Sun Ethernet Fabric Operating System EVLAN Administration Guide

Part No: E62983-02
July 2015

ORACLE

Part No: E62983-02

Documentation Accessibility

For information about Oracle's commitment to accessibility, visit the Oracle Accessibility Program website at `https://www.oracle.com/pls/topic/lookup?ctx=acc&id=docacc`.

Access to Oracle Support

Oracle customers that have purchased support have access to electronic support through My Oracle Support. For information, visit `http://www.oracle.com/pls/topic/lookup?ctx=acc&id=info` or visit `https://www.oracle.com/pls/topic/lookup?ctx=acc&id=trs` if you are hearing impaired.

Référence: E62983-02

Accessibilité de la documentation

Pour plus d'informations sur l'engagement d'Oracle pour l'accessibilité à la documentation, visitez le site Web Oracle Accessibility Program, à l'adresse `http://www.oracle.com/pls/topic/lookup?ctx=acc&id=docacc`.

Accès au support électronique

Les clients Oracle qui ont souscrit un contrat de support ont accès au support électronique via My Oracle Support. Pour plus d'informations, visitez le site `https://www.oracle.com/pls/topic/lookup?ctx=acc&id=info` ou le site `https://www.oracle.com/pls/topic/lookup?ctx=acc&id=trs` si vous êtes malentendant.

Contents

Using This Documentation

- **Overview** – Provides basic configuration tasks for SEFOS EVLAN (Exclusive VLAN) from Oracle
- **Audience** – System administrators and authorized service providers
- **Required knowledge** – Advanced experience in configuring SEFOS software on Ethernet switches

These topics describe how to access the documentation and leave feedback on it.

- "Product Documentation Library" on page 7
- "Feedback" on page 7

Product Documentation Library

Documentation and resources for this product and related products are available at:

Oracle Switch ES2-72 and Oracle Switch ES2-64:

`http://www.oracle.com/goto/es2-72_es2-64/docs`

Sun Blade 6000 Ethernet Switched NEM 24p 10GbE:

`http://www.oracle.com/pls/topic/lookup?ctx=SB6K-24p-10GbE`

Sun Network 10GbE Switch 72p:

`http://www.oracle.com/pls/topic/lookup?ctx=SN-10GbE-72p`

Feedback

Provide feedback about this documentation at `http://www.oracle.com/goto/docfeedback`.

Protocol Description

In a traditional VLAN, the VLAN represents an L3 broadcast domain or a subnet. EVLAN provides a discrete isolation of ports belonging to a traditional VLAN. Therefore, one host in an EVLAN can communicate with some of the hosts in the EVLAN, while the first host cannot communicate with other hosts even though they are in the same EVLAN and subnet.

An EVLAN consists of two types of EVLANs, principal and restricted.

Principal EVLAN

A principal EVLAN enables communication with network devices outside the EVLAN domain. In effect, this type of VLAN is the main VLAN, used to carry the EVLAN traffic upstream to the outside world. Communication to devices outside the EVLAN domain must go through the external ports of the principal EVLAN.

Restricted EVLAN

Restricted EVLANs are the host-facing VLANs that carry EVLAN traffic downstream to the hosts.

There are two types of restricted EVLAN, solitary-restricted and group-restricted. The main difference between the two types is whether or not the ports within the restricted EVLAN can communicate with each other.

- **Solitary-restricted EVLAN**. This type of EVLAN isolates the ports within a restricted EVLAN, preventing them from communicating with each other. Because this type of EVLAN isolates its member ports, a single solitary-restricted EVLAN is sufficient for a given EVLAN domain.

- **Group-restricted EVLAN**. This type of EVLAN allows communication between its ports. Isolation between multiple group- or solitary-restricted EVLANs is maintained. There can be multiple group-restricted EVLANs in a given EVLAN.

EVLAN Port Types

There are three types of EVLAN ports:

- **External ports**. Use these ports to communicate to the outside world. Frames enter and leave the EVLAN through these ports. You can connect devices like routers and shared resources to external ports.
- **Internal ports**. Use these ports to connect to the hosts on the restricted EVLANs.
- **Inter-switch trunk ports**. Use these generic trunk (or hybrid) ports to interconnect multiple switches that belong to the same EVLAN to each other. The isolation behavior of the restricted EVLANs is extended and maintained on all switches belonging to the same EVLAN domain. You can share inter-switch trunk ports with regular VLANs.

Supported CLI Commands

You can use these CLI commands to configure EVLANs:

- `evlan vid`
- `no evlan vid`
- `ports internal IFLIST external IFLIST inter-switch IFLIST name`
- `ports add internal IFLIST external IFLIST inter-switch IFLIST name`
- `no ports internal IFLIST external IFLIST inter-switch IFLIST name`
- `evlan vid type ports internal IFLIST external IFLIST inter-switch IFLIST name`
- `no evlan vid`
- `evlan vid type ports add internal IFLIST external IFLIST inter-switch IFLIST name`
- `switchport evlan-vlan shared`
- `no switchport evlan-vlan shared`
- `show evlan`
- `show evlan summary`
- `show evlan vid`

Refer to the *Sun Ethernet Fabric Operating System CLI Base Reference Manual* for the complete set of commands and the various options available for configuring EVLANs.

Configuring EVLAN

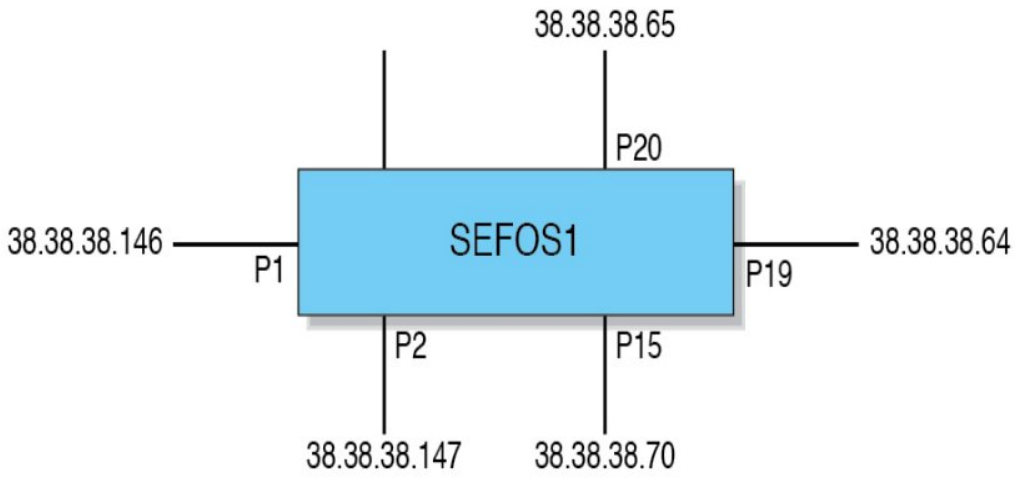
This section provides examples of a single-switch EVLAN configuration, as well as a configuration with multiple switches.

