

ASA:DHCPv6中繼配置示例和故障排除

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簡介

本文檔介紹如何將思科自適應安全裝置(ASA)配置為DHCPv6中繼代理，並介紹一些基本故障排除。在ASA代碼版本9.0及更高版本中，ASA支援

必要條件

需求

思科建議您瞭解以下主題：

- IPv6基本概念
- IPv6編址機制
- DHCPv6資料包流

- DHCP中繼概念

採用元件

本文檔中的資訊基於ASA 5500版本9.1.2。

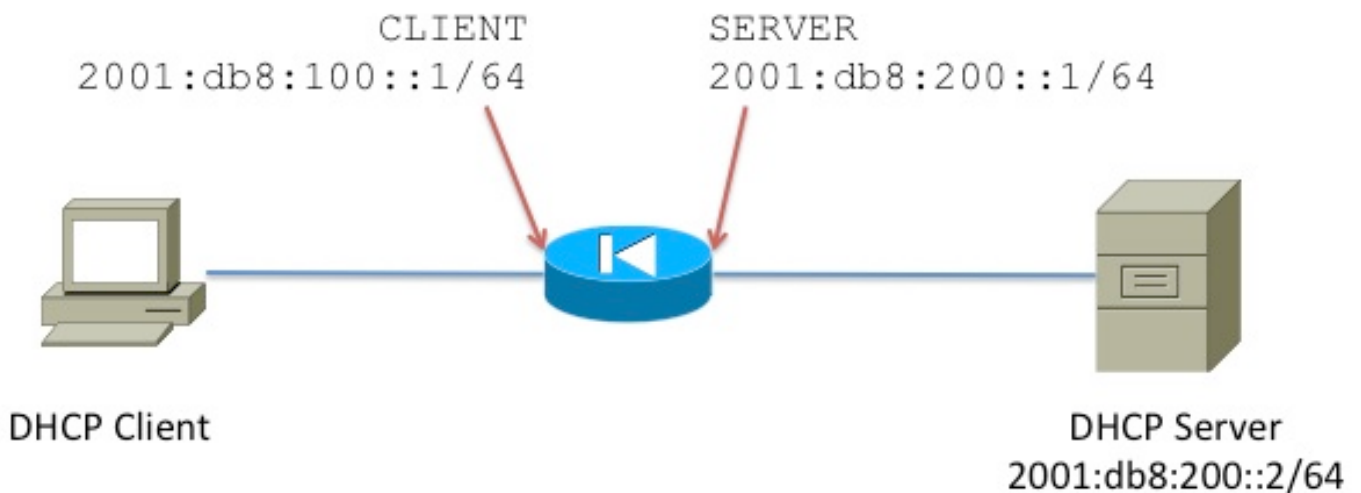
本文中的資訊是根據特定實驗室環境內的裝置所建立。文中使用到的所有裝置皆從已清除（預設）的組態來啟動。如果您的網路正在作用，請確保您已瞭解任何指令可能造成的影響。

有狀態和無狀態DHCPv6

如果您瞭解IPv6中的不同地址分配方法，它將幫助您瞭解DHCPv6中繼功能在ASA上的工作方式。有關無狀態地址自動配置(SLAAC)和DHCPv6的簡介，請參閱[使用SLAAC和DHCP在IPv6中分配動態地址](#)。

網路圖表

此示例配置說明如何將ASA配置為DHCPv6中繼代理。在此配置中，**CLIENT**是連線IPv6客戶端的介面。**SERVER**是通過DHCPv6伺服器2001:db8:200::2/64進行訪問的介面。



