

目录

[简介](#)

[先决条件](#)

[要求](#)

[使用的组件](#)

[有状态的与无状态的DHCPv6](#)

[网络图](#)

[DHCPv6与DHCPv4消息类型](#)

[无状态的DHCPv6中继](#)

[配置](#)

[数据包流](#)

[验证](#)

[调试](#)

[Wireshark快照](#)

[有状态的DHCPv6](#)

[配置](#)

[数据包流](#)

[验证](#)

[调试](#)

[Wireshark快照](#)

[故障排除](#)

[DHCP中继输出](#)

[版本地址](#)

[调试](#)

[相关信息](#)

[相关的思科支持社区讨论](#)

简介

本文描述如何配置思科可适应安全工具(ASA)，DHCPv6中继代理并且包括那些基本故障排除。在ASA代码版本9.0中及以后，ASA支持

先决条件

要求

Cisco 建议您了解以下主题：

- IPv6基本概念
- 寻址的IPv6机制
- DHCPv6数据包流
- DHCP中继概念

使用的组件

本文档中的信息根据ASA 5500版本9.1.2。

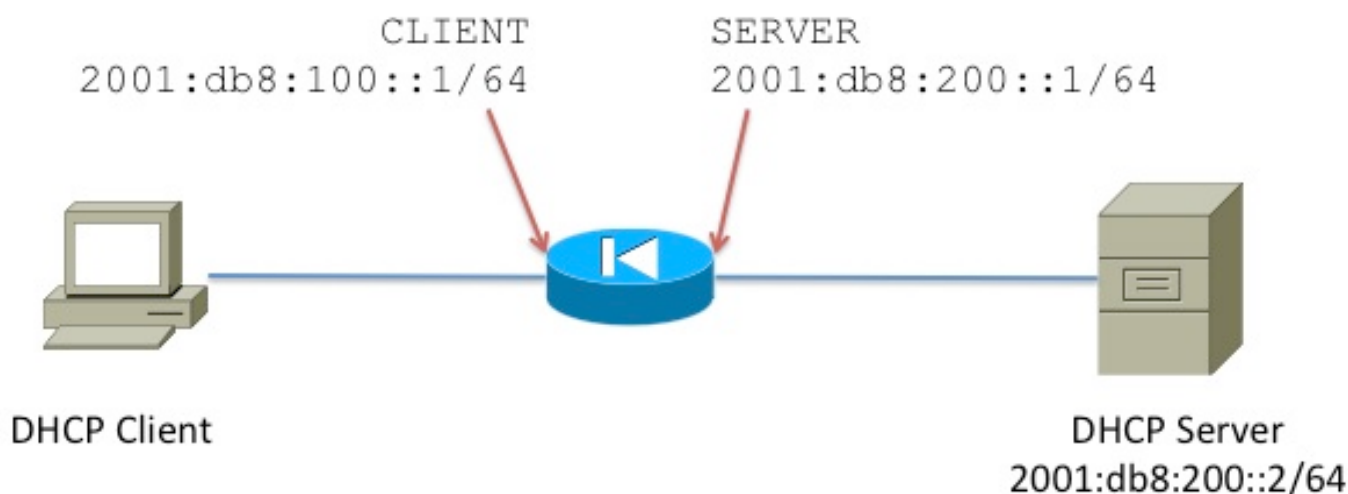
本文档中的信息都是基于特定实验室环境中的设备编写的。本文档中使用的所有设备最初均采用原始（默认）配置。如果您使用的是真实网络，请确保您已经了解所有命令的潜在影响。

有状态的与无状态的DHCPv6

如果了解地址分配不同的说法在IPv6的，帮助您知道DHCPv6中继功能如何在ASA运作。对[动态地址分配的Refre在IPv6使用SLAAC和DHCP](#)简介的无状态的地址自动配置(SLAAC)和DHCPv6。

网络图

此配置示例描述如何配置ASA作为DHCPv6中继代理。在此配置中，**客户端**是IPv6客户端连接的接口。**服务器**是DHCPv6服务器2001:db8:200::2/64是可及的接口。



DHCPv6与DHCPv4消息类型

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-Fow (12), Relay-Reply (13)	none

