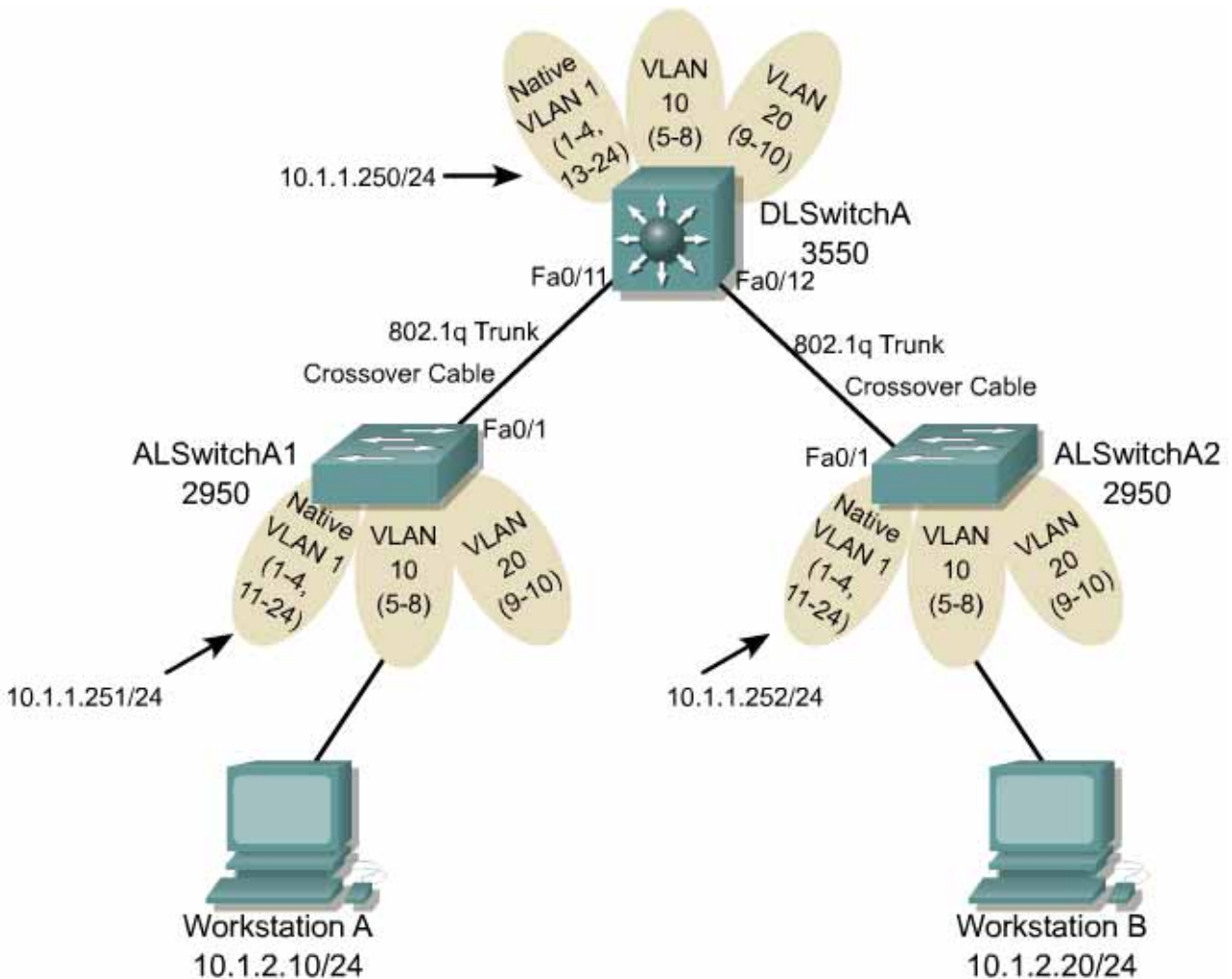


Lab 2.3.7.2 Catalyst 2950T and 3550 Series VTP Pruning



Objective

Configure VTP pruning between two Cisco Catalyst WS-C2950T-24-EI switches and a Cisco Catalyst WS-C3550-24-EMI switch using the command-line interface (CLI) mode.

