

8.5.1 Lab – Configure DHCPv6 (Answers)

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Lab – Configure DHCPv6 (Instructor Version)

Topology



Addressing Table

Device	Interface	IPv6 Address
R1	G0/0/0	<u>2001:db8:acad:2::1 /64</u>

Device	Interface	IPv6 Address
R1	G0/0/1	fe80::1
		2001:db8:acad:1::1/64
		fe80::1
	G0/0/0	2001:db8:acad:2::2/64
		fe80::2
		2001:db8:acad:3::1 /64
R2	G0/0/1	fe80::1
		2001:db8:acad:3::1 /64
PC-A	NIC	DHCP
PC-B	NIC	DHCP

Objectives

- **Part 1: Build the Network and Configure Basic Device Settings**
- **Part 2: Verify SLAAC address assignment from R1**
- **Part 3: Configure and verify a Stateless DHCPv6 Server on R1**
- **Part 4: Configure and verify a Stateful DHCPv6 Server on R1**
- **Part 5: Configure and verify a DHCPv6 Relay on R2**

Background / Scenario

The dynamic assignment of IPv6 global unicast addresses (GUA) can be configured the following three ways:

- Stateless Address Autoconfiguration (SLAAC)
- Stateless Dynamic Host Configuration Protocol for IPv6 (DHCPv6)
- Stateful DHCPv6

When using SLAAC to assign IPv6 addresses to hosts a DHCPv6 server is not used. Because a DHCPv6 server is not used when implementing SLAAC, hosts are unable to receive additional critical network information, including a domain name server (DNS) address as well as a domain name.

When using Stateless DHCPv6 to assign IPv6 addresses to host, a DHCPv6 server is used to assign the additional critical network information, however the IPv6 address is assigned using SLAAC.

When implementing Stateful DHCPv6, a DHCPv6 server assigns all network information, including the IPv6 address.

The determination of how hosts obtain they dynamic IPv6 addressing is dependent on flag setting contain within the router advertisement (RA) messages.

In this scenario, the company has grown in size, and the network administrators can no longer assign IP addresses to devices manually. Your job is to configure the R2 router to assign IPv6 addresses on two different subnets connected to router R1.

Note: The routers used with CCNA hands-on labs are Cisco 4221 with Cisco IOS XE Release 16.9.4 (universalk9 image). The switches used in the labs are Cisco Catalyst 2960s with Cisco IOS Release 15.2(2) (lanbasek9 image). Other routers, switches, and Cisco IOS versions can be used. Depending on the model and Cisco IOS version, the commands available and the output produced might vary from what is shown in the labs. Refer to the Router Interface Summary Table at the end of the lab for the correct interface identifiers.

Note: Ensure that the routers and switches have been erased and have no startup configurations. If you are unsure contact your instructor.

Required Resources

- 2 Routers (Cisco 4221 with Cisco IOS XE Release 16.9.4 universal image or comparable)
- 2 Switches (Cisco 2960 with Cisco IOS Release 15.2(2) lanbasek9 image or comparable) – Optional
- 2 PCs (Windows with a terminal emulation program, such as Tera Term)
- Console cables to configure the Cisco IOS devices via the console ports
- Ethernet cables as shown in the topology

Instructions

Part 1: Build the Network and Configure Basic Device Settings

In Part 1, you will set up the network topology and configure basic settings on the PC hosts and switches.

Step 1: Cable the network as shown in the topology.

Attach the devices as shown in the topology diagram, and cable as necessary.