无状态的DHCPv6中继

配置

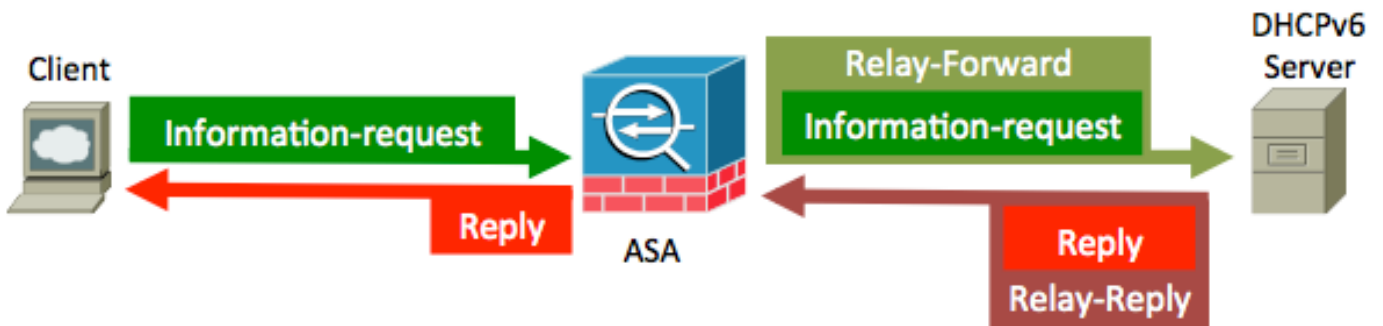
这是无状态的DHCPv6中继配置的基本配置在ASA :

数据包流

使用无状态的DHCPv6 , 这是从客户端的数据包流 :



ASA截断这些数据包并且包裹他们到DHCP中继格式 :



验证

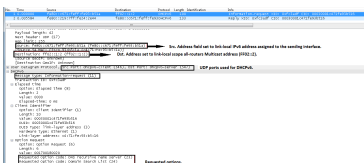
调试

如果启用dhcprelay调试的IPv6并且调试IPv6 dhcp , 则相关输出打印对屏幕。此输出从一个工作的方案被采取 :

在INFORMATION-REQUEST请求包中 , 客户端仅请求dns-server和域 , 预计 , 因为client为无状态的DHCPv6配置。

Wireshark快照

DHCP客户端请求



ASA中继的DHCP请求

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

Ports used for DHCPv6 Relay

- 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: 34
 - Value: 0bfc3adf0008000200000001000a00030001c471fe93b516...
 - 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)

从服务器的DHCP回复

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
 - Option: DNS recursive name server (23)
 - Length: 16
 - Value: 20010db81000000000000000000000000001
 - DNS server address: 2001:db8:1000::1 (2001:db8:1000::1)
 - Domain Search List
 - Option: Domain Search List (24)
 - Length: 11
 - Value: 05636973636f03636fed00
 - DNS Domain Search List
 - Domain: cisco.com

DNS Server Provided by DHCPv6 Server

Domain name

转发的回复对客户端

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	0.003594	fe80::219:7ff:fe24:2e44	fe80::c671:feff:fe93:b51a	DHCPv6	133		Reply XID: 0xfc3adf CID: 00030001c471fe93b516

Ports used to reply clients

- User Datagram Protocol, Src Port: dhcpv6-server (547), Dst Port: dhcpv6-client (546)
- 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: 20010db81000000000000000000000000001
 - DNS server address: 2001:db8:1000::1 (2001:db8:1000::1)
 - Domain Search List
 - Option: Domain Search List (24)
 - Length: 11
 - Value: 05636973636f03636fed00
 - DNS Domain Search List
 - Domain: cisco.com

