LAB GUIDE

OSPF Troubleshooting

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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 will enable the reader to gain hands on experience with OSPF troubleshooting. This lab as shown in Figure 1 is preconfigured with 2 problems, you will use the troubleshooting flowchart to perform verification steps to identify and fix the problems.

Lab Overview

This lab as shown in Figure 1 will allow you to route between Loopbacks on each switch via OSPF after the 2 problems are identified and fixed.

/31 subnets are used between the switches.

Note: Importing EVE-NG lab will not import the configs, you will need to copy and paste the configs from the appendix into your switches before attempting this lab.

Lab Network Layout

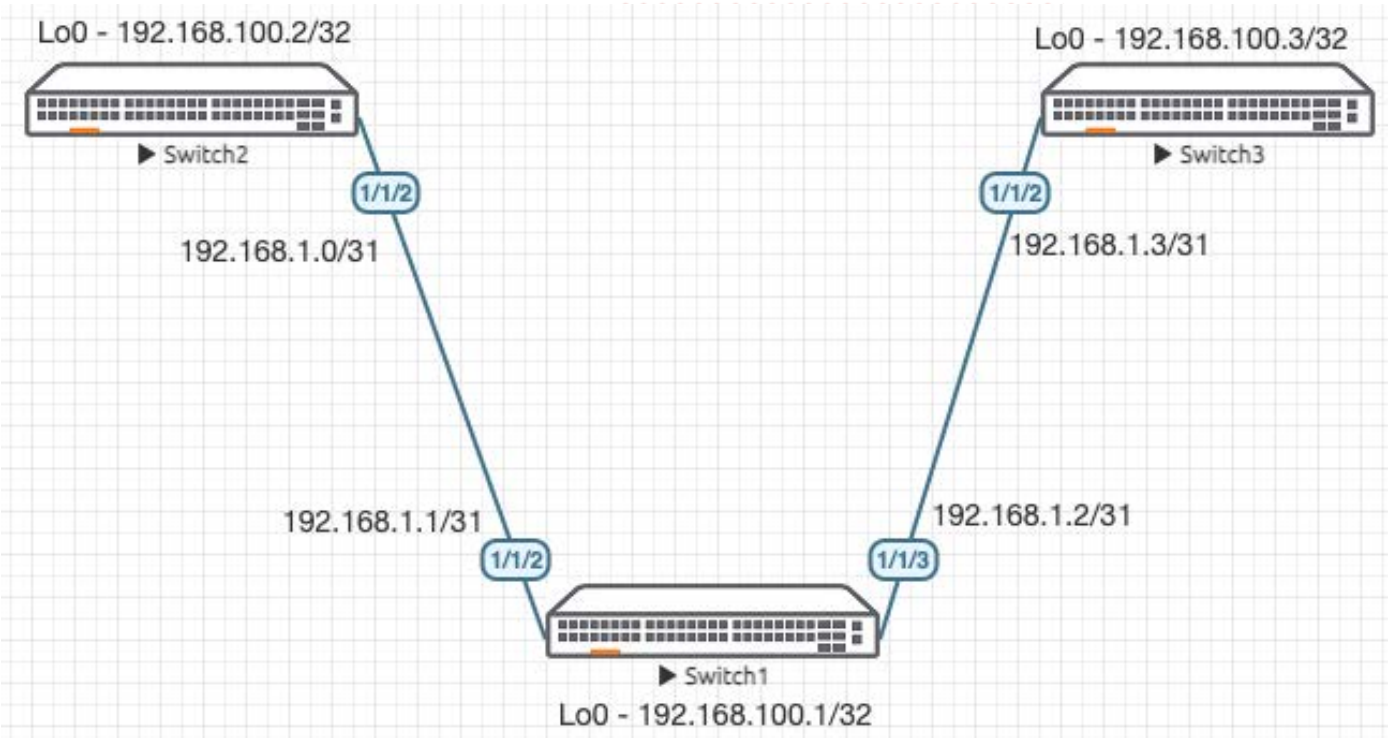


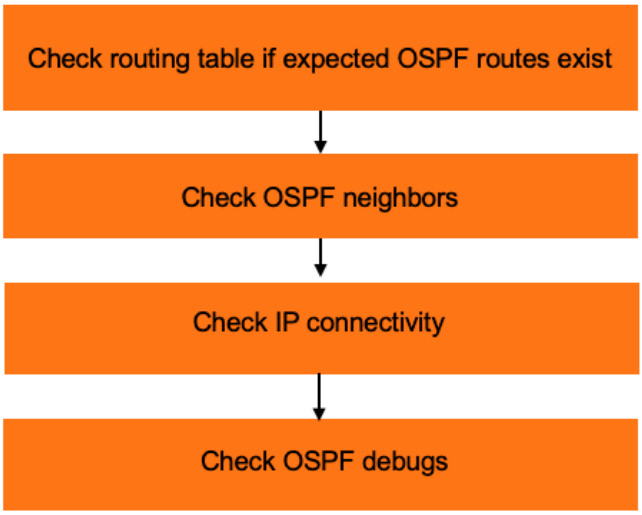
Figure 1. Lab topology and addresses

Lab Tasks

Task 1 – Lab setup

For this lab refer to Figure 1 for topology and IP address details.

- Start all the devices, including VPCS hosts
- Open each switch console and log in with user “admin” and hit enter, so that no password is applied
- Configs are not transferred in the .unl/.zip files, copy and paste in configs for all devices from the appendix section



Task 2 – Check routing table if expected OSPF routes exist

- Start with Switch1 (in the middle), this way, you can check if routes exist from both neighbors at the same time.

```
Switch1# sh ip ro

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/   Distance/    Age
                                                                     Type      Metric
-------------------------------------------------------------------------------------------------
----------
192.168.1.0/31      -                1/1/2         -                 C         [0/0]        -
192.168.1.1/32      -                1/1/2         -                 L         [0/0]        -