Step 2: Configure basic settings for each switch. (Optional)

a. Assign a device name to the switch.

```
switch(config)# hostname S1
switch(config)# hostname S2
```

b. Disable DNS lookup to prevent the router from attempting to translate incorrectly entered commands as though they were host names.

```
S1(config)# no ip domain-lookup
S2(config)# no ip domain-lookup
```

c. Assign **class** as the privileged EXEC encrypted password.

```
S1(config)# enable secret class
S2(config)# enable secret class
```

d. Assign **cisco** as the console password and enable login.

```
S1(config)# line console 0
S1(config-line)# password cisco
S1(config-line)# login
```

```
S2(config)# line console 0
S2(config-line)# password cisco
S2(config-line)# login
```

e. Assign **cisco** as the VTY password and enable login.

```
S1(config)# line vty 0 4
S1(config-line)# password cisco
S1(config-line)# login
```

```
S2(config)# line vty 0 4
S2(config-line)# password cisco
S2(config-line)# login
```

f. Encrypt the plaintext passwords.

```
S1(config)# service password-encryption
```

```
S2(config)# service password-encryption
```

g. Create a banner that warns anyone accessing the device that unauthorized access is prohibited.

```
S1(config)# banner motd $ Authorized Users Only! $
```

```
S2(config)# banner motd $ Authorized Users Only! $
```

h. Shutdown all unused ports

```
S1(config)# interface range f0/1-4, f0/7-24, g0/1-2
S1(config-if-range)# shutdown
```

```
S2(config)# interface range f0/1-4, f0/7-17, f0/19-24, g0/1-2
S2(config-if-range)# shutdown
```

i. Save the running configuration to the startup configuration file.

```
S1# copy running-config startup-config
```

```
S2# copy running-config startup-config
```

Step 3: Configure basic settings for each router.

a. Assign a device name to the router.

```
router(config)# hostname R1
```

```
router(config)# hostname R2
```

b. Disable DNS lookup to prevent the router from attempting to translate incorrectly entered commands as though they were host names.

```
R1(config)# no ip domain lookup
```

```
R2(config)# no ip domain lookup
```

c. Assign **class** as the privileged EXEC encrypted password.

```
R1(config)# enable secret class
```

```
R2(config)# enable secret class
```

d. Assign **cisco** as the console password and enable login.

```
R1(config)# line console 0
```

```
R1(config-line)# password cisco
```

```
R1(config-line)# login
```

```
R2(config)# line console 0
```

```
R2(config-line)# password cisco
```

```
R2(config-line)# login
```

e. Assign **cisco** as the VTY password and enable login.

```
R1(config)# line vty 0 4
```

```
R1(config-line)# password cisco
```

```
R1(config-line)# login
```

```
R2(config)# line vty 0 4
```

```
R2(config-line)# password cisco
```

```
R2(config-line)# login
```

f. Encrypt the plaintext passwords.

```
R1(config)# service password-encryption
```

```
R2(config)# service password-encryption
```

g. Create a banner that warns anyone accessing the device that unauthorized access is prohibited.

```
R1(config)# banner motd $ Authorized Users Only! $
```

```
R2(config)# banner motd $ Authorized Users Only! $
```

h. Enable IPv6 Routing

```
R1(config)# ipv6 unicast-routing
```

```
R2(config)# ipv6 unicast-routing
```

i. Save the running configuration to the startup configuration file.

```
R1(config)# exit
```

```
R1# copy running-config startup-config
```

```
R2(config)# exit
```

```
R2# copy running-config startup-config
```

Step 4: Configure interfaces and routing for both routers.

a. Configure the Go/o/o and Go/o/1 interfaces on R1 and R2 with the IPv6 addresses specified in the table above.

```
R1(config)# interface g0/0/1
```

```
R1(config-if)# ipv6 address fe80::1 link-local
```

```
R1(config-if)# ipv6 address 2001:db8:acad:1::1/64
```

```
R1(config-if)# no shutdown
```

```
R1(config)# interface g0/0/0
```

```
R1(config-if)# ipv6 address fe80::1 link-local
```

```
R1(config-if)# ipv6 address 2001:db8:acad:2::1/64
```

```
R1(config-if)# no shutdown
```

```
R2(config)# interface g0/0/1
```

```
R2(config-if)# ipv6 address fe80::1 link-local
```

```
R2(config-if)# ipv6 address 2001:db8:acad:3::1/64
```

```
R2(config-if)# no shutdown
```

```
R1(config)# interface g0/0/0
```

```
R1(config-if)# ipv6 address fe80::2 link-local
```

```
R1(config-if)# ipv6 address 2001:db8:acad:2::2/64
```

```
R1(config-if)# no shutdown
```

