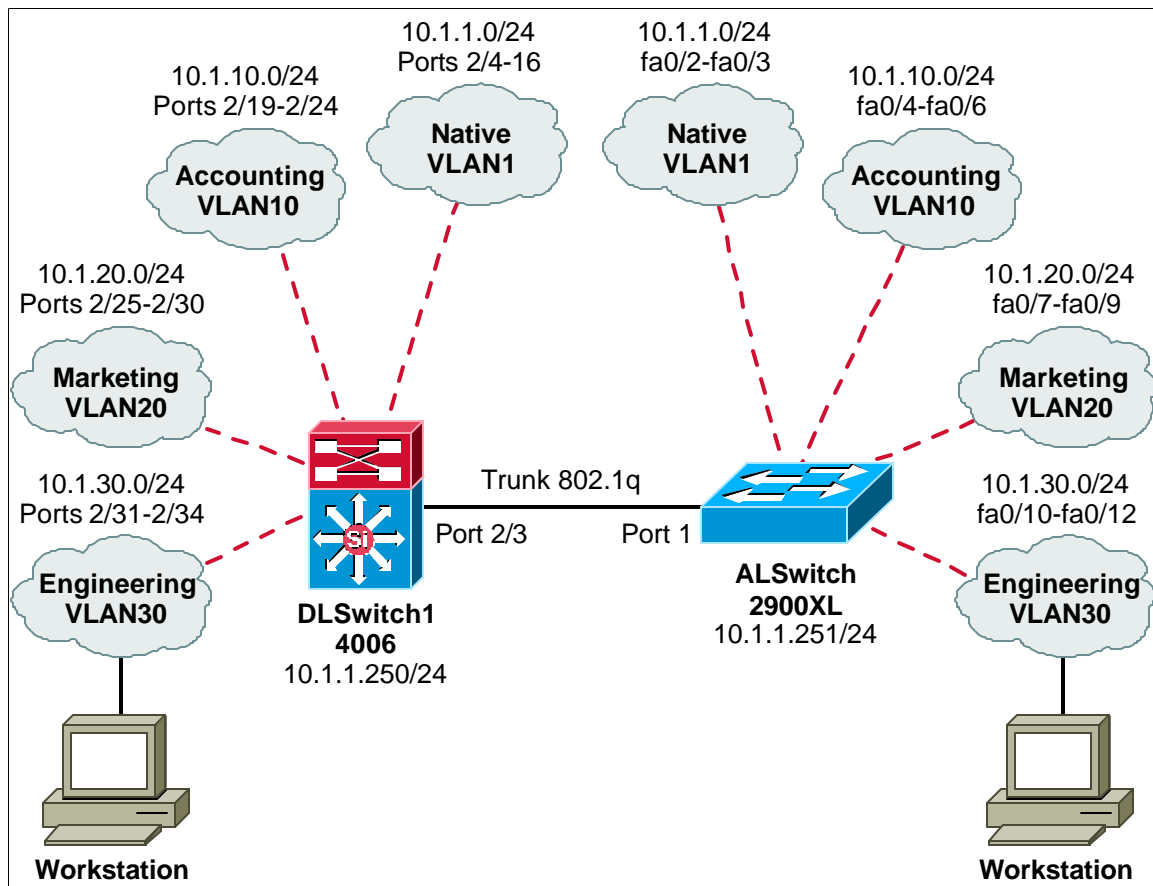


Lab 4.8.2: VTP Pruning



Objective:

Configure VTP pruning between a Catalyst 4000 switch and Catalyst 2900 switch.

Scenario:

You have configured a VTP trunk line between your distribution layer switch and your access layer switch, but you have no workstations in VLANs 10 and 20 connected to your access layer switch. There is no reason for broadcast traffic for VLANs 10 and 20 to travel over our trunk link and down to the access layer any more because there are no devices down there.

VTP pruning allows VTP to intelligently determine that there are no devices in a particular VLAN at the other end of a trunk link. It will then temporarily prune that VLAN from the trunk. Should a device join that VLAN in the future, the VLAN will be placed back on the trunk line.

Design:

Switched Network VTP Configuration Information:

Switch	VTP Domain	VTP Mode
DLSwitch1	Corp	Server
ALSwitch	Corp	Client

Switch VLAN Port Assignments:

Switch	VLAN 1 Default	VLAN 10 Accounting	VLAN 20 Marketing	VLAN 30 Engineering
DLSwitch1		19-24	25-30	31-34
ALSwitch		4-6	7-9	10-12

Lab Tasks:

If you are continuing on from the VTP trunk and domain lab, you can skip to step 10.