DHCPv6與DHCPv4消息型別

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

無狀態DHCPv6中繼

組態

以下是ASA上無狀態DHCPv6中繼配置的基本配置：

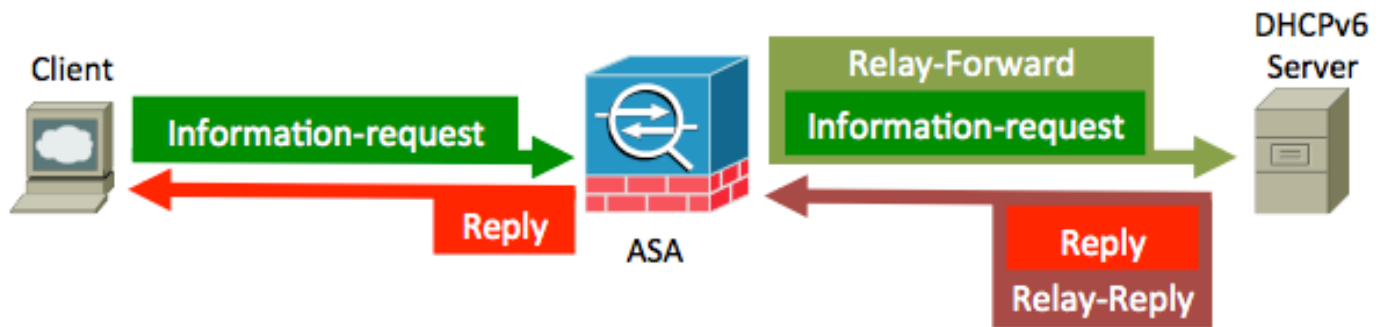
```
interface GigabitEthernet0/1
 nameif CLIENT
 security-level 100
 ipv6 address 2001:db8:100::1/64
 ipv6 enable
 ipv6 nd other-config-flag
!
interface GigabitEthernet0/0
 nameif SERVER
 security-level 0
 ipv6 address 2001:db8:200:1/64
 ipv6 enable
!
ipv6 dhcprelay server 2001:db8:200:2 inside
ipv6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

封包流量

使用無狀態DHCPv6時，下面是來自客戶端的資料包流：



ASA會攔截這些資料包並將其封裝為DHCP中繼格式：



驗證

調試

如果啟用 `debug ipv6 dhcprelay` 和 `debug ipv6 dhcp`，則相關輸出將列印到螢幕。此輸出來自一個工作場景：

```
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
```

在INFORMATION-REQUEST請求資料包中，客戶端僅請求DNS-Server和Domain，這是預期的，因為客戶端配置為無狀態DHCPv6。

Wireshark快照

DHCP使用者端請求

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.

ASA中繼的DHCP請求

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)
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: 0bf3c3adf0008000200000001000a00030001c471fe93b516...
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)
  
```

Ports used for DHCPv6 Relay

來自伺服器的DHCP回覆

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: 20010db8100000000000000000000001

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**

回覆已轉發到客戶端

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: 20010db8100000000000000000000001

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

有狀態DHCPv6

組態

以下是ASA上的有狀態DHCPv6中繼配置的基本配置：

```

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

```

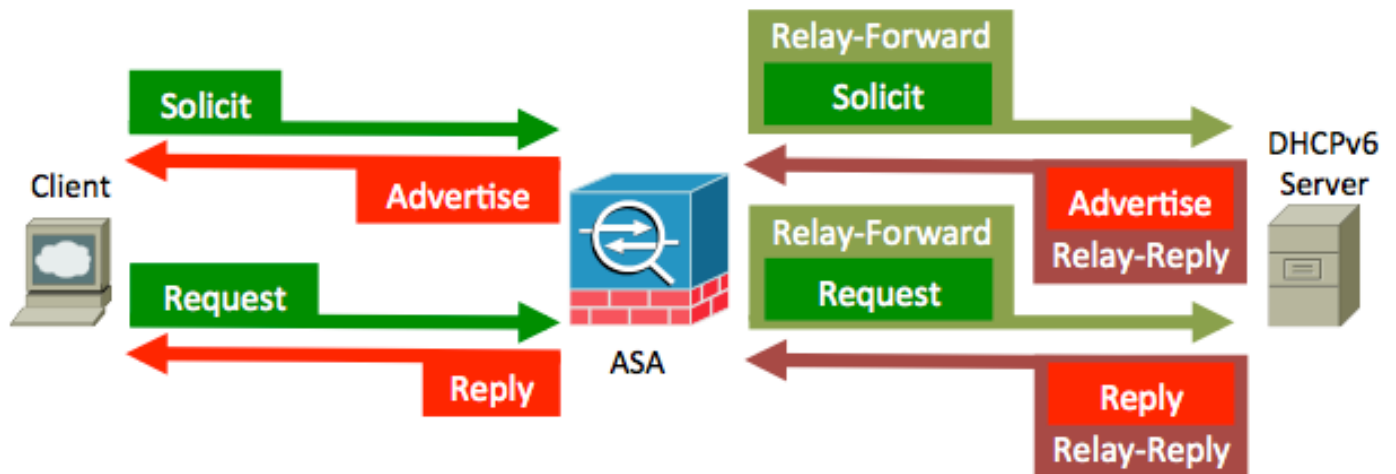
```
!  
ipv6 dhcprelay server 2001:db8:200:2 inside  
ipv6 dhcprelay enable outside
```

封包流量

使用有狀態DHCPv6時，下面是來自客戶端的資料包流：



ASA會攔截這些資料包並將其封裝為DHCP中繼格式：



驗證

調試

```
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

```

Wireshark快照

SOLICIT(1)