b. Configure a default route on each router pointed to the IP address of Go/o/o on the other router.

```
R1(config)# ipv6 route ::/0 2001:db8:acad:2::2
R2(config)# ipv6 route ::/0 2001:db8:acad:2::1
```

c. Verify routing is working by pinging R2's Go/o/1 address from R1

```
R1#(config)# exit
R1# ping 2001:db8:acad:1::1
```

d. Save the running configuration to the startup configuration file.

```
R1# copy running-config startup-config
```

Part 2: Verify SLAAC Address Assignment from R1

In Part 2, you will verify that Host PC-A receives an IPv6 address using the SLAAC method.

Power PC-A up and ensure that the NIC is configured for IPv6 automatic configuration.

After a few moments, the results of the command **ipconfig** should show that PC-A has assigned itself an address from the 2001:db8:1::/64 network.

```
C:\Users\Student> ipconfig
Windows IP Configuration
```

Ethernet adapter Ethernet 2:

```
Connection-specific DNS Suffix . :
IPv6 Address. . . . . : 2001:db8:acad:1:5c43:ee7c:2959:da68
Temporary IPv6 Address. . . . . : 2001:db8:acad:1:3c64:e4f9:46e1:1f23
Link-local IPv6 Address . . . . . : fe80::5c43:ee7c:2959:da68%6
IPv4 Address. . . . . : 169.254.218.104
Subnet Mask . . . . . : 255.255.0.0
Default Gateway . . . . . : fe80::1%6
```

Where did the host-id portion of the address come from?

Answer will depend upon the operating system configuration. Either the host generates an EUI-64 address based on the interface MAC, or the host generates a random 64-bit address.

Part 3: Configure and Verify a DHCPv6 server on R1

In Part 3, you will configure and verify a stateless DHCP server on R1. The objective is to provide PC-A with DNS server and Domain information.

Step 1: Examine the configuration of PC-A in more detail.

a. Issue the command **ipconfig /all** on PC-A and take a look at the output.

```
C:\Users\Student> ipconfig /all
Windows IP Configuration
```

```
Host Name . . . . . : DESKTOP-3FR7RKA
Primary Dns Suffix . . . . . :
Node Type . . . . . : Hybrid
IP Routing Enabled. . . . . : No
WINS Proxy Enabled. . . . . : No
```

Ethernet adapter Ethernet0:

```
Connection-specific DNS Suffix . :
Description . . . . . : Intel(R) 852574L Gigabit Network Connection
Physical Address. . . . . : 00-50-56-83-63-6D
IPv6 Address. . . . . : 2001:db8:acad:1:5c43:ee7c:2959:da68(Preferred)
Temporary IPv6 Address. . . . . : 2001:db8:acad:1:3c64:e4f9:46e1:1f23(Preferred)
Link-local IPv6 Address . . . . . : fe80::5c43:ee7c:2959:da68%6(Preferred)
IPv4 Address. . . . . : 169.254.218.104(Preferred)
Subnet Mask . . . . . : 255.255.0.0
Default Gateway . . . . . : fe80::1%6
DHCPv6 IAID . . . . . : 50334761
DHCPv6 Client DUID. . . . . : 00-01-00-01-24-F5-CE-A2-00-50-56-B3-63-6D
DNS Servers . . . . . : fec0:0:0:ffff::1%1
                       fec0:0:0:ffff::2%1
                       fec0:0:0:ffff::3%1
NetBIOS over Tcpip. . . . . : Enabled
```

b. Notice that there is no Primary DNS suffix. Also note that the DNS server addresses provided are “site local anycast” addresses, and not unicast addresses, as would be expected.