1. First, configure your 4000 switch to the diagram above. You can skip this step if you already have the Lab 3.1.3 (4000 initial setup) configured.

```
Console> enable
Console> (enable) set system name DLSwitch1
System name set.
DLSwitch1> (enable)

DLSwitch1> (enable) set password
Enter old password: (Because you do not currently have a password, just hit enter)
Enter new password:
Retype new password:
Password changed.

DLSwitch1> (enable) set enablepass
Enter old password: (Because you do not currently have a password, just hit enter)
Enter new password:
Retype new password:
Password changed.

DLSwitch1> (enable) set interface sc0 10.1.1.250 255.255.255.0
DLSwitch1> (enable) set interface sc0 1
```

2. Next, configure your 2900 switch to the diagram above. You can also use the same config that you used in Lab 3.2.3 - Catalyst 2900 Initial Setup and skip this step.

```
Switch>enable
Switch#

Set the switch name.

Switch#config terminal
Switch(config)#host ALSwitch
ALSwitch(config)#

ALSwitch(config)#enable password class
ALSwitch(config)#line con 0
ALSwitch(config-line)#password cisco
ALSwitch(config-line)#login
ALSwitch(config-line)#line vty 0 15
```

```
ALSwitch(config-line)#password cisco
ALSwitch(config-line)#login

ALSwitch(config)#interface vlan 1
ALSwitch(config-if)#ip address 10.1.1.251 255.255.255.0
```

3. We need to configure VTP (VLAN Trunking Protocol) on both switches. VTP is the protocol that will communicate information about which VLANs exist from one switch to another. If VTP did not provide this information, we would have to create the VLANs on all switches individually.

By default, the Catalyst 4000 is configured as a VTP server.

The switch defaults to a VTP server, so we do not have to turn VTP server on. In the event that this was shut off, we would use the command:

```
DLSwitch1> (enable) set vtp mode server
```

We want the 4000 to act as a VTP server to provide our VLAN information to our other switches.

Once the 4000 is setup as a VTP server, we need to specify the VTP domain name:

```
DLSwitch1> (enable) set vtp domain corp
```

This command sets the VTP server domain name to "corp". This name must match all other switches that are in this VTP domain.

The Catalyst 2900XL will be configured as the VTP client. We want the 2900XL to learn the VLANs from the 4000s VTP server.

This is done through the vtp database command on the 2900XL. This command puts you into a new type of IOS configuration mode. Note that this mode is entered from the privileged mode exec prompt, and not from the typical global configuration mode.

```
ALSwitch#vlan database
ALSwitch(vlan)#vtp client
ALSwitch(vlan)#vtp domain corp
ALSwitch(vlan)#exit
ALSwitch#
```

This sets the 2900XL in client VTP mode and sets the VTP domain name to "corp".

Once the VTP protocol is configured, you will be able to configure VLANs.

4. Next we will assign our ports on our 4000 to their appropriate VLANs and set their names.

```
DLSwitch1> (enable) set vlan 10 2/19-24
DLSwitch1> (enable) set vlan 20 2/25-30
DLSwitch1> (enable) set vlan 30 2/31-34
DLSwitch1> (enable) set vlan 10 name Accounting
DLSwitch1> (enable) set vlan 20 name Marketing
DLSwitch1> (enable) set vlan 30 name Engineering
```

We do not need to configure the other ports as VLAN 1 because that is the default VLAN to which ports are assigned.

Use the **show vlan** command to verify that your ports are assigned to the correct VLAN.

```
DLSwitch1> (enable) sh vlan
```

VLAN	Name	Status	IfIndex	Mod/Ports, Vlans
1	default	active	6	1/1-2 2/1-18
10	Accounting	active	45	2/19-24
20	Marketing	active	46	2/25-30
30	Engineering	active	47	2/31-34
1002	fddi-default	active	7	
1003	token-ring-default	active	10	
1004	fddinet-default	active	8	
1005	trnet-default	active	9	

Our 2900XL is in client VTP mode; all of this VLAN information should get passed on to the 2900XL from the 4000.

- Now let's cable up our trunk line. We need to connect Port 1 (fa0/1) on our ALSwitch (2900XL) to port 2/3 (1st 10/100 Ethernet port) on our DLSwitch1 (4000).

Use the appropriate cable to connect these two switches together.

- Configure the end of each trunk link as a 802.1q encapsulated trunk line.

On the Catalyst 4000:

```
DLSwitch1> (enable) set trunk 2/3 nonegotiate dot1q 1-1005
```

This command sets port 2/3 to a dot1q trunk line that supports VLANs 1-1005. The nonegotiate tells the switch that it should not try to auto-sense what type of trunk link this is.

On the Catalyst 2900XL:

```
ALSwitch#config term
ALSwitch(config)#int fa0/1
ALSwitch(config)#switchport mode trunk
ALSwitch(config)#switchport trunk encapsulation dot1q
```

The first interface command tells the switch that this switch port is a trunk link. The second command tells the switch that this is 802.1q trunk line.

- Now that we have our VLAN trunk link configured, we need to check to see if our VTP client (the 2900XL) has picked up our defined VLANs.

You may need to give the two switches a few moments for them to exchange VLAN information.

Use the **show vlan** command on the 2900XL to see if it has learned the new VLANs from the 4000.