192.168.1.2/31      -                1/1/3         -                 C         [0/0]        -
192.168.1.2/32      -                1/1/3         -                 L         [0/0]        -
192.168.100.1/32    -                loopback0     -                 L         [0/0]        -

Total Route Count : 5
```

- Since only connected (C) and local (L) routes are seen, this means none of the expected OSPF routes exist

Task 3 – Check OSPF neighbors

- Check if OSPF neighbors are up

```
Switch1# sh ip os nei
No OSPF neighbor found on VRF default.
```

- Since both neighbors are down, move onto next step

Task 4 – Check IP connectivity

- Check that IP connectivity to both neighbors work as expected

```
Switch1# ping 192.168.1.0
PING 192.168.1.0 (192.168.1.0) 100(128) bytes of data.
From 192.168.1.1 icmp_seq=1 Destination Host Unreachable
From 192.168.1.1 icmp_seq=2 Destination Host Unreachable
From 192.168.1.1 icmp_seq=3 Destination Host Unreachable
^C

--- 192.168.1.0 ping statistics ---
4 packets transmitted, 0 received, +3 errors, 100% packet loss, time 3073ms


Switch1# ping 192.168.1.3
PING 192.168.1.3 (192.168.1.3) 100(128) bytes of data.
108 bytes from 192.168.1.3: icmp_seq=1 ttl=64 time=21.0 ms
108 bytes from 192.168.1.3: icmp_seq=2 ttl=64 time=1.90 ms
108 bytes from 192.168.1.3: icmp_seq=3 ttl=64 time=1.78 ms
```

```
108 bytes from 192.168.1.3: icmp_seq=4 ttl=64 time=2.10 ms
108 bytes from 192.168.1.3: icmp_seq=5 ttl=64 time=1.76 ms

--- 192.168.1.3 ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4004ms
rtt min/avg/max/mdev = 1.764/5.699/20.951/7.626 ms
```

- Since only 1 neighbor responded, next step would be to check debugs and fix issues on neighbors

Task 4 – Check OSPF debugs

- Check that no debugs are currently enabled

```
Switch1# sh debug
Not configured
```

- Enable desired OSPF debugs

```
Switch1# debug ospfv2 all
```

- Take note that debug destination uses buffer by default, check debug buffer

```
Switch1# show debug buffer
!snip
```

