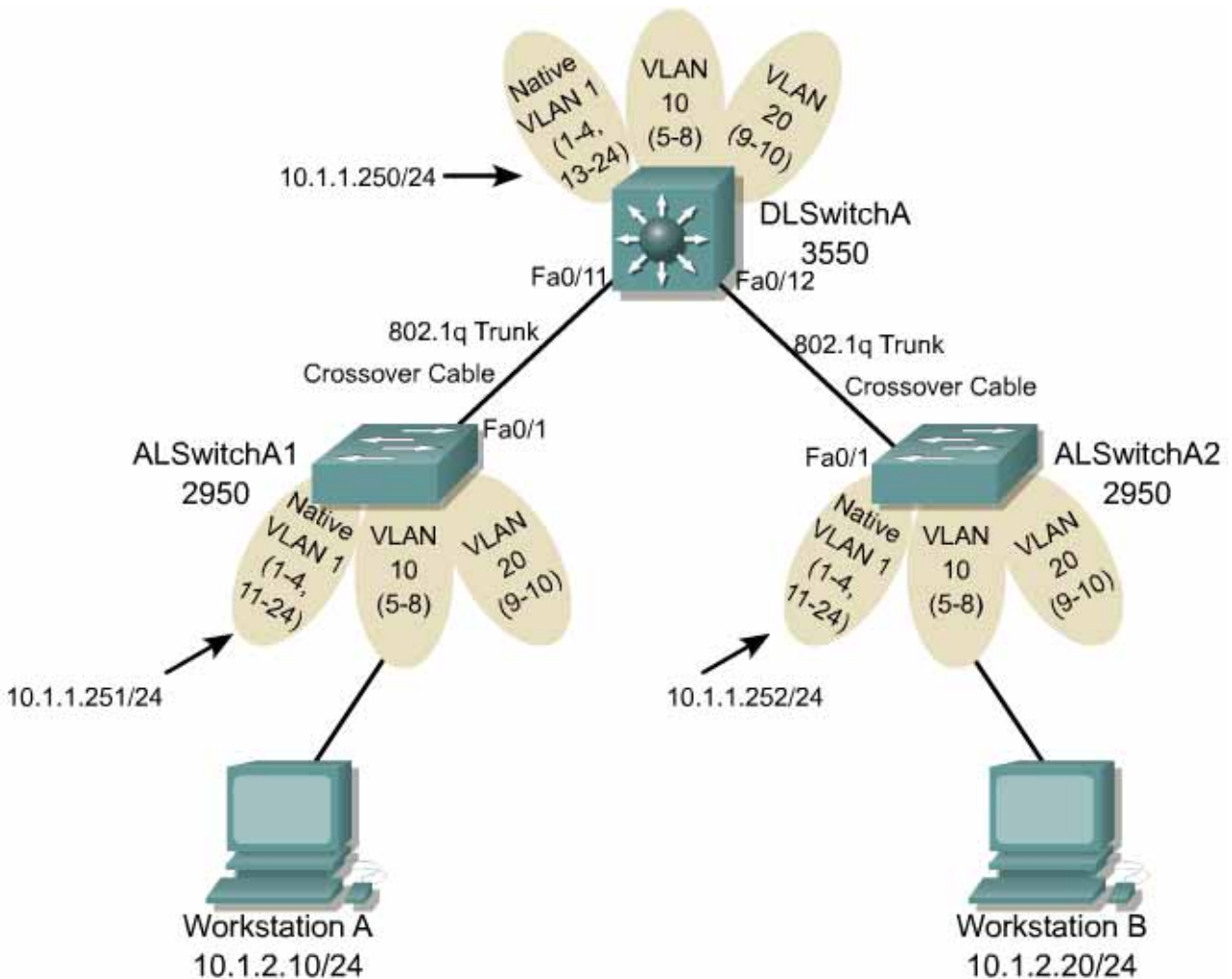


Lab 2.3.7.1 Catalyst 2950T and 3550 Series VTP Domain and VLAN Trunking



Objective

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

Scenario

VLANs must logically segment a network by function, team, or application regardless of the physical location of the users. All end stations in a particular IP subnet are often associated with a specific VLAN. Trunking or connecting switches and the VLAN Trunking Protocol (VTP) are used to segment the network. The VTP maintains configuration consistency by managing the addition, deletion, and renaming of VLANs on the entire network from a single central switch. VTP minimizes configuration inconsistencies that can cause problems such as duplicate VLAN names, incorrect VLAN-type specifications, and security violations.

