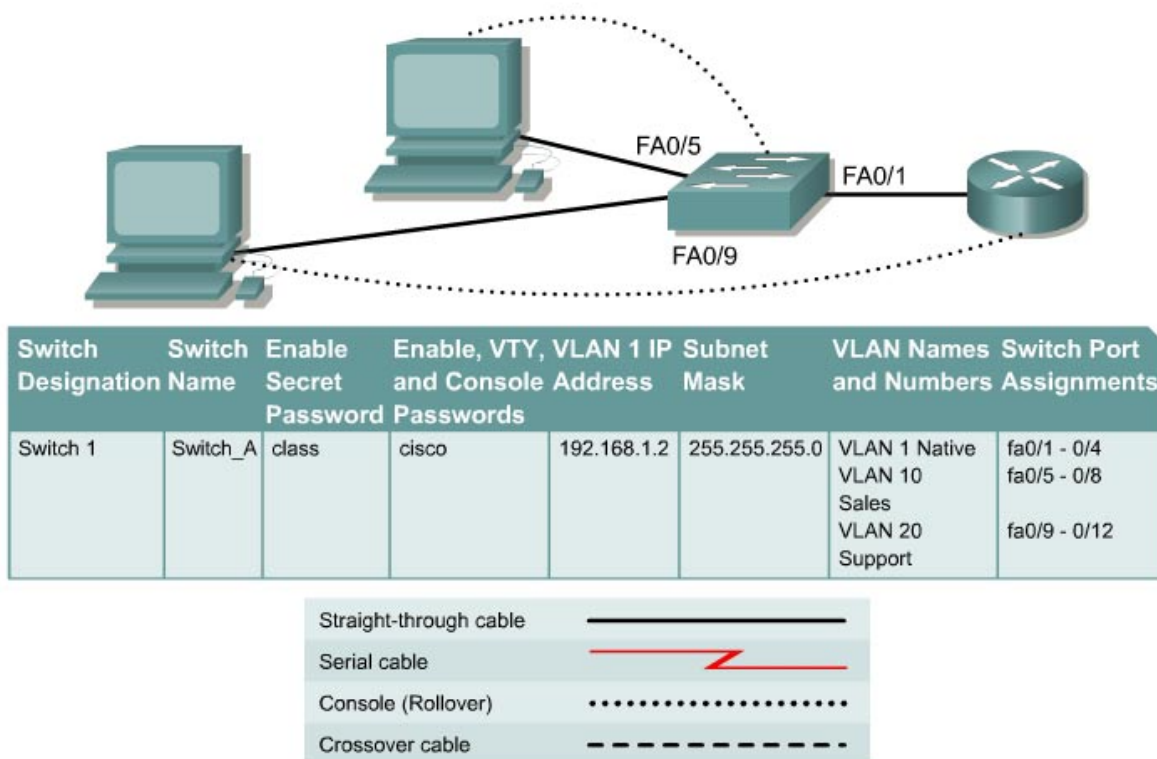


Lab 9.3.6 Configuring Inter-VLAN Routing – 2900XL Series



Objective

- Create a basic switch configuration and verify it.
- Create multiple VLANs, name them and assign multiple member ports to them.
- Create a basic configuration on a router.
- Create an 802.1q trunk line between the switch and router to allow communication between VLANs.
- Test the routing functionality.

Background/Preparation

When managing a switch, the Management Domain is always VLAN 1. The Network Administrator's workstation must have access to a port in the VLAN 1 Management Domain. All ports are assigned to VLAN 1 by default. This lab will also help demonstrate how VLANs can be used to separate traffic and reduce broadcast domains.

Cable a network similar to the one in the diagram. The configuration output used in this lab is produced from a 2950 series switch. Any other switch used may produce different output. The following steps are to be executed on each switch unless specifically instructed otherwise. Instructions are also provided for the 2900 and 1900 Series switches. The 1900 Series switch initially

displays a User Interface Menu. Select the “Command Line” option from the menu to perform the steps for this lab.

Note: The router used must have a Fast Ethernet interface in order to support trunking and inter-VLAN routing. The 2500 series router cannot be used for this lab.

Start a HyperTerminal session.

Note: Go to the erase and reload instructions at the end of this lab. Perform those steps on all switches in this lab assignment before continuing.

Step 1 Configure the switch

Configure the hostname, access, and command mode passwords, as well as the management LAN settings. These values are shown in the chart. If problems occur while performing this configuration, refer to the Basic Switch Configuration lab.

Step 2 Configure the hosts attached to the switch

Configure the hosts using the following information.

- a. For the host in port 0/5:
IP address 192.168.5.2
Subnet mask 255.255.255.0
Default gateway 192.168.5.1
- b. For the host in port 0/9:
IP address 192.168.7.2
Subnet mask 255.255.255.0
Default gateway 192.168.7.1

Step 3 Verify connectivity

Check to see if the hosts can ping the switch.

- a. Ping the switch IP address from the hosts.
- b. Were the pings successful? No
- c. Why or why not? This will not work, because the host are on different networks.

