LAB GUIDE

a Hewlett Packard Enterprise company

Campus 2-Tier with Routed Access – RIPv2

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 is the first of a series of IPv4 labs for 2-tier campus networks. In this lab, you will configure RIPv2 routed access, DHCP relay and server and achieve DHCP server redundancy.

Lab Overview

In this lab you will configure IPv4 addresses, RIPv2, DHCP relay and server and validate the configuration by testing an IPv4 client.

Lab Network Layout

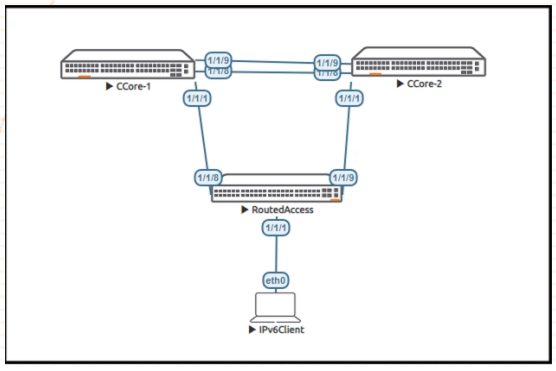

Figure 1. Lab topology and addresses

Notes:

- The client will be simulated with the management port of another AOS-CX switch, for its simplicity in testing DHCP

Table 1. IPv6 Addresses

Device	Interface	IPv6 address	Subnet Mask
Collapsed Core 1	1/1/1	10.0.1.9	/30
	1/1/8	10.0.1.1	/30
	1/1/9	10.0.1.5	/30
	Loopback 0	10.0.0.1	/32
Collapsed Core 2	1/1/1	10.0.1.13	/30
	1/1/8	10.0.1.2	/30
	1/1/9	10.0.1.6	/30
	Loopback 0	10.0.0.1	/32
Routed Access	Vlan 10	192.168.10.1	/30
	1/1/8	10.0.1.10	/30
	1/1/9	10.0.1.14	/30
	Loopback 0	10.0.0.3	
IPv4 Client	DHCP		

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 RIPv2

Collapsed-Core-1 Switch

```
configure
  session-timeout 0
  hostname ColCore-1
  router rip 1
  interface loopback 0
    ip address 10.0.0.1/32
    ip rip 1 10.0.0.1
  interface 1/1/1
    no shutdown
    ip address 10.0.1.9/30
    ip rip 1 10.0.1.9
        exit
  interface 1/1/8
    no shutdown
    ip address 10.0.1.1/30
    ip rip 1 10.0.1.1
        exit
  interface 1/1/9
    no shutdown
    ip address 10.0.1.5/30
```

```
    ip rip 1 10.0.1.5
   write memory
```

Collapsed-Core-2 Switch

```
  configure
    session-timeout 0
    hostname ColCore-1
    router rip 1
    interface loopback 0
      ip address 10.0.0.1/32
      ip rip 1 10.0.0.1
    interface 1/1/1
      no shutdown
      ip address 10.0.1.13/30
      ip rip 1 10.0.1.13
          exit
    interface 1/1/8
      no shutdown
      ip address 10.0.1.2/30
      ip rip 1 10.0.1.2
          exit
    interface 1/1/9
      no shutdown
      ip address 10.0.1.6/30
      ip rip 1 10.0.1.6
          exit
    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.

```
ping 10.0.1.12

PING 10.0.1.12 (10.0.1.12) 100(128) bytes of data.
108 bytes from 10.0.1.13: icmp_seq=1 ttl=64 time=0.037 ms
108 bytes from 10.0.1.13: icmp_seq=2 ttl=64 time=0.073 ms
108 bytes from 10.0.1.13: icmp_seq=3 ttl=64 time=0.059 ms
108 bytes from 10.0.1.13: icmp_seq=4 ttl=64 time=0.046 ms
108 bytes from 10.0.1.13: icmp_seq=5 ttl=64 time=0.046 ms

--- 10.0.1.12 ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4005ms
rtt min/avg/max/mdev = 0.037/0.052/0.073/0.012 ms
```

```
ping 10.0.1.1

PING 10.0.1.1 (10.0.1.1) 100(128) bytes of data.
108 bytes from 10.0.1.1: icmp_seq=1 ttl=64 time=5.41 ms
108 bytes from 10.0.1.1: icmp_seq=2 ttl=64 time=2.00 ms
108 bytes from 10.0.1.1: icmp_seq=3 ttl=64 time=5.72 ms
108 bytes from 10.0.1.1: icmp_seq=4 ttl=64 time=2.17 ms
108 bytes from 10.0.1.1: icmp_seq=5 ttl=64 time=3.89 ms

--- 10.0.1.1 ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4006ms
rtt min/avg/max/mdev = 1.996/3.837/5.719/1.559 ms
```

Routed Access Switch