Information forwarded to client

有状态的DHCPv6

配置

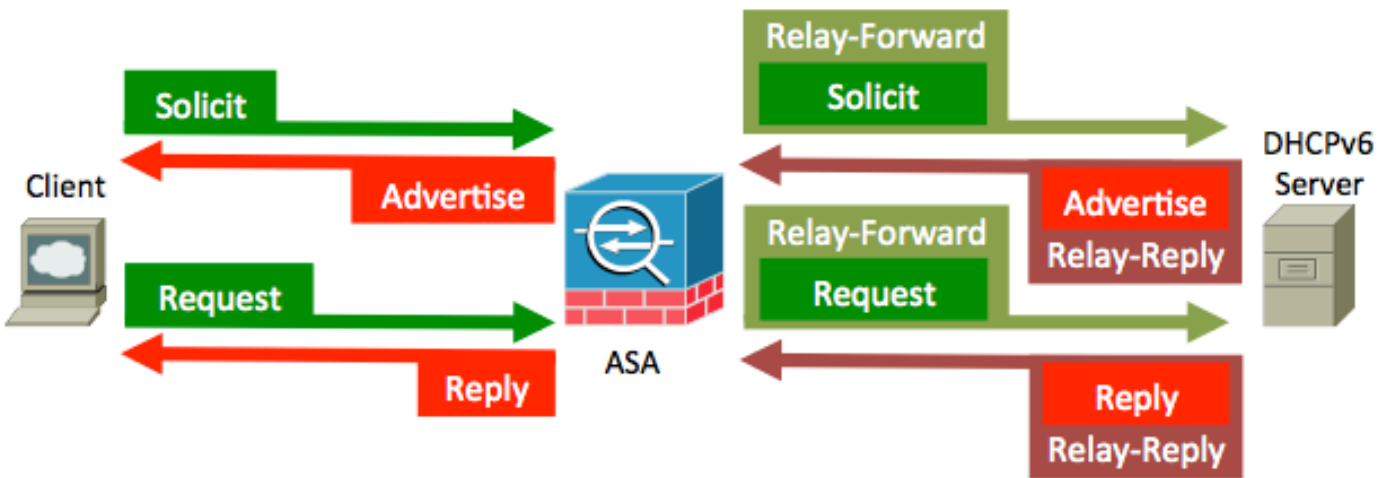
这是有状态的DHCPv6中继配置的基本配置在ASA :

数据包流

使用有状态的DHCPv6 , 这是从客户端的数据包流 :



ASA截断这些数据包并且包裹他们到DHCP中继格式 :



验证

调试

Wireshark快照

恳求(1)

DHCPv6客户端传送请求信息为了找出DHCPv6服务器。



ASA中继请求消息。

```
Source          Destination    Protocol Length Identification  Info
2001:db8:200::1 2001:db8:200::2 DHCPv6 160 Relay-forw : 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: 00030001c471fe93b55

<
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) Ports used between ASA and DHCPv6 server.
DHCPv6
Message type: Relay-forw (12) ASA relay's Solicit message
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
```

通告(2)

服务器传送通告信息为了表明为DHCP服务是可用的，以回应从客户端接收的请求消息。

```
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: 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: 00030001c471fe93b55

<
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) Server sends an Advertise message to indicate that it is available for DHCPv6 service.
Transaction ID: 0x260139
Server Identifier
Client Identifier
Identity Association for Non-temporary Address
DNS recursive name server
Domain Search List
Interface-Id
```

