

ASA: DHCPv6 Relay-configuratievoorbeeld en probleemoplossing

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Inleiding

Het document beschrijft hoe u een Cisco adaptieve security applicatie (ASA) kunt configureren als een DHCPv6-relais en bevat ook een aantal fundamentele probleemoplossing. In ASA Code versie 9.0 en hoger ondersteunt de ASA

Voorwaarden

Vereisten

Cisco raadt kennis van de volgende onderwerpen aan:

- IPv6-basisconcepten
- IPv6-adresseringsmechanisme
- DHCPv6-pakketstroom
- DHCP-relaisconcepten

Gebruikte componenten

De informatie in dit document is gebaseerd op ASA 5500 versie 9.1.2.

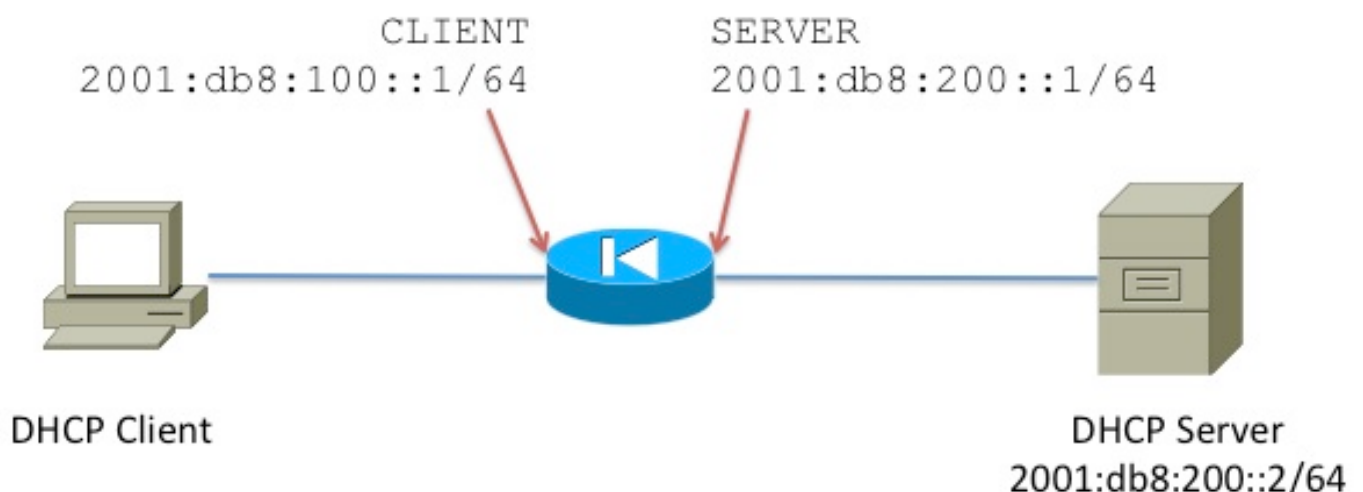
De informatie in dit document is gebaseerd op de apparaten in een specifieke laboratoriumomgeving. Alle apparaten die in dit document worden beschreven, hadden een opgeschoonde (standaard)configuratie. Als uw netwerk live is, moet u de potentiële impact van elke opdracht begrijpen.

Stateful vs stateless DHCPv6

Als u de verschillende methode van adrestoewijzing in IPv6 begrijpt, helpt het u te begrijpen hoe de DHCPv6 relais functie op de ASA werkt. Raadpleeg [Dynamische adrestoewijzing in IPv6 met behulp van SLAAC en DHCP](#) voor een introductie naar de automatische configuratie van het stateless adres (SLAAC) en DHCPv6.

Netwerkdigram

Deze voorbeeldconfiguratie beschrijft hoe de ASA als een DHCPv6 relais agent te configureren. In deze configuratie is **CLIENT** de interface waar de IPv6-client is aangesloten. **SERVER** is de interface waardoor de DHCPv6-server **2001:db8:200::2/64** bereikbaar is.



DHCPv6 vs DHCPv4-berichttypes

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

Stateless DHCPv6-relay

Configuratie

Hier is de basisconfiguratie voor de stateless DHCPv6-configuratie van de ASA:

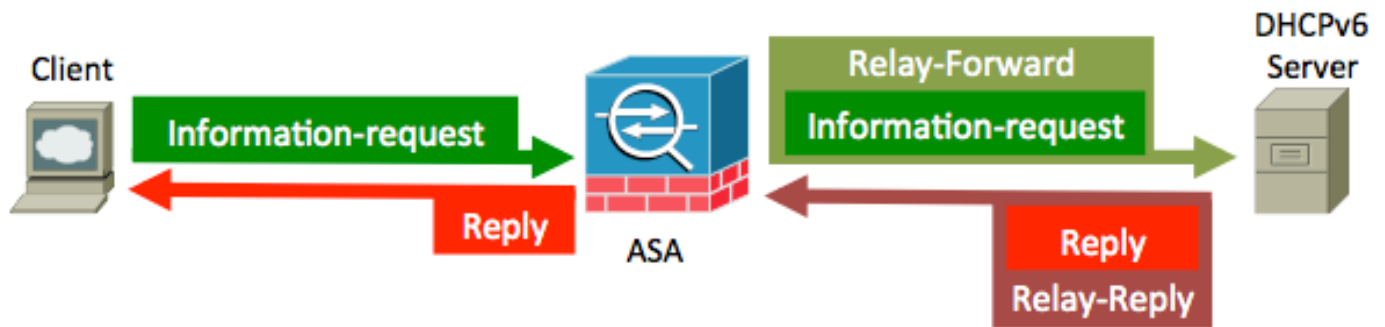
```
interface GigabitEthernet0/1
 nameif CLIENT
 security-level 100
 ipv6 address 2001:db8:100::1/64
 ipv6 enable
 ipv6 nd other-config-flag
!
interface GigabitEthernet0/0
 nameif SERVER
 security-level 0
 ipv6 address 2001:db8:200:1/64
 ipv6 enable
!
ipv6 dhcprelay server 2001:db8:200:2 inside
ipv6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

PacketFlow

Met stateless DHCPv6 is hier de pakketstroom van de client:



ASA onderschept deze pakketten en wikkelt ze in het DHCP-relais formaat:



Verifiëren

Debugs

Als u het **debug ipv6-decrelay** toelaat en **ipv6-dhcp** debug, dan drukt u de relevante uitvoerafdrukken op het scherm uit. Deze output wordt afgeleid van een werkscenario:

```
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
```

In het informatiepakket waarmee u een aanvraag indient, vraagt de client alleen om **DNS-server** en **Domain**, wat verwacht wordt aangezien de client is geconfigureerd voor stateless DHCPv6.

Wireshark Snapshots

DHCP-cliantaanvraag

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.

DHCP-aanvraag via 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)
  
```

DHCP-antwoord op server

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**

Aan client doorsturen

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

Stateful DHCPv6

Configuratie

Hier is de basisconfiguratie voor Stateful DHCPv6-relaisconfiguratie op de 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
```

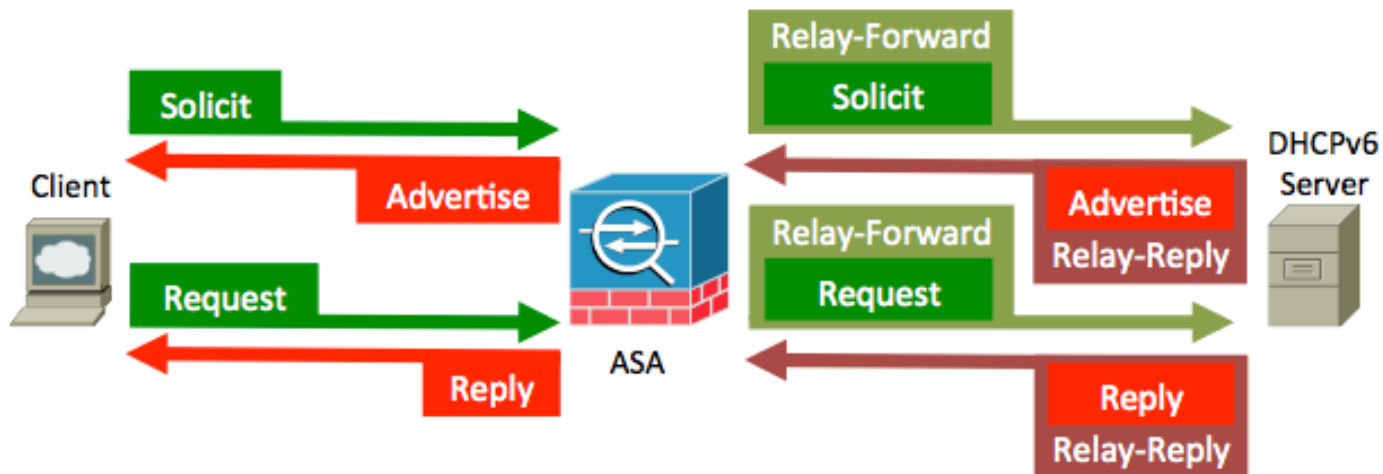
```
!
ipv6 dhcprelay server 2001:db8:200:2 inside
ipv6 dhcprelay enable outside
```

PacketFlow

Met stateful DHCPv6 is hier de pakketstroom van de client:



ASA onderscheppt deze pakketten en wikkelt ze in het DHCP-relais formaat:



Verifiëren

Debugs

```
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 Snapshots

SOLICIET (1)

Een DHCPv6-client stuurt een legaal bericht om DHCPv6-servers te lokaliseren.