Single-Switch Configuration

These sections describe the single-switch configuration:

Single-Switch Topology

This figure shows the IP addresses and port assignments for the example single-switch configuration. In this example, port 1 is an external port. Ports 2, 15,19, and 20 are internal ports.



Configure External and Internal Ports in a Solitary-Restricted EVLAN

To configure a single switch for use with EVLAN, you must first configure the external and internal ports. In the following example, `EVLAN 10` is identified as the principal EVLAN, and `EVLAN 600` is identified as a solitary-restricted EVLAN. This configuration has no group-restricted EVLANs.

For an example of configuring external and internal ports with group-restricted ports, see "Configure Ports in Solitary- and Group-Restricted EVLANs" on page 15.

1. **Disable GVRP.**

```
SEFOS# conf t
SEFOS(config)# evlan 10

  % GVRP/GARP Has to be disabled in Exclusive Vlan Mode
SEFOS(config)# set gvrp disable
SEFOS(config)#
```

2. **Create the principal EVLAN.**

```
SEFOS(config)# evlan 10
SEFOS(config-evlan)#
```

The mode changes to EVLAN configuration.

3. Add ports to the principal EVLAN.

```
SEFOS(config-evlan)# ports internal extreme-ethernet 0/2,0/15,0/19,0/20 external extreme-
ethernet 0/1 name main
SEFOS(config-evlan)#
```

4. Create restricted VLANs and assign ports to them.

The ports must belong to the principal EVLAN.

```
SEFOS(config-evlan)# evlan 600 solo ports internal extreme-ethernet 0/2,0/15,0/19,0/20
 external extreme-ethernet 0/1 name solo600
SEFOS(config-evlan)# exit
SEFOS(config)#
```

5. Enable the interfaces.

```
SEFOS(config)# interface extreme-ethernet 0/1
SEFOS(config-if)# no shutdown
SEFOS(config-if)# exit
SEFOS(config)#
SEFOS(config)# interface extreme-ethernet 0/2
SEFOS(config-if)# no shutdown
SEFOS(config-if)# exit
SEFOS(config)#
SEFOS(config)# end
```

6. Check the configuration.

```
SEFOS# show evlan

Exclusive Vlan database
---------------------------
XVlan ID : 10
Type : Principal
Principal XVlan : 10
External Ports : Ex0/1
Internal Ports : Ex0/2, Ex0/15, Ex0/19, Ex0/20
ISWTrunk Ports :
Name : main
-----------------------------------------------------
XVlan ID : 600
Type : Restricted: Solitary
Principal XVlan : 10
External Ports : Ex0/1
Internal Ports : Ex0/2, Ex0/15, Ex0/19, Ex0/20
ISWTrunk Ports :
Name : solo600
-----------------------------------------------------
```

7. **Verify the configuration by checking connectivity on the hosts connected to the external and internal ports.**

   The pings between solo internal and external ports are successful, and the pings between internal ports fail.

   a. **Ping from the host on port 2 to the host on port 1.**

```
[root@nsn173-147 ~]# ping 38.38.38.146

PING 38.38.38.146 (38.38.38.146) 56(84) bytes of data.
64 bytes from 38.38.38.146: icmp_seq=0 ttl=255 time=1.61 ms
64 bytes from 38.38.38.146: icmp_seq=1 ttl=255 time=0.288 ms

--- 38.38.38.146 ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 1002ms
rtt min/avg/max/mdev = 0.288/0.952/1.616/0.664 ms, pipe 2
```

   b. **Ping from the host on port 20 to the host on port 1.**

```
[root@nsn173-64 ~]# ping 38.38.38.146

PING 38.38.38.146 (38.38.38.146) 56(84) bytes of data.
64 bytes from 38.38.38.146: icmp_seq=1 ttl=255 time=1.19 ms
64 bytes from 38.38.38.146: icmp_seq=2 ttl=255 time=0.094 ms


--- 38.38.38.146 ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 1000ms
rtt min/avg/max/mdev = 0.094/0.642/1.191/0.549 ms
```

   c. **Ping from the host on port 20 to the host on port 2.**

```
[root@nsn173-64 ~]# ping 38.38.38.147

PING 38.38.38.147 (38.38.38.147) 56(84) bytes of data.

--- 38.38.38.147 ping statistics ---
3 packets transmitted, 0 received, 100% packet loss, time 1999ms
```

   d. **Ping from the host on port 2 to the host on port 15.**

```
 [root@nsn173-147 ~]# ping 38.38.38.70

PING 38.38.38.70 (38.38.38.70) 56(84) bytes of data.
From 38.38.38.147 icmp_seq=1 Destination Host Unreachable
From 38.38.38.147 icmp_seq=2 Destination Host Unreachable
From 38.38.38.147 icmp_seq=3 Destination Host Unreachable
```

e. Ping from the host on port 15 to the host on port 1.

```
[root@nsn173-70 ~]# ping 38.38.38.146

PING 38.38.38.146 (38.38.38.146) 56(84) bytes of data.
64 bytes from 38.38.38.146: icmp_seq=1 ttl=255 time=1.48 ms
64 bytes from 38.38.38.146: icmp_seq=2 ttl=255 time=0.114 ms
64 bytes from 38.38.38.146: icmp_seq=3 ttl=255 time=0.091 ms
```

f. Ping from the host on port 20 to the host on port 1.

```
nsn173-65:~ # ping 38.38.38.146

PING 38.38.38.146 (38.38.38.146) 56(84) bytes of data.
64 bytes from 38.38.38.146: icmp_seq=1 ttl=255 time=2.90 ms
64 bytes from 38.38.38.146: icmp_seq=2 ttl=255 time=0.136 ms
64 bytes from 38.38.38.146: icmp_seq=3 ttl=255 time=0.132 ms
```

g. Ping from the host on port 20 to the host on port 2.

```
nsn173-65:~ # ping 38.38.38.147

PING 38.38.38.147 (38.38.38.147) 56(84) bytes of data.
From 38.38.38.65: icmp_seq=1 Destination Host Unreachable
From 38.38.38.65 icmp_seq=1 Destination Host Unreachable
From 38.38.38.65 icmp_seq=2 Destination Host Unreachable
From 38.38.38.65 icmp_seq=3 Destination Host Unreachable
```

h. Ping from the host on port 15 to the host on port 20.

```
[root@nsn173-64 ~]# ping 38.38.38.65

PING 38.38.38.65 (38.38.38.65) 56(84) bytes of data.
From 38.38.38.64 icmp_seq=2 Destination Host Unreachable
From 38.38.38.64 icmp_seq=3 Destination Host Unreachable
From 38.38.38.64 icmp_seq=4 Destination Host Unreachable
```