The basic procedures for creating and maintaining trunks and VTP domains on the 2950T and 3550 switches are similar and specific differences will be addressed if necessary.

Step 1

Disconnect all cables to the switch, erase the startup configuration, erase the VLAN database, and reload the switch if necessary.

Cable the network devices according to the diagram.

Use the information and procedures from the previous labs to do the following:

1. Name the switches DLSwitchA, ALSwitchA1, and ALSwitchA2 respectively.
2. Configure cisco as the secret, console, and vty password on all of the switches.
3. Assign the appropriate IP address to the Management VLAN 1 of each switch. Do not forget to enable the interface with the **no shutdown** command.

```
Switch#config terminal
Switch(config)#hostname DLSwitchA
DLSwitchA(config)#enable secret cisco
DLSwitchA(config)#line con 0
DLSwitchA(config-line)#password cisco
DLSwitchA(config-line)#login
DLSwitchA(config-line)#line vty 0 15
DLSwitchA(config-line)#password cisco
DLSwitchA(config-line)#login
DLSwitchA(config-line)#interface vlan 1
DLSwitchA(config-if)#ip address 10.1.1.250 255.255.255.0
DLSwitchA(config-if)#no shutdown
DLSwitchA(config-if)#^Z
```

```
Switch#config terminal
Switch(config)#hostname ALSwitchA1
ALSwitchA1(config)#enable secret cisco
ALSwitchA1(config)#line con 0
ALSwitchA1(config-line)#password cisco
ALSwitchA1(config-line)#login
ALSwitchA1(config-line)#line vty 0 15
ALSwitchA1(config-line)#password cisco
ALSwitchA1(config-line)#login
ALSwitchA1(config-line)#interface vlan 1
ALSwitchA1(config-if)#ip address 10.1.1.251 255.255.255.0
ALSwitchA1(config-if)#no shutdown
ALSwitchA1(config-if)#^Z
```

```
Switch#config terminal
Switch(config)#hostname ALSwitchA2
ALSwitchA2(config)#enable secret cisco
ALSwitchA2(config)#line con 0
ALSwitchA2(config-line)#password cisco
ALSwitchA2(config-line)#login
ALSwitchA2(config-line)#line vty 0 15
ALSwitchA2(config-line)#password cisco
ALSwitchA2(config-line)#login
ALSwitchA2(config-line)#interface vlan 1
ALSwitchA2(config-if)#ip address 10.1.1.252 255.255.255.0
ALSwitchA2(config-if)#no shutdown
ALSwitchA2(config-if)#^Z
```

Step 2

Recall that a VTP domain, which is also called a VLAN management domain, consists of one or more trunked or interconnected switches that are under the administrative responsibility of a central switch. A switch can only be in one VTP domain with the same domain name. The command-line interface (CLI), Cluster Management Suite (CMS) software, or Simple Network Management Protocol (SNMP) can be used to make global VLAN configuration changes for a domain.

The default VTP mode for the 2950T and 3550 switches is the VTP Server mode. However, VLAN information is not propagated until a domain name is specified and learned through trunked ports. The following table describes the three VTP modes.

| VTP Mode | Description |
|-----------------|---|
| VTP Server | This has a default VTP mode. VLANs can be created, modified, and deleted. Other configuration parameters may be specified for all switches in the VTP domain. VTP servers advertise VLAN configurations to other switches in the same VTP domain and synchronize VLAN configurations with other switches based on advertisements received over trunk links. In the VTP Server mode, VLAN configurations are saved in NVRAM. |
| VTP Client | This behaves like a VTP server without the ability to create, change, or delete VLANs. In the VTP Client mode, VLAN configurations are not saved in NVRAM. |
| VTP Transparent | Switches in the VTP Transparent mode do not participate in VTP. The switch does not advertise its VLAN configuration and does not synchronize its VLAN configuration based on received advertisements. However, in VTP version two, transparent switches do forward VTP advertisements they receive from other switches from their trunk interfaces. Therefore, local VLANs may be created, modified, and deleted on a switch in the VTP Transparent mode. In the VTP Transparent mode, VLAN configurations are saved in NVRAM, but they are not advertised to other switches. |

Issue a **show vtp status** command on any of the switches. The output should be similar to the following sample for DLSwitchA.

```
DLSwitchA#show vtp status
VTP Version                : 2
Configuration Revision      : 0
Maximum VLANs supported locally : 1005
Number of existing VLANs    : 5
VTP Operating Mode          : Server
VTP Domain Name             :
VTP Pruning Mode            : Disabled
VTP V2 Mode                 : Disabled
VTP Traps Generation        : Disabled
MD5 digest                  : 0xBF 0x86 0x94 0x45 0xFC 0xDF 0xB5 0x70
Configuration last modified by 0.0.0.0 at 0-0-00 00:00:00
Local updater ID is 10.1.1.250 on interface Vl1 (lowest numbered VLAN
interface found)
```

Since no VLAN configurations were made, all settings will be the defaults. Notice the VTP mode is **Server**. The number of existing VLANs is the five built-in VLANs. The 3550 switch will support 1005

maximum VLANs locally. The 2950T switch will support 250. The Configuration Revision is zero and the VTP version is two. All switches must run the same VTP version.

