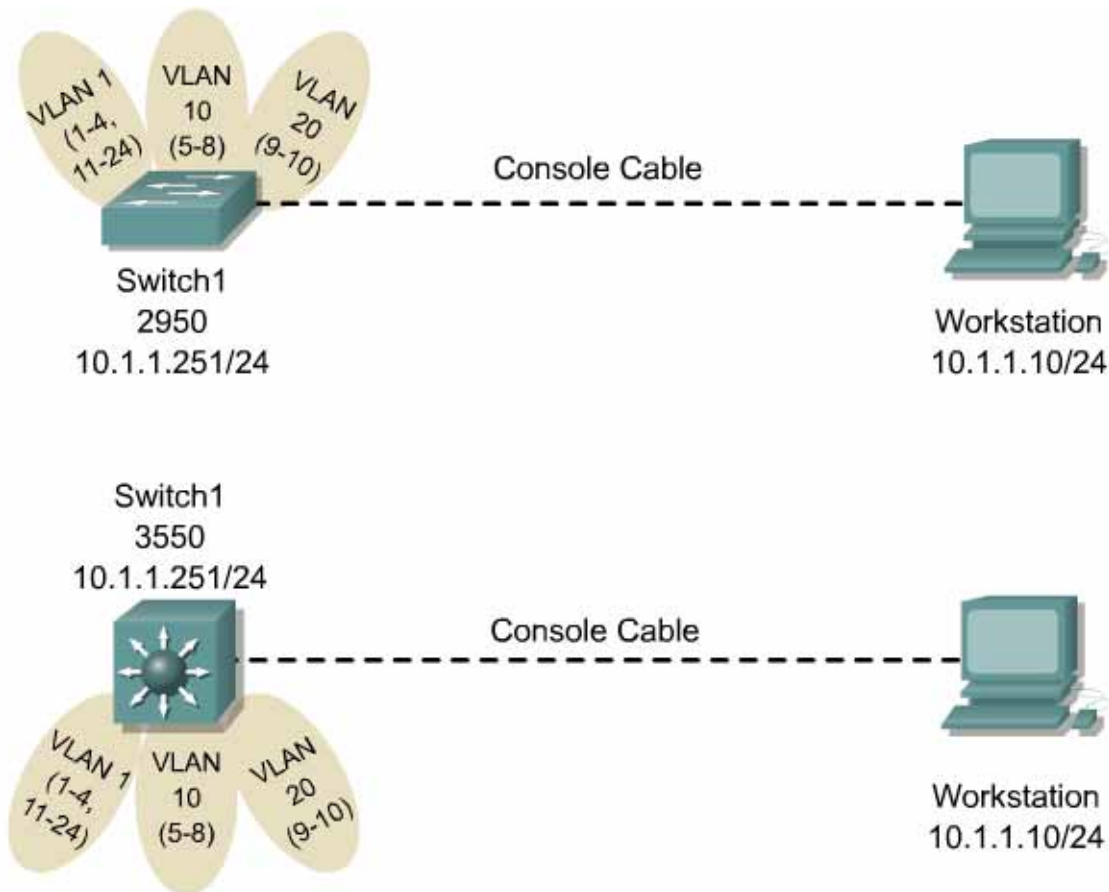


Lab 2.1.7 Catalyst 2950T and 3550 Series Static VLANs



Objective

Create and maintain VLANs on a Cisco Catalyst 2950T or 3550 series Ethernet switch using 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. VLAN membership on a switch that is assigned manually for each interface is known as interface-based or static VLAN membership.

The basic procedures for creating and maintaining VLANs on the 2950T and 3550 series of Ethernet switches are essentially the same.

Step 1

Select a 2950T or 3550 switch. Both of these switches have 24 2-gigabit ports. If necessary, power up the switch and use the standard process for establishing a HyperTerminal console connection

from a workstation. It does not matter if the switch configuration from the previous lab is running or if students start with no configuration.

Issue a **show vlan** command from the privileged mode.

The following sample output is for a 2950T switch.

Switch#**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, Fa0/11, 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	-	-	-	-	-	0	0
1004	fdnet	101004	1500	-	-	-	ieee	-	0	0
1005	trnet	101005	1500	-	-	-	ibm	-	0	0

Remote SPAN VLANs

Primary	Secondary	Type	Ports
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The following sample output is for a 3550 switch.

Switch#**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, Fa0/11, 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	-	-	-	-	-	0	0
1004	fdnet	101004	1500	-	-	-	ieee	-	0	0
1005	trnet	101005	1500	-	-	-	ibm	-	0	0

Primary	Secondary	Type	Ports
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Note the default VLAN numbers, names, associated types, and that all switch ports are automatically assigned to VLAN 1.

Step 2

Issue the **switchport mode ?** command for interface FastEthernet 0/1.

The switch port mode of all ports is set to dynamic desirable by default. This means the port will actively attempt to convert the link to a trunk link.