Step 2: Configure R1 to provide stateless DHCPv6 for PC-A.

a. Create an IPv6 DHCP pool on R1 named R1-STATELESS. As a part of that pool, assign the DNS server address as 2001:db8:acad::254 and the domain name as stateless.com.

```
R1(config)# ipv6 dhcp pool R1-STATELESS
R1(config-dhcp)# dns-server 2001:db8:acad::254
R1(config-dhcp)# domain-name STATELESS.com
```

b. Configure the Go/o/1 interface on R1 to provide the OTHER config flag to the R1 LAN, and specify the DHCP pool you just created as the DHCP resource for this interface.

```
R1(config)# interface g0/0/1
R1(config-if)# ipv6 nd other-config-flag
R1(config-if)# ipv6 dhcp server R1-STATELESS
```

c. Save the running configuration to the startup configuration file.

```
R1# copy running-config startup-config
```

d. Restart PC-A.

e. Examine the output of `ipconfig /all` and notice the changes.

```
C:\Users\Student> ipconfig /all
Windows IP Configuration
```

```
Host Name . . . . . : DESKTOP-3FR7RKA
Primary Dns Suffix . . . . . :
Node Type . . . . . : Hybrid
IP Routing Enabled. . . . . : No
WINS Proxy Enabled. . . . . : No
DNS Suffix Search List. . . . . : STATELESS.com
```

```
Ethernet adapter Ethernet0:
```

```
Connection-specific DNS Suffix . : STATELESS.com
Description . . . . . : Intel(R) 82574L Gigabit Network Connection
Physical Address. . . . . : 00-50-56-83-63-6D
DHCP Enabled. . . . . : Yes
Autoconfiguration Enabled . . . . : Yes
IPv6 Address. . . . . : 2001:db8:acad:1:5c43:ee7c:2959:da68(Preferred)
Temporary IPv6 Address. . . . . : 2001:db8:acad:1:3c64:e4f9:46e1:1f23(Preferred)
Link-local IPv6 Address . . . . . : fe80::5c43:ee7c:2959:da68%6(Preferred)
IPv4 Address. . . . . : 169.254.218.104(Preferred)
Subnet Mask . . . . . : 255.255.0.0
Default Gateway . . . . . : fe80::1%6
DHCPv6 IAID . . . . . : 50334761
DHCPv6 Client DUID. . . . . : 00-01-00-01-24-F5-CE-A2-00-50-56-B3-63-6D
DNS Servers . . . . . : 2001:db8:acad::254
NetBIOS over Tcpip. . . . . : Enabled
Connection-specific DNS Suffix Search List :
                                STATELESS.com
```

f. Test connectivity by pinging R2's Go/o/1 interface IP address.

Part 4: Configure a stateful DHCPv6 server on R1

In Part 4, you will configure R1 to respond to DHCPv6 requests from the LAN on R2.

a. Create a DHCPv6 pool on R1 for the 2001:db8:acad:3:aaaa::/80 network. This will provide addresses to the LAN connected to interface Go/o/1 on R2. As a part of the pool, set the DNS server to 2001:db8:acad::254, and set the domain name to STATEFUL.com.

```
R1(config)# ipv6 dhcp pool R2-STATEFUL
R1(config-dhcp)# address prefix 2001:db8:acad:3:aaa::/80
R1(config-dhcp)# dns-server 2001:db8:acad::254
R1(config-dhcp)# domain-name STATEFUL.com
```

b. Assign the DHCPv6 pool you just created to interface go/o/o on R1.

```
R1(config)# interface g0/0/0
R1(config-if)# ipv6 dhcp server R2-STATEFUL
```

Part 5: Configure and verify DHCPv6 relay on R2.

In Part 5, you will configure and verify DHCPv6 relay on R2, allowing PC-B to receive an IPv6 Address.