The importance of the Configuration Revision number is that the switch in the VTP Server mode with the highest revision number will propagate VLAN information over trunked ports. Every time VLAN information is modified and saved in the VLAN database or `vlan.dat`, the revision number is increased by one when the user exits from the VLAN configuration mode.

Multiple switches in the VTP domain can be in the VTP Server mode. These switches can be used to manage all other switches in the VTP domain. This is suitable for small-scale networks where the VLAN information is small and easily stored in all switches. In a large network, the administrator must determine which switches will make the best VTP servers. The network administrator should set aside some of the more powerful switches and keep them as VTP servers. The other switches in the VTP domain can be configured as clients. The number of VTP servers should be consistent based on the amount of redundancy desired in the network.

| | |
|-------------|---|
| Note | To remove or delete all local VLAN configurations and to reset the revision number to zero, the VLAN database or <code>vlan.dat</code> needs to be deleted. The steps for deleting the VLAN database were covered in the previous lab. Shut down the interfaces or disconnect all cables. From the privileged mode prompt, run the <code>delete flash:vlan.dat</code> command and reload the switch to replace the running configuration. |
|-------------|---|

Step 3

Change the VTP domain name in DLSwitchA to CORP.

Issue a `show vtp status` command to verify that the VTP domain name is CORP, the VTP mode is Server, and the Configuration Revision is zero as shown in the following sample output. Since only the VTP operating mode and domain name were entered, the Configuration Revision is not affected and is still zero.

```
DLSwitchA#show vtp status
VTP Version                : 2
Configuration Revision      : 0
Maximum VLANs supported locally : 1005
Number of existing VLANs    : 5
VTP Operating Mode         : Server
VTP Domain Name            : CORP
VTP Pruning Mode           : Disabled
VTP V2 Mode                : Disabled
VTP Traps Generation       : Disabled
MD5 digest                 : 0xD3 0x8B 0x04 0xD2 0x2C 0x7B 0x29 0x05
Configuration last modified by 0.0.0.0 at 0-0-00 00:00:00
Local updater ID is 10.1.1.250 on interface Vl1 (lowest numbered VLAN
interface found)
```

VLAN information is not propagated until a VTP Domain Name is specified and learned through trunked ports. The default settings for interfaces on the 2950T-24-EI and 3550-24-EMI switches are to automatically trunk when cabled appropriately. Therefore, VTP automatically propagates the CORP VTP Domain Name to both ALSwitchA1 and ALSwitchA2.

Issue a `show vtp status` command on ALSwitchA1 and ALSwitchA2 to verify that the VTP Domain Name is **CORP**, the VTP mode is **Server**, and the Configuration Revision is zero as shown in the following ALSwitchA1 sample output.

```
ALSwitchA1#show vtp status
VTP Version                : 2
Configuration Revision      : 0
Maximum VLANs supported locally : 250
Number of existing VLANs    : 5
```

```

VTP Operating Mode           : Server
VTP Domain Name             : CORP
VTP Pruning Mode            : Disabled
VTP V2 Mode                 : Disabled
VTP Traps Generation        : Disabled
MD5 digest                  : 0xD3 0x8B 0x04 0xD2 0x2C 0x7B 0x29 0x05
Configuration last modified by 0.0.0.0 at 0-0-00 00:00:00
Local updater ID is 10.1.1.251 on interface Vl1 (lowest numbered VLAN
interface found)

```

Issue a **show interfaces FastEthernet 0/2 switchport** command on DLSwitchA and on ALSwitchA1 or ALSwitchA2 to view the default interface settings. The trunking-related items are highlighted.

```

DLSwitchA#show interfaces FastEthernet 0/2 switchport
Name: Fa0/2
Switchport: Enabled
Administrative Mode: dynamic desirable
Operational Mode: down
Administrative Trunking Encapsulation: negotiate
Negotiation of Trunking: On
Access Mode VLAN: 1 (default)
Trunking Native Mode VLAN: 1 (default)
Administrative private-vlan host-association: none
Administrative private-vlan mapping: none
Operational private-vlan: none
Trunking VLANs Enabled: ALL
Pruning VLANs Enabled: 2-1001

Protected: false
Unknown unicast blocked: disabled
Unknown multicast blocked: disabled

Voice VLAN: none (Inactive)
Appliance trust: none