▼ Configure Ports in Solitary- and Group-Restricted EVLANs

In this example, `EVLAN 10` is the principal EVLAN. In addition, `EVLAN 100` is identified as a group-restricted EVLAN with internal ports 2 and 15 and external port 1. `EVLAN 600` is identified as a solitary-restricted EVLAN with internal ports 19 and 20 and external port 1.

1. **Disable GVRP.**

```
SEFOS# conf t
SEFOS(config)# set gvrp disable
SEFOS(config)#
```

2. **Create the principal VLAN and add ports to it.**

```
SEFOS(config)# evlan 10
SEFOS(config-evlan)# ports internal extreme-ethernet 0/2,0/15,0/19,0/20 external extreme-
ethernet 0/1 name main
```

3. **Create a group-restricted EVLAN and add ports to it.**

```
SEFOS(config-evlan)# evlan 100 group ports internal extreme-ethernet 0/2,0/15 external
 extreme-ethernet 0/1 name group100
```

4. **Create a solitary-restricted EVLAN and add ports to it.**

```
SEFOS(config-evlan)# evlan 600 solo ports internal extreme-ethernet 0/19,0/20 external
 extreme-ethernet 0/1 name solo600
SEFOS(config-evlan)# exit
SEFOS(config)#
```

5. **Enable the interfaces.**

```
SEFOS(config)# interface extreme-ethernet 0/1
SEFOS(config-if)# no shutdown
SEFOS(config-if)# exit
SEFOS(config)#
SEFOS(config)# interface extreme-ethernet 0/2
SEFOS(config-if)# no shutdown
SEFOS(config-if)# exit
SEFOS(config)#
SEFOS(config)# end
```

6. **Check the configuration.**

```
SEFOS# show evlan

Exclusive Vlan database
---------------------------
XVlan ID : 10
Type : Principal
Principal XVlan : 10
External Ports : Ex0/1
```

```
Internal Ports : Ex0/2, Ex0/15, Ex0/19, Ex0/20
ISWTrunk Ports :
Name : main
-----------------------------------------------------
XVlan ID : 100
Type : Restricted: Group
Principal XVlan : 10
External Ports : Ex0/1
Internal Ports : Ex0/2, Ex0/15
ISWTrunk Ports :
Name : group100
-----------------------------------------------------
XVlan ID : 600
Type : Restricted: Solitary
Principal XVlan : 10
External Ports : Ex0/1
Internal Ports : Ex0/19, Ex0/20
ISWTrunk Ports :
Name : solo600
-----------------------------------------------------
```

7. Verify the configuration by checking connectivity on the hosts connected to the external and internal ports.

a. Ping within hosts connected to group-restricted ports 2 and 15.

```
[root@nsn173-147 ~]# ping 38.38.38.70

PING 38.38.38.70 (38.38.38.70) 56(84) bytes of data.
64 bytes from 38.38.38.70: icmp_seq=0 ttl=64 time=0.193 ms
64 bytes from 38.38.38.70: icmp_seq=1 ttl=64 time=0.269 ms
64 bytes from 38.38.38.70: icmp_seq=2 ttl=64 time=0.099 ms
64 bytes from 38.38.38.70: icmp_seq=3 ttl=64 time=0.146 ms
  [root@nsn173-147 ~]# ping 38.38.38.146

PING 38.38.38.146 (38.38.38.146) 56(84) bytes of data.
64 bytes from 38.38.38.146: icmp_seq=0 ttl=255 time=0.352 ms
64 bytes from 38.38.38.146: icmp_seq=1 ttl=255 time=0.261 ms
64 bytes from 38.38.38.146: icmp_seq=2 ttl=255 time=0.084 ms
```

b. Ping between hosts connected on group-restricted and solitary-restricted ports.

```
 [root@nsn173-147 ~]# ping 38.38.38.64

PING 38.38.38.64 (38.38.38.64) 56(84) bytes of data.
From 38.38.38.147 icmp_seq=1 Destination Host Unreachable
From 38.38.38.147 icmp_seq=2 Destination Host Unreachable
From 38.38.38.147 icmp_seq=3 Destination Host Unreachable
From 38.38.38.147 icmp_seq=5 Destination Host Unreachable
```

Allowing Regular VLAN on EVLAN Ports

In a normal configuration, ports configured as EVLAN internal and external ports do not allow regular VLAN traffic to be carried. However, in some configurations, it would be desirable to allow both regular VLAN and EVLAN traffic on a given port. Such ports would function as internal or external ports for EVLAN traffic, and would function as they usually would. In addition, these ports function as a trunk port for regular VLANs. To enable this, the regular VLAN must be tagged.

▼ Configure Regular VLAN on an EVLAN Port

Use these CLI commands to enable or disable regular VLANs on EVLAN ports:

- `switchport evlan-vlan shared`
- `no switchport evlan-vlan shared`

This example shows how to enable regular VLANs on EVLAN ports for the sample configuration presented in this guide.

