

Campus 3-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 3-tier campus networks. In this lab, you will configure RIPv2 routed access and DHCP server to test client reachability across the network.

Lab Network Layout

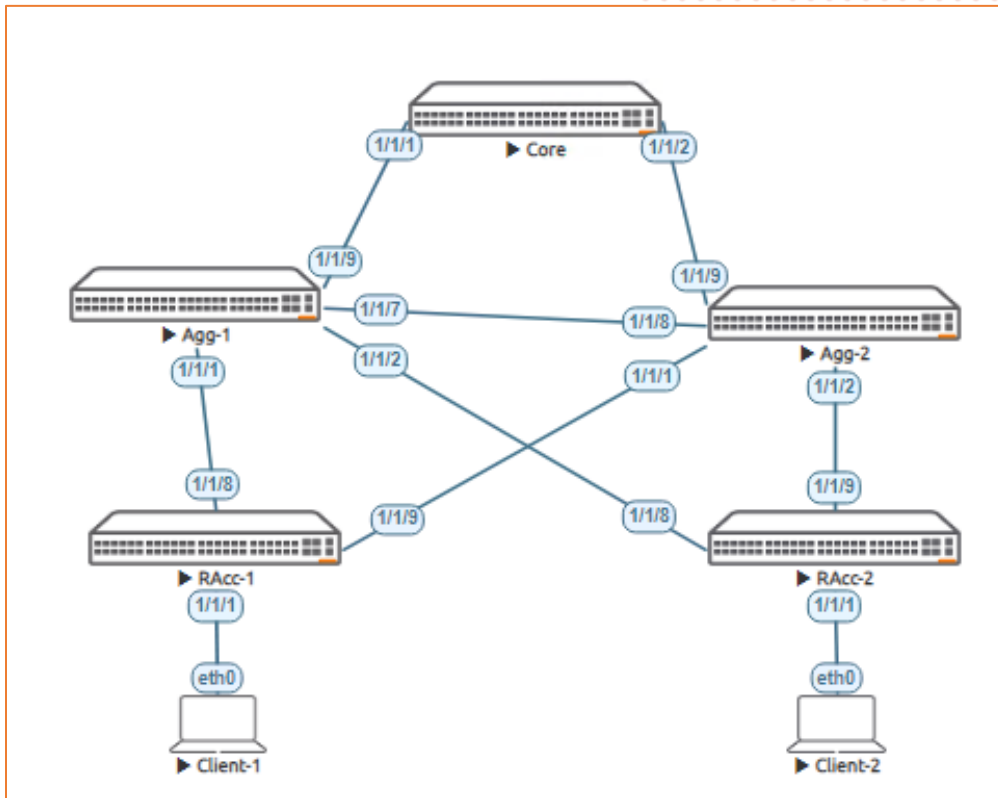


Figure 1. Lab topology and addresses

Table 1. IPv4 Addresses

Device	Interface	IPv4 address	Subnet Mask
Core	Loopback 0	10.0.0.1	/30
	1/1/1	10.0.1.1	/30
	1/1/2	10.0.2.1	/30
Agg-1	Loopback 0	10.0.0.2	/32
	1/1/9	10.0.1.2	/30
	1/1/8	10.0.3.1	/30
	1/1/2	10.0.4.1	/30
	1/1/1	10.0.5.1	/30
Agg-2	Loopback 0	10.0.0.3	/32
	1/1/9	10.0.2.2	/30
	1/1/8	10.0.3.2	/30
	1/1/2	10.0.6.1	/30
	1/1/1	10.0.7.1	/30
RAcc-1	Loopback 0	10.0.0.4	/32
	1/1/8	10.0.5.2	/30
	1/1/9	10.0.7.2	/30
	VLAN 11	10.0.11.1	/24
RAcc-2	Loopback 0	10.0.0.5	/32
	1/1/8	10.0.4.2	/30
	1/1/9	10.0.6.2	/30
	VLAN 12	10.0.12.1	/24
IPv4 Client 1 & 2	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 IPv4 Addresses and RIPv2