Step 1: Power on PC-B and examine the SLAAC address that it generates.

```
C:\Users\Student> ipconfig /all
Windows IP Configuration
```

```
Host Name . . . . . : DESKTOP-3FR7RKA
Primary Dns Suffix . . . . . :
Node Type . . . . . : Hybrid
IP Routing Enabled. . . . . : No
WINS Proxy Enabled. . . . . : No
```

```
Ethernet adapter Ethernet0:
```

```
Connection-specific DNS Suffix . :
Description . . . . . : Intel(R) 82574L Gigabit Network Connection
Physical Address. . . . . : 00-50-56-B3-7B-06
DHCP Enabled. . . . . : Yes
Autoconfiguration Enabled . . . . : Yes
IPv6 Address. . . . . : 2001:db8:acad:3:a0f3:3d39:f9fb:a020(Preferred)
Temporary IPv6 Address. . . . . : 2001:db8:acad:3:d4f3:7b16:eeee:b2b5(Preferred)
Link-local IPv6 Address . . . . . : fe80::a0f3:3d39:f9fb:a020%6(Preferred)
IPv4 Address. . . . . : 169.254.160.32(Preferred)
Subnet Mask . . . . . : 255.255.0.0
Default Gateway . . . . . : fe80::1%6
DHCPv6 IAID . . . . . : 50334761
DHCPv6 Client DUID. . . . . : 00-01-00-01-24-F2-08-38-00-50-56-B3-7B-06
DNS Servers . . . . . : fec0:0:0:ffff::1%1
                       : fec0:0:0:ffff::2%1
                       : fec0:0:0:ffff::3%1
NetBIOS over Tcpip. . . . . : Enabled
```

Notice in the output that the prefix used is 2001:db8:acad:3::

Step 2: Configure R2 as a DHCP relay agent for the LAN on Go/o/1.

a. Configure the `ipv6 dhcp relay` command on R2 interface Go/o/1, specifying the destination address of the Go/o/o interface on R1. Also configure the `managed-config-flag` command.

```
R2(config)# interface g0/0/1
R2(config-if)# ipv6 nd managed-config-flag
R2(config-if)# ipv6 dhcp relay destination 2001:db8:acad:2::1 g0/0/0
```

b. Save your configuration.

```
R2# copy running-configuration startup-configuration
```

Step 3: Attempt to acquire an IPv6 address from DHCPv6 on PC-B.

a. Restart PC-B.

b. Open a command prompt on PC-B and issue the command `ipconfig /all` and examine the output to see the results of the DHCPv6 relay operation.

```
C:\Users\Student> ipconfig /all
Windows IP Configuration
```

```
Host Name . . . . . : DESKTOP-3FR7RKA
Primary Dns Suffix . . . . . :
Node Type . . . . . : Hybrid
IP Routing Enabled. . . . . : No
WINS Proxy Enabled. . . . . : No
DNS Suffix Search List. . . . . : STATEFUL.com
```

```
Ethernet adapter Ethernet0:
```

```
Connection-specific DNS Suffix . : STATEFUL.com
Description . . . . . : Intel(R) 852574L Gigabit Network Connection
Physical Address. . . . . : 00-50-56-B3-7B-06
DHCP Enabled. . . . . : Yes
Autoconfiguration Enabled . . . . : Yes
IPv6 Address. . . . . : 2001:db8:acad3:aaaa:7104:8b7d:5402(Preferred)
Lease Obtained. . . . . : Sunday, October 6, 2019 3:27:13 PM
Lease Expires . . . . . : Tuesday, October 8, 2019 3:27:13 PM
Link-local IPv6 Address . . . . . : fe80::a0f3:3d39:f9fb:a020%6(Preferred)
IPv4 Address. . . . . : 169.254.160.32(Preferred)
Subnet Mask . . . . . : 255.255.0.0
Default Gateway . . . . . : fe80::2%6
DHCPv6 IAID . . . . . : 50334761
DHCPv6 Client DUID. . . . . : 00-01-00-01-24-F2-08-38-00-50-56-B3-7B-06
DNS Servers . . . . . : 2001:db8:acad::254
NetBIOS over Tcpip. . . . . : Enabled
Connection-specific DNS Suffix Search List :
                                     STATEFUL.com
```

c. Test connectivity by pinging R1's Go/o/1 interface IP address.