The image shows a Wireshark capture of a network packet. The packet list pane shows three entries:

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
fe80::219:7ff:fe24:2e44	fe80::c671:feff:fe93:b51a	DHCPv6	177		Reply XID: 0x2609aa CID: 00030001c471fe93b516 IAA: 2001:db8:300:0:48ae:5f5d:8290:e926

The packet details pane shows the following information for the selected DHCPv6 SOLICIT packet:

- Message type:** solicit (1) **DHCPv6 client sends a solicit message.**
- Transaction ID:** 0x260139
- Elapsed time:** 2 (option: Elapsed time (8), value: 0000, elapsed-time: 0 ms)
- Client Identifier:**
 - Option: Client Identifier (1)**
 - Length:** 10
 - Value:** 00030001c471fe93b516
 - DUID:** 00030001c471fe93b516 **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.**
 - 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:** 00040001000000000000000000
 - IAID:** 00040001
 - T1:** 0
 - T2:** 0

The packet bytes pane shows the raw data of the packet.

De ASA geeft de exclusieve boodschap terug.

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) **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

BIJWERKING (2)

Een server verstuurt een Adverse-bericht om aan te geven dat het beschikbaar is voor DHCP-service, in antwoord op een legaal bericht dat van een client wordt ontvangen.

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) **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
 - Offered IP Address**
 - 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:db8:1000:0:0:0:0:0
 - DNS Server IP Address**
 - DNS server address: 2001:db8:1000::1 (2001:db8:1000::1)
- Domain Search List
 - Option: Domain Search List (24)
 - Length: 11
 - Value: 05636973636f03636fd00
 - Domain Name Provided**
 - DNS Domain Search List
 - Domain: cisco.com

Interface-Id

VERZOEK (3)

Een client verstuurt een melding om configuratieparameters te vragen, waaronder IP-adressen of gedelegeerde prefixes, van een specifieke server.

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: 20010db803000000048ae5f5d8290e926ffffffffffffffffffff
    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.

ANTWOORD (7)

Een server verstuurt een bericht van het antwoord dat toegewezen adressen en configuratieparameters in antwoord op een dichtbij, verzoek, verleng of herbinden bericht bevat dat van een client is ontvangen. Een server verstuurt een antwoordbericht met configuratieparameters in antwoord op een bericht van de informatieaanvraag. Een server verstuurt een antwoordbericht in antwoord op een Bevestigd bericht dat bevestigt of ontkent dat de aan de cliënt toegewezen adressen geschikt zijn voor de verbinding waarmee de cliënt verbonden is. Een server verstuurt een antwoordbericht om de ontvangst van een release- of inleverbericht te bevestigen.

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: 20010db803000000048ae5f5d8290e926ffffffffffffffffffff
    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: 05636973636f03636f6d00
    DNS Domain Search List
    Domain: cisco.com
  
```

Problemen oplossen

Bevestig verbinding met de DHCPv6-server.

```
ciscoasa# show ipv6 neighbor
```

```
IPv6 Address
```

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

2001:db8:200::2

0 0024.14a3.3c98 REACH SERVER

Bevestig dat u pakketten van de cliënt ontvangt wanneer het een IPv6 adres vraagt. Het pakket dat door de client wordt verzonden, is afhankelijk van de instellingen van de adrestoewijzing (dat wil zeggen, stateful vs stateless).

Wanneer de client met het DHCPv6-proces begint, wordt een bericht van de router met nauwkeurig bericht verzonden om de aanwezigheid van IPv6-routers op de link te ontdekken. Het stuurt een multicast bericht van de routeraanvraag om de IPv6-routers te vragen te reageren. In de Ethernet-kop van het bericht van de routeraanvraag geven deze velden weer:

- Het veld Bron Adres is het MAC-adres van de host die het IPv6-adres opvraagt.
- Het veld Doeladres is ingesteld op 33-33-00-00-00-02.

In de IPv6-header van het bericht routeraanvraag worden deze velden weergegeven.

- Het veld Bron Adres wordt ingesteld op een link-lokaal IPv6-adres dat aan de verzendende interface is toegewezen of op het niet gespecificeerde IPv6-adres (::).
- Het veld Adres doelmap wordt ingesteld op het link-lokale bereik van alle-routers multicast adres (F02:2).
- Het veld Hop Limit is ingesteld op 255.

In antwoord op deze vraag sturen de IPv6-routers ongevraagde berichten voor routeradvertenties. Het bericht routeradvertenties bevat de informatie die door hosts wordt vereist om de koppeling prefixes, de link Max Transmission Unit (MTU) en specifieke routes te bepalen.

```
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 Relay-uitgangen

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

1 in use, 1 most used

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

Opmerking: De band wordt na een korte periode door de ASA geschrapt. Dit wordt gezien in `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
```

Releaseadressen

Clients kunnen hun DHCPv6-toegewezen adres vrijgeven nadat zij dit voor het netwerk hebben gebruikt. De volgende sectie toont de debug uitvoer verbonden met adresrelease in Stateful DHCPv6.

Debugs

```
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
```


Gerelateerde informatie

[De betekenis van verschillende DHCP-opties](#)

[ASA DHCP Relay-configuratievoorbeeld](#)

[ASA configureren om IPv6-verkeer door te geven](#)

[ASA Packet Capture met CLI en ASDM Configuratievoorbeeld](#)