Core Switch

```

configure
 session-timeout 0
 hostname Core
 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 10.0.1.1/30
  ip rip 1 10.0.1.1
  exit
interface 1/1/2
  no shutdown
  ip address 10.0.2.1/30
  ip rip 1 10.0.2.1
  exit
write memory
```

Agg-1 Switch

```
configure
  session-timeout 0
  hostname Agg-1
  router rip 1
  interface loopback 0
    ip address 10.0.0.2/32
    ip rip 1 10.0.0.2
  interface 1/1/9
    no shutdown
    ip address 10.0.1.2/30
    ip rip 1 10.0.1.2
    exit
  interface 1/1/8
    no shutdown
    ip address 10.0.3.1/30
    ip rip 1 10.0.3.1
    exit
  interface 1/1/2
    no shutdown
    ip address 10.0.4.1/30
    ip rip 1 10.0.4.1
    exit
  interface 1/1/1
    no shutdown
    ip address 10.0.5.1/30
    ip rip 1 10.0.5.1
    exit
write memory
```

Agg-2 Switch

```
configure
  session-timeout 0
  hostname Agg-2
  router rip 1
  interface loopback 0
    ip address 10.0.0.3/32
    ip rip 1 10.0.0.3
  interface 1/1/9
    no shutdown
    ip address 10.0.2.2/30
    ip rip 1 10.0.2.2
    exit
  interface 1/1/8
    no shutdown
    ip address 10.0.3.2/30
    ip rip 1 10.0.3.2
    exit
  interface 1/1/2
    no shutdown
    ip address 10.0.6.1/30
    ip rip 1 10.0.6.1
    exit
```

```
interface 1/1/1
  no shutdown
  ip address 10.0.7.1/30
  ip rip 1 10.0.7.1
  exit
write memory
```

RAcc-1 Switch

```
configure
  session-timeout 0
  hostname RAcc-1
  router rip 1
  interface loopback 0
    ip address 10.0.0.4/32
    ip rip 1 10.0.0.4
  interface 1/1/8
    no shutdown
    ip address 10.0.5.2/30
    ip rip 1 10.0.5.2
    exit
  interface 1/1/9
    no shutdown
    ip address 10.0.7.2/30
    ip rip 1 10.0.7.2
    exit
vlan 11
interface vlan 11
  ip address 10.0.11.1/24
  ip rip 1 10.0.11.1
  exit
interface 1/1/1
  no shutdown
  no routing
  vlan access 11
write memory
```

RAcc-2 Switch

```
configure
  session-timeout 0
  hostname RAcc-2
  router rip 1
  interface loopback 0
    ip address 10.0.0.5/32
    ip rip 1 10.0.0.5
  interface 1/1/8
    no shutdown
    ip address 10.0.4.2/30
    ip rip 1 10.0.4.2
    exit
  interface 1/1/9
    no shutdown
    ip address 10.0.6.2/30
    ip rip 1 10.0.6.2
    exit
vlan 12
interface vlan 12
  ip address 10.0.12.1/24
  ip rip 1 10.0.12.1
  exit
interface 1/1/1
  no shutdown
  no routing
  vlan access 12
write memory
```

Test connectivity between switches by pinging loop back and interface addresses from each switch. Also check that the desired RIP neighbors appear.

```
Agg-2# ping 10.0.0.4
```

```
PING 10.0.0.4 (10.0.0.4) 100(128) bytes of data.
```

```
108 bytes from 10.0.0.4: icmp_seq=1 ttl=64 time=2.61 ms
```

```
108 bytes from 10.0.0.4: icmp_seq=2 ttl=64 time=2.99 ms
```

```
108 bytes from 10.0.0.4: icmp_seq=3 ttl=64 time=3.21 ms
```

```
108 bytes from 10.0.0.4: icmp_seq=4 ttl=64 time=2.12 ms
```

```
108 bytes from 10.0.0.4: icmp_seq=5 ttl=64 time=1.86 ms
```

```
--- 10.0.0.4 ping statistics ---
```

```
5 packets transmitted, 5 received, 0% packet loss, time 4005ms
```

```
rtt min/avg/max/mdev = 1.861/2.558/3.208/0.506 ms
```

```
show ip rip neighbors
```

```
VRF : default
```

```
Process-ID : 1
```

```
-----  
Total Number of Neighbors: 3
```