Scenario

In Lab 2.3.7.1, a VTP trunk was configured between a Cisco Catalyst WS-C3550-24-EMI, the DLSwitchA, and two Cisco Catalyst WS-C2950T-24-EI switches, indicated as ALSwitchA1 and ALSwitchA2. As a result, the switches will flood broadcast, multicast, and unknown unicast traffic across the trunk link within the VTP domain. This will happen even though receiving switches may discard them.

The network shown in the diagram does not have any devices connected to the Marketing VLAN 20. Therefore, there is no reason for flooded broadcast, multicast, or unknown unicast traffic for the

Marketing VLAN 20 to traverse the trunk link. VTP pruning allows the VTP to intelligently determine if there are no devices in a particular VLAN at the other end of a trunk link. By pruning, it restricts flooded traffic only to those trunk links that the traffic must use to reach the destination devices. This results in increasing available bandwidth.

By default, VTP pruning is disabled. VTP pruning blocks unneeded, flooded traffic to VLANs on trunk ports that are included in the pruning-eligible list. Only VLANs included in the pruning-eligible list can be pruned. VLAN 1 is always pruning-ineligible. By default, VLANs 2 through 1001 are pruning-eligible on the Cisco Catalyst WS-C2950T-24-EI and WS-C3550-24-EMI trunk ports. If the VLANs are configured as pruning-ineligible, the flooding continues.

Notice that the basic procedures for VTP pruning on the 2950T and 3550 switches are the same.

Step 1

If the same switches and set up from Lab 2.3.7.1 are used, verify connectivity with a **ping** between switches and between workstations. Then continue with Step 2.

If a different set of switches is used, it is necessary to insure there are no inappropriate VTP, VLAN information, or other configurations present. Disconnect any cables from the switches, and then power up the switches. Delete the startup configuration and the VLAN database (vlan.dat), and then reload the switches. Cable the lab according to the diagram shown, and then load the configurations from Lab 2.3.7.1.

Enable VLAN 1 on all switches with the **no shutdown** interface command.

The VTP and VLAN information retained in the VLAN database (vlan.dat) are not saved with the startup configuration. Therefore, if the switches from Lab 2.3.7.1 are not used with this lab, load the previously saved configurations and set into the respective switches that are to be used. Also the VTP Domain Name will not be present and will have to be reentered to enable VTP.

```
DLSwitchA#vlan database
DLSwitchA(vlan)#vtp domain CORP
Changing VTP domain name from NULL to CORP
DLSwitchA(vlan)#exit
APPLY completed.
Exiting....
```

The accounting and marketing names created for VLAN 10 and VLAN 20 also will not be present. This will not have an impact on the completion of this lab. However, the names on DLSwitchA may be reentered.

```
DLSwitchA#vlan database
DLSwitchA(vlan)#vlan 10 name Accounting
VLAN 10 added:
  Name: Accounting
DLSwitchA(vlan)#vlan 20 name Marketing
VLAN 20 added:
  Name: Marketing
DLSwitchA(vlan)#exit
APPLY completed.
Exiting....
```

All of the switches will be in the VTP server mode. This again will not impact completion of this lab. However, ALSwitchA1 and ALSwitchA2 can be reset to the VTP client mode.

```
ALSwitchA1#vlan database
ALSwitchA1(vlan)#vtp client
Setting device to VTP CLIENT mode.
ALSwitchA1(vlan)#exit
In CLIENT state, no apply attempted.
Exiting....
```

```

ALSwitchA2#vlan database
ALSwitchA2(vlan)#vtp client
Setting device to VTP CLIENT mode.
ALSwitchA2(vlan)#exit
In CLIENT state, no apply attempted.
Exiting....