The following command is for a 2950T switch.

```
Switch#config terminal
Switch(config)#interface FastEthernet 0/1
Switch(config-if)#switchport mode ?
    access      Set trunking mode to ACCESS unconditionally
    dynamic     Set trunking mode to dynamically negotiate access or trunk mode
    trunk       Set trunking mode to TRUNK unconditionally
```

The following command is for a 3550 switch.

```
Switch#config terminal
Switch(config)#interface FastEthernet 0/1
Switch(config-if)#switchport mode ?
    access          Set trunking mode to ACCESS unconditionally
    dot1q-tunnel    Set trunking mode to DOT1Q TUNNEL unconditionally
    dynamic          Set trunking mode to dynamically negotiate access or trunk
                    mode
    trunk            Set trunking mode to TRUNK unconditionally
```

A port on the 2950T switch can operate in one of three modes while a port on the 3550 switch can operate in one of four modes.

The command for setting a single port to the access mode is shown in the following example, which uses the FastEthernet 0/1 port.

```
Switch#config terminal
Switch(config)#interface FastEthernet 0/1
Switch(config-if)#switchport mode access
Switch(config-if)#^Z
```

Use the **show vlan** command to determine the mode of a port. Ports configured for a particular VLAN will be shown in that VLAN. Ports configured to trunk mode will not appear in any of the VLANs. The **show interfaces switchport** command will list the configured mode of each port in detail.

The following partial sample output is for a 2950T switch.

```
Switch#show interfaces switchport

<Output omitted>
```

```
Name: Fa0/24
Switchport: Enabled
Administrative Mode: dynamic desirable
Operational Mode: static access
Administrative Trunking Encapsulation: dot1q
Operational Trunking Encapsulation: native
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
Name: Gi0/1
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
```

<Output omitted>

The following partial sample output is for a 3550 switch.

```
Switch#show interfaces switchport
```

<Output omitted>

```
Name: Fa0/24
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
Name: Gi0/1
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

```

<Output omitted>

Ports configured as dynamic desirable ports will not be identified in the output of a **show running-config** command. Ports configured otherwise will be specifically noted.

The following partial sample output is for a 2950T switch.

<Output omitted>

```

!
interface FastEthernet0/1
  switchport mode trunk
  no ip address
!
interface FastEthernet0/2
  switchport mode trunk
  no ip address
!
interface FastEthernet0/3
  no ip address
!
interface FastEthernet0/4
  no ip address
!

```

<Output omitted>

The following partial sample output is for a 3550 switch.

<Output omitted>

```

!
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

```

```

!
interface FastEthernet0/13
  no ip address
!
interface FastEthernet0/14
  no ip address
!
<Output omitted>

```

Step 3

Create a VLAN in one of two ways. One way is to assign a port to a VLAN that does not exist. The switch will automatically create the VLAN to which the port has been assigned. Another way is to create VLANs without assigning port membership.

The 2950T and 3550 switches have a **range** command that can be used to designate multiple individual ports or a continuous range of ports for an operation.

VLAN 1 is the Management VLAN by default. Therefore, all ports are automatically assigned to VLAN 1 and all ports are in the access mode. There is no need to create a VLAN 1, assign ports to it, or to set the mode of each port. VLANs 10 and 20 must be created and ports 5 through 8 and ports 9 and 10 must be assigned to each VLAN respectively.

Use the **range** command to assign ports 5 to 8 to VLAN 10.

```

Switch#config terminal
Switch(config)#interface range FastEthernet 0/5 - 8
Switch(config-if-range)#switchport access vlan 10
% Access VLAN does not exist. Creating vlan 10
Switch(config-if-range)#^z

```

VLAN 10 was created at the same time ports 5 to 8 were assigned to it.

Issue a **show vlan** command to verify that VLAN 10 has been created and ports 5 to 8 are assigned to it. The output should be similar to the following sample output.

```
Switch#show vlan
```

VLAN	Name	Status	Ports
1	default	active	Fa0/1, 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	VLAN0010	active	Fa0/5, Fa0/6, Fa0/7, Fa0/8
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
1002	fddi	101002	1500	-	-	-	-	-	0	0
1003	tr	101003	1500	-	-	-	-	-	0	0
1004	fdnet	101004	1500	-	-	-	ieee	-	0	0
1005	trnet	101005	1500	-	-	-	ibm	-	0	0

<Output omitted>

Since VLAN 10 was not named, the switch automatically assigns a default name, which is VLAN0010.

Step 4

Create a VLAN without assigning ports to it at the same time. This involves a somewhat different process than Step 3. Enter the following vlan database configuration mode from the privileged mode.

```
Switch#vlan database
Switch(vlan)#
```

Enter a question mark (?). The following output will appear.

```
Switch(vlan)#?
VLAN database editing buffer manipulation commands:
  abort  Exit mode without applying the changes
  apply  Apply current changes and bump revision number
  exit   Apply changes, bump revision number, and exit mode
  no     Negate a command or set its defaults
  reset  Abandon current changes and reread current database
  show   Show database information
  vlan   Add, delete, or modify values associated with a single VLAN
  vtp    Perform VTP administrative functions.
```

Notice the highlighted vlan configuration option.