Step 4 Create and name two VLANs

Enter the following commands to create and name two VLANs:

```
Switch_A#vlan database
Switch_A(vlan)#vlan 10 name Sales
Switch_A(vlan)#vlan 20 name Support
Switch_A(vlan)#exit

1900:

Switch_A#config terminal
Switch_A(config)#vlan 10 name Sales
Switch_A(config)#vlan 20 name Support
Switch_A(config)#exit
```

Step 5 Assign ports to VLAN 10

Assigning ports to VLANs must be done from the interface mode. Enter the following commands to add ports 0/5 to 0/8 to VLAN 10:

```
Switch_A#configure terminal
Switch_A(config)#interface fastethernet 0/5
Switch_A(config-if)#switchport mode access
Switch_A(config-if)#switchport access vlan 10
Switch_A(config-if)#interface fastethernet 0/6
Switch_A(config-if)#switchport mode access
Switch_A(config-if)#switchport access vlan 10
Switch_A(config-if)#interface fastethernet 0/7
Switch_A(config-if)#switchport mode access
Switch_A(config-if)#switchport access vlan 10
Switch_A(config-if)#interface fastethernet 0/8
Switch_A(config-if)#switchport mode access
Switch_A(config-if)#switchport access vlan 10
Switch_A(config-if)#end
```

1900:

```
Switch_A#configure terminal
Switch_A(config)#interface ethernet 0/5
Switch_A(config-if)#vlan static 10
Switch_A(config-if)#interface ethernet 0/6
Switch_A(config-if)#vlan static 10
Switch_A(config-if)#interface ethernet 0/7
Switch_A(config-if)#vlan static 10
Switch_A(config-if)#interface ethernet 0/8
Switch_A(config-if)#vlan static 10
Switch_A(config-if)#end
```

Step 6 Assign ports to VLAN 20

Enter the following commands to add ports 0/9 to 0/12 to VLAN 20:

```
Switch_A#configure terminal
Switch_A(config)#interface fastethernet 0/9
Switch_A(config-if)#switchport mode access
Switch_A(config-if)#switchport access vlan 20
Switch_A(config-if)#interface fastethernet 0/10
Switch_A(config-if)#switchport mode access
Switch_A(config-if)#switchport access vlan 20
Switch_A(config-if)#interface fastethernet 0/11
Switch_A(config-if)#switchport mode access
Switch_A(config-if)#switchport access vlan 20
Switch_A(config-if)#interface fastethernet 0/12
Switch_A(config-if)#switchport mode access
Switch_A(config-if)#switchport access vlan 20
Switch_A(config-if)#end
```

1900:

```
Switch_A#configure terminal
Switch_A(config)#interface ethernet 0/9
Switch_A(config-if)#vlan static 20
Switch_A(config-if)#interface ethernet 0/10
Switch_A(config-if)#vlan static 20
Switch_A(config-if)#interface ethernet 0/11
Switch_A(config-if)#vlan static 20
```

```
Switch_A(config-if)#interface ethernet 0/12
Switch_A(config-if)#vlan static 20
Switch_A(config-if)#end
```

Step 7 Display the VLAN interface information

- a. On Switch_A, type the command `show vlan` at the Privileged EXEC prompt as follows:

```
Switch_A#show vlan
```

- b. Are ports assigned correctly? [Yes](#)

Step 8 Create the trunk

On Switch_A, type the following commands at the Fast Ethernet 0/1 interface command prompt. Note that Ethernet 0/1 and the other access ports on a 1900 switch only support 10 Mbps Ethernet and cannot be used as trunk ports. The trunk ports (if present) on a 24-port 1900 are typically Fast Ethernet 0/26 and 0/27.

```
Switch_A(config)#interface fastethernet0/1
Switch_A(config-if)#switchport mode trunk
Switch_A(config-if)#end
```

2900:

```
Switch_A(config)#interface fastethernet0/1
Switch_A(config-if)#switchport mode trunk
Switch_A(config-if)#switchport trunk encapsulation dot1q
Switch_A(config-if)#end
```

1900: [Note the 1900 switch will only support ISL trunking, not dot1q.](#)

```
Switch_A#configure terminal
Switch_A(config)#interface fastethernet0/26
Switch_A(config-if)#trunk on
```

Step 9 Configure the router

- a. Configure the router with the following data. Note that in order to support trunking and inter-VLAN routing, the router must have a Fast Ethernet interface.

Hostname is **Router_A**

Console, VTY, and enable passwords are **cisco**.

Enable secret password is **class**.

- b. Then configure the Fast Ethernet interface using the following commands:

Note: If working with a 1900 switch, replace the “dot1q” encapsulation with “isl” in the following router configuration commands.

```
Router_A(config)#interface fastethernet 0/0
Router_A(config-if)#no shutdown
Router_A(config-if)#interface fastethernet 0/0.1
Router_A(config-subif)#encapsulation dot1q 1
Router_A(config-subif)#ip address 192.168.1.1 255.255.255.0
Router_A(config-if)#interface fastethernet 0/0.2
Router_A(config-subif)#encapsulation dot1q 10
Router_A(config-subif)#ip address 192.168.5.1 255.255.255.0
Router_A(config-if)#interface fastethernet 0/0.3
```

```
Router_A(config-subif)#encapsulation dot1q 20
Router_A(config-subif)#ip address 192.168.7.1 255.255.255.0
Router_A(config-subif)#end
```

Step 10 Save the router configuration

Step 11 Display the router routing table

- Type `show ip route` at the Privileged EXEC mode prompt.
- Are there entries in the routing table? 3
- What interface are they all pointing to? fastethernet0/0
- Why is there not a need to run a routing protocol? All interfaces are connected.