```

```

ALSwitchA1#show interfaces FastEthernet 0/2 switchport
Name: Fa0/2
Switchport: Enabled
Administrative Mode: dynamic desirable
Operational Mode: down
Administrative Trunking Encapsulation: dot1q
Negotiation of Trunking: On
Access Mode VLAN: 1 (default)
Trunking Native Mode VLAN: 1 (default)
Administrative private-vlan host-association: none
Administrative private-vlan mapping: none
Operational private-vlan: none
Trunking VLANs Enabled: ALL
Pruning VLANs Enabled: 2-1001

Protected: false

Voice VLAN: none (Inactive)
Appliance trust: none

```

Issue a **show vlan** command on DLSwitchA and on ALSwitchA1 or ALSwitchA2. All ports except for those used as trunk ports will be assigned to VLAN 1 as shown in the following sample output.

```
DLSwitchA#show vlan
```

| VLAN | Name | Status | Ports |
|------|---------|--------|----------------------------|
| 1 | default | active | Fa0/1, Fa0/2, Fa0/3, Fa0/4 |

```

Fa0/5, Fa0/6, Fa0/7, Fa0/8
Fa0/9, Fa0/10, Fa0/13, Fa0/14
Fa0/15, Fa0/16, Fa0/17, Fa0/18
Fa0/19, Fa0/20, Fa0/21, Fa0/22
Fa0/23, Fa0/24, Gi0/1, Gi0/2
1002 fddi-default          active
1003 token-ring-default    active
1004 fddinet-default       active
1005 trnet-default         active

```

<Output omitted>

Notice that interfaces FastEthernet 0/11 and 0/12 are not in VLAN 1.

```
ALSwitchA1#show 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, Fa0/13 Fa0/14, Fa0/15, Fa0/16, Fa0/17 Fa0/18, Fa0/19, Fa0/20, Fa0/21 Fa0/22, Fa0/23, Fa0/24, Gi0/1 Gi0/2 |
| 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 |
| 1002 | fddi | 101002 | 1500 | - | - | - | - | - | 0 | 0 |
| 1003 | tr | 101003 | 1500 | - | - | - | - | srb | 0 | 0 |
| 1004 | fdnet | 101004 | 1500 | - | - | - | ieee | - | 0 | 0 |
| 1005 | trnet | 101005 | 1500 | - | - | - | ibm | - | 0 | 0 |

<Output omitted>

Notice that interface FastEthernet 0/1 is not in VLAN 1.

Issue a **show interface FastEthernet 0/11 switchport** command on DLSwitchA and a **show interface FastEthernet 0/1 switchport** command on ALSwitchA1 or ALSwitchA2. Note the status of the highlighted items of the trunked interfaces.

```

DLSwitchA#show interfaces FastEthernet 0/11 switchport
Name: Fa0/11
Switchport: Enabled
Administrative Mode: dynamic desirable
Operational Mode: trunk
Administrative Trunking Encapsulation: negotiate
Operational Trunking Encapsulation: dot1q
Negotiation of Trunking: On
Access Mode VLAN: 1 (default)
Trunking Native Mode VLAN: 1 (default)
Administrative private-vlan host-association: none
Administrative private-vlan mapping: none
Operational private-vlan: none
Trunking VLANs Enabled: ALL

```

```

Pruning VLANs Enabled: 2-1001

Protected: false
Unknown unicast blocked: disabled
Unknown multicast blocked: disabled

Voice VLAN: none (Inactive)
Appliance trust: none

ALSwitchA1#show interfaces FastEthernet 0/1 switchport
Name: Fa0/1
Switchport: Enabled
Administrative Mode: dynamic desirable
Operational Mode: trunk
Administrative Trunking Encapsulation: dot1q
Operational Trunking Encapsulation: dot1q
Negotiation of Trunking: On
Access Mode VLAN: 1 (default)
Trunking Native Mode VLAN: 1 (default)
Administrative private-vlan host-association: none
Administrative private-vlan mapping: none
Operational private-vlan: none
Trunking VLANs Enabled: ALL
Pruning VLANs Enabled: 2-1001

Protected: false

Voice VLAN: none (Inactive)
Appliance trust: none

```

Another way to determine if any ports are in the trunk mode is to issue the **show interface trunk** command. The following sample outputs are for DLSwitchA and ALSwitchA1.

