

Campus 2-Tier with Routed Access – Lab 1

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/>

TABLE OF CONTENTS

Lab Objective	1
Lab Overview	1
Lab Network Layout	1
Lab Task 1 – Initialize the Switches and Configure IPv6 Addresses and RIPng	2
Lab Task 2 – Configure DHCP	4
Lab Task 3 – Validate	5

Lab Objective

This is the first of a series of IPv6 labs for 2-tier campus networks. In this lab, you will configure RIPng routed access, DHCPv6 relay and server and achieve DHCPv6 server redundancy.

Lab Overview

In this lab you will configure IPv6 addresses, RIPng, DHCPv6 relay and server and validate the configuration by testing an IPv6 client.

Lab Network Layout

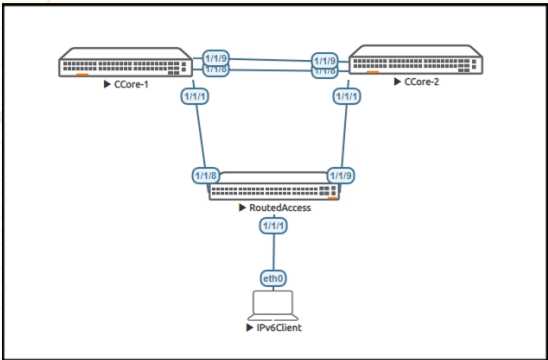


Figure 1. Lab topology and addresses

Notes:

- A loopback interface with the same IPv6 anycast address (2001::1/64) will be used on the Collapsed Core switches to:
 - Use as DHCPv6-server address
 - Use as a testing point for IPv6 routing (to respond to pings from the access layer and the client)
- The client will be simulated with the management port of another AOS-CX switch, for its simplicity in testing DHCPv6

Table 1. IPv6 Addresses

Device	Interface	IPv6 address	Prefix Length
Server	1	2001:0:0:1::1	64
	2	2001:0:0:2::1	64
Collapsed Core 1	1/1/1	2001:0:0:5::1	64
	1/1/8	2001:0:0:3::1	64
	1/1/9	2001:0:0:4::1	64
	Loopback 0	2001::1	64
Collapsed Core 1	1/1/1	2001:0:0:6::1	64
	1/1/8	2001:0:0:3::2	64
	1/1/9	2001:0:0:4::2	64
	Loopback 0	2001::1	64
Routed Access	Vlan 10	2001:0:0:10::1	64
	1/1/8	2001:0:0:5::1	64
	1/1/9	2001:0:0:6::2	64
IPv6 Client	SLAAC		

Recommended AOS-CX Switch Simulator Version: 10:07:0010

Login to each switch with username: admin and no password. You will be prompted to assign a new password.

Lab Task 1 – Initialize the Switches and Configure IPv6 Addresses and RIPng

Collapsed-Core-1 Switch

```
configure
  session-timeout 0
  hostname ColCore-1
  router ripng 1
  ! Make the loopback interface reachable
  redistribute connected
  interface loopback 0
    ipv6 address 2001::1/64
    ipv6 ripng 1
  interface 1/1/1
    no shutdown
    ipv6 address 2001:0:0:5::1/64
    ipv6 ripng 1
```

```

interface 1/1/8
  no shutdown
  ipv6 address 2001:0:0:3::1/64
  ipv6 ripng 1
interface 1/1/9
  no shutdown
  ipv6 address 2001:0:0:4::1/24
  ipv6 ripng 1
end
write memory

```

Collapsed-Core-2 Switch

```

configure
  session-timeout 0
  hostname ColCore-1
  router ripng 1
  ! Make the loopback interface reachable
  redistribute connected
  interface loopback 0
    ipv6 address 2001::1/64
  interface 1/1/1
    no shutdown
    ipv6 address 2001:0:0:6::1/64
    ipv6 ripng 1
  interface 1/1/8
    no shutdown
    ipv6 address 2001:0:0:3::2/64
    ipv6 ripng 1
  interface 1/1/9
    no shutdown
    ipv6 address 2001:0:0:4::2/24
    ipv6 ripng 1
  end
write memory

```

Important: notice that the loopback 0 address on both core switches is the same. This is a simple way of making the DHCP server on each switch to be seen by the DHCP relay as the same, and to provide redundancy.

```
ping6 2001:0:0:3::1
```

```

PING 2001:0:0:3::1(2001:0:0:3::1) 100 data bytes
108 bytes from 2001:0:0:3::1: icmp_seq=1 ttl=64 time=0.036 ms
108 bytes from 2001:0:0:3::1: icmp_seq=2 ttl=64 time=0.062 ms
108 bytes from 2001:0:0:3::1: icmp_seq=3 ttl=64 time=0.051 ms
108 bytes from 2001:0:0:3::1: icmp_seq=4 ttl=64 time=0.052 ms
108 bytes from 2001:0:0:3::1: icmp_seq=5 ttl=64 time=0.072 ms

--- 2001:0:0:3::1 ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4005ms
rtt min/avg/max/mdev = 0.036/0.054/0.072/0.012 ms

