

# Loop Protect

**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 provide hands on experience with the Loop Protect feature in AOS-CX.

Loop protect is helpful in environments where STP cannot be used to detect and prevent loops in an L2 network.

### Lab Overview

This lab as shown in Figure 1 has 3 switches connected in a loop.

In this lab, you will:

- Configure 802.1Q trunks with 2 VLANs between the 3 switches
- Create an L2 loop between the 3 switches
- Use packet capture to identify loop protect packets being sent out of a switch
- Ensure loop protect detects and prevents a loop by shutting down a port

## Lab Network Layout

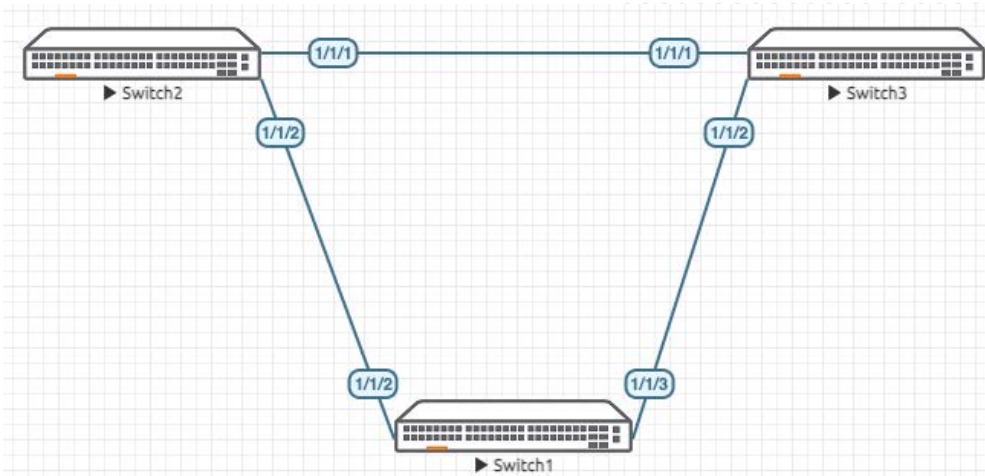


Figure 1. Lab topology and addresses

## Lab Tasks

### Task 1 – Lab setup

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

- Start all the devices, including hosts
- Open each switch console and log in with user “admin” and hit enter, so that no password is applied
- Set your desired password
- Change all hostnames as shown in the topology:  
configure  
hostname ...
- On all devices, bring up required ports:  
int 1/1/1-1/1/6  
no shutdown  
use “exit” to go back a level
- Validate LLDP neighbors appear as expected on each switch  
show lldp neighbor

#### Switch1

```
Switch1(config)# sh lld nei
```

```
LLDP Neighbor Information
=====
```

```
Total Neighbor Entries      : 2
Total Neighbor Entries Deleted : 0
Total Neighbor Entries Dropped : 0
Total Neighbor Entries Aged-Out : 0
```

LOCAL-PORT	CHASSIS-ID	PORT-ID	PORT-DESC	TTL	SYS-NAME
1/1/2	08:00:09:8a:14:fa	1/1/1	1/1/2	120	Switch2
1/1/3	08:00:09:12:8e:9e	1/1/2	1/1/2	120	Switch3

## Task 2 – Configure VLANs and Interfaces

- Configure interfaces, 802.1Q trunks and required VLANs on these 3 switches

### Switch1

```
Switch1(config)# vlan 10-11
Switch1(config-vlan-<10-11>)# int 1/1/2-1/1/3
Switch1(config-if-<1/1/2-1/1/3>)# no routing
Switch1(config-if-<1/1/2-1/1/3>)# vlan trunk allowed 10-11
```

*! We will shut down 1/1/3 for now to break the loop*

```
Switch1(config-if-<1/1/2-1/1/3>)# int 1/1/3
Switch1(config-if)# shu
```

### Switch2

```
Switch2(config)# vlan 10-11
Switch2(config-vlan-<10-11>)# int 1/1/1-1/1/2
Switch2(config-if-<1/1/1-1/1/2>)# no routing
Switch2(config-if-<1/1/1-1/1/2>)# vlan trunk allowed 10-11
```

### Switch3

```
Switch3(config)# vlan 10-11
Switch3(config-vlan-<10-11>)# int 1/1/1-1/1/2
Switch3(config-if-<1/1/1-1/1/2>)# no routing
Switch3(config-if-<1/1/1-1/1/2>)# vlan trunk allowed 10-11
```

## Task 3 – Enable loop protect on Switch1

- Enable loop protect on ports to other switches, enabling it on 1 VLAN will be sufficient to detect loops

```
Switch1(config)# int 1/1/2-1/1/3
Switch1(config-if-<1/1/2-1/1/3>)# loop-protect 英文版缺少此命令
Switch1(config-if-<1/1/2-1/1/3>)# loop-protect vlan 10
```