1. **Disable GVRP.**

```
SEFOS# conf t
SEFOS(config)# evlan 10
% GVRP/GARP Has to disabled for Exclusive Vlan configuration
SEFOS(config)# set gvrp disable
SEFOS(config)# set gmrp disable
```

2. **Create the principal VLAN and add ports to it.**

```
SEFOS(config)# evlan 10
SEFOS(config-evlan)#
SEFOS(config-evlan)# port internal ext 0/15-24 extern extreme-ethernet 0/3-6 inter-switch
 ext 0/11
SEFOS(config-evlan)# evlan 30 solo ports internal ext 0/15-19 extern extreme-ethernet
 0/3-6 inter-switch ext 0/11
SEFOS(config-evlan)# evlan 60 group port intern ext 0/21-24 extern extreme-ethernet 0/3-6
 inter-switch ext 0/11
SEFOS(config-evlan)# end
```

3. **View the configuration.**

```
SEFOS#
SEFOS# show evlan

Exclusive Vlan database
---------------------------

XVlan ID : 10
Type : Principal
Principal XVlan : 10
External Ports : Ex0/3, Ex0/4, Ex0/5, Ex0/6
Internal Ports : Ex0/15, Ex0/16, Ex0/17, Ex0/18, Ex0/19, Ex0/20
Ex0/21, Ex0/22, Ex0/23, Ex0/24
ISWTrunk Ports : Ex0/11
Name :
-----------------------------------------------------
XVlan ID : 30
Type : Restricted: Solitary
Principal XVlan : 10
External Ports : Ex0/3, Ex0/4, Ex0/5, Ex0/6
Internal Ports : Ex0/15, Ex0/16, Ex0/17, Ex0/18, Ex0/19
ISWTrunk Ports : Ex0/11
Name :
-----------------------------------------------------
XVlan ID : 60
Type : Restricted: Group
Principal XVlan : 10
External Ports : Ex0/3, Ex0/4, Ex0/5, Ex0/6
Internal Ports : Ex0/21, Ex0/22, Ex0/23, Ex0/24
ISWTrunk Ports : Ex0/11
Name :
-----------------------------------------------------
```

Display Port VLAN Properties

- **Type.**

```
SEFOS# show vlan port config

Vlan Port configuration table
------------------------------
?...

Port Ex0/3
Port Vlan ID : 10
Port Acceptable Frame Type : Admit All
Port Ingress Filtering : Disabled
Port Mode : Hybrid
Exclusive VLAN Port Mode : External
VLAN & Exclusive VLAN Port Sharing : Disabled
```

```
Exclusive VLAN VID : 10
Port Gvrp Status : Enabled
Port Gmrp Status : Enabled
Port Gvrp Failed Registrations : 0
Gvrp last pdu origin : 00:00:00:00:00:00
Port Restricted Vlan Registration : Disabled
Port Restricted Group Registration : Disabled
Mac Based Support : Disabled
Subnet Based Support : Disabled
Port-and-Protocol Based Support : Enabled
Default Priority : 0
Tunnel Status : Disabled
Dot1x Protocol Tunnel Status : Peer
LACP Protocol Tunnel Status : Peer
Spanning Tree Tunnel Status : Peer
GVRP Protocol Tunnel Status : Peer
GMRP Protocol Tunnel Status : Peer
IGMP Protocol Tunnel Status : Peer
Filtering Utility Criteria : Default
Port Protected Status : Disabled
-------------------------------------------------------
?...
Port Ex0/15
Port Vlan ID                        : 30
Port Acceptable Frame Type          : Admit All
Port Ingress Filtering              : Disabled
Port Mode                           : Hybrid
Exclusive VLAN Port Mode            : Internal
VLAN & Exclusive VLAN Port Sharing  : Disabled
Exclusive VLAN VID                  : 30
Port Gvrp Status                    : Enabled
Port Gmrp Status                    : Enabled
Port Gvrp Failed Registrations      : 0
Gvrp last pdu origin                : 00:00:00:00:00:00
Port Restricted Vlan Registration   : Disabled
Port Restricted Group Registration  : Disabled
Mac Based Support                   : Disabled
Subnet Based Support                : Disabled
Port-and-Protocol Based Support     : Enabled
Default Priority                    : 0
Tunnel Status                       : Disabled
Dot1x Protocol Tunnel Status        : Peer
LACP Protocol Tunnel Status         : Peer
Spanning Tree Tunnel Status         : Peer
GVRP Protocol Tunnel Status         : Peer
GMRP Protocol Tunnel Status         : Peer
IGMP Protocol Tunnel Status         : Peer
Filtering Utility Criteria          : Default
Port Protected Status               : Disabled
```

Configure Regular VLAN 100 With Ports Used in an EVLAN

This example shows how to configure a VLAN with ports used in an EVLAN using the sample configuration presented in this guide. In the first steps, the configuration attempt fails because the ports are used in an EVLAN. Once sharing is enabled, tagged ports can be configured as members of regular VLANs. Only tagged port configuration is allowed, and untagged ports cannot be configured as members of regular VLANs.

1. Configure a VLAN using ports already used in an EVLAN.

```
SEFOS# conf t
SEFOS(config)# vlan 100
SEFOS(config-vlan)# port ext 0/15-18 untagged ext 0/15-18
/r% Untagged Port is already used in a EVLAN
% Portlist Contains Port(s) used by EVLANs
SEFOS(config-vlan)# port ext 0/15-18
/r% EVLAN member Port Can not be Shared
% Portlist Contains Port(s) used by EVLANs
SEFOS(config-vlan)# exit
```

With the default EVLAN configuration, ports cannot be shared between regular VLANs and EVLAN.

2. Enable sharing.

```
SEFOS(config)# int range ext 0/15-18
SEFOS(config-if-range)# switchport evlan-vlan shared
SEFOS(config-if-range)# exit
SEFOS(config)# vlan 100
SEFOS(config-vlan)# port ext 0/15-18 untagged ext 0/15-18
/r% Untagged Port is already used in a EVLAN
% Portlist Contains Port(s) used by EVLANs
SEFOS(config-vlan)# port ext 0/15-18
SEFOS(config-vlan)# end
```

Only untagged port configuration is allowed.