```

Verify connectivity with a **ping** between switches and between workstations.

The sample outputs from this lab are based upon the continuation of this lab from Lab 2.3.7.1 with the same switches and set up. If different switches are used with the Lab 2.3.7.1 configurations loaded, this output may appear slightly different. However, it will not impact a successful completion of this lab.

Step 2

Issue the **show interfaces trunk** command on any of the switches to see the status of the VLANs when pruning is disabled. The following is sample output for DLSwitchA and ALSwitchA1:

```
DLSwitchA#show interfaces trunk
```

Port	Mode	Encapsulation	Status	Native vlan
Fa0/11	on	802.1q	trunking	1
Fa0/12	on	802.1q	trunking	1

Port	Vlans allowed on trunk
Fa0/11	1-4094
Fa0/12	1-4094

Port	Vlans allowed and active in management domain
Fa0/11	1,10,20
Fa0/12	1,10,20

Port	Vlans in spanning tree forwarding state and not pruned
Fa0/11	1,10,20
Fa0/12	1,10,20

```
ALSwitchA1#show interfaces trunk
```

Port	Mode	Encapsulation	Status	Native vlan
Fa0/1	on	802.1q	trunking	1

Port	Vlans allowed on trunk
Fa0/1	1-4094

Port	Vlans allowed and active in management domain
Fa0/1	1,10,20

Port	Vlans in spanning tree forwarding state and not pruned
Fa0/1	1,10,20

Notice that VLANs 1, 10, and 20 are all active in the VTP management domain.

1. Which VLANs are not pruned?
2. Which VLAN and switch have workstations currently connected?

Enabling VTP pruning on a VTP server will enable pruning for the entire VTP domain. Therefore, VTP pruning needs to be enabled only on DLSwitchA as shown in the following:

```

DLSwitchA#vlan database
DLSwitchA(vlan)#vtp pruning
Pruning switched ON
DLSwitchA(vlan)#exit
APPLY completed.
Exiting....

```

Note To disable VTP pruning, use the `no vtp pruning` vlan configuration mode command.

On any of the switches, verify VTP pruning is enabled with the `show vtp status` command. The following is a sample output for DLSwitchA:

```

DLSwitchA#show vtp status
VTP Version           : 2
Configuration Revision : 2
Maximum VLANs supported locally : 1005
Number of existing VLANs : 7
VTP Operating Mode     : Server
VTP Domain Name        : CORP
VTP Pruning Mode       : Enabled
VTP V2 Mode            : Disabled
VTP Traps Generation   : Disabled
MD5 digest             : 0x02 0xF1 0xDF 0xD4 0x61 0xBA 0x5E 0x18
Configuration last modified by 10.1.1.250 at 3-1-93 01:17:55
Local updater ID is 10.1.1.250 on interface Vl1 (lowest numbered VLAN interface found)

```

Step 3

Issue the `show interfaces trunk` command on all of the switches to see the status of the VLANs with pruning enabled. The following shows ample outputs from this command:

```

DLSwitchA#show interfaces trunk

Port      Mode      Encapsulation  Status        Native vlan
Fa0/11    on        802.1q         trunking      1
Fa0/12    on        802.1q         trunking      1

Port      Vlans allowed on trunk
Fa0/11    1-4094
Fa0/12    1-4094

Port      Vlans allowed and active in management domain
Fa0/11    1,10,20
Fa0/12    1,10,20

Port      Vlans in spanning tree forwarding state and not pruned
Fa0/11    1,10
Fa0/12    1,10

ALSwitchA1#show interfaces trunk

Port      Mode      Encapsulation  Status        Native vlan
Fa0/1     on        802.1q         trunking      1

Port      Vlans allowed on trunk
Fa0/1     1-4094

Port      Vlans allowed and active in management domain
Fa0/1     1,10,20

Port      Vlans in spanning tree forwarding state and not pruned