- Verify loop protect on ports

```
Switch1(config-if-<1/1/2-1/1/3>)# do sh loop-protect
```

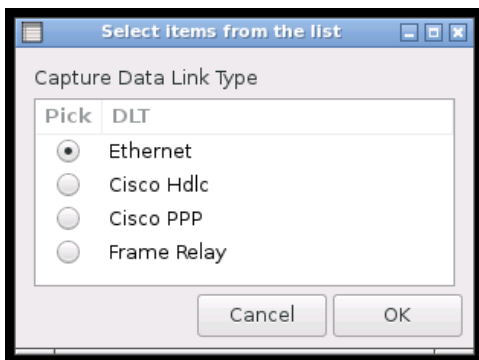
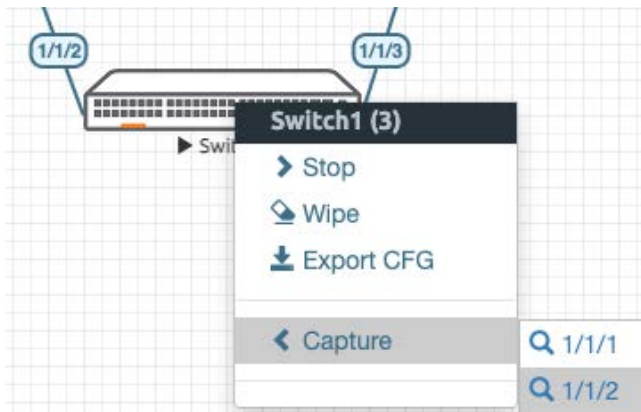
Status and Counters - Loop Protection Information

```
Transmit Interval           : 5 (sec)
Port Re-enable Timer       : Disabled
Loop Detected Trap        : Disabled

Interface 1/1/2
  Loop-protect enabled     : Yes
  Loop-Protect enabled VLANs : 10
  Action on loop detection : TX disable
  Loop detected count      : 0
  Loop detected           : No
  Interface status        : up

Interface 1/1/3
  Loop-protect enabled     : Yes
  Loop-Protect enabled VLANs : 10
  Action on loop detection : TX disable
  Loop detected count      : 0
  Loop detected           : No
  Interface status        : down
```

- Start a packet capture on Switch1 (1/1/2) connected to Switch2



- You should see the protocol ID: 0x0003 packets being sent into the network that are used for loop protect detection with source MAC info

1	0.000000000	HewlettP_16:7b:7e	HewlettP_09:13:a6	IEEE80...	141	OUI 08:00:09 (Hewlett Packard), PID 0x0003
2	4.999736376	HewlettP_16:7b:7e	HewlettP_09:13:a6	IEEE80...	141	OUI 08:00:09 (Hewlett Packard), PID 0x0003
3	9.999683017	HewlettP_16:7b:7e	HewlettP_09:13:a6	IEEE80...	141	OUI 08:00:09 (Hewlett Packard), PID 0x0003
4	14.999770090	HewlettP_16:7b:7e	HewlettP_09:13:a6	IEEE80...	141	OUI 08:00:09 (Hewlett Packard), PID 0x0003
5	15.659103476	HewlettP_8a:24:42	LLDP_Multicast	LLDP	137	TTL = 120 SysName = Switch2 SysDesc = Aruba
6	17.646777843	HewlettP_16:7b:c6	LLDP_Multicast	LLDP	137	TTL = 120 SysName = Switch1 SysDesc = Aruba

```

▶ Frame 1: 141 bytes on wire (1128 bits), 141 bytes captured (1128 bits) on interface 0
▶ Ethernet II, Src: HewlettP_16:7b:7e (08:00:09:16:7b:7e), Dst: HewlettP_09:13:a6 (09:00:09:09:13:a6)
▶ 802.1Q Virtual LAN, PRI: 0, DEI: 0, ID: 10
▼ IEEE802a OUI Extended Ethertype
  Organization Code: 08:00:09 (Hewlett Packard)
  Protocol ID: 0x0003
▼ Data (118 bytes)
  Data: 312f312f32000000000000000000000073000000000000...
  [Length: 118]
  
```

## Task 4 – Enable loop and verify loop is prevented on Switch1

- On Switch1, unshut 1/1/3 to create loop

### Switch1

```
Switch1(config-if-<1/1/2-1/1/3>)# int 1/1/3
Switch1(config-if)# no shu
```

If a loop protect packet is received by the same switch that sent it, it indicates a loop exists and one of the following actions is taken:

- Discovery of the loop is logged but port states are not changed
  - The sending port is disabled
  - The sending and receiving ports are both disabled
- Verify loop is detected and prevented as 1 of the ports is disabled (default loop protect behaviour)

```
Switch1(config-if)# do sh loop-pro
```