3. View the VLAN configuration.

```
SEFOS#
SEFOS# show vlan

Vlan database
-----------------------------------------------------
Vlan ID : 100
Member Ports : Ex0/15, Ex0/16, Ex0/17, Ex0/18
```

```
Untagged Ports : None
Forbidden Ports : None
Name :
Status : Permanent
-----------------------------------------------------

TopNEM1 SEFOS# show evlan
Exclusive Vlan database
--------------------------
XVlan ID : 10
Type : Principal
Principal XVlan : 10
External Ports : Ex0/3, Ex0/4, Ex0/5, Ex0/6
Internal Ports : Ex0/15, Ex0/16, Ex0/17, Ex0/18, Ex0/19, Ex0/20
Ex0/21, Ex0/22, Ex0/23, Ex0/24
ISWTrunk Ports : Ex0/11
Name :
-----------------------------------------------------
XVlan ID : 30
Type : Restricted: Solitary
Principal XVlan : 10
External Ports : Ex0/3, Ex0/4, Ex0/5, Ex0/6
Internal Ports : Ex0/15, Ex0/16, Ex0/17, Ex0/18, Ex0/19
ISWTrunk Ports : Ex0/11
Name :
-----------------------------------------------------
XVlan ID : 60
Type : Restricted: Group
Principal XVlan : 10
External Ports : Ex0/3, Ex0/4, Ex0/5, Ex0/6
Internal Ports : Ex0/21, Ex0/22, Ex0/23, Ex0/24
ISWTrunk Ports : Ex0/11
Name :
-----------------------------------------------------
```

4. View the port configuration.

```
TopNEM1 SEFOS# show vlan port config

Vlan Port configuration table
------------------------------
Port Ex0/3
Port Vlan ID : 10
Port Acceptable Frame Type : Admit All
Port Ingress Filtering : Disabled
Port Mode : Hybrid
Exclusive VLAN Port Mode : External
VLAN & Exclusive VLAN Port Sharing : Disabled
Exclusive VLAN VID : 10
Port Gvrp Status : Enabled
Port Gmrp Status : Enabled
Port Gvrp Failed Registrations : 0
Gvrp last pdu origin : 00:00:00:00:00:00
```

```
Port Restricted Vlan Registration : Disabled
Port Restricted Group Registration : Disabled
Mac Based Support : Disabled
Subnet Based Support : Disabled
Port-and-Protocol Based Support : Enabled
Default Priority : 0
Tunnel Status : Disabled
Dot1x Protocol Tunnel Status : Peer
LACP Protocol Tunnel Status : Peer
Spanning Tree Tunnel Status : Peer
GVRP Protocol Tunnel Status : Peer
GMRP Protocol Tunnel Status : Peer
IGMP Protocol Tunnel Status : Peer
Filtering Utility Criteria : Default
Port Protected Status : Disabled
-----------------------------------------------------

Port Ex0/15
Port Vlan ID : 30
Port Acceptable Frame Type : Admit All
Port Ingress Filtering : Disabled
Port Mode : Hybrid
Exclusive VLAN Port Mode : Internal
VLAN & Exclusive VLAN Port Sharing : Enabled
Exclusive VLAN VID : 30
Port Gvrp Status : Enabled
Port Gmrp Status : Enabled
Port Gvrp Failed Registrations : 0
Gvrp last pdu origin : 00:00:00:00:00:00
Port Restricted Vlan Registration : Disabled
Port Restricted Group Registration : Disabled
Mac Based Support : Disabled
Subnet Based Support : Disabled
Port-and-Protocol Based Support : Enabled
Default Priority : 0
Tunnel Status : Disabled
Dot1x Protocol Tunnel Status : Peer
LACP Protocol Tunnel Status : Peer
Spanning Tree Tunnel Status : Peer
GVRP Protocol Tunnel Status : Peer
GMRP Protocol Tunnel Status : Peer
IGMP Protocol Tunnel Status : Peer
Filtering Utility Criteria : Default
Port Protected Status : Disabled
-----------------------------------------------------
Port Ex0/16
Port Vlan ID : 30
Port Acceptable Frame Type : Admit All
Port Ingress Filtering : Disabled
Port Mode : Hybrid
Exclusive VLAN Port Mode : Internal
VLAN & Exclusive VLAN Port Sharing : Enabled
Exclusive VLAN VID : 30
Port Gvrp Status : Enabled
```

```
Port Gmrp Status : Enabled
Port Gvrp Failed Registrations : 0
Gvrp last pdu origin : 00:00:00:00:00:00
Port Restricted Vlan Registration : Disabled
Port Restricted Group Registration : Disabled
Mac Based Support : Disabled
Subnet Based Support : Disabled
Port-and-Protocol Based Support : Enabled
Default Priority : 0
Tunnel Status : Disabled
Dot1x Protocol Tunnel Status : Peer
LACP Protocol Tunnel Status : Peer
Spanning Tree Tunnel Status : Peer
GVRP Protocol Tunnel Status : Peer
GMRP Protocol Tunnel Status : Peer
IGMP Protocol Tunnel Status : Peer
Filtering Utility Criteria : Default
Port Protected Status : Disabled
------------------------------------------------------
```

5. **Show the running configuration for the shared port.**

```
TopNEM1 SEFOS# show running-config int ext 0/15

Building configuration...
interface extreme-ethernet 0/15
 no shutdown
 no negotiation
 speed 10000
spanning-tree portfast
switchport pvid 30
switchport evlan-vlan shared
```

Multiple-Switch Configuration

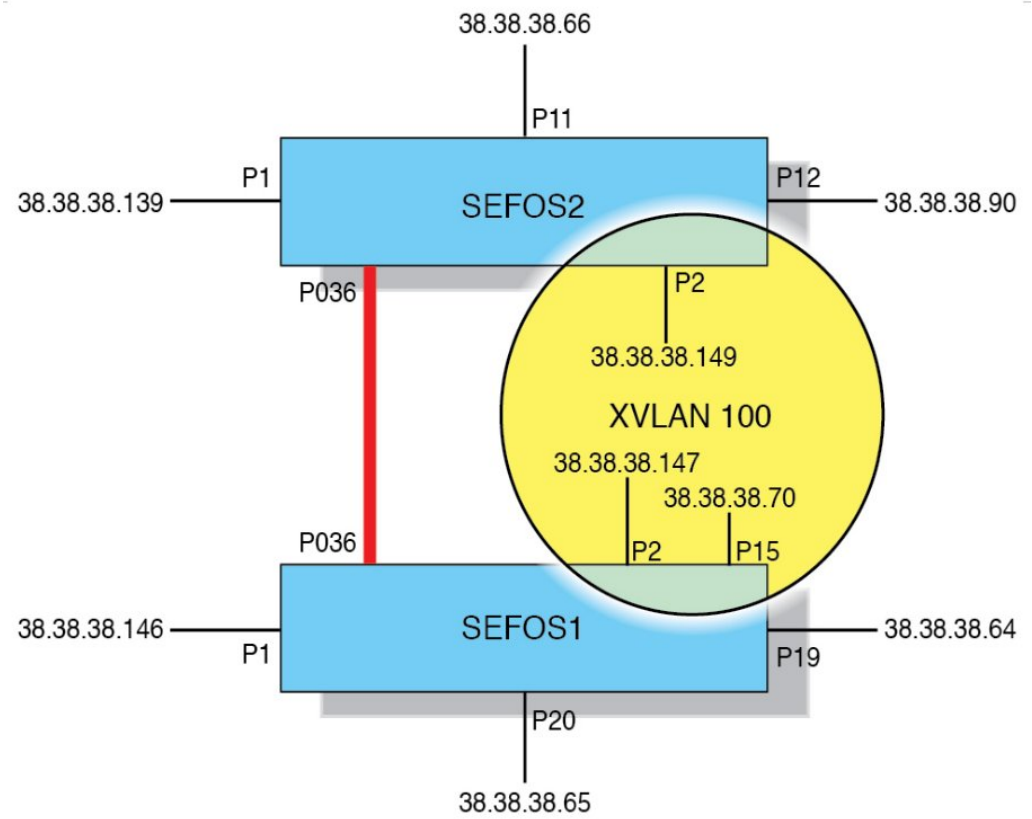
These sections describe the multiple-switch configuration:

- "Multiple-Switch Topology" on page 24
- "Connect Two Switches With Two Restricted EVLANs" on page 25
- "Connect EVLANs Across SEFOS1 and SEFOS2" on page 29

Multiple-Switch Topology

A typical EVLAN configuration has multiple switches, interconnected with VLAN trunks. The example configuration in this section illustrates how to interconnect two SEFOS switches (SEFOS1 and SEFOS2), and extend the EVLAN across them. There are two restricted EVLANs on these switches under principal EVLAN 100.

This figure shows the IP addresses and port assignments for the multiple-switch configuration. In this example, port 1 is the external port on both switches (SEFOS1 and SEFOS2). On SEFOS1, ports 19 and 20 are solitary-restricted internal ports, and ports 2 and 15 are group-restricted internal ports. On SEFOS2, ports 11 and 12 are solitary-restricted internal ports. Port 2 is the only group-restricted internal port.



Connect Two Switches With Two Restricted EVLANs

This example assumes the same configuration of SEFOS1 as is described in "Single-Switch Configuration" on page 11. The additional switch that is included in the multiple-switch configuration (SEFOS2) is configured as described in this section.

1. **Disable GVRP.**

```
SEFOS# conf t
SEFOS(config)# set gvrp disable
SEFOS(config)#
```

2. **Create the principal VLAN and add ports to it.**

```
SEFOS(config)# evlan 10
SEFOS(config-evlan)# ports internal extreme-ethernet 0/2,0/11-12 external extreme-ethernet
 0/1 name main
```

3. **Create a group-restricted EVLANs and add ports to it.**

```
SEFOS(config-evlan)# evlan 100 group ports internal extreme-ethernet 0/2 external extreme-
ethernet 0/1 name group100
```

4. **Create a solitary-restricted EVLAN and add ports to it.**

```
SEFOS(config-evlan)# evlan 600 solo ports internal extreme-ethernet 0/11-12 external
 extreme-ethernet 0/1 name solo600
SEFOS(config-evlan)# exit
SEFOS(config)#
```

5. **Enable the interfaces.**

```
SEFOS(config)# interface extreme-ethernet 0/1
SEFOS(config-if)# no shutdown
SEFOS(config-if)# exit
SEFOS(config)#
SEFOS(config)# interface extreme-ethernet 0/2
SEFOS(config-if)# no shut
SEFOS(config-if)# exit
SEFOS(config)# interface extreme-ethernet 0/11-12
SEFOS(config-if)# no shutdown
SEFOS(config-if)# exit
SEFOS(config)#
SEFOS(config)# end
```

6. **Check the configuration.**

```
SEFOS# show evlan

Exclusive Vlan database
---------------------------

XVlan ID : 10
Type : Principal
```

```
Principal XVlan : 10
External Ports : Ex0/1
Internal Ports : Ex0/2, Ex0/11, Ex0/12
ISWTrunk Ports :
Name : main
-----------------------------------------------------
XVlan ID : 100
Type : Restricted: Group
Principal XVlan : 10
External Ports : Ex0/1
Internal Ports : Ex0/2
ISWTrunk Ports :
Name : group100
-----------------------------------------------------
XVlan ID : 600
Type : Restricted: Solitary
Principal XVlan : 10
External Ports : Ex0/1
Internal Ports : Ex0/11, Ex0/12
ISWTrunk Ports :
Name : solo600
-----------------------------------------------------
```

7. Verify the configuration by checking connectivity on the hosts connected to the external and internal ports.

a. Ping between external and internal ports.

```
nsn173-90:~ # ping 38.38.38.139


PING 38.38.38.139 (38.38.38.139) 56(84) bytes of data.
64 bytes from 38.38.38.139: icmp_seq=1 ttl=64 time=3.44 ms
64 bytes from 38.38.38.139: icmp_seq=2 ttl=64 time=0.159 ms

[root@nsn173-139 ~]# ping 38.38.38.149

PING 38.38.38.149 (38.38.38.149) 56(84) bytes of data.
64 bytes from 38.38.38.149: icmp_seq=1 ttl=255 time=0.318 ms
64 bytes from 38.38.38.149: icmp_seq=2 ttl=255 time=0.126 ms

[root@nsn173-139 ~]# ping 38.38.38.66

PING 38.38.38.66 (38.38.38.66) 56(84) bytes of data.
64 bytes from 38.38.38.66: icmp_seq=1 ttl=64 time=1.06 ms
64 bytes from 38.38.38.66: icmp_seq=2 ttl=64 time=0.162 ms
64 bytes from 38.38.38.66: icmp_seq=3 ttl=64 time=0.115 ms

[root@nsn173-139 ~]# ping 38.38.38.90

PING 38.38.38.90 (38.38.38.90) 56(84) bytes of data.
64 bytes from 38.38.38.90: icmp_seq=1 ttl=64 time=1.68 ms
```

```
64 bytes from 38.38.38.90: icmp_seq=2 ttl=64 time=0.194 ms
64 bytes from 38.38.38.90: icmp_seq=3 ttl=64 time=0.145 ms

[root@nsn173-147 ~]# ping 38.38.38.70

PING 38.38.38.70 (38.38.38.70) 56(84) bytes of data.
64 bytes from 38.38.38.70: icmp_seq=0 ttl=64 time=0.193 ms
64 bytes from 38.38.38.70: icmp_seq=1 ttl=64 time=0.269 ms
64 bytes from 38.38.38.70: icmp_seq=2 ttl=64 time=0.099 ms
64 bytes from 38.38.38.70: icmp_seq=3 ttl=64 time=0.146 ms

[root@nsn173-147 ~]# ping 38.38.38.146

PING 38.38.38.146 (38.38.38.146) 56(84) bytes of data.
64 bytes from 38.38.38.146: icmp_seq=0 ttl=255 time=0.352 ms
64 bytes from 38.38.38.146: icmp_seq=1 ttl=255 time=0.261 ms
64 bytes from 38.38.38.146: icmp_seq=2 ttl=255 time=0.084 ms
```