Device Configs – Final

Switch S1

```

S1# show run
Building configuration...

Current configuration : 1706 bytes
!
version 15.2
no service pad
service timestamps debug datetime msec
service timestamps log datetime msec
service password-encryption
!
hostname S1
!
boot-start-marker
boot-end-marker
!
enable secret 5 $1$73g3$Jo3CGq7B8MLGHbPVaa7mW1
!
no aaa new-model
system mtu routing 1500
!
!
no ip domain-lookup
!
!
spanning-tree mode pvst
spanning-tree extend system-id
!
vlan internal allocation policy ascending
!
!
interface FastEthernet0/1
shutdown
!
interface FastEthernet0/2
shutdown
!
interface FastEthernet0/3
shutdown
!
interface FastEthernet0/4
shutdown
!
interface FastEthernet0/5
!
interface FastEthernet0/6
!
interface FastEthernet0/7
shutdown
!
interface FastEthernet0/8
shutdown
!
interface FastEthernet0/9
shutdown
!
interface FastEthernet0/10
shutdown
!
interface FastEthernet0/11
shutdown
!
interface FastEthernet0/12
shutdown
!
interface FastEthernet0/13
shutdown
!
interface FastEthernet0/14
shutdown
!
interface FastEthernet0/15
shutdown
!
interface FastEthernet0/16
shutdown
!
interface FastEthernet0/17
shutdown

```

```
!  
interface FastEthernet0/18  
shutdown  
!  
interface FastEthernet0/19  
shutdown  
!  
interface FastEthernet0/20  
shutdown  
!  
interface FastEthernet0/21  
shutdown  
!  
interface FastEthernet0/22  
shutdown  
!  
interface FastEthernet0/23  
shutdown  
!  
interface FastEthernet0/24  
shutdown  
!  
interface GigabitEthernet0/1  
shutdown  
!  
interface GigabitEthernet0/2  
shutdown  
!  
interface Vlan1  
no ip address  
!  
ip http server  
ip http secure-server  
!  
banner motd ^C Authorized Users Only! ^C  
!  
line con 0  
password 7 13061E010803  
login  
line vty 0 4  
password 7 13061E010803  
login  
line vty 5 15  
login  
!  
end
```

Switch S2

```

S2# show run
Building configuration...

Current configuration : 1706 bytes
!
version 15.2
no service pad
service timestamps debug datetime msec
service timestamps log datetime msec
service password-encryption
!
hostname S2
!
boot-start-marker
boot-end-marker
!
enable secret 5 $1$fREN$AwRLs.iAyQ1hBS7EhVz5J.
!
no aaa new-model
system mtu routing 1500
!
!
no ip domain-lookup
!
!
spanning-tree mode pvst
spanning-tree extend system-id
!
vlan internal allocation policy ascending
!
!
interface FastEthernet0/1
shutdown
!
interface FastEthernet0/2
shutdown
!
interface FastEthernet0/3
shutdown
!
interface FastEthernet0/4
shutdown
!
interface FastEthernet0/5
!
interface FastEthernet0/6
shutdown
!
interface FastEthernet0/7
shutdown
!
interface FastEthernet0/8
shutdown
!
interface FastEthernet0/9
shutdown
!
interface FastEthernet0/10
shutdown
!
interface FastEthernet0/11
shutdown
!
interface FastEthernet0/12
shutdown
!
interface FastEthernet0/13
shutdown
!
interface FastEthernet0/14
shutdown
!
interface FastEthernet0/15
shutdown
!
interface FastEthernet0/16
shutdown
!
interface FastEthernet0/17

```

```
shutdown
!
interface FastEthernet0/18
!
interface FastEthernet0/19
shutdown
!
interface FastEthernet0/20
shutdown
!
interface FastEthernet0/21
shutdown
!
interface FastEthernet0/22
shutdown
!
interface FastEthernet0/23
shutdown
!
interface FastEthernet0/24
shutdown
!
interface GigabitEthernet0/1
shutdown
!
interface GigabitEthernet0/2
shutdown
!
interface Vlan1
no ip address
!
ip http server
ip http secure-server
!
banner motd ^C Authorized Users Only! ^C
!
line con 0
password 7 121A0C041104
login
line vty 0 4
password 7 121A0C041104
login
line vty 5 15
login
!
end
```