Step 12 Test the VLANs and the trunk

Ping from the host in Switch_A port 0/9 to the host in port 0/5.

- Was the ping successful? Yes
- Why? The trunk to the router forwarded packets from VLAN 20 to VLAN 10

Ping from the host in Switch_A port 0/5 to the switch IP 192.168.1.2.

- Was the ping successful? Yes

Step 13 Move the hosts

- Move the hosts to other VLANs and try pinging the management VLAN 1.
- Note the results of the pinging.

All pings were successful with correct ip settings on host

Once the steps are complete, logoff by typing `exit`, and turn all the devices off. Then remove and store the cables and adapter.

```
Switch>enable
Switch#configure terminal
Switch(config)#hostname Switch A
Switch A(config)#enable secret class

Switch A(config)#line con 0
Switch A(config-line)#password cisco
Switch A(config-line)#login
Switch A(config-line)#line vty 0 15
Switch A(config-line)#password cisco
Switch A(config-line)#login
Switch A(config-line)#exit
Switch A(config)#interface Vlan1
Switch A(config-if)#ip address 192.168.1.2 255.255.255.0
Switch A(config-if)#no shutdown
Switch A(config-if)#exit
Switch A(config)#ip default-gateway 192.168.1.1
Switch A(config)#end
Switch A#vlan datab

Switch A#vlan database
Switch A(vlan)#vlan 10 name Sales
VLAN 10 added:
    Name: Sales
Switch A(vlan)#vlan 20 name Support
```

```

VLAN 20 added:
    Name: Support
Switch A(vlan)#exit
APPLY completed.
Exiting....

```

```

Switch A#configure terminal
Switch A(config)#interface fastethernet0/5
Switch A(config-if)#switchport mode access
Switch A(config-if)#switchport access vlan 10
Switch A(config-if)#interface fastethernet0/6
Switch A(config-if)#switchport mode access
Switch A(config-if)#switchport access vlan 10
Switch A(config-if)#interface fastethernet0/7
Switch A(config-if)#switchport mode access
Switch A(config-if)#switchport access vlan 10
Switch A(config-if)#interface fastethernet0/8
Switch A(config-if)#switchport mode access
Switch A(config-if)#switchport access vlan 10
Switch A(config-if)#end

```

```

Switch A#configure terminal
Switch A(config)#interface fastethernet0/9
Switch A(config-if)#switchport mode access
Switch A(config-if)#switchport access vlan 20
Switch A(config-if)#interface fastethernet0/10
Switch A(config-if)#switchport mode access
Switch A(config-if)#switchport access vlan 20
Switch A(config-if)#interface fastethernet0/11
Switch A(config-if)#switchport mode access
Switch A(config-if)#switchport access vlan 20
Switch A(config-if)#interface fastethernet0/12
Switch A(config-if)#switchport mode access
Switch A(config-if)#switchport access vlan 20
Switch A(config-if)#end

```

```
Switch A#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
10	Sales	active	Fa0/5, Fa0/6, Fa0/7, Fa0/8
20	Support	active	Fa0/9, Fa0/10, Fa0/11, Fa0/12
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

1005 trnet 101005 1500 - - - ibm - 0 0

```
Switch A#configure terminal
Switch A(config)#interface fastethernet0/1
Switch A(config-if)#switchport mode trunk
Switch A(config-if)#end
```

```
Router>enable
Router#configure terminal
Router(config)#hostname Router A
```

```
Router A(config)#enable secret class
Router A(config)#line con 0
Router A(config-line)#password cisco
Router A(config-line)#login
Router A(config-line)#line vty 0 4
Router A(config-line)#password cisco
Router A(config-line)#login
Router A(config-line)#exit
Router A(config)#interface fastethernet 0/0
Router A(config-if)#no shutdown
Router A(config-if)#interface fastethernet 0/0.1
Router A(config-subif)#encapsulation dot1q 1
Router A(config-subif)#ip address 192.168.1.1 255.255.255.0
Router A(config-subif)#interface fastethernet 0/0.2
Router A(config-subif)#encapsulation dot1q 10
Router A(config-subif)#ip address 192.168.5.1 255.255.255.0
Router A(config-subif)#interface fastethernet 0/0.3
Router A(config-subif)#encapsulation dot1q 20
Router A(config-subif)#ip address 192.168.7.1 255.255.255.0
Router A(config-subif)#end
```

```
Router A#show ip route
```

```
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter
       area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route
```

```
Gateway of last resort is not set
```

```
C    192.168.5.0/24 is directly connected, FastEthernet0/0.2
C    192.168.7.0/24 is directly connected, FastEthernet0/0.3
C    192.168.1.0/24 is directly connected, FastEthernet0/0.1
Router_A#
```