```

```
ping6 2001:0:0:4::1
```

```

PING 2001:0:0:4::2(2001:0:0:4::1) 100 data bytes
108 bytes from 2001:0:0:4::1: icmp_seq=1 ttl=64 time=24.0 ms
108 bytes from 2001:0:0:4::1: icmp_seq=2 ttl=64 time=2.34 ms
108 bytes from 2001:0:0:4::1: icmp_seq=3 ttl=64 time=2.36 ms
108 bytes from 2001:0:0:4::1: icmp_seq=4 ttl=64 time=2.50 ms
108 bytes from 2001:0:0:4::1: icmp_seq=5 ttl=64 time=2.35 ms

--- 2001:0:0:4::1 ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4005ms
rtt min/avg/max/mdev = 2.340/6.699/23.958/8.629 ms

```

Routed Access Switch

```
configure
  session-timeout 0
  hostname RAccess
  vlan 10
  interface 1/1/1
    no shutdown
    no routing
    vlan access 10
  interface vlan 10
    ipv6 address 2001:0:0:10::1/64
    ipv6 ripng 1
  interface 1/1/8
    no shutdown
    ipv6 address 2001:0:0:5::2/64
  interface 1/1/9
    no shutdown
    ipv6 address 2001:0:0:6::2/64
  end
write memory
!
```

```
! Validate
ping6 2001:0:0:5::1
PING 2001:0:0:5::1(2001:0:0:5::1) 100 data bytes
108 bytes from 2001:0:0:5::1: icmp_seq=1 ttl=64 time=1.58 ms
108 bytes from 2001:0:0:5::1: icmp_seq=2 ttl=64 time=1.88 ms
[. . .]
```

```
ping6 2001:0:0:6::1
PING 2001:0:0:6::1(2001:0:0:6::1) 100 data bytes
108 bytes from 2001:0:0:6::1: icmp_seq=1 ttl=64 time=23.6 ms
108 bytes from 2001:0:0:6::1: icmp_seq=2 ttl=64 time=2.28 ms
[. . .]
```

```
ping6 2001::1
PING 2001::1(2001::1) 100 data bytes
108 bytes from 2001::1: icmp_seq=1 ttl=64 time=1.95 ms
108 bytes from 2001::1: icmp_seq=2 ttl=64 time=2.02 ms
[. . .]
```

Lab Task 2 – Configure DHCP

DHCP Server on Collapsed Core 1

```
configure
  dhcpv6-server vrf default
  pool VLAN10
    range 2001:0:0:10::10 2001:0:0:10::7f prefix-len 64
    lease 00:01:00
  exit
  authoritative
  enable
end
write memory
```

DHCP Server on Collapsed Core 1

```
configure
  dhcpv6-server vrf default
  pool VLAN10
    range 2001:0:0:10::80 2001:0:0:10::ff prefix-len 64
    lease 00:01:00
  exit
  authoritative
  enable
```

```
end
write memory
```

DHCP Relay on Routed Access Switch

Configure DHCP Relay

```
configure
interface vlan 10
  ipv6 helper-address unicast 2001::1
  ! This IPv6 address is the same for both DHCPv6 servers (see notes above and below)
  no ipv6 nd suppress-ra
  exit
dhcpv6-relay
end
write memory
```

Important: notice that the DHCPv6 range on both servers is different, taking ½ range each server. This tactic provides redundancy without conflicts.

Lab Task 3 – Validate

Client

```
show interface mgmt
  Address Mode: dhcp
  Admin State: up
  Link State: up
  Mac Address: 50:02:00:04:00:00
  IPv4 address/subnet-mask:
  Default gateway IPv4:
  IPv6 address/prefix: 2001:0:0:10::e1/64
  IPv6 link local address/prefix: fe80::5202:ff:fe04:0/64
  Default gateway IPv6: fe80::800:980:ab3:78ac
  Primary Nameserver:
  Secondary Nameserver:
  Tertiary Nameserver:
```

```
ping6 2001::1 vrf mgmt
PING 2001::1(2001::1) 100 data bytes
108 bytes from 2001::1: icmp_seq=1 ttl=63 time=12.9 ms
108 bytes from 2001::1: icmp_seq=2 ttl=63 time=2.28 ms
108 bytes from 2001::1: icmp_seq=3 ttl=63 time=2.51 ms
108 bytes from 2001::1: icmp_seq=4 ttl=63 time=2.21 ms
108 bytes from 2001::1: icmp_seq=5 ttl=63 time=2.74 ms

--- 2001::1 ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4005ms
rtt min/avg/max/mdev = 2.214/4.523/12.874/4.179 ms
```

On each Collapsed Core Server

Run `show dhcpv6-server leases`

and verify which one provided the address to the client.

Test DHCPv6 server redundancy

- Shutdown port 1/1/8 on the DHCPv6 relay switch
- On the client shutdown the management interface and turn it back on to get a new IPv6 address
 - Check the DHCPv6 leases on the core switches
- Repeat after re-enabling port 1/1/8 and disabling port 1/1/9 on the DHCPv6 relay switch

End of Lab



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