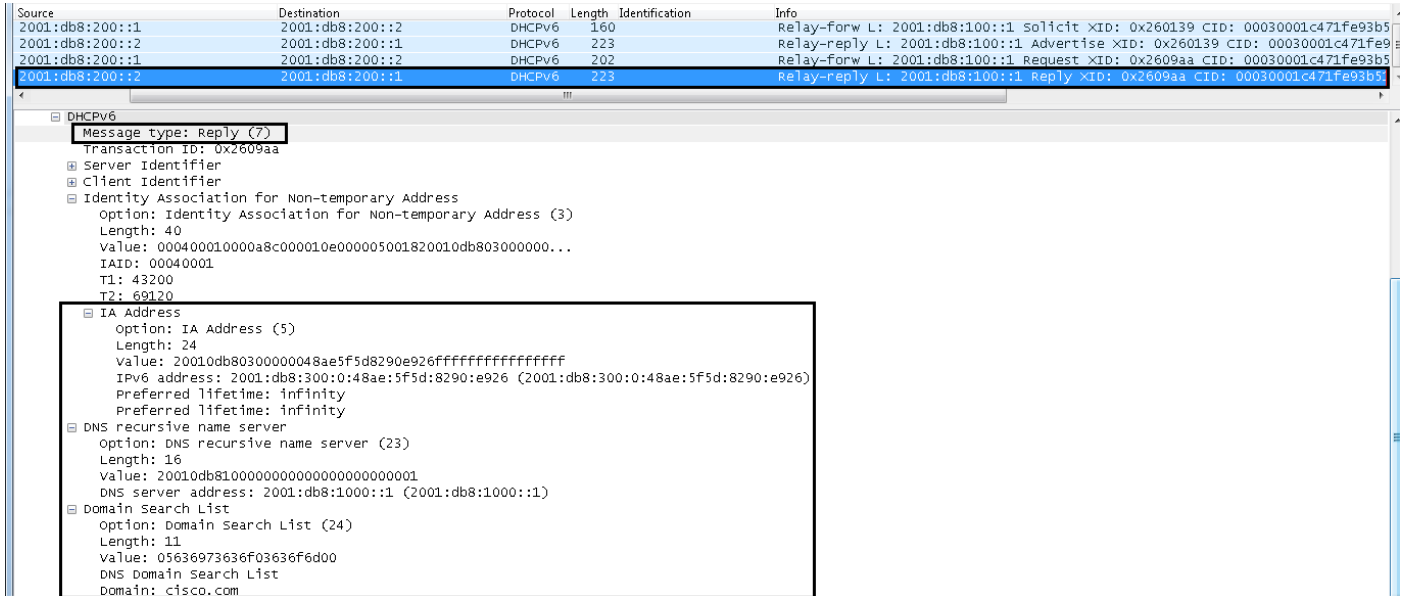
```
Message type: Advertise (2)
Transaction ID: 0x260139
Server Identifier
Option: Server Identifier (2)
Length: 10
Value: 00030001002414a33c94 Server DUID
DUID: 00030001002414a33c94
DUID Type: link-layer address (3)
Hardware type: Ethernet (1)
Link-layer address: 00:24:14:a3:3c:94
Client Identifier
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: 20010db80300000048ae5f5d8290e926ffffffffffffffff IPv6 address: 2001:db8:300:0:48ae:5f5d:8290:e926 (2001:db8:300:0:48ae:5f5d:8290:e926) Offered IP Address
Preferred lifetime: infinity
Preferred lifetime: infinity
DNS recursive name server
Option: DNS recursive name server (23)
Length: 16
Value: 20010db8100000000000000000000000000000000
DNS server address: 2001:db8:1000::1 (2001:db8:1000::1) DNS Server IP Address
Domain Search List
Option: Domain Search List (24)
Length: 11
Value: 05636973636f03636fd00
DNS Domain Search List
Domain: cisco.com Domain Name Provided
Interface-Id
```

REQUEST (3)

客户端发送Request信息为了要求配置参数，包括IP地址或分配的前缀，从一个特定服务器。

服务器传送包含已分配地址和配置参数以回应请求的回复信息，请求，更新或者重新绑定从客户端接收的消息。服务器传送包含配置参数以回应Information-request消息的回复信息。服务器传回

复信息以回应确认的确认消息或拒绝地址分配到客户端是适当的对客户端连接的链路。服务器传送回复信息为了确认版本的收据或拒绝消息。



故障排除

确认连接用DHCPv6服务器。

```
ciscoasa# show ipv6 neighbor
IPv6 Address                               Age Link-layer Addr State Interface
2001:db8:200::2                            0 0024.14a3.3c98 REACH SERVER
```

确认您收到从客户端的数据包，当它请求IPv6地址。客户端发送的数据包将取决于地址分配设置(即有状态的与无状态)。

当客户端开始DHCPv6进程时，发送路由器恳求消息为了发现IPv6路由器在线状态链路的。它传送组播路由器恳请信息为了提示IPv6路由器响应。在路由器恳请消息的以太网报头，这些字段显示：

- 源地址域是请求IPv6地址主机的MAC地址。
- 目的地址字段设置到33-33-00-00-00-02。

在路由器恳请消息的IPv6报头，这些字段显示。

- 源地址域设置为链路本地IPv6地址分配到发送的接口或IPv6未指明的地址(:)。
- 目的地址字段设置为链路本地范围所有路由器组播地址(FF02::2)。
- 跳Limit字段设置到255。

合情合理IPv6路由器发送未经请求的路由器通告消息路由器通告消息由主机包含需的信息为了确定链路前缀、链路最大传输单元(MTU)和特定路由。

```
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中继输出

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

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

注意：捆绑由ASA删除在短期之后。这在dhcprelay调试的IPv6被看到。

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

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

```
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
```

版本地址

在他们执行使用它为网络后，客户端能发布他们的分配的DHCPv6地址。下一部分显示用在有状态的DHCPv6的地址版本关联的debug输出。

调试


```
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
```

相关信息

[了解多种DHCP选项](#)

[ASA DHCP中继配置示例](#)

[配置ASA通过IPv6流量](#)

[有CLI和ASDM配置示例的ASA数据包捕获](#)