Status and Counters - Loop Protection Information

```
Transmit Interval          : 5 (sec)
Port Re-enable Timer      : Disabled
Loop Detected Trap        : Disabled
```

```
Interface 1/1/2
Loop-protect enabled      : Yes
Loop-Protect enabled VLANs : 10
Action on loop detection  : TX disable
Loop detected count       : 1
Loop detected             : Yes
  Detected on VLAN        : 10
  Detected at             : 2021-06-09T22:57:12
Interface status          : down
```

```
Interface 1/1/3
Loop-protect enabled      : Yes
Loop-Protect enabled VLANs : 10
Action on loop detection  : TX disable
Loop detected count       : 0
Loop detected             : No
Interface status          : up
```

## Appendix – Complete Configurations

- If you face issues during your lab, you can verify your configs with the configs listed in this section
- If configs are the same, try powering off/powering on the switches to reboot them

### Switch1

```
Switch1# sh run
Current configuration:
!
!Version ArubaOS-CX Virtual.10.07.0004
!export-password: default
hostname Switch1
user admin group administrators password ciphertext
AQBapfLDQUyYkc7G8jiiLYsVnVobj/u9GrYoWrQhC8Bh+ntZYgAAAKOg2fGgyuPFaVC3uFWTfi6WvU6/1BdR2bZw0wU/WNO
Cj7U055iWY2vKztqXIDrAQdc8TAuZkFGwg0Jp3by5k2
uqtI6kkkQvRzTUxHB0orUPOke1I/qbUjfr3Mh+nJpQ9O23
led locator on
ntp server pool.ntp.org minpoll 4 maxpoll 4 iburst
ntp enable
!
!
!
!
!
!
ssh server vrf mgmt
vlan 1,10-11
interface mgmt
    no shutdown
    ip dhcp
interface 1/1/1
    no shutdown
interface 1/1/2
    no shutdown
    no routing
    vlan trunk native 1
    vlan trunk allowed 10-11
    loop-protect
    loop-protect vlan 10
interface 1/1/3
    no shutdown
    no routing
    vlan trunk native 1
    vlan trunk allowed 10-11
    loop-protect
    loop-protect vlan 10
interface 1/1/4
    no shutdown
interface 1/1/5
    no shutdown
interface 1/1/6
    no shutdown
!
!
!
!
!
https-server vrf mgmt
https-server vrf mgmt
```

### Switch2

```
Switch2# sh run
Current configuration:
!
!Version ArubaOS-CX Virtual.10.07.0004
!export-password: default
hostname Switch2
user admin group administrators password ciphertext
AQBapThMptxqFInprZFYSpfPwBfxijWFnBfUzZe+BxJ5fLofYgAAACZtxwdeBkcZfgVmJccE1ku3trTvX1kGFIAiejEGkNK
Ok8biKq/n9Es5h1jhrzPDjYgz6caIUuPIoZDok8GL2u
3aegtAv9K3DtF2299xDkEhzwUJneH94hoWxsLEjKGU9fFa
led locator on
ntp server pool.ntp.org minpoll 4 maxpoll 4 iburst
ntp enable
!
!
!
!
!
!
ssh server vrf mgmt
vlan 1,10-11
interface mgmt
    no shutdown
    ip dhcp
interface 1/1/1
    no shutdown
    no routing
    vlan trunk native 1
    vlan trunk allowed 10-11
interface 1/1/2
    no shutdown
    no routing
    vlan trunk native 1
    vlan trunk allowed 10-11
interface 1/1/3
    no shutdown
interface 1/1/4
    no shutdown
interface 1/1/5
    no shutdown
interface 1/1/6
    no shutdown
!
!
!
!
!
https-server vrf mgmt
```

### Switch3

```
Switch3# sh run
Current configuration:
!
!Version ArubaOS-CX Virtual.10.07.0004
!export-password: default
hostname Switch3
user admin group administrators password ciphertext
AQBapVspfXYst0T2YjNexlVhZr+WzEpljJGdqToDdWVsSNp7YgAAAE82gWYabqopE61bU2c/Z5C5cOJgoIqRc/LbA2S2gVu
7pulaJqtp7N0hYtmOdWkUXmv4ybkygabKIKEUs5IRDm
G/H1JnB2Poo44H+MI/m8J8dmIOYn9xuDzyGu/TCozjgn+a
led locator on
```

```
ntp server pool.ntp.org minpoll 4 maxpoll 4 iburst
ntp enable
!
!
!
!
!
ssh server vrf mgmt
vlan 1,10-11
interface mgmt
    no shutdown
    ip dhcp
interface 1/1/1
    no shutdown
    no routing
    vlan trunk native 1
    vlan trunk allowed 10-11
interface 1/1/2
    no shutdown
    no routing
    vlan trunk native 1
    vlan trunk allowed 10-11
interface 1/1/3
    no shutdown
interface 1/1/4
    no shutdown
interface 1/1/5
    no shutdown
interface 1/1/6
    no shutdown
!
!
!
!
!
https-server vrf mgmt
```





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