Peer-Address	Type	Last Heard Time	Rcvd-Bad-Pkts	Rcvd-Bad-Routes
10.0.1.1	RIPv2	17s	0	0
10.0.4.2	RIPv2	20s	0	0
10.0.5.2	RIPv2	20s	0	0

Also check the routing table of each switch to ensure the appropriate routes are being learned at each switch.

```
Agg-1(config)# show ip route
```

```
Displaying ipv4 routes selected for forwarding
```

```
Origin Codes: C - connected, S - static, L - local
```

```
R - RIP, B - BGP, O - OSPF
```

```
Type Codes: E - External BGP, I - Internal BGP, V - VPN, EV - EVPN
```

```
IA - OSPF internal area, E1 - OSPF external type 1
```

```
E2 - OSPF external type 2
```

```
VRF: default
```

Prefix	Nexthop	Interface	VRF(egress)	Origin/ Type	Distance/ Metric	Age
10.0.0.1/32	10.0.1.1	1/1/9	-	R	[120/2]	
00h:37m:56s						
10.0.0.2/32	-	loopback0	-	L	[0/0]	-
10.0.0.3/32	10.0.5.2	1/1/1	-	R	[120/3]	
00h:37m:56s						
	10.0.1.1	1/1/9	-		[120/3]	
00h:37m:56s						

00h:37m:56s	10.0.4.2	1/1/2	-			[120/3]
10.0.0.4/32	10.0.5.2	1/1/1	-	R		[120/2]
00h:37m:56s						
10.0.0.5/32	10.0.4.2	1/1/2	-	R		[120/2]
00h:37m:56s						
10.0.1.0/30	-	1/1/9	-	C		[0/0] -
10.0.1.2/32	-	1/1/9	-	L		[0/0] -
10.0.2.0/30	10.0.1.1	1/1/9	-	R		[120/2]
00h:37m:56s						
10.0.3.0/30	-	1/1/8	-	C		[0/0] -
10.0.3.1/32	-	1/1/8	-	L		[0/0] -
10.0.4.0/30	-	1/1/2	-	C		[0/0] -
10.0.4.1/32	-	1/1/2	-	L		[0/0] -
10.0.5.0/30	-	1/1/1	-	C		[0/0] -

Lab Task 2 – Configure DHCP

DHCP Server on RAcc1

```
configure
dhcp-server vrf default
pool vlan11
range 10.0.11.10 10.0.11.15
default-router 10.0.11.1
exit
enable
write memory
```

DHCP Server on RAcc-2

```
configure
dhcp-server vrf default
pool vlan12
range 10.0.12.10 10.0.12.15
default-router 10.0.12.1
exit
enable
write memory
```

Lab Task 3 – Validate

Client-1

```
VPCS> ip dhcp
DORA IP 10.0.11.11/24 GW 10.0.11.1 - Note: DORA=DHCP Discover, Offer, Request, Accept

VPCS> ping 10.0.12.12

84 bytes from 10.0.12.12 icmp_seq=1 ttl=61 time=4.606 ms
84 bytes from 10.0.12.12 icmp_seq=2 ttl=61 time=3.387 ms
84 bytes from 10.0.12.12 icmp_seq=3 ttl=61 time=3.797 ms
84 bytes from 10.0.12.12 icmp_seq=4 ttl=61 time=4.048 ms
84 bytes from 10.0.12.12 icmp_seq=5 ttl=61 time=3.469 ms
```

Client-2

```
VPCS> ip dhcp
DORA IP 10.0.12.12/24 GW 10.0.12.1

VPCS> ping 10.0.11.11

84 bytes from 10.0.11.11 icmp_seq=1 ttl=61 time=6.653 ms
```

```
84 bytes from 10.0.11.11 icmp_seq=2 ttl=61 time=5.548 ms
84 bytes from 10.0.11.11 icmp_seq=3 ttl=61 time=3.883 ms
84 bytes from 10.0.11.11 icmp_seq=4 ttl=61 time=4.377 ms
84 bytes from 10.0.11.11 icmp_seq=5 ttl=61 time=6.660 ms
```

End of Lab



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