers multicast address (FF02::2).
- El campo Límite de saltos está establecido en 255.

En Respuesta, los routers IPv6 envían mensajes de anuncio de router no solicitados El mensaje de anuncio de router contiene la información requerida por los hosts para determinar los prefijos de link, la unidad máxima de transmisión (MTU) de link y las rutas específicas.

```
ciscoasa(config)# show capture capin detail
```

```
fe80::c671:feff:fe93:b51a.546 > ff02::1:2.547: [udp sum ok] udp 42  
[hlim 255] (len 100)---->Request from client
```

```
fe80::219:7ff:fe24:2e44.547 > fe80::c671:feff:fe93:b51a.546: [udp sum ok]  
udp 75 [class 0xe0] (len 133, hlim 255)
```

```
ciscoasa(config)# show capture capout detail
```

2 packets captured

```
1: 12:06:52.700799      2001:db8:200:1.547 > 2001:db8:200:2.547:  udp 88  
[class 0xe0]---->ASA forwards request to DHCPv6 router
```

```
2: 12:06:53.289047      2001:db8:200:2.547 > 2001:db8:200:1.547:  udp 121  
[class 0xe0]----> Reply from DHCPV6 server.
```

## Salidas de relé DHCP

```
ciscoasa# show ipv6 dhcprelay binding
```

1 in use, 1 most used

```
Client: fe80::c671:feff:fe93:b51a (CLIENT)
```

```
DUID: 00030001c471fe93b516, Timeout in 56 seconds
```

**Nota:** El ASA elimina el enlace después de un breve período. Esto se ve en **debug ipv6 dhcprelay**.

```
IPv6 DHCP_RELAY: Deleting binding for fe80::c671:feff:fe93:b51a at interface CLIENT
```

```
ciscoasa# show ipv6 dhcprelay statistics
```

Relay Messages:

SOLICIT	2
ADVERTISE	2
REQUEST	2
CONFIRM	0
RENEW	0
REBIND	0
REPLY	9
RELEASE	1
DECLINE	0
RECONFIGURE	0
INFORMATION-REQUEST	6
RELAY-FORWARD	11
RELAY-REPLY	11

Relay Errors:

Malformed message:	0
Block allocation/duplication failure:	0
Hop count limit exceeded:	0
Forward binding creation failure:	0
Reply binding lookup failure:	0
No output route:	0
Conflict relay server route:	0
Failed to add server input rule:	0
Unit or context is not active:	0

Total Relay Bindings Created: 8

## Direcciones de lanzamiento

Los clientes pueden liberar su dirección asignada de DHCPv6 después de haberla utilizado para la red. En la siguiente sección se muestra el resultado de depuración asociado con la liberación de direcciones en DHCPv6 con estado.

### Depuraciones

```
IPv6 DHCP: Received RELEASE from fe80::c671:feff:fe93:b51a on CLIENT
```

```
IPv6 DHCP: detailed packet contents
```

```
src fe80::c671:feff:fe93:b51a (CLIENT)
dst ff02::1:2
type RELEASE(8), xid 3180815
option ELAPSED-TIME(8), len 2
elapsed-time 0
option CLIENTID(1), len 10
00030001c471fe93b516
option SERVERID(2), len 10
00030001002414a33c94
option IA-NA(3), len 40
IAID 0x00040001, T1 0, T2 0
option IAADDR(5), len 24
IPv6 address 2001:db8:300:0:48ae:5f5d:8290:e926
preferred INFINITY, valid INFINITY
```

```
IPv6 DHCP_RELAY: Relaying RELEASE from fe80::c671:feff:fe93:b51a on CLIENT
```

IPv6 DHCP\_RELAY: Creating relay binding for fe80::c671:feff:fe93:b51a at interface CLIENT

IPv6 DHCP\_RELAY: to 2001:db8:200::2 via 2001:db8:200::2 using SERVER

IPv6 DHCP: Sending RELAY-FORWARD to 2001:db8:200::2 on SERVER

IPv6 DHCP: detailed packet contents

```
src 2001:db8:200::1
dst 2001:db8:200::2 (SERVER)
type RELAY-FORWARD(12), hop 0
link 2001:db8:100::1
peer fe80::c671:feff:fe93:b51a
option RELAY-MSG(9), len 82
type RELEASE(8), xid 3180815
option ELAPSED-TIME(8), len 2
  elapsed-time 0
option CLIENTID(1), len 10
  00030001c471fe93b516
option SERVERID(2), len 10
  00030001002414a33c94
option IA-NA(3), len 40
  IAID 0x00040001, T1 0, T2 0
option IAADDR(5), len 24
  IPv6 address 2001:db8:300:0:48ae:5f5d:8290:e926
  preferred INFINITY, valid INFINITY
option INTERFACE-ID(18), len 4
  0x00000015
```

IPv6 DHCP: Received RELAY-REPLY from 2001:db8:200::2 on SERVER

IPv6 DHCP: detailed packet contents

```
src 2001:db8:200::2 (SERVER)
dst 2001:db8:200::1
type RELAY-REPLY(13), hop 0
link 2001:db8:100::1
peer fe80::c671:feff:fe93:b51a
option RELAY-MSG(9), len 45
type REPLY(7), xid 3180815
option SERVERID(2), len 10
  00030001002414a33c94
option CLIENTID(1), len 10
  00030001c471fe93b516
option STATUS-CODE(13), len 9
  status code SUCCESS(0)
  status message: SUCCESS
option INTERFACE-ID(18), len 4
  0x00000015
```

IPv6 DHCP\_RELAY: Relaying RELAY-REPLY from 2001:db8:200::2 on SERVER

IPv6 DHCP\_RELAY: relayed msg: REPLY

IPv6 DHCP\_RELAY: to fe80::c671:feff:fe93:b51a

IPv6 DHCP: Sending REPLY to fe80::c671:feff:fe93:b51a on CLIENT

IPv6 DHCP: detailed packet contents

```
src fe80::219:7ff:fe24:2e44
dst fe80::c671:feff:fe93:b51a (CLIENT)
type REPLY(7), xid 3180815
option SERVERID(2), len 10
  00030001002414a33c94
option CLIENTID(1), len 10
  00030001c471fe93b516
option STATUS-CODE(13), len 9
  status code SUCCESS(0)
  status message: SUCCESS
```



## Información Relacionada

[Introducción a las diversas opciones de DHCP](#)

[Ejemplo de configuración de retransmisión DHCP de ASA](#)

[Configuración del ASA para pasar el tráfico IPv6](#)

[Ejemplo de Configuración de Capturas de Paquetes ASA con CLI y ASDM](#)