Create VLAN 20.

```
Switch(vlan)#vlan 20
VLAN 20 added:
  Name: VLAN0020
Switch(vlan)#
```

The VLAN is created immediately with a default name. To remove a VLAN, the following command in the vlan configuration mode would be used.

```
Switch(vlan)#no vlan 20
```

Ports still need to be assigned to VLAN 20. Port assignment to a VLAN is an interface configuration operation. Exit vlan configuration mode and enter interface configuration mode.

Exit from the vlan configuration mode and use the **range** command to assign ports 9 and 10 to VLAN 20.

```
Switch(vlan)#exit
APPLY completed.
Exiting....
Switch#
Switch#config terminal
Switch(config)#interface range FastEthernet 0/9 , FastEthernet 0/10
Switch(config-if-range)#switchport access vlan 20
Switch(config-if-range)#^z
```

A comma (,) delimiter was used instead of the hyphen (-) that was used in Step 3. A space is required before and after the comma.

Issue a **show vlan** command to verify the creation of VLAN 20 and with ports 9 and 10 assigned to it. The output should be similar to the following sample output.

Switch#**show vlan**

VLAN	Name	Status	Ports
1	default	active	Fa0/1, 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	VLAN0010	active	Fa0/5, Fa0/6, Fa0/7, Fa0/8
20	VLAN0020	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	-	-	-	-	-	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

<Output omitted>

Step 5

Re-enter the vlan configuration mode and issue a question mark (?).

```
Switch#vlan database
Switch(vlan)#?
VLAN database editing buffer manipulation commands:
  abort  Exit mode without applying the changes
  apply  Apply current changes and bump revision number
  exit   Apply changes, bump revision number, and exit mode
  no     Negate a command or set its defaults
  reset  Abandon current changes and reread current database
  show   Show database information
  vlan   Add, delete, or modify values associated with a single VLAN
  vtp    Perform VTP administrative functions.
```

Use the **vlan** option to name or rename a VLAN. For example, the following command would rename VLAN 20 from its default name of VLAN0020 to Accounting.

```
Switch(vlan)#vlan 20 name Accounting
VLAN 20 modified:
  Name: Accounting
Switch(vlan)#
```

The **show** option will allow users to view various settings before committing any changes with the **apply** or **exit** options. Issue a **show ?** command and review the following output.

```
Switch(vlan)#show ?
```



```

changes    Show the changes to the database since modification began (or
           since 'reset')
current    Show the database installed when modification began (or since
           'reset')
proposed   Show the database as it would be modified if applied
<cr>

```

Use the **abort** option to return to the privileged mode.

```

Switch(vlan)#abort
Aborting...
Switch#

```

Issue a **show running-config** command. The ports that were assigned to VLAN 10 and 20 will indicate the VLAN to which the port has been assigned. The following is a partial sample output.

<Output omitted>

```

!
interface FastEthernet0/1
!
interface FastEthernet0/2
!
interface FastEthernet0/3
!
interface FastEthernet0/4
!
interface FastEthernet0/5
switchport access vlan 10
!
interface FastEthernet0/6
switchport access vlan 10
!
interface FastEthernet0/7
switchport access vlan 10
!
interface FastEthernet0/8
switchport access vlan 10
!
interface FastEthernet0/9
switchport access vlan 20
!
interface FastEthernet0/10
switchport access vlan 20
!
interface FastEthernet0/11
!
interface FastEthernet0/12
!
<Output omitted>

```

A port assignment to VLAN 1 will not be indicated since VLAN1 is the default.

Students have now created static VLANs two different ways and assigned ports statically with the **range** command. They have also learned to remove, name, and rename VLANs.

Note Traffic between VLANs must be routed. Inter-VLAN routing will be covered in a later lab.

Step 6

Prepare for the next lab by removing all VLAN information and configurations. The VLAN database, or `vlan.dat`, and startup configuration will need to be deleted.

If a switch is trunked with other switches and all cables are disconnected or the interfaces are shut down, the VTP server and client switches will not be able to exchange VLAN information. This will be covered in greater detail in the next lab. To avoid any difficulties, disconnect all cables.

The VLAN information is saved in a flash file called `vlan.dat`. This file needs to be deleted to remove the VLAN information. This is done with the `delete flash:vlan.dat` or `delete vlan.dat` command.

```
Switch#delete flash:vlan.dat
Delete filename [vlan.dat]?
Delete flash:vlan.dat? [confirm]
Switch#
```

The `erase startup-config` command is used to remove the VLAN configuration.

```
Switch#erase startup-config

Erasing the nvram filesystem will remove all files! Continue? [confirm]
[OK]
Erase of nvram: complete
Switch#
```

After the startup configuration and VLAN information have been erased, the switch needs to be reloaded.

```
Switch#reload
System configuration has been modified. Save? [yes/no]: n
Proceed with reload? [confirm]
```

After the switch reloads, it will have the default VLAN information and configuration.