b. Ping between hosts connected to group-restricted and solitary-restricted ports.

```
[root@nsn173-147 ~]# ping 38.38.38.64

PING 38.38.38.64 (38.38.38.64) 56(84) bytes of data.
From 38.38.38.147 icmp_seq=1 Destination Host Unreachable
From 38.38.38.147 icmp_seq=2 Destination Host Unreachable
From 38.38.38.147 icmp_seq=3 Destination Host Unreachable
From 38.38.38.147 icmp_seq=5 Destination Host Unreachable
```

c. Ping between hosts on internal restricted ports.

```
nsn173-90:~ # ping 38.38.38.149

PING 38.38.38.149 (38.38.38.149) 56(84) bytes of data.
^C
--- 38.38.38.149 ping statistics ---
2 packets transmitted, 0 received, 100% packet loss, time 999ms

nsn173-90:~ # ping 38.38.38.66

PING 38.38.38.66 (38.38.38.66) 56(84) bytes of data.
^C
--- 38.38.38.66 ping statistics ---
2 packets transmitted, 0 received, 100% packet loss, time 1013ms
```

Connect EVLANs Across SEFOS1 and SEFOS2

The interconnect between the two switches can be a regular port or an 802.3ad link aggregation port. In this example, a LAG port is used.

This task shows how to create a LAG port between the two NEMs and assign it as inter-switch trunk port.

1. On SEFOS1, create a LAG consisting of ports 3, 4, 5, and 6.

```
SEFOS# conf t
SEFOS(config)# set port-channel enable
SEFOS(config)#
SEFOS(config)# interface port-channel 36
SEFOS(config-if)# no shutdown
SEFOS(config-if)# exit
SEFOS(config)#
SEFOS(config)# interface range extreme-ethernet 0/3-6
SEFOS(config-if-range)# shutdown
SEFOS(config-if-range)# channel-group 36 mode active
SEFOS(config-if-range)# no shutdown
SEFOS(config-if-range)# exit
SEFOS(config)#
SEFOS(config)# evlan 10
SEFOS(config-evlan)# port add inter-switch po 36
SEFOS(config-evlan)# evlan 600 solo port add inter-switch po 36
SEFOS(config-evlan)# evlan 100 group port add inter-switch po 36
SEFOS(config-evlan)#
SEFOS(config-evlan)# end
```

2. Show the EVLAN configuration.

```
SEFOS# show evlan

Exclusive Vlan database
---------------------------
XVlan ID : 10
Type : Principal
Principal XVlan : 10
External Ports : Ex0/1
Internal Ports : Ex0/2, Ex0/15, Ex0/19, Ex0/20
ISWTrunk Ports : po36
Name : main
--------------------------------------------------
XVlan ID : 100
Type : Restricted: Group
Principal XVlan : 10
External Ports : Ex0/1
Internal Ports : Ex0/2, Ex0/15
ISWTrunk Ports : po36
```

```
Name : group100
--------------------------------------------------
XVlan ID : 600
Type : Restricted: Solitary
Principal XVlan : 10
External Ports : Ex0/1
Internal Ports : Ex0/19, Ex0/20
ISWTrunk Ports : po36
Name : solo600
--------------------------------------------------
```

3. Create a a LAG on SEFOS2 and configure it as an inter-switch port for the EVLAN.

```
SEFOS# conf t
SEFOS(config)# set port-channel enable
SEFOS(config)#
SEFOS(config)# interface port-channel 36
SEFOS(config-if)# no shutdown
SEFOS(config-if)# exit
SEFOS(config)#
SEFOS(config)# interface range extreme-ethernet 0/3-6
SEFOS(config-if-range)# shutdown
SEFOS(config-if-range)# channel-group 36 mode active
SEFOS(config-if-range)# no shutdown
SEFOS(config-if-range)# exit
SEFOS(config)#
SEFOS(config)# evlan 10
SEFOS(config-evlan)# port add inter-switch po 36
SEFOS(config-evlan)# evlan 600 solo port add inter-switch po 36
SEFOS(config-evlan)# evlan 100 group port add inter-switch po 36
SEFOS(config-evlan)# exit
SEFOS(config)# end
SEFOS#
```

4. Check the EVLAN configuration on SEFOS2.

```
SEFOS# show evlan

Exclusive Vlan database
-------------------------
XVlan ID : 10
Type : Principal
Principal XVlan : 10
External Ports : Ex0/1
Internal Ports : Ex0/2, Ex0/11, Ex0/12
ISWTrunk Ports : po36
Name : main
--------------------------------------------------
XVlan ID : 100
Type : Restricted: Group
```

```
Principal XVlan : 10
External Ports : Ex0/1
Internal Ports : Ex0/2
ISWTrunk Ports : po36
Name : group100
-----------------------------------------------------
XVlan ID : 600
Type : Restricted: Solitary
Principal XVlan : 10
External Ports : Ex0/1
Internal Ports : Ex0/11, Ex0/12
ISWTrunk Ports : po36
Name : solo600
-----------------------------------------------------
```

5. Check the LAG port status.

```
SEFOS# show etherchannel summary

Port-channel Module Admin Status is enabled
Port-channel Module Oper Status is enabled
Port-channel System Identifier is 00:14:4f:6c:56:0f

Flags:
D - down P - in port-channel
I - stand-alone H - Hot-standby (LACP only)

Number of channel-groups in use: 1
Number of aggregators: 1

Group Port-channel Protocol Ports
------------------------------------------------------------------------------
36 Po36(P) LACPEx0/3(P),Ex0/4(P),Ex0/5(P),Ex0/6(P)
```