Router R1

```

R1# show run
Building configuration...

Current configuration : 3959 bytes
!
version 16.9
service timestamps debug datetime msec
service timestamps log datetime msec
service password-encryption
platform qfp utilization monitor load 80
no platform punt-keepalive disable-kernel-core
!
hostname R1
!
boot-start-marker
boot-end-marker
!
!
enable secret 5 $1$I56A$PEdL3aayz4ui1KNVACjUE1
!
no aaa new-model
!
!
no ip domain lookup
!
!
login on-success log
!
!
subscriber templating
!
!
ipv6 unicast-routing
ipv6 dhcp pool R1-STATELESS
dns-server 2001:DB8:ACAD::254
domain-name STATELESS.com
!
ipv6 dhcp pool R2-STATEFUL
address prefix 2001:DB8:ACAD:3:AAAA::/80
dns-server 2001:DB8:ACAD::254
domain-name STATEFUL.com
!
multilink bundle-name authenticated
!
spanning-tree extend system-id
!
!
redundancy
mode none
!
!
interface GigabitEthernet0/0/0
no ip address
ipv6 address FE80::1 link-local
ipv6 address 2001:DB8:ACAD:2::1/64
ipv6 dhcp server R2-STATEFUL
negotiation auto
!
interface GigabitEthernet0/0/1
no ip address
negotiation auto
ipv6 address FE80::1 link-local
ipv6 address 2001:DB8:ACAD:1::1/64
ipv6 nd other-config-flag
ipv6 dhcp server R1-STATELESS
!
interface Serial0/1/0
no ip address
shutdown
!
interface Serial0/1/1
no ip address
shutdown
!
ip forward-protocol nd
no ip http server
ip http secure-server
!

```

```
!  
ipv6 route ::/0 2001:DB8:ACAD:2::2  
!  
!  
control-plane  
!  
banner motd ^C Authorized Users Only! ^C  
!  
line con 0  
password 7 030752180500  
login  
transport input none  
stopbits 1  
line aux 0  
stopbits 1  
line vty 0 4  
password 7 045802150C2E  
login  
!  
end
```

Router R2

```
R2# show run
Building configuration...
```

```
Current configuration : 1639 bytes
!
version 16.9
service timestamps debug datetime msec
service timestamps log datetime msec
service password-encryption
platform qfp utilization monitor load 80
no platform punt-keepalive disable-kernel-core
!
hostname R2
!
boot-start-marker
boot-end-marker
!
!
enable secret 5 $1$Q7m2$XP0D4vB3fJxSm3X3V53uq1
!
no aaa new-model
!
no ip domain lookup
!
login on-success log
!
!
subscriber templating
!
!
ipv6 unicast-routing
multilink bundle-name authenticated
!
spanning-tree extend system-id
!
!
redundancy
mode none
!
!
interface GigabitEthernet0/0/0
no ip address
ipv6 address FE80::2 link-local
ipv6 address 2001:DB8:ACAD:2::2/64
!
interface GigabitEthernet0/0/1
no ip address
negotiation auto
ipv6 address FE80::2 link-local
ipv6 address 2001:DB8:ACAD:3::1/64
ipv6 nd prefix 2001:DB8:ACAD:3::/64 2592000 604800 no-autoconfig
ipv6 nd managed-config-flag
ipv6 dhcp relay destination 2001:DB8:ACAD:2::1 GigabitEthernet0/0/0
!
interface Serial0/1/0
no ip address
!
interface Serial0/1/1
no ip address
!
ip forward-protocol nd
no ip http server
ip http secure-server
!
!
ipv6 route ::/0 2001:DB8:ACAD:2::1
!
!
control-plane
!
banner motd ^C Authorized Users Only! ^C
!
line con 0
password 7 045802150C2E
login
transport input none
stopbits 1
line aux 0
```

```
stopbits 1
line vty 0 4
password 7 00071A150754
login
!
!
end
```

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