DHCPv6客戶端傳送Solicit消息以查詢DHCPv6伺服器。

The screenshot displays a network traffic capture in Wireshark. The top section shows the packet list with columns for Source, Destination, Protocol, Length, and Identification. A DHCPv6 SOLICIT packet is highlighted, showing its source as fe80::c671:feff:fe93:b51a and destination as ff02::1:2. The packet details pane shows the following information:

- Message type: SOLICIT (1)**: DHCPv6 client sends a solicit message.
- Transaction ID: 0x260139**
- Elapsed time (8)**: Length: 2, Value: 0000, Elapsed-time: 0 ms
- Client Identifier (1)**: Option: Client Identifier (1), Length: 10, Value: 00030001c471fe93b516. A note states: "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."
- Hardware type: Ethernet (1)**: Link-layer address: c4:71:fe:93:b5:16
- Option Request (6)**: 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 (3)**: Option: Identity Association for Non-temporary Address (3), Length: 12, Value: 00040001000000000000000000. A note states: "The client is responsible for creating IAs and requesting that a server assign IPv6 address to IA."

ASA中繼請求消息。

Source	Destination	Protocol	Length	Identification	Info
fe80::c671:feff:fe93:b51a	ff02::1:2	DHCPv6	114		Solicit XID: 0x260139 CID: 00030001c471fe93b516
fe80::219:7ff:fe24:2e44	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

```

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.

答覆(7)

伺服器傳送包含已分配地址和配置引數的回覆消息，以響應從客戶端接收的Solicit、Request、Renew或Rebind消息。伺服器傳送包含配置引數的回覆消息以響應資訊請求消息。伺服器傳送回覆消息以響應確認或拒絕分配給客戶機的地址與客戶機所連線的鏈路相符的確認消息。伺服器傳送回覆消息以確認收到釋放或拒絕消息。

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: 00030001c471fe93b516
2001:db8:200::2	2001:db8:200::1	DHCPv6	223		Relay-reply L: 2001:db8:100::1 Advertise XID: 0x260139 CID: 00030001c471fe93b516
2001:db8:200::1	2001:db8:200::2	DHCPv6	202		Relay-forw L: 2001:db8:100::1 Request XID: 0x2609aa CID: 00030001c471fe93b516
2001:db8:200::2	2001:db8:200::1	DHCPv6	223		Relay-reply L: 2001:db8:100::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: 20010db8100000000000000000000001
    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
  
```

疑難排解

確認與DHCPv6伺服器的連線。

```
ciscoasa# show ipv6 neighbor
```

```
IPv6 Address                               Age Link-layer Addr State Interface
2001:db8:200::2                            0 0024.14a3.3c98 REACH SERVER
```

確認在客戶端請求IPv6地址時收到來自該客戶端的資料包。客戶端傳送的資料包將取決於地址分配設定 (即有狀態和無狀態)。

當客戶端開始DHCPv6進程時，它會傳送Router Solicit消息以發現鏈路上存在IPv6路由器。它傳送組播路由器請求消息以提示IPv6路由器響應。在Router Solicitation消息的乙太網報頭中，將顯示以下欄位：

- Source Address欄位是請求IPv6地址的主機的MAC地址。
- Destination Address欄位設定為33-33-00-00-00-02。

在路由器請求消息的IPv6報頭中，將顯示以下欄位。

- Source Address欄位設定為分配給傳送介面的本地鏈路IPv6地址或IPv6未指定的地址(::)。
- Destination Address欄位設定為本地鏈路範圍所有路由器組播地址(FF02::2)。
- Hop Limit欄位設定為255。

作為響應，IPv6路由器傳送未經請求的路由器通告消息Router Advertisement消息包含主機確定鏈路字首、鏈路最大傳輸單元(MTU)和特定路由所需的資訊。

```
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.
```

DHCP中繼輸出

```
ciscoasa# show ipv6 dhcprelay binding
1 in use, 1 most used
```

```
Client: fe80::c671:feff:fe93:b51a (CLIENT)
DUID: 00030001c471fe93b516, Timeout in 56 seconds
```

附註：ASA會在短期內刪除繫結。debug ipv6 dhcprelay中會顯示這種情況。

```
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
```

發行地址

客戶端可以在完成之後釋放其DHCPv6分配的地址用於網路。下一部分顯示與有狀態DHCPv6中的地址釋放相關的調試輸出。

調試

```
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
```

相關資訊

[瞭解各種DHCP選項](#)

[ASA DHCP中繼配置示例](#)

[配置ASA以傳遞IPv6流量](#)

[使用CLI和ASDM的ASA資料包捕獲配置示例](#)