- The 1st error you should see is regarding received source IP – the 192.168.10.0 IP configured on the neighbor is wrong

```
2021-07-20:21:00:56.322288|hpe-routing|LOG_ERR|AMM|-|OSPFV2|OSPFv2_PACKET|OSPF 268698624 Received packet's
source IP address was incorrect.
2021-07-20:21:00:56.322307|hpe-routing|LOG_ERR|AMM|-|OSPFV2|OSPFv2_PACKET|Source IP address = 192.168.10.0
2021-07-20:21:00:56.322317|hpe-routing|LOG_ERR|AMM|-|OSPFV2|OSPFv2_PACKET|Receiving interface's address =
192.168.1.1
2021-07-20:21:00:56.322326|hpe-routing|LOG_ERR|AMM|-|OSPFV2|OSPFv2_PACKET|Diagnostic information for
support:
2021-07-20:21:00:56.322336|hpe-routing|LOG_ERR|AMM|-|OSPFV2|OSPFv2_PACKET|Packet data =
2021-07-20:21:00:56.322346|hpe-routing|LOG_ERR|AMM|-|OSPFV2|OSPFv2_PACKET|   45C00040 C7D60000 01594621
C0A80A00 E0000005 0201002C C0A86402 00000000
2021-07-20:21:00:56.322356|hpe-routing|LOG_ERR|AMM|-|OSPFV2|OSPFv2_PACKET|   D6F50000 00000000 00000000
FFFFFFFE 000A0201 00000028 00000000 00000000
2021-07-20:21:00:56.322366|hpe-routing|LOG_ERR|AMM|-|OSPFV2|OSPFv2_PACKET|
2021-07-20:21:00:56.322379|hpe-routing|LOG_ERR|AMM|-|OSPFV2|OSPFv2_PACKET|(End of Packet, OSPFv2 process Id
= 1, VRF Name = default)
```

- The 2nd error you should see is regarding authentication type, this means both sides don't have a matching authentication type set

```
2021-07-20:21:35:13.756479|hpe-routing|LOG_WARN|AMM|-|OSPFV2|OSPFv2_PACKET|OSPF 268698624 Packet received
with unexpected authentication type 2.
2021-07-20:21:35:13.756499|hpe-routing|LOG_WARN|AMM|-|OSPFV2|OSPFv2_PACKET|Expected authentication type =
0.
2021-07-20:21:35:13.756517|hpe-routing|LOG_WARN|AMM|-|OSPFV2|OSPFv2_PACKET|Packet data =
2021-07-20:21:35:13.756529|hpe-routing|LOG_WARN|AMM|-|OSPFV2|OSPFv2_PACKET|   45C00050 38BF0000 0159DE25
C0A80103 E0000005 0201002C C0A86403 00000000
2021-07-20:21:35:13.756539|hpe-routing|LOG_WARN|AMM|-|OSPFV2|OSPFv2_PACKET|   00000002 00000110 0000080E
FFFFFFFE 000A0201 00000028 C0A80103 00000000
2021-07-20:21:35:13.756548|hpe-routing|LOG_WARN|AMM|-|OSPFV2|OSPFv2_PACKET|   5A2A5208 EB0265FD 467C98AE
911E3A1F
2021-07-20:21:35:13.756557|hpe-routing|LOG_WARN|AMM|-|OSPFV2|OSPFv2_PACKET|(End of Packet, OSPFv2 process
Id = 1, VRF Name = default)
```

- After getting the required info, disable all debugs

```
Switch1# no debug all
```

Task 5 – Fix issues

- With the debug info found, you should be able to modify Switch2 (change 1/1/2 IP) and Switch3 (disable OSPF authentication) configs so that Switch1 neighbors come up as expected

```
Switch1# sh ip os nei
VRF : default                          Process : 1
=================================================

Total Number of Neighbors : 2

Neighbor ID      Priority  State             Nbr Address       Interface
-------------------------------------------------------------------------
192.168.100.2    1         FULL/BDR          192.168.1.0       1/1/2

192.168.100.3    1         FULL/DR           192.168.1.3       1/1/3
```