```
C:\>ping 192.168.5.2
```

```
Pinging 192.168.5.2 with 32 bytes of data:
```

```
Reply from 192.168.5.2: bytes=32 time<10ms TTL=127
Reply from 192.168.5.2: bytes=32 time<10ms TTL=127
```

Reply from 192.168.5.2: bytes=32 time<10ms TTL=127
Reply from 192.168.5.2: bytes=32 time<10ms TTL=127

Ping statistics for 192.168.5.2:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 192.168.1.2

Pinging 192.168.1.2 with 32 bytes of data:

Reply from 192.168.1.2: bytes=32 time<10ms TTL=254
Reply from 192.168.1.2: bytes=32 time=40ms TTL=254
Reply from 192.168.1.2: bytes=32 time=20ms TTL=254
Reply from 192.168.1.2: bytes=32 time<10ms TTL=254

Ping statistics for 192.168.1.2:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 40ms, Average = 15ms

Erasing and Reloading the Switch

For the majority of the labs in CCNA 3 and CCNA 4 it is necessary to start with an unconfigured switch. Use of a switch with an existing configuration may produce unpredictable results. These instructions allow preparation of the switch prior to performing the lab so previous configuration options do not interfere. The following is the procedure for clearing out previous configurations and starting with an unconfigured switch. Instructions are provided for the 2900, 2950, and 1900 Series switches.

2900 and 2950 Series Switches

1. Enter into the Privileged EXEC mode by typing **enable**.

```
Switch>enable
```

If prompted for a password, enter **class**, if that does not work, ask the instructor.

2. Remove the VLAN database information file.

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

If there was no VLAN file, this message is displayed.

```
%Error deleting flash:vlan.dat (No such file or directory)
```

3. Remove the switch startup configuration file from NVRAM.

```
Switch#erase startup-config
```

The responding line prompt will be:

```
Erasing the nvram filesystem will remove all files! Continue? [confirm]
```

Press **Enter** to confirm.

The response should be:

```
Erase of nvram: complete
```

4. Check that VLAN information was deleted.

Verify that the VLAN configuration was deleted in Step 2 using the **show vlan** command. If previous VLAN configuration information (other than the default management VLAN 1) is still present it will be necessary to power cycle the switch (hardware restart) instead of issuing the **reload** command. To power cycle the switch, remove the power cord from the back of the switch or unplug it. Then plug it back in.

If the VLAN information was successfully deleted in Step 2, go to Step 5 and restart the switch using the **reload** command.

5. Software restart (using the **reload** command)

Note: This step is not necessary if the switch was restarted using the power cycle method.

- a. At the Privileged EXEC mode enter the command **reload**.

```
Switch#reload
```

The responding line prompt will be:

```
System configuration has been modified. Save? [yes/no] :
```

- b. Type **n** and then press **Enter**.

The responding line prompt will be:

```
Proceed with reload? [confirm] [Enter]
```

The first line of the response will be:

```
Reload requested by console.
```

After the switch has reloaded, the line prompt will be:

```
Would you like to enter the initial configuration dialog? [yes/no] :
```

- c. Type **n** and then press **Enter**.

The responding line prompt will be:

```
Press RETURN to get started! [Enter]
```

1900 Series Switches

1. Remove VLAN Trunking Protocol (VTP) information.

```
#delete vtp
```

This command resets the switch with VTP parameters set to factory defaults.

All other parameters will be unchanged.

```
Reset system with VTP parameters set to factory defaults, [Y]es or [N]o?
```

Enter **y** and press **Enter**.

2. Remove the switch startup configuration from NVRAM.

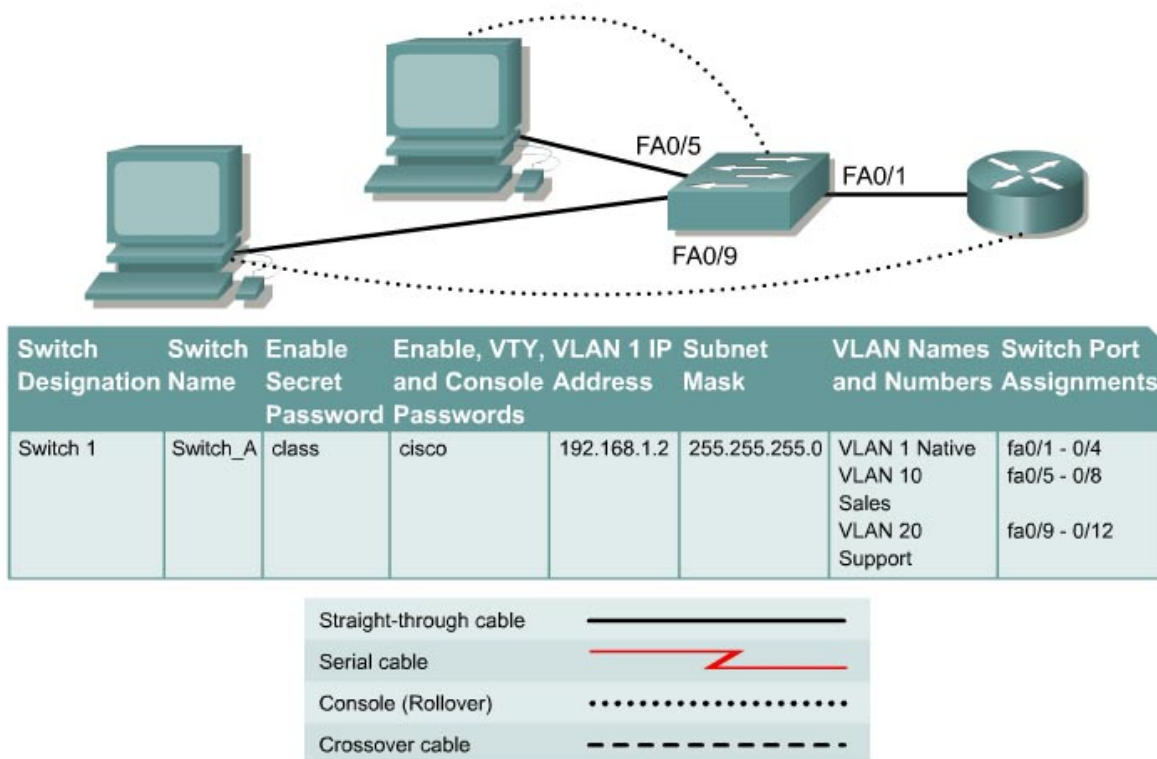
```
#delete nvram
```

This command resets the switch with factory defaults. All system parameters will revert to their default factory settings. All static and dynamic addresses will be removed.