```
DLSwitchA#show interfaces trunk
```

| Port | Mode | Encapsulation | Status | Native vlan |
|--------|-----------|---------------|----------|-------------|
| Fa0/11 | desirable | n-802.1q | trunking | 1 |
| Fa0/12 | desirable | n-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 |
| Fa0/12 | 1 |

| Port | Vlans in spanning tree forwarding state and not pruned |
|--------|--|
| Fa0/11 | 1 |
| Fa0/12 | 1 |

```
ALSwitchA1#show interfaces trunk
```

| Port | Mode | Encapsulation | Status | Native vlan |
|-------|-----------|---------------|----------|-------------|
| Fa0/1 | desirable | 802.1q | trunking | 1 |

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

| Port | Vlans allowed and active in management domain |
|-------|---|
| Fa0/1 | 1 |

| Port | Vlans in spanning tree forwarding state and not pruned |
|-------|--|
| Fa0/1 | 1 |

The respective ports have been automatically trunked and verified by the **show vlan**, **show interfaces FastEthernet 0/# switchport**, and **show interfaces trunk** commands. However, if a **show running-config** command is issued now, it will not show that the status of the respective ports is trunk. The following sample outputs are for DLSwitchA and ALSwitchA1.

```
DLSwitchA#show running-config
Building configuration...

Current configuration : 1595 bytes
!
<Output omitted>

!
interface FastEthernet0/11
no ip address
!
interface FastEthernet0/12
no ip address
!
<Output omitted>

ALSwitchA1#show running-config
Building configuration...

Current configuration : 1594 bytes
!
<Output omitted>

!
interface FastEthernet0/1
no ip address
!
<Output omitted>
```

The trunk status of the respective trunk ports will appear in the output of the **show running-config** command after the ports have been manually configured as trunk ports.

Step 4

Remember that more than one switch can exist in the VTP Server mode. However, for this lab DLSwitchA will manage all switches in the VTP domain so its VTP mode will be left in the default server mode. The VTP mode of ALSwitchA1 and ALSwitchA2 should be changed to the VTP Client mode.

Exiting....

The VTP Domain Name CORP does not need to be entered since it is already propagated from DLSwitchA.

Issue a **show vtp status** command on ALSwitchA1 and ALSwitchA2 to verify that the VTP mode is client. The Configuration Revision is still zero on the three switches since only the VTP operating mode was entered.

```
ALSwitchA1#show vtp status
VTP Version                : 2
Configuration Revision      : 0
Maximum VLANs supported locally : 250
Number of existing VLANs    : 5
VTP Operating Mode          : Client
```



```

VTP Domain Name           : CORP
VTP Pruning Mode          : Disabled
VTP V2 Mode               : Disabled
VTP Traps Generation      : Disabled
MD5 digest                : 0xD3 0x8B 0x04 0xD2 0x2C 0x7B 0x29 0x05
Configuration last modified by 0.0.0.0 at 0-0-00 00:00:00

```

```

ALSwitchA2#show vtp status
VTP Version                : 2
Configuration Revision     : 0
Maximum VLANs supported locally : 250
Number of existing VLANs   : 5
VTP Operating Mode        : Client
VTP Domain Name           : CORP
VTP Pruning Mode          : Disabled
VTP V2 Mode               : Disabled
VTP Traps Generation      : Disabled
MD5 digest                : 0xD3 0x8B 0x04 0xD2 0x2C 0x7B 0x29 0x05
Configuration last modified by 0.0.0.0 at 0-0-00 00:00:00

```

Step 5

VLAN 10 and VLAN 20 need to be created and named Accounting and Marketing. Ports should be statically assigned to the respective VLANs. The VLAN configurations are only necessary on DLSwitchA since it will manage the VTP domain and it is in the VTP Server mode.

Issue a **show vtp status** command on one the switches. The Configuration Revision number will now be increased from zero to one as shown in the following sample output for DLSwitchA.