```

```
Fa0/1 1,10
```

```
ALSwitchA2#show interfaces trunk
```

Port	Mode	Encapsulation	Status	Native vlan
Fa0/1	on	802.1q	trunking	1

Port	Vlans allowed on trunk
Fa0/1	1-4094

Port	Vlans allowed and active in management domain
Fa0/1	1,10,20

Port	Vlans in spanning tree forwarding state and not pruned
Fa0/1	1,10

1. How is the output from Step 3, with pruning enabled, different from Step 2, with pruning disabled? Why?

1. If there are no devices connected to any port in VLAN 1, why is it not pruned?

Step 4

Unplug the workstation from VLAN 10 on ALSwitchA2. Then plug the workstation into port 9 or 10 on VLAN 20. There is now a workstation connected to VLAN 10 on ALSwitchA1, a workstation connected to VLAN 20 on ALSwitchA2. There are still no workstations connected to DLSwitchA. Issue the **show interfaces trunk** command on all switches and examine the output. It may take a minute or two for the switches to adjust to the change. Sample outputs are shown as follows:

```
DLSwitchA#show interfaces trunk
```

Port	Mode	Encapsulation	Status	Native vlan
Fa0/11	on	802.1q	trunking	1
Fa0/12	on	802.1q	trunking	1

Port	Vlans allowed on trunk
Fa0/11	1-4094
Fa0/12	1-4094

Port	Vlans allowed and active in management domain
Fa0/11	1,10,20
Fa0/12	1,10,20

Port	Vlans in spanning tree forwarding state and not pruned
Fa0/11	1,10
Fa0/12	1,20

```
ALSwitchA1#show interfaces trunk
```

Port	Mode	Encapsulation	Status	Native vlan
Fa0/1	on	802.1q	trunking	1

Port	Vlans allowed on trunk
Fa0/1	1-4094

Port	Vlans allowed and active in management domain
Fa0/1	1,10,20

```
Port      Vlans in spanning tree forwarding state and not pruned
Fa0/1     1,20
```

```
ALSwitchA2#show interfaces trunk
```

```
Port      Mode          Encapsulation  Status        Native vlan
Fa0/1     on            802.1q         trunking      1
```

```
Port      Vlans allowed on trunk
Fa0/1     1-4094
```

```
Port      Vlans allowed and active in management domain
Fa0/1     1,10,20
```

```
Port      Vlans in spanning tree forwarding state and not pruned
Fa0/1     1,10
```

Examine the pruning status, which is highlighted in the sample output, of the trunk ports in each switch. What is the result of pruning on each switch now with the changes that were made in Step 4?

DLSwitchA:

ALSwitchA1:

ALSwitchA2:

Step 5

Unplug the workstation from VLAN 20 on ALSwitchA2. Plug the workstation into a port in VLAN 10, using ports 5 through 8. There are now workstations in VLAN 10 on both ALSwitchA1 and ALSwitchA2.

Verify connectivity with a **ping** between the workstations.

Various commands can be executed to view trunking and pruning status and activity for informational and troubleshooting purposes. The commands used in the Module 2 labs are as follows:

```
show vtp status
show vtp counters
```

```
show interfaces switchport
show interfaces trunk
```

Issue the commands on any of the switches. Then observe, and examine the output. Another useful command is the `debug sw-vlan vtp pruning` command.

Execute the `debug sw-vlan vtp pruning` command on any of the switches and observe the output. After observing the output for a few minutes, use the `undebug all` command to turn off debugging.

Save the configurations for use in the next lab. If possible, retain the same switches and set up.