```
Reset system with factory defaults, [Y]es or [N]o?
```

Enter **y** and press **Enter**.

Lab 9.3.6 Configuring Inter-VLAN Routing – 2950 Series



Objective

- Create a basic switch configuration and verify it.
- Create multiple VLANs, name them and assign multiple member ports to them.
- Create a basic configuration on a router.
- Create an 802.1q trunk line between the switch and router to allow communication between VLANs.
- Test the routing functionality.

Background/Preparation

When managing a switch, the Management Domain is always VLAN 1. The Network Administrator's workstation must have access to a port in the VLAN 1 Management Domain. All ports are assigned to VLAN 1 by default. This lab will also help demonstrate how VLANs can be used to separate traffic and reduce broadcast domains.

Cable a network similar to the one in the diagram. The configuration output used in this lab is produced from a 2950 series switch. Any other switch used may produce different output. The following steps are to be executed on each switch unless specifically instructed otherwise. Instructions are also provided for the 2900 and 1900 Series switches. The 1900 Series switch initially

displays a User Interface Menu. Select the “Command Line” option from the menu to perform the steps for this lab.

Note: The router used must have a Fast Ethernet interface in order to support trunking and inter-VLAN routing. The 2500 series router cannot be used for this lab.

Start a HyperTerminal session.

Note: Go to the erase and reload instructions at the end of this lab. Perform those steps on all switches in this lab assignment before continuing.

Step 1 Configure the switch

Configure the hostname, access, and command mode passwords, as well as the management LAN settings. These values are shown in the chart. If problems occur while performing this configuration, refer to the Basic Switch Configuration lab.

Step 2 Configure the hosts attached to the switch

Configure the hosts using the following information.

- a. For the host in port 0/5:
 - IP address 192.168.5.2
 - Subnet mask 255.255.255.0
 - Default gateway 192.168.5.1
- b. For the host in port 0/9:
 - IP address 192.168.7.2
 - Subnet mask 255.255.255.0
 - Default gateway 192.168.7.1

Step 3 Verify connectivity

Check to see if the hosts can ping the switch.

- a. Ping the switch IP address from the hosts.
- b. Were the pings successful? No
- d. Why or why not? This will not work, because the host are on different networks.

Step 4 Create and name two VLANs

Enter the following commands to create and name two VLANs:

```
Switch_A#vlan database
Switch_A(vlan)#vlan 10 name Sales
Switch_A(vlan)#vlan 20 name Support
Switch_A(vlan)#exit

1900:

Switch_A#config terminal
Switch_A(config)#vlan 10 name Sales
Switch_A(config)#vlan 20 name Support
Switch_A(config)#exit
```

Step 5 Assign ports to VLAN 10

Assigning ports to VLANs must be done from the interface mode. Enter the following commands to add ports 0/5 to 0/8 to VLAN 10:

```
Switch_A#configure terminal
Switch_A(config)#interface fastethernet 0/5
Switch_A(config-if)#switchport mode access
Switch_A(config-if)#switchport access vlan 10
Switch_A(config-if)#interface fastethernet 0/6
Switch_A(config-if)#switchport mode access
Switch_A(config-if)#switchport access vlan 10
Switch_A(config-if)#interface fastethernet 0/7
Switch_A(config-if)#switchport mode access
Switch_A(config-if)#switchport access vlan 10
Switch_A(config-if)#interface fastethernet 0/8
Switch_A(config-if)#switchport mode access
Switch_A(config-if)#switchport access vlan 10
Switch_A(config-if)#end
```

1900:

```
Switch_A#configure terminal
Switch_A(config)#interface ethernet 0/5
Switch_A(config-if)vlan static 10
Switch_A(config-if)#interface ethernet 0/6
Switch_A(config-if)vlan static 10
Switch_A(config-if)#interface ethernet 0/7
Switch_A(config-if)vlan static 10
Switch_A(config-if)#interface ethernet 0/8
Switch_A(config-if)vlan static 10
Switch_A(config-if)#end
```

Step 6 Assign ports to VLAN 20

Enter the following commands to add ports 0/9 to 0/12 to VLAN 20:

```
Switch_A#configure terminal
Switch_A(config)#interface fastethernet 0/9
Switch_A(config-if)#switchport mode access
Switch_A(config-if)#switchport access vlan 20
Switch_A(config-if)#interface fastethernet 0/10
Switch_A(config-if)#switchport mode access
Switch_A(config-if)#switchport access vlan 20
Switch_A(config-if)#interface fastethernet 0/11
Switch_A(config-if)#switchport mode access
Switch_A(config-if)#switchport access vlan 20
Switch_A(config-if)#interface fastethernet 0/12
Switch_A(config-if)#switchport mode access
Switch_A(config-if)#switchport access vlan 20
Switch_A(config-if)#end
```

1900:

```
Switch_A#configure terminal
Switch_A(config)#interface ethernet 0/9
Switch_A(config-if)vlan static 20
Switch_A(config-if)#interface ethernet 0/10
Switch_A(config-if)vlan static 20
Switch_A(config-if)#interface ethernet 0/11
```

```
Switch_A(config-if)vlan static 20
Switch_A(config-if)#interface ethernet 0/12
Switch_A(config-if)vlan static 20
Switch_A(config-if)#end
```

Step 7 Display the VLAN interface information

- a. On Switch_A, type the command `show vlan` at the Privileged EXEC prompt as follows:

```
Switch_A#show vlan
```

- b. Are ports assigned correctly? [Yes](#)

Step 8 Create the trunk

On Switch_A, type the following commands at the Fast Ethernet 0/1 interface command prompt. Note that Ethernet 0/1 and the other access ports on a 1900 switch only support 10 Mbps Ethernet and cannot be used as trunk ports. The trunk ports (if present) on a 24-port 1900 are typically Fast Ethernet 0/26 and 0/27.

```
Switch_A(config)#interface fastethernet0/1
Switch_A(config-if)#switchport mode trunk
Switch_A(config-if)#end

2900:

Switch_A(config)#interface fastethernet0/1
Switch_A(config-if)#switchport mode trunk
Switch_A(config-if)#switchport trunk encapsulation dot1q
Switch_A(config-if)#end

1900: Note the 1900 switch will only support ISL trunking, not dot1q.

Switch_A#configure terminal
Switch_A(config)#interface fastethernet0/26
Switch_A(config-if)#trunk on
```

Step 9 Configure the router

- a. Configure the router with the following data. Note that in order to support trunking and inter-VLAN routing, the router must have a Fast Ethernet interface.

Hostname is `Router_A`

Console, VTY, and enable passwords are `cisco`.

Enable secret password is `class`.

- b. Then configure the Fast Ethernet interface using the following commands:

Note: If working with a 1900 switch, replace the “dot1q” encapsulation with “isl” in the following router configuration commands.

```
Router_A(config)#interface fastethernet 0/0
Router_A(config-if)#no shutdown
Router_A(config-if)#interface fastethernet 0/0.1
Router_A(config-subif)#encapsulation dot1q 1
Router_A(config-subif)#ip address 192.168.1.1 255.255.255.0
Router_A(config-if)#interface fastethernet 0/0.2
Router_A(config-subif)#encapsulation dot1q 10
Router_A(config-subif)#ip address 192.168.5.1 255.255.255.0
```

```
Router_A(config-if)#interface fastethernet 0/0.3
Router_A(config-subif)#encapsulation dot1q 20
Router_A(config-subif)#ip address 192.168.7.1 255.255.255.0
Router_A(config-subif)#end
```

Step 10 Save the router configuration

Step 11 Display the router routing table

- Type `show ip route` at the Privileged EXEC mode prompt.
- Are there entries in the routing table? 3
- What interface are they all pointing to? fastethernet0/0
- Why is there not a need to run a routing protocol? All interfaces are connected.

Step 12 Test the VLANs and the trunk

Ping from the host in Switch_A port 0/9 to the host in port 0/5.

- Was the ping successful? Yes
- Why? The trunk to the router forwarded packets from VLAN 20 to VLAN 10

Ping from the host in Switch_A port 0/5 to the switch IP 192.168.1.2.

- Was the ping successful? Yes

Step 13 Move the hosts

- Move the hosts to other VLANs and try pinging the management VLAN 1.
- Note the results of the pinging.

All pings were successful with correct ip settings on host

Once the steps are complete, logoff by typing `exit`, and turn all the devices off. Then remove and store the cables and adapter.

```
Switch>enable
Switch#configure terminal
Switch(config)#hostname Switch A

Switch_A(config)#enable secret class

Switch_A(config)#line con 0
Switch_A(config-line)#password cisco
Switch_A(config-line)#login
Switch_A(config-line)#line vty 0 15
Switch_A(config-line)#password cisco
Switch_A(config-line)#login
Switch_A(config-line)#exit
Switch_A(config)#interface Vlan1
Switch_A(config-if)#ip address 192.168.1.2 255.255.255.0
Switch_A(config-if)#no shutdown
Switch_A(config-if)#exit
Switch_A(config)#ip default-gateway 192.168.1.1
Switch_A(config)#end

Switch_A#vlan database
Switch_A(vlan)#vlan 10 name Sales
VLAN 10 added:
```

```

      Name: Sales
Switch A(vlan)#vlan 20 name Support
VLAN 20 added:
      Name: Support
Switch A(vlan)#exit
APPLY completed.
Exiting....

```