```

DLSwitchA#show vtp status
VTP Version                : 2
Configuration Revision     : 1
Maximum VLANs supported locally : 1005
Number of existing VLANs   : 7
VTP Operating Mode        : Server
VTP Domain Name           : CORP
VTP Pruning Mode          : Disabled
VTP V2 Mode               : Disabled
VTP Traps Generation      : Disabled
MD5 digest                : 0x13 0x72 0x7B 0x59 0x34 0xE0 0x8B 0x45
Configuration last modified by 10.1.1.250 at 3-1-93 00:28:52
Local updater ID is 10.1.1.250 on interface Vl1 (lowest numbered VLAN
Interface found)

```

Assign ports to the respective VLANs on DLSwitchA. Switch ports Fa0/5 – 0/8 should be assigned to VLAN 10. Switchports Fa0/9 – 0/10 should be assigned to VLAN 20.

There is no need to assign the other ports to VLAN 1 since that is the default VLAN to which the ports are assigned.

Issue the **show vlan** command on DLSwitchA to verify the configurations. The following sample output will be shown.

```

DLSwitchA#show vlan

```

| VLAN | Name | Status | Ports |
|------|------------|--------|--|
| 1 | default | active | Fa0/1, Fa0/2, Fa0/3, Fa0/4 Fa0/13, Fa0/14, Fa0/15, Fa0/16 Fa0/17, Fa0/18, Fa0/19, Fa0/20 Fa0/21, Fa0/22, Fa0/23, Fa0/24 Gi0/1, Gi0/2 |
| 10 | Accounting | active | Fa0/5, Fa0/6, Fa0/7, Fa0/8 |
| 20 | Marketing | active | Fa0/9, Fa0/10 |

```

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 |
| 1002 | fddi | 101002 | 1500 | - | - | - | - | - | 0 | 0 |
| 1003 | tr | 101003 | 1500 | - | - | - | - | srp | 0 | 0 |
| 1004 | fdnet | 101004 | 1500 | - | - | - | - | ieee | 0 | 0 |

| VLAN | Type | SAID | MTU | Parent | RingNo | BridgeNo | Stp | BrdgMode | Trans1 | Trans2 |
|------|-------|--------|------|--------|--------|----------|-----|----------|--------|--------|
| 1005 | trnet | 101005 | 1500 | - | - | - | - | ibm | 0 | 0 |

Remote SPAN VLANs

| Primary | Secondary | Type | Ports |
|---------|-----------|------|-------|
| | | | |

On ALSwitchA1, verify that the VTP version number is also set to 1.

```

ALSwitch1# show vtp status
VTP Version                : 2
Configuration Revision      : 1
Maximum VLANs supported locally : 250
Number of existing VLANs    : 7
VTP Operating Mode          : Client
VTP Domain Name             : CORP
VTP Pruning Mode            : Disabled
VTP V2 Mode                 : Disabled
VTP Traps Generation        : Disabled
MD5 digest                  : 0xC2 0xB3 0xFE 0xD1 0xDE 0x28 0x73 0x10
Configuration last modified by 10.1.1.250 at 3-1-93 00:37:15
ALSwitch1#

```

Issue a **show vlan** command on ALSwitchA1 or ALSwitchA2. VLAN 10 Accounting and VLAN 20 Marketing should be listed to indicate that VTP has propagated the information from DLSwitchA. The following sample output is for ALSwitchA1.

ALSwitchA1#show 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, Fa0/13 Fa0/14, Fa0/15, Fa0/16, Fa0/17 Fa0/18, Fa0/19, Fa0/20, Fa0/21 Fa0/22, Fa0/23, Fa0/24, Gi0/1 Gi0/2 |
| 10 | Accounting | active | |
| 20 | Marketing | 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 |
| 1002 | fddi | 101002 | 1500 | - | - | - | - | - | 0 | 0 |

| VLAN | Type | SAID | MTU | Parent | RingNo | BridgeNo | Stp | BrdgMode | Trans1 | Trans2 |
|------|-------|--------|------|--------|--------|----------|------|----------|--------|--------|
| 1003 | tr | 101003 | 1500 | - | - | - | - | srp | 0 | 0 |
| 1004 | fdnet | 101004 | 1500 | - | - | - | ieee | - | 0 | 0 |
| 1005 | trnet | 101005 | 1500 | - | - | - | ibm | - | 0 | 0 |

| Remote SPAN VLANs | | | | | | | | | | |
|-------------------|--|--|--|--|--|--|--|--|--|--|
| | | | | | | | | | | |

| Primary | Secondary | Type | Ports |
|---------|-----------|------|-------|
| | | | |

Since no VLANs were created locally on the ALSwitchA1 and ALSwitchA2, why do VLANs 10 and 20 appear in the preceding output?

Step 6

Use the following manual configurations to enable VTP so that VLAN configurations can be managed and propagated from DLSwitchA if the ports did not automatically trunk:

- Enter the Ethernet trunk encapsulation type.
- Configure the FastEthernet 0/11 and FastEthernet 0/12 interfaces as trunk ports.
- Specify the native VLAN.