```
configure
  session-timeout 0
  hostname RAccess
  vlan 10
  interface loopback 0
    ip address 10.0.0.3/32
    ip rip 1 10.0.0.3
        exit
  interface vlan 10
    ip address 192.168.10.1/24
    ip helper-address 10.0.0.1
    ip rip 1 192.168.10.1
        exit
  interface 1/1/1
    no shutdown
    no routing
    vlan access 10
  interface 1/1/8
    no shutdown
    ip address 10.0.1.10/30
    ip rip 1 10.0.1.10
        exit
  interface 1/1/9
    no shutdown
    ip address 10.0.1.14/30
    ip rip 1 10.0.1.14
        exit
write memory
!
! Validate
```

```
ping 10.0.1.11

PING 10.0.1.11 (10.0.1.11) 100(128) bytes of data.
108 bytes from 10.0.1.10: icmp_seq=1 ttl=64 time=0.036 ms
108 bytes from 10.0.1.10: icmp_seq=2 ttl=64 time=0.046 ms
108 bytes from 10.0.1.10: icmp_seq=3 ttl=64 time=0.044 ms
108 bytes from 10.0.1.10: icmp_seq=4 ttl=64 time=0.047 ms
108 bytes from 10.0.1.10: icmp_seq=5 ttl=64 time=0.087 ms
```

```
ping 10.0.1.15

PING 10.0.1.15 (10.0.1.15) 100(128) bytes of data.
108 bytes from 10.0.1.14: icmp_seq=1 ttl=64 time=0.038 ms
108 bytes from 10.0.1.14: icmp_seq=2 ttl=64 time=0.057 ms
108 bytes from 10.0.1.14: icmp_seq=3 ttl=64 time=0.044 ms
108 bytes from 10.0.1.14: icmp_seq=4 ttl=64 time=0.061 ms
108 bytes from 10.0.1.14: icmp_seq=5 ttl=64 time=0.046 ms
```

```
ping 10.0.0.1

PING 10.0.0.1 (10.0.0.1) 100(128) bytes of data.
108 bytes from 10.0.0.1: icmp_seq=1 ttl=64 time=2.66 ms
108 bytes from 10.0.0.1: icmp_seq=2 ttl=64 time=2.29 ms
108 bytes from 10.0.0.1: icmp_seq=3 ttl=64 time=2.13 ms
108 bytes from 10.0.0.1: icmp_seq=4 ttl=64 time=3.06 ms
108 bytes from 10.0.0.1: icmp_seq=5 ttl=64 time=1.97 ms
```

Lab Task 2 – Configure DHCP

DHCP Server on Collapsed Core 1

```
    configure
      dhcp-server vrf default
       pool VLAN10
           range 192.168.10.100 192.168.10.110
           exit
       authoritative
       enable   end
  write memory
```

DHCP Server on Collapsed Core 2

```
    configure
      dhcp-server vrf default
       pool VLAN10
           range 192.168.10.130 192.168.10.140
           exit
       authoritative
       enable   end
  write memory
```

DHCP Relay on Routed Access Switch

Configure DHCP Relay

```
    configure
      interface vlan 10
        ip address 192.168.10.1/24
        ip helper-address 10.0.0.1
        ip rip 1 192.168.10.1
           exit
      dhcp-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: 192.168.10.138/24
  Default gateway IPv4: 192.168.10.1
  IPv6 address/prefix:
  IPv6 link local address/prefix: fe80::5202:ff:fe04:0/64
  Default gateway IPv6:
  Primary Nameserver:
  Secondary Nameserver:
  Tertiary Nameserver:
```

```
ping 10.0.0.1 vrf mgmt.

PING 10.0.0.1 (10.0.0.1) 100(128) bytes of data.
108 bytes from 10.0.0.1: icmp_seq=1 ttl=63 time=4.87 ms
108 bytes from 10.0.0.1: icmp_seq=2 ttl=63 time=3.02 ms
108 bytes from 10.0.0.1: icmp_seq=3 ttl=63 time=8.23 ms
108 bytes from 10.0.0.1: icmp_seq=4 ttl=63 time=2.65 ms
```

```
108 bytes from 10.0.0.1: icmp_seq=5 ttl=63 time=3.09 ms

--- 10.0.0.1 ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4005ms
rtt min/avg/max/mdev = 2.652/4.373/8.232/2.076 ms
```

On each Collapsed Core Server

Run `show dhcp-server leases`

and verify which one provided the address to the client.

Test DHCPv6 server redundancy

- Shutdown port 1/1/8 on the DHCP relay switch
- On the client shutdown the management interface and turn it back on to get a new IPv4 address
    - Check the DHCP leases on the core switches
- Repeat after re-enabling port 1/1/8 and disabling port 1/1/9 on the DHCP relay switch

End of Lab

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