```

Switch A#configure terminal
Switch A(config)#interface fastethernet0/5
Switch A(config-if)#switchport mode access
Switch A(config-if)#switchport access vlan 10
Switch A(config-if)#interface fastethernet0/6
Switch A(config-if)#switchport mode access
Switch A(config-if)#switchport access vlan 10
Switch A(config-if)#interface fastethernet0/7
Switch A(config-if)#switchport mode access
Switch A(config-if)#switchport access vlan 10
Switch A(config-if)#interface fastethernet0/8
Switch A(config-if)#switchport mode access
Switch A(config-if)#switchport access vlan 10
Switch A(config-if)#end

```

```

Switch A#configure terminal
Switch A(config)#interface fastethernet0/9
Switch A(config-if)#switchport mode access
Switch A(config-if)#switchport access vlan 20
Switch A(config-if)#interface fastethernet0/10
Switch A(config-if)#switchport mode access
Switch A(config-if)#switchport access vlan 20
Switch A(config-if)#interface fastethernet0/11
Switch A(config-if)#switchport mode access
Switch A(config-if)#switchport access vlan 20
Switch A(config-if)#interface fastethernet0/12
Switch A(config-if)#switchport mode access
Switch A(config-if)#switchport access vlan 20
Switch A(config-if)#end

```

```
Switch A#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
2	VLAN2	active	
3	VLAN3	active	
10	Sales	active	Fa0/5, Fa0/6, Fa0/7, Fa0/8
20	Support	active	Fa0/9, Fa0/10, Fa0/11, Fa0/12
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

2	enet	100002	1500	-	-	-	-	-	0	0
3	enet	100003	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
1005	trnet	101005	1500	-	-	-	ibm	-	0	0

Remote SPAN VLANs

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

```
Switch A#configure terminal
Switch A(config)#interface fastethernet0/1
Switch A(config-if)#switchport mode trunk
Switch A(config-if)#end
```

```
Router>enable
Router#configure terminal
Router(config)#hostname Router A
Router A(config)#enable secret class
Router A(config)#line con 0
Router A(config-line)#password cisco
Router A(config-line)#login
Router A(config-line)#line vty 0 4
Router A(config-line)#password cisco
Router A(config-line)#login
Router A(config-line)#exit
Router A(config)#interface fastethernet 0/0
Router A(config-if)#no shutdown
Router A(config-if)#interface fastethernet 0/0.1
Router A(config-subif)#encapsulation dot1q 1
Router A(config-subif)#ip address 192.168.1.1 255.255.255.0
Router A(config-subif)#interface fastethernet 0/0.2
Router A(config-subif)#encapsulation dot1q 10
Router A(config-subif)#ip address 192.168.5.1 255.255.255.0
Router A(config-subif)#interface fastethernet 0/0.3
Router A(config-subif)#encapsulation dot1q 20
Router A(config-subif)#ip address 192.168.7.1 255.255.255.0
Router A(config-subif)#end
```

Router A#show ip route

```
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter
       area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route
```

Gateway of last resort is not set

```
C    192.168.5.0/24 is directly connected, FastEthernet0/0.2
C    192.168.7.0/24 is directly connected, FastEthernet0/0.3
C    192.168.1.0/24 is directly connected, FastEthernet0/0.1
Router_A#
```

C:\>ping 192.168.5.2

Pinging 192.168.5.2 with 32 bytes of data:

```
Reply from 192.168.5.2: bytes=32 time<10ms TTL=127
Reply from 192.168.5.2: bytes=32 time<10ms TTL=127
Reply from 192.168.5.2: bytes=32 time<10ms TTL=127
Reply from 192.168.5.2: bytes=32 time<10ms TTL=127
```

Ping statistics for 192.168.5.2:

```
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

C:\>ping 192.168.1.2

Pinging 192.168.1.2 with 32 bytes of data:

```
Reply from 192.168.1.2: bytes=32 time<10ms TTL=254
Reply from 192.168.1.2: bytes=32 time=40ms TTL=254
Reply from 192.168.1.2: bytes=32 time=20ms TTL=254
Reply from 192.168.1.2: bytes=32 time<10ms TTL=254
```

Ping statistics for 192.168.1.2:

```
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 40ms, Average = 15ms
```

C:\>

Switch A#show running-config

Building configuration...

Current configuration : 2053 bytes

```
!
version 12.1
no service pad
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname Switch_A
!
enable secret 5 $1$5kx7$u7JjZnEXhjHJ0cJIplN4t.
!
ip subnet-zero
!
spanning-tree mode pvst
no spanning-tree optimize bpdu transmission
spanning-tree extend system-id
!
```

```
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
  switchport mode access
  no ip address
!
interface FastEthernet0/6
  switchport access vlan 10
  switchport mode access
  no ip address
!
interface FastEthernet0/7
  switchport access vlan 10
  switchport mode access
  no ip address
!
interface FastEthernet0/8
  switchport access vlan 10
  switchport mode access
  no ip address
!
interface FastEthernet0/9
  switchport access vlan 20
  switchport mode access
  no ip address
!
interface FastEthernet0/10
  switchport access vlan 20
  switchport mode access
  no ip address
!
interface FastEthernet0/11
  switchport access vlan 20
  switchport mode access
  no ip address
!
interface FastEthernet0/12
  switchport access vlan 20
  switchport mode access
  no ip address
!
interface FastEthernet0/13
  no ip address
!
interface FastEthernet0/14
  no ip address
!
```