6. Ensure that the external hosts on SEFOS1 and SEFOS2 can be reached.

```
[root@nsn173-139 ~]# ping 38.38.38.146

PING 38.38.38.146 (38.38.38.146) 56(84) bytes of data.
64 bytes from 38.38.38.146: icmp_seq=1 ttl=255 time=1.71 ms
64 bytes from 38.38.38.146: icmp_seq=2 ttl=255 time=0.054 ms
64 bytes from 38.38.38.146: icmp_seq=3 ttl=255 time=0.135 ms
```

7. Ensure that the internal/isolated hosts on SEFOS1 and the external hosts on SEFOS2 can communicate.

```
[root@nsn173-139 ~]# ping 38.38.38.147

PING 38.38.38.147 (38.38.38.147) 56(84) bytes of data.
64 bytes from 38.38.38.147: icmp_seq=1 ttl=64 time=0.793 ms
64 bytes from 38.38.38.147: icmp_seq=2 ttl=64 time=0.236 ms
```

```
64 bytes from 38.38.38.147: icmp_seq=3 ttl=64 time=0.334 ms

[root@nsn173-139 ~]# ping 38.38.38.70

PING 38.38.38.70 (38.38.38.70) 56(84) bytes of data.
64 bytes from 38.38.38.70: icmp_seq=1 ttl=64 time=2.04 ms
64 bytes from 38.38.38.70: icmp_seq=2 ttl=64 time=0.085 ms
64 bytes from 38.38.38.70: icmp_seq=3 ttl=64 time=0.166 ms

[root@nsn173-139 ~]# ping 38.38.38.64

PING 38.38.38.64 (38.38.38.64) 56(84) bytes of data.
64 bytes from 38.38.38.64: icmp_seq=1 ttl=64 time=1.70 ms
64 bytes from 38.38.38.64: icmp_seq=2 ttl=64 time=0.238 ms

[root@nsn173-139 ~]# ping 38.38.38.65

PING 38.38.38.65 (38.38.38.65) 56(84) bytes of data.
64 bytes from 38.38.38.65: icmp_seq=1 ttl=64 time=1.29 ms
64 bytes from 38.38.38.65: icmp_seq=2 ttl=64 time=0.192 ms
```

8. **Ensure that the solitary-restricted port on SEFOS2 and the external port on SEFOS1 can communicate.**

```
nsn173-90:~ # ping 38.38.38.139

PING 38.38.38.139 (38.38.38.139) 56(84) bytes of data.
64 bytes from 38.38.38.139: icmp_seq=1 ttl=64 time=1.94 ms
```

9. **Ensure that the solitary-restricted ports on SEFOS1 and SEFOS2 can communicate with each other.**

   The hosts are expected to be unreachable.

```
nsn173-90:~ # ping 38.38.38.147

PING 38.38.38.147 (38.38.38.147) 56(84) bytes of data.
From 38.38.38.90: icmp_seq=1 Destination Host Unreachable
From 38.38.38.90 icmp_seq=1 Destination Host Unreachable
From 38.38.38.90 icmp_seq=2 Destination Host Unreachable

nsn173-90:~ # ping 38.38.38.64

PING 38.38.38.64 (38.38.38.64) 56(84) bytes of data.
From 38.38.38.90: icmp_seq=2 Destination Host Unreachable
From 38.38.38.90 icmp_seq=2 Destination Host Unreachable
From 38.38.38.90 icmp_seq=3 Destination Host Unreachable

nsn173-90:~ # ping 38.38.38.65

PING 38.38.38.65 (38.38.38.65) 56(84) bytes of data.
From 38.38.38.90: icmp_seq=1 Destination Host Unreachable
```

```
From 38.38.38.90 icmp_seq=1 Destination Host Unreachable
From 38.38.38.90 icmp_seq=2 Destination Host Unreachable

nsn173-90:~ # ping 38.38.38.70

PING 38.38.38.70 (38.38.38.70) 56(84) bytes of data.
From 38.38.38.90: icmp_seq=1 Destination Host Unreachable
From 38.38.38.90 icmp_seq=1 Destination Host Unreachable
From 38.38.38.90 icmp_seq=2 Destination Host Unreachable
```

10. Ensure that the group-restricted ports on SEFOS1 and SEFOS2 can communicate with each other.

The hosts are expected to be reachable. On the restricted `EVLAN 100`, the following hosts are assigned:

- On SEFOS1, port 2 is assigned host `.147`, port 15 is assigned host `.70`.
- On SEFOS2, port 2 is assigned host `.149`.

```
# ping 38.38.38.70
38.38.38.70 is alive

# ping 38.38.38.147
38.38.38.147 is alive
#
```

11. Show the host MAC addresses learned on the SEFOS1 and SEFOS2 switches.

a. On SEFOS1, type.

```
SEFOS# show mac-address-table

Vlan Mac Address Type Ports
---- ----------- ---- -----
10 00:00:5a:9f:71:a8 Learnt Ex0/2
10 00:14:4f:1e:da:21 Learnt Ex0/1
10 00:14:4f:1e:e1:8f Learnt po36
10 00:14:4f:6c:63:11 Learnt po36
10 00:14:4f:6c:63:12 Learnt po36
10 00:14:4f:6c:63:13 Learnt po36
10 00:14:4f:6c:63:14 Learnt po36
10 00:14:4f:6c:63:27 Learnt po36
10 00:14:4f:6c:78:e8 Learnt po36
10 00:1b:21:51:26:bd Learnt po36
10 00:1b:21:51:26:ed Learnt po36
10 00:1b:21:53:6d:b9 Learnt Ex0/19
10 00:1b:21:53:6e:55 Learnt Ex0/15
10 00:1b:21:66:4a:a1 Learnt Ex0/20
```

b. On SEFOS2, type.

```
SEFOS# show mac-address-table

Vlan Mac Address Type Ports
---- ----------- ---- -----
10 00:00:5a:9f:71:a8 Learnt po36
10 00:14:4f:1e:da:21 Learnt po36
10 00:14:4f:1e:e1:8f Learnt Ex0/2
10 00:14:4f:6c:56:11 Learnt po36
10 00:14:4f:6c:56:12 Learnt po36
10 00:14:4f:6c:56:13 Learnt po36
10 00:14:4f:6c:56:14 Learnt po36
10 00:14:4f:6c:56:27 Learnt po36
10 00:14:4f:6c:78:e8 Learnt Ex0/1
10 00:1b:21:51:26:bd Learnt Ex0/12
10 00:1b:21:51:26:ed Learnt Ex0/11
10 00:1b:21:53:6e:55 Learnt po36

Total Mac Addresses displayed: 12
```