ALSwitch#**sh vlan**

VLAN	Name	Status	Ports
1	default	active	Fa0/2, Fa0/3, Fa0/4, Fa0/5, Fa0/6, Fa0/7, Fa0/8, Fa0/9, Fa0/10, Fa0/11, Fa0/12
10	Accounting	active	
20	Marketing	active	
30	Engineering	active	
1002	fddi-default	active	
1003	token-ring-default	active	
1004	fddinet-default	active	
1005	trnet-default	active	

VLAN	Type	SAID	MTU	Parent	RingNo	BridgeNo	Stp	BrdgMode	Trans1	Trans2
1	enet	100001	1500	-	-	-	-	-	0	0
10	enet	100010	1500	-	-	-	-	-	0	0
20	enet	100020	1500	-	-	-	-	-	0	0
30	enet	100030	1500	-	-	-	-	-	0	0
1002	fddi	101002	1500	-	0	-	-	-	0	0
1003	tr	101003	1500	-	0	-	-	srb	0	0
1004	fdnet	101004	1500	-	-	-	ieee	-	0	0
1005	trnet	101005	1500	-	-	-	ibm	-	0	0

You should now see the three VLANs that were created on the 4000 show up on the 2900XL.

Even though the VLANs are now configured on the 2900XL, we have not assigned any ports to those VLANs.

8. Assign ports on the 2900XL to their appropriate VLANs:

```
ALSwitch(config)#interface fa0/4  
ALSwitch(config-if)#switchport access vlan 10
```

```
ALSwitch(config)#interface fa0/5  
ALSwitch(config-if)#switchport access vlan 10
```

```
ALSwitch(config)#interface fa0/6  
ALSwitch(config-if)#switchport access vlan 10
```

```
ALSwitch(config)#interface fa0/7  
ALSwitch(config-if)#switchport access vlan 20
```

```
ALSwitch(config)#interface fa0/8  
ALSwitch(config-if)#switchport access vlan 20
```

```
ALSwitch(config)#interface fa0/9  
ALSwitch(config-if)#switchport access vlan 20
```

```
ALSwitch(config)#interface fa0/10  
ALSwitch(config-if)#switchport access vlan 30
```

```
ALSwitch(config)#interface fa0/11  
ALSwitch(config-if)#switchport access vlan 30
```

```
ALSwitch(config)#interface fa0/12  
ALSwitch(config-if)#switchport access vlan 30
```

9. From the ALSwitch, attempt to ping the DLSwitch1. You should be successful.

```
ALSwitch#ping 10.1.1.250
```

```
Type escape sequence to abort.  
Sending 5, 100-byte ICMP Echos to 10.1.1.250, timeout is 2 seconds:  
!!!!  
Success rate is 100 percent (5/5), round-trip min/avg/max = 6/13/36  
ms
```

10. Make sure that there are no devices plugged into the non-trunk ports on ALSwitch.

Examine the output from the **show trunk** command on DLSwitch1:

```
DLSwitch1> (enable) sh trunk  
* - indicates vtp domain mismatch  
Port      Mode      Encapsulation  Status      Native vlan  
-----  
2/3       nonegotiate  dot1q          trunking    1  
  
Port      Vlans allowed on trunk  
-----  
2/3       1-1005  
  
Port      Vlans allowed and active in management domain  
-----  
2/3       1,10,20,30  
  
Port      Vlans in spanning tree forwarding state and not pruned  
-----  
2/3       1,10,20,30
```

Notice that all defined VLANs 10, 20, and 30 are in spanning tree forwarding state and not pruned. But we have no devices on ALSwitch. It would be a shame to forward broadcast traffic for VLANs 10, 20 and 30 if there is nobody over there to hear it.

11. Configure VTP pruning.

VTP pruning solves this problem. Pruning checks the other end of a trunk link to see if there are any members in a VLAN. If there are not, then it “prunes” them from the spanning tree forwarding state. This temporarily keeps traffic from coming down that trunk line.

On DLSwitch1:

```
DLSwitch1> (enable) set vtp pruning enable  
This command will enable the pruning function in the entire  
management domain. All devices in the management domain should be  
pruning-capable before enabling.  
Do you want to continue (y/n) [n]? y
```

On ALSwitch:

```
ALSwitch#vlan database  
ALSwitch(vlan)#vtp pruning  
ALSwitch(vlan)#exit
```

That is all there is to it. This enables VTP pruning of the spanning-tree state table.

12. Verify that you are pruning:

```
DLSwitch1> (enable) sh trunk
* - indicates vtp domain mismatch
Port      Mode      Encapsulation  Status      Native vlan
-----
  2/3      nonegotiate  dot1q          trunking    1

Port      Vlans allowed on trunk
-----
  2/3      1-1005

Port      Vlans allowed and active in management domain
-----
  2/3      1,10,20,30

Port      Vlans in spanning tree forwarding state and not pruned
-----
  2/3      1
```

Notice that now, only VLAN 1 is in a forwarding state.

Why is VLAN 1 there?

Why are all of the other VLANs not there?

Plug a workstation into a VLAN 30 port on ALSwitch.

Check your show trunk command again. What changed?

Move your workstation to a port in either VLAN 10 or 20.

Does the spanning tree forwarding state update?

How long does it take?
