Configuring Inter-VLAN Routing
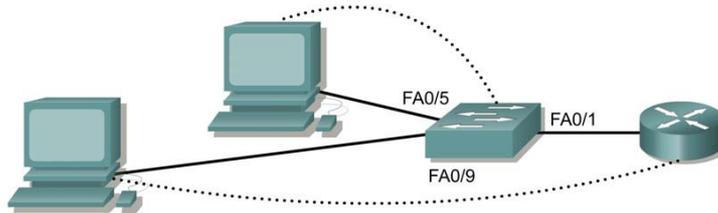
Switch Designation	Switch Name	Enable Secret Password	Enable, VTY, and Console Passwords	VLAN 1 IP Address	Subnet Mask	VLAN Names and Numbers	Switch Port Assignments
Switch 1	Switch_A	class	cisco	192.168.1.2	255.255.255.0	VLAN 1 Native VLAN 10 Sales VLAN 20 Support	fa0/1 - 0/4 fa0/5 - 0/8 fa0/9 - 0/12

Straight-through cable	————————
Serial cable	———/\————
Console (Rollover)	··················
Crossover cable	– – – – – – – –

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.

Note: The router used must have a Fast Ethernet interface in order to support trunking and inter-VLAN routing.

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?
_____

c. Why or why not?
_____

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
```

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
```

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 fastethernet0/12
Switch_A(config-if)#switchport mode access
Switch_A(config-if)#switchport access vlan 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?

_____

Step 8 Create the trunk
On Switch_A, type the following commands at the Fast Ethernet 0/1 interface command prompt.

```
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
```

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:

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
a. Type show ip route at the Privileged EXEC mode prompt.
b. Are there entries in the routing table?

_____
c. What interface are they all pointing to?

_____
d. Why is there not a need to run a routing protocol?

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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.
a. Was the ping successful?

_____
b. Why?

_____
__
Ping from the host in Switch_A port 0/5 to the switch IP 192.168.1.2.
c. Was the ping successful?

_____

Step 13 Move the hosts
a. Move the hosts to other VLANs and try pinging the management
VLAN 1.
b. Note the results of the pinging.

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

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.

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)