

IPv6 SLAAC and DHCP

IMPORTANT! THIS GUIDE ASSUMES THAT THE AOS-CX OVA HAS BEEN INSTALLED AND WORKS IN GNS3 OR EVE-NG. PLEASE REFER TO GNS3/EVE-NG INITIAL SETUP LABS IF REQUIRED.

<https://www.eve-ng.net/index.php/documentation/howtos/howto-add-aruba-cx-switch/>

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Lab Objective

This lab is intended to provide the fundamental concepts on providing IPv6 addresses to a client.

Lab Overview

This guide will take you through the following steps:

- Setup the network
- Configure and test IPv6 SLAAC (state-less address auto-configuration)
- Configure and test IPv6 DHCP relay and DHCP Server

Lab Network Layout

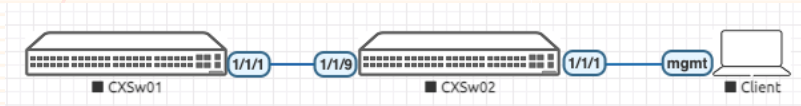


Figure 1. Lab topology

Important: the client is a 3rd AOS-CX simulator connected to CXSw02 using its management interface. The diagram shows a client icon just to express its role.

Lab Task 1 – Setup the network

- Create the network shown in Figure 1
- Start all the nodes
- Configure the switches and the VPC for basic connectivity (enable the corresponding interfaces and assign IPv6 addresses to both switches)

CXSw01

- Login using admin / (no password)
- When prompted, assign the password: admin

```
configure
  hostname CXSw01
  interface loopback 0
    ipv6 address 2001::1/64
  vlan 20
  interface vlan 20
    ipv6 address 2001:0:0:20::1/64
    exit
  interface 1/1/1
    no routing
    vlan trunk allowed 20
    no shutdown
    exit
  ipv6 route 2001:0:0:30::/64 2001:0:0:20::2
end
```

- Verify

```
show ipv6 interface vlan 20
```

```
Interface vlan20 is up
Admin state is up
IPv6 address:
  2001:0:0:20::1/64 [VALID]
  IPv6 link-local address: fe80::800:980:1424:7bec/64 [VALID]
  IPv6 virtual address configured: none
  IPv6 multicast routing: disable
  IPv6 Forwarding feature: enabled
  IPv6 multicast groups locally joined:
    ff02::1 ff02::1:ff00:1 ff02::1:ff24:7bec ff02::1:ff00:0
    ff02::2
  IPv6 multicast (S,G) entries joined: none
  IPv6 MTU 1500
  IPv6 unicast reverse path forwarding: none
  IPv6 load sharing: none
  L3 Counters: Rx Disabled, Tx Disabled
```

Statistic	RX	TX	Total
L3 Packets	0	0	0

CXSw02

- Login using admin / (no password)
- When prompted, assign the password: admin

```
configure
hostname CXSw02
vlan 20,30
interface vlan 20
    ipv6 address 2001:0:0:20::2/64
    exit
ipv6 route 2001::/64 2001:0:0:20::1
interface vlan 30
    ipv6 address 2001:0:0:30::1/64
    exit
interface 1/1/9
    no routing
    vlan trunk allowed 20
    no shutdown
end
interface 1/1/1
    no routing
    vlan access 30
    no shutdown
```

- Verify

```
show lldp neighbor-info
```

```
LLDP Neighbor Information
```

```
=====
```

```
. . .
```

LOCAL-PORT	CHASSIS-ID	PORT-ID	PORT-DESC	TTL	SYS-NAME
1/1/9	08:00:09:24:7b:ec	1/1/1	1/1/1	120	CXSw01

```
show vlan
```

VLAN	Name	Status	Reason	Type	Interfaces
1	DEFAULT_VLAN_1	down	no_member_port	default	
20	VLAN20	up	ok	static	1/1/9
30	VLAN30	up	ok	static	1/1/1

```
show ipv6 interface brief
```

```
IPv6 Interface Status for VRF "default"
Interface          Link-local Address/IPv6 Address      Interface Status      link/admin
. . .
vlan20              fe80::800:980:14e9:fd9c/64           up/ Admin state is up
                   2001:0:0:20::2/64
vlan30              fe80::800:980:1ee9:fd9c/64           up/ Admin state is up
                   2001:0:0:30::1/64
```