- Routes to remote loopbacks should now appear in Switch1

```
Switch1# sh ip ro

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/   Distance/    Age
                                                                     Type      Metric
-------------------------------------------------------------------------------------------------------
192.168.1.0/31      -                1/1/2         -                 C         [0/0]        -
192.168.1.1/32      -                1/1/2         -                 L         [0/0]        -
192.168.1.2/31      -                1/1/3         -                 C         [0/0]        -
192.168.1.2/32      -                1/1/3         -                 L         [0/0]        -
192.168.100.1/32    -                loopback0     -                 L         [0/0]        -
192.168.100.2/32    192.168.1.0      1/1/2         -                 O/E2      [110/25]     00h:00m:12s
192.168.100.3/32    192.168.1.3      1/1/3         -                 O/E2      [110/25]     00h:00m:02s

Total Route Count : 7
```

Appendix – Complete Configurations

- Configs with problems are provided below

Switch1

```
!Version ArubaOS-CX Virtual.10.07.0010
!export-password: default
hostname Switch1
led locator on
ntp server pool.ntp.org minpoll 4 maxpoll 4 iburst
ntp enable
!
!
!
!
```

```
!
!
ssh server vrf mgmt
vlan 1
interface mgmt
    no shutdown
    ip dhcp
interface 1/1/1
    no shutdown
interface 1/1/2
    no shutdown
    ip address 192.168.1.1/31
    ip ospf 1 area 0.0.0.0
interface 1/1/3
    no shutdown
    ip address 192.168.1.2/31
    ip ospf 1 area 0.0.0.0
interface 1/1/4
    no shutdown
interface 1/1/5
    no shutdown
interface 1/1/6
    no shutdown
interface loopback 0
    ip address 192.168.100.1/32
!
!
!
!
!
router ospf 1
    router-id 192.168.100.1
    redistribute local loopback
    area 0.0.0.0
https-server vrf mgmt
```

Switch2

```
!Version ArubaOS-CX Virtual.10.07.0010
!export-password: default
hostname Switch2
led locator on
ntp server pool.ntp.org minpoll 4 maxpoll 4 iburst
ntp enable
!
!
!
!
!
!
ssh server vrf mgmt
vlan 1
interface mgmt
    no shutdown
    ip dhcp
interface 1/1/1
    no shutdown
interface 1/1/2
    no shutdown
    ip address 192.168.10.0/31
    ip ospf 1 area 0.0.0.0
interface 1/1/3
    no shutdown
interface 1/1/4
```

```
    no shutdown
interface 1/1/5
    no shutdown
interface 1/1/6
    no shutdown
interface loopback 0
    ip address 192.168.100.2/32
!
!
!
!
!
router ospf 1
    router-id 192.168.100.2
    redistribute local loopback
    area 0.0.0.0
https-server vrf mgmt
```

Switch3

```
!Version ArubaOS-CX Virtual.10.07.0010
!export-password: default
hostname Switch3
user admin group administrators password ciphertext
AQBapaVRhtk+fqsxLQg0k8z8ZE5BdgQpSK8t/DfQNVwm0EyRYgAAANWyltl1PdvkBHhg/PwmtTE0P9yKPU/f0xk7Z3KXaB2
Lf0c5l7OPRxHJR0zAHXCZTHVGTNZ0lCT/kFme1A0Dv2X
dqBvXMr7bSesFxHYJklZTSCa/hEzmuF7fHqgewdIdE4Ht
led locator on
ntp server pool.ntp.org minpoll 4 maxpoll 4 iburst
ntp enable
!
!
!
!
!
!
ssh server vrf mgmt
vlan 1
interface mgmt
    no shutdown
    ip dhcp
interface 1/1/1
    no shutdown
interface 1/1/2
    no shutdown
    ip address 192.168.1.3/31
    ip ospf 1 area 0.0.0.0
    ip ospf authentication message-digest
    ip ospf message-digest-key 1 md5 ciphertext
AQBapVuqYeTJuT8/BoIlC2z4MxuT3VVmiduKtDwIP1jbCCxZCAAAAEe+Xod/lZX8
interface 1/1/3
    no shutdown
interface 1/1/4
    no shutdown
interface 1/1/5
    no shutdown
interface 1/1/6
    no shutdown
interface loopback 0
    ip address 192.168.100.3/32
!
!
!
!
```

```
!
router ospf 1
    router-id 192.168.100.3
    redistribute local loopback
    area 0.0.0.0
https-server vrf mgmt
```

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