By default, interfaces on the 2950T-24-EI and 3550-24-EMI switches should automatically trunk when cabled and propagate VLAN information after a domain name is entered in a VTP server switch.

The 3550 switch supports three Ethernet trunk encapsulation types:

- Cisco proprietary InterSwitch Link protocol (ISL)
- IEEE 802.1q
- Negotiate or default – This specifies that the interface negotiates with the neighboring interface to become an ISL, which is preferred, or 802.1q trunk. This depends on the configuration and capabilities of the neighboring interface.

The 2950T switch does not support ISL. Since the 2950T switch only supports IEEE 802.1q, the 3550 switch automatically negotiates that encapsulation type through the trunk connection.

The Negotiation of Trunking is activated by default for both switches. As soon as there is a cable connection, the switches establish a trunk link.

VLAN 1 is the Native VLAN by default so it is not necessary to configure it. VLANs other than VLAN 1 may be designated as the Native VLAN. However, the Native VLAN must be the same on trunked switches in 802.1q trunking.

In 802.1q trunking, all VLAN packets are tagged on the trunk link to indicate the VLAN to which they belong. The Native VLAN packets are sent untagged on the trunk link.

Although trunking has been automatically negotiated and established, the interfaces and native VLAN should be configured manually. Enter the following configurations on DLSwitchA. Configure switchports Fa0/11 and Fa0/12 on DLSwitchA as trunk ports while using 802.1q trunking. Assign both ports to native VLAN 1.

ALSwitchA1 and ALSwitchA2 should also be configured properly. The FastEthernet 0/1 port should be configured as a trunk port for ALSwitchA1 and ALSwitchA2. VLAN 1 should be designated as the native VLAN, which must be the same on all trunk links. Ports need to be statically assigned to the respective VLANs. Switch ports Fa0/5 – 0/8 should be assigned to VLAN 10. Switchports Fa0/9 – 0/10 should be assigned to VLAN 20.

Step 7

Verify the configurations with various **show** commands on DLSwitchA. Sample outputs are provided for comparison.

Issue the **show vtp counters** command.

```
DLSwitchA#show vtp counters
VTP statistics:
Summary advertisements received      : 20
Subset advertisements received      : 4
Request advertisements received      : 2
Summary advertisements transmitted : 16
Subset advertisements transmitted   : 6
Request advertisements transmitted   : 0
Number of config revision errors    : 0
Number of config digest errors      : 0
Number of V1 summary errors         : 0

VTP pruning statistics:

Trunk      Join Transmitted Join Received  Summary advts received from
-----
Fa0/11      0                1                0
Fa0/12      0                1                0
non-pruning-capable device
-----
```

1. Which ports on the DLSwitchA are the trunk ports?

Issue the **show interfaces** command on DLSwitchA for FastEthernet trunk ports 0/11 and 0/12. The output for FastEthernet 0/12 should be similar to the following output for FastEthernet 0/11.

```
DLSwitchA#show interfaces FastEthernet0/11 switchport
Name: Fa0/11
Switchport: Enabled
Administrative Mode: trunk
Operational Mode: trunk
Administrative Trunking Encapsulation: dot1q
Operational Trunking Encapsulation: dot1q
Negotiation of Trunking: On
Access Mode VLAN: 1 (default)
Trunking Native Mode VLAN: 1 (default)
Administrative private-vlan host-association: none
Administrative private-vlan mapping: none
Operational private-vlan: none
Trunking VLANs Enabled: ALL
Pruning VLANs Enabled: 2-1001

Protected: false
Unknown unicast blocked: disabled
Unknown multicast blocked: disabled

Voice VLAN: none (Inactive)
Appliance trust: none
```