- Verify connectivity between the switches

```
ping6 2001::1
```

```
PING 2001::1(2001::1) 100 data bytes
108 bytes from 2001::1: icmp_seq=1 ttl=64 time=1.69 ms
108 bytes from 2001::1: icmp_seq=2 ttl=64 time=1.81 ms
108 bytes from 2001::1: icmp_seq=3 ttl=64 time=2.09 ms
108 bytes from 2001::1: icmp_seq=4 ttl=64 time=1.87 ms
108 bytes from 2001::1: icmp_seq=5 ttl=64 time=1.85 ms

--- 2001::1 ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4004ms
rtt min/avg/max/mdev = 1.688/1.860/2.088/0.130 ms
```

Lab Task 2. Setup the SLAAC Service

CXSw02

- Configure SLAAC on VLAN 30

Note: In CX, the IPv6 Router Advertisement is suppressed by default and for SLAAC to work you will have to re-enable it

```
configure
interface vlan 30
  ipv6 nd prefix 2001:0:0:30::1/64
! re-enable IPv6 router advertisements
  no ipv6 nd suppress-ra
end
write memory
```

Client

- Login using admin / "no password"
- When prompted assign the password: "admin"
- Check if the management interface has received the IPv6 address

```
show interface mgmt
Address Mode: dhcp
Admin State: up
Link State: up
Mac Address: 50:00:00:03:00:00
IPv4 address/subnet-mask:
Default gateway IPv4:
IPv6 address/prefix: 2001::30:5200:ff:fe03:0/64
```

IPv6 link local address/prefix: fe80::5200:ff:fe03:0/64

Default gateway IPv6: fe80::800:980:1e70:794d

Primary Nameserver:

Secondary Nameserver:

Tertiary Nameserver:

Notes: Why is this a “stateless” address assignment method?

- Notice that the switch offered only a prefix, while the host interface is provided by the host itself using EUI-64 notation
- Finally, the switch that offered the IPv6 prefix does not know the client’s final IPv6 address

Lab Task 3. Setup the DHCPv6 Relay and Server

CXSw01

- Configure the DHCP Server for the subnet 2001:0:0:30::/64 (VLAN 30 on CX-Sw-02)

```
configure
dhcpv6-server vrf default
  pool v30
    range 2001:0:0:30::31 2001:0:0:30::3f prefix-len 64
  exit
authoritative
enable
end
write memory
```

CXSw02

- Replace SLAAC with DHCPV6 relay
 - Remove the IPv6 ND Prefix
 - Keep the “no ipv6 nd suppress-ra” to provide the default gateway
 - DHCPv6 servers do not provide a default gateway, the relay service does it via RA advertisements

```
configure
interface vlan 30
  no ipv6 nd prefix 2001:0:0:30::/64
  ipv6 helper-address unicast 2001::1
exit
dhcpv6-relay
```

- Verify

```
show run int vlan 30
```

```
interface vlan30
  ipv6 address 2001:0:0:30::1/64
  no ipv6 nd suppress-ra
  ipv6 helper-address unicast 2001::1
exit
```

```
show dhcpv6-relay
```

```
DHCPV6 Relay Agent : enabled
Option 79           : disabled
```

Client

```
show interface mgmt
```

```
Address Mode: dhcp
Admin State: up
Link State: up
Mac Address: 50:00:00:03:00:00
IPv4 address/subnet-mask:
Default gateway IPv4:
IPv6 address/prefix: 2001:0:0:30::36/64
IPv6 link local address/prefix: fe80::5200:ff:fe03:0/64
Default gateway IPv6: fe80::800:980:1e70:794d
Primary Nameserver:
Secondary Nameserver:
Tertiary Nameserver:
```

Note: Notice that the Default Gateway is a link-local address. The same as the one configure with SLAAC.

CXSw01

```
show dhcpv6-server leases
```

IPv6-Address	Client-Id	Expiry-Time	Client-Hostname	VRF-Name	Link-Address
-----	-----	-----	-----	-----	-----
2001:0:0:30::36	*	23:40:46 28/06/2021	*	default	00:01:00:01:28:6d:07:22:50:00:00:03:00:00

Notes: DHCPv6 is a stateful address assignment method: The DHCPv6 server has a table of the IPv6 address leases (DHCPv6 state table)



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