DEBUG SW-VLAN VTP PRUNING OUTPUT

```
DLSwitchA#debug sw-vlan vtp pruning
vtp pruning debugging is on
DLSwitchA#VTP PRUNING DEBUG: trunk Fa0/11 rx Join, len=166 (domain
CORP)
VTP PRUNING DEBUG: trunk Fa0/12 timeout
VTP PRUNING DEBUG: trunk Fa0/11 timeout
VTP PRUNING DEBUG: trunk Fa0/12 rx Join, len=166 (domain CORP)
VTP PRUNING DEBUG: trunk Fa0/11 rx Join, len=166 (domain CORP)
VTP PRUNING DEBUG: trunk Fa0/12 timeout
VTP PRUNING DEBUG: trunk Fa0/11 timeout
VTP PRUNING DEBUG: trunk Fa0/12 rx Join, len=166 (domain CORP)
VTP PRUNING DEBUG: trunk Fa0/11 rx Join, len=166 (domain CORP)
VTP PRUNING DEBUG: trunk Fa0/12 timeout
VTP PRUNING DEBUG: trunk Fa0/11 timeout
VTP PRUNING DEBUG: trunk Fa0/12 rx Join, len=166 (domain CORP)
VTP PRUNING DEBUG: trunk Fa0/11 rx Join, len=166 (domain CORP)
VTP PRUNING DEBUG: trunk Fa0/12 timeout
VTP PRUNING DEBUG: trunk Fa0/11 timeout
VTP PRUNING DEBUG: trunk Fa0/12 rx Join, len=166 (domain CORP)
VTP PRUNING DEBUG: trunk Fa0/11 rx Join, len=166 (domain CORP)
VTP PRUNING DEBUG: trunk Fa0/12 timeout
VTP PRUNING DEBUG: trunk Fa0/11 timeout
<Output omitted>
```

```
ALSwitchA1#debug sw-vlan vtp pruning
vtp pruning debugging is on
ALSwitchA1#VTP PRUNING DEBUG: trunk Fa0/1 rx Join, len=166 (domain
CORP)
VTP PRUNING DEBUG: trunk Fa0/1 timeout
VTP PRUNING DEBUG: trunk Fa0/1 rx Join, len=166 (domain CORP)
VTP PRUNING DEBUG: trunk Fa0/1 timeout
VTP PRUNING DEBUG: trunk Fa0/1 rx Join, len=166 (domain CORP)
VTP PRUNING DEBUG: trunk Fa0/1 timeout
VTP PRUNING DEBUG: trunk Fa0/1 rx Join, len=166 (domain CORP)
VTP PRUNING DEBUG: trunk Fa0/1 timeout
VTP PRUNING DEBUG: trunk Fa0/1 rx Join, len=166 (domain CORP)
VTP PRUNING DEBUG: trunk Fa0/1 timeout
VTP PRUNING DEBUG: trunk Fa0/1 rx summary from pruning-support
device (vl prunin
g)
VTP PRUNING DEBUG: trunk Fa0/1 rx Join, len=166 (domain CORP)
VTP PRUNING DEBUG: trunk Fa0/1 timeout
VTP PRUNING DEBUG: trunk Fa0/1 rx Join, len=166 (domain CORP)
VTP PRUNING DEBUG: trunk Fa0/1 timeout
<Output omitted>
```

[illegible]

```
DLSwitchA#show interfaces trunk
```

```
Port      Vlans allowed on trunk
Fa0/11    1-4094
Fa0/12    1-4094
```

```
Port      Vlans in spanning tree forwarding state and not pruned
Fa0/11    1,10
Fa0/12    1,10
```

Port	Mode	Encapsulation	Status	Native vlan
Fa0/1	on	802.1q	trunking	1

Port	Vlans in spanning tree forwarding state and not pruned
Fa0/1	1,10

ALSwitchA2#**show interfaces trunk**

Port	Mode	Encapsulation	Status	Native vlan
Fa0/1	on	802.1q	trunking	1

Port	Vlans allowed on trunk
Fa0/1	1-4094

Port	Vlans allowed and active in management domain
Fa0/1	1,10,20

Port	Vlans in spanning tree forwarding state and not pruned
Fa0/1	1,10