2. What is the Ethernet trunk encapsulation type?

3. What is the native VLAN?

Issue the **show vtp counters**, **show interfaces FastEthernet 0/1 switchport**, and **show vlan** commands on ALSwitchA1 and ALSwitchA2. Output for ALSwitchA2 should be similar to the following sample output for ALSwitchA1.

```
ALSwitchA1#show vtp counters
VTP statistics:
Summary advertisements received      : 1543
Subset advertisements received      : 8
Request advertisements received      : 0
Summary advertisements transmitted  : 1473
Subset advertisements transmitted    : 16
Request advertisements transmitted   : 10
Number of config revision errors     : 0
Number of config digest errors       : 0
Number of V1 summary errors          : 0

VTP pruning statistics:
Trunk      Join Transmitted Join Received      Summary advts received from
-----
Fa0/1      0                0                0
non-pruning-capable device
```

```
ALSwitchA1#show interfaces FastEthernet 0/1 switchport
Name: Fa0/1
Switchport: Enabled
Administrative Mode: trunk
Operational Mode: trunk
Administrative Trunking Encapsulation: dot1q
Operational Trunking Encapsulation: dot1q
Negotiation of Trunking: On
Access Mode VLAN: 1 (default)
Trunking Native Mode VLAN: 1 (default)
Administrative private-vlan host-association: none
Administrative private-vlan mapping: none
Operational private-vlan: none
Trunking VLANs Enabled: ALL
Pruning VLANs Enabled: 2-1001

Protected: false

Voice VLAN: none (Inactive)
Appliance trust: none
```

```
ALSwitchA1#show vlan
```

| VLAN | Name | Status | Ports |
|------|--------------------|--------|---|
| 1 | default | active | Fa0/2, Fa0/3, Fa0/4, Fa0/11 Fa0/12, Fa0/13, Fa0/14, Fa0/15 Fa0/16, Fa0/17, Fa0/18, Fa0/19 Fa0/20, Fa0/21, Fa0/22, Fa0/23 Fa0/24, Gi0/1, Gi0/2 |
| 10 | Accounting | active | Fa0/5, Fa0/6, Fa0/7, Fa0/8 |
| 20 | Marketing | active | Fa0/9, Fa0/10 |
| 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 |
| 1002 | fddi | 101002 | 1500 | - | - | - | - | - | 0 | 0 |
| 1003 | tr | 101003 | 1500 | - | - | - | - | srb | 0 | 0 |
| 1004 | fdnet | 101004 | 1500 | - | - | - | ieee | - | 0 | 0 |
| 1005 | trnet | 101005 | 1500 | - | - | - | ibm | - | 0 | 0 |

Remote SPAN VLANs

| Primary | Secondary | Type | Ports |
|---------|-----------|------|-------|
|---------|-----------|------|-------|

Output of the **show running-config** command will show the trunk status and trunk encapsulation type of the trunk ports. It will also indicate if the ports are in VLAN 10 or VLAN 20. Partial outputs for DLSwitchA and ALSwitchA1 are as follows.

```
DLSwitchA#show running-config
Building configuration...

Current configuration : 1879 bytes
!
<Output omitted>
!
interface FastEthernet0/4
 no ip address
!
interface FastEthernet0/5
 switchport access vlan 10
 no ip address
!
interface FastEthernet0/6
 switchport access vlan 10
 no ip address
!
interface FastEthernet0/7
 switchport access vlan 10
 no ip address
!
interface FastEthernet0/8
 switchport access vlan 10
 no ip address
!
interface FastEthernet0/9
 switchport access vlan 20
 no ip address
!
interface FastEthernet0/10
 switchport access vlan 20
 no ip address
!
interface FastEthernet0/11
 switchport trunk encapsulation dot1q
 switchport mode trunk
 no ip address
!
interface FastEthernet0/12
 switchport trunk encapsulation dot1q
 switchport mode trunk
 no ip address
!
```

<Output omitted>

```
ALSwitchA1#show running-config
```

```
Building configuration...
```

```
Current configuration : 1779 bytes
```

```
!
```

<Output omitted>

```
!
```

```
interface FastEthernet0/1
```

```
switchport mode trunk
```

```
no ip address
```

```
!
```

```
interface FastEthernet0/2
```

```
no ip address
```

```
!
```

```
interface FastEthernet0/3
```

```
no ip address
```

```
!
```

```
interface FastEthernet0/4
```

```
no ip address
```

```
!
```

```
interface FastEthernet0/5
```

```
switchport access vlan 10
```

```
no ip address
```

```
!
```

```
interface FastEthernet0/6
```

```
switchport access vlan 10
```

```
no ip address
```

```
!
```

```
interface FastEthernet0/7
```

```
switchport access vlan 10
```

```
no ip address
```

```
!
```

```
interface FastEthernet0/8
```

```
switchport access vlan 10
```

```
no ip address
```

```
!
```

```
interface FastEthernet0/9
```

```
switchport access vlan 20
```

```
no ip address
```

```
!
```

```
interface FastEthernet0/10
```

```
switchport access vlan 20
```

```
no ip address
```

```
!
```

```
interface FastEthernet0/11
```

```
no ip address
```

```
!
```

<Output omitted>

Step 8

Ping from Workstation A to Workstation B as a final test of the configuration. The **ping** should be successful.

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