```
interface FastEthernet0/15  
no ip address  
!  
interface FastEthernet0/16  
no ip address  
!  
interface FastEthernet0/17  
no ip address  
!  
interface FastEthernet0/18  
no ip address  
!  
interface FastEthernet0/19  
no ip address  
!  
interface FastEthernet0/20  
no ip address  
!  
interface FastEthernet0/21  
no ip address  
!  
interface FastEthernet0/22  
no ip address  
!  
interface FastEthernet0/23  
no ip address  
!  
interface FastEthernet0/24  
no ip address  
!  
interface Vlan1  
ip address 192.168.1.2 255.255.255.0  
no ip route-cache  
!  
ip default-gateway 192.168.1.1  
ip http server  
  
!  
line con 0  
password cisco  
login  
line vty 0 4  
password cisco  
login  
line vty 5 15  
password cisco  
login  
!  
end
```

```
Router A#show runnig-config  
Building configuration...
```

```
Current configuration : 863 bytes  
!  
version 12.2  
service timestamps debug uptime  
service timestamps log uptime
```

```
no service password-encryption
!
hostname Router_A
!
enable secret 5 $1$ihY0$.S.8M7iVky3u28ZYmHgWx1
!
ip subnet-zero

!
call rsvp-sync

!
interface FastEthernet0/0
  no ip address
  duplex auto
  speed auto
!
interface FastEthernet0/0.1
  encapsulation dot1Q 1 native
  ip address 192.168.1.1 255.255.255.0
!
interface FastEthernet0/0.2
  encapsulation dot1Q 10
  ip address 192.168.5.1 255.255.255.0
!
interface FastEthernet0/0.3
  encapsulation dot1Q 20
  ip address 192.168.7.1 255.255.255.0
!
interface Serial0/0
  no ip address
  shutdown
  no fair-queue
!
interface Serial0/1
  no ip address
  shutdown
!
ip classless
ip http server
!
!
!
dial-peer cor custom

!
line con 0
  password cisco
  login
line aux 0
line vty 0 4
  password cisco
  login
!
end
```

Erasing and Reloading the Switch

For the majority of the labs in CCNA 3 and CCNA 4 it is necessary to start with an unconfigured switch. Use of a switch with an existing configuration may produce unpredictable results. These instructions allow preparation of the switch prior to performing the lab so previous configuration options do not interfere. The following is the procedure for clearing out previous configurations and starting with an unconfigured switch. Instructions are provided for the 2900, 2950, and 1900 Series switches.

2900 and 2950 Series Switches

1. Enter into the Privileged EXEC mode by typing **enable**.

```
Switch>enable
```

If prompted for a password, enter **class**, if that does not work, ask the instructor.

2. Remove the VLAN database information file.

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

If there was no VLAN file, this message is displayed.

```
%Error deleting flash:vlan.dat (No such file or directory)
```

3. Remove the switch startup configuration file from NVRAM.

```
Switch#erase startup-config
```

The responding line prompt will be:

```
Erasing the nvram filesystem will remove all files! Continue? [confirm]
```

Press **Enter** to confirm.

The response should be:

```
Erase of nvram: complete
```

4. Check that VLAN information was deleted.

Verify that the VLAN configuration was deleted in Step 2 using the **show vlan** command. If previous VLAN configuration information (other than the default management VLAN 1) is still present it will be necessary to power cycle the switch (hardware restart) instead of issuing the **reload** command. To power cycle the switch, remove the power cord from the back of the switch or unplug it. Then plug it back in.

If the VLAN information was successfully deleted in Step 2, go to Step 5 and restart the switch using the **reload** command.

5. Software restart (using the **reload** command)

Note: This step is not necessary if the switch was restarted using the power cycle method.

- a. At the Privileged EXEC mode enter the command `reload`.

```
Switch#reload
```

The responding line prompt will be:

```
System configuration has been modified. Save? [yes/no] :
```

- b. Type `n` and then press **Enter**.

The responding line prompt will be:

```
Proceed with reload? [confirm] [Enter]
```

The first line of the response will be:

```
Reload requested by console.
```

After the switch has reloaded, the line prompt will be:

```
Would you like to enter the initial configuration dialog? [yes/no] :
```

- c. Type `n` and then press **Enter**.

The responding line prompt will be:

```
Press RETURN to get started! [Enter]
```

1900 Series Switches

1. Remove VLAN Trunking Protocol (VTP) information.

```
#delete vtp
```

This command resets the switch with VTP parameters set to factory defaults.

All other parameters will be unchanged.

```
Reset system with VTP parameters set to factory defaults, [Y]es or [N]o?
```

Enter `y` and press **Enter**.

2. Remove the switch startup configuration from NVRAM.

```
#delete nvram
```

This command resets the switch with factory defaults. All system parameters will revert to their default factory settings. All static and dynamic addresses will be removed.

```
Reset system with factory defaults, [Y]es or [N]o?
```

Enter `y` and press **Enter**.