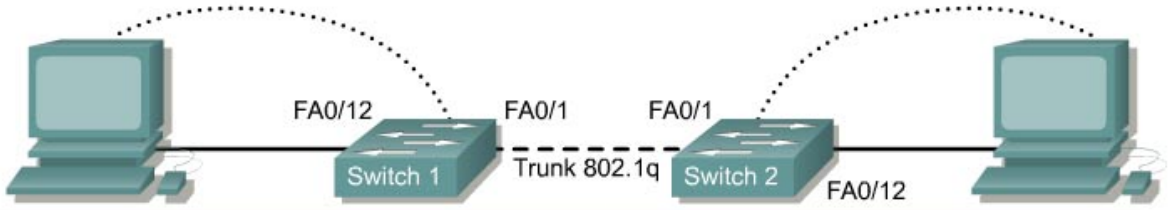
Lab 9.1.5b Trunking with 802.1q – 2924XL Series



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 Accounting VLAN 20 Marketing VLAN 30 Engineering	fa0/2 - 0/3 fa0/4 - 0/6 fa0/7 - 0/9 fa0/10 - 0/12
Switch 2	Switch_B	class	cisco	192.168.1.3	255.255.255.0	VLAN 1 Native VLAN 10 Accounting VLAN 20 Marketing VLAN 30 Engineering	fa0/2 - 0/3 fa0/4 - 0/6 fa0/7 - 0/9 fa0/10 - 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 an 802.1q trunk line between the two switches to allow communication between paired VLANs.
- Test the VLANs functionality by moving a workstation from one VLAN to another.

Background/Preparation

Trunking changes the formatting of the packets. The ports need to be in agreement as to which format is being used to transmit data on the trunk or no data will be passed. If there is different trunking encapsulation on the two ends of the link they will not able to communicate. Similar situation will occur if one of the ports is configured in trunking mode (unconditionally) and the other one is in access mode (unconditionally).

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 one of the diagram. The configuration output used in this lab is produced from 2950 series switch. Any other switch used may produce different output. The following steps are intended to be executed on each switch unless specifically instructed otherwise.

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". Do not configure VLANs and trunking yet.

Step 2 Configure the hosts attached to the switch

Configure the IP address, mask, and default gateway on each host. Be sure to choose addresses that are on the same subnet as the switch.

Step 3 Verify connectivity

a. To verify that the host and switch are correctly configured, ping the switch from the hosts.

b. Were the pings successful? Yes

c. If the answer is no, troubleshoot the host and switches configurations.

Step 4 Display the VLAN interface information

On Switch_A, type the command **show vlan** at the Privileged EXEC prompt as follows:

```
Switch_A#show vlan
```

Note: There should be an entry for VLAN 1 and the default VLANs (1002 +). If other VLANs appear, they could be deleted as instructed in Step 2 of the Erasing and Reloading instructions at the end of this lab or refer to the Lab Exercise: Deleting VLAN Configurations.

Step 5 Create and name three VLANs

Enter the following commands to create and name three VLANs:

```
Switch_A#vlan database
Switch_A(vlan)#vlan 10 name Accounting
Switch_A(vlan)#vlan 20 name Marketing
Switch_A(vlan)#vlan 30 name Engineering
Switch_A(vlan)#exit
```

Use the **show vlan** command to verify that the VLANs have been created correctly.

Step 6 Assign ports to a VLAN 10

Assigning ports to VLANs must be done from the interface mode. Enter the following commands to add ports 0/4 to 0/6 to VLAN 10:

```
Switch_A#configure terminal
Switch_A(config)#interface fastethernet 0/4
Switch_A(config-if)#switchport mode access
Switch_A(config-if)#switchport access vlan 10
```



```
Switch_A(config-if)#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)#end
```

Step 7 Assign ports to VLAN 20

Enter the following commands to add ports 0/7 to 0/9 to VLAN 20:

```
Switch_A#configure terminal
Switch_A(config)#interface fastethernet 0/7
Switch_A(config-if)#switchport mode access
Switch_A(config-if)#switchport access vlan 20
Switch_A(config-if)#interface fastethernet 0/8
Switch_A(config-if)#switchport mode access
Switch_A(config-if)#switchport access vlan 20
Switch_A(config-if)#interface fastethernet 0/9
Switch_A(config-if)#switchport mode access
Switch_A(config-if)#switchport access vlan 20
Switch_A(config-if)#end
```

Step 8 Assign ports to VLAN 30

Enter the following commands to add ports 0/10 to 0/12 to VLAN 30:

```
Switch_A#configure terminal
Switch_A(config)#interface fastethernet 0/10
Switch_A(config-if)#switchport mode access
Switch_A(config-if)#switchport access vlan 30
Switch_A(config-if)#interface fastethernet 0/11
Switch_A(config-if)#switchport mode access
Switch_A(config-if)#switchport access vlan 30
Switch_A(config-if)#interface fastethernet 0/12
Switch_A(config-if)#switchport mode access
Switch_A(config-if)#switchport access vlan 30
Switch_A(config-if)#end
```

Step 9 Create VLANs on Switch_B

Repeat Steps 5 through 9 on Switch_B to create its VLANs

Step 10 Display the VLAN interface information

a. On both switches, type the command **show vlan** at the Privileged EXEC prompt as follows:

```
Switch_A#show vlan
```

b. Are ports 0/10 through 0/12 assigned to VLAN 30? Yes

Step 11 Test the VLANs

Ping from the host in Switch_A port 0/12 to the host in Switch_B port 0/12.

a. Was the ping successful? No

b. Why? No trunk has been configured yet.

Ping from the host in Switch_A port 0/12 to the switch IP 192.168.1.2.

c. Was the ping successful? No

d. Why? Interfaces are in different VLANs.

Step 12 Create the trunk

On both switches, Switch_A and Switch_B, type the following command at the fastethernet 0/1 interface command prompt. Note that it is not necessary to specify the encapsulation on a 2950, since it only supports 802.1Q.

```
Switch_A(config)#interface fastethernet 0/1
Switch_A(config-if)#switchport mode trunk
Switch_A(config-if)#end

Switch_B(config)#interface fastethernet 0/1
Switch_B(config-if)#switchport mode trunk
Switch_B(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

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

Step 13 Verify the trunk

a. To verify that port Fast Ethernet 0/1 has been established as a trunk port, type **`show interface fastethernet 0/1 switchport`** at the Privileged EXEC mode prompt.

b. What type of trunking encapsulation is shown on the output results? dot1q (**Note:** This is a 2900/dot1q lab. If the 2900 specific commands above are used, encap will be dot1q otherwise the default encap is ISL)

c. According to the output with **`show interface fastethernet 0/1 switchport`** on Switch_B, is there a difference from the Administrative Trunking Encapsulation from the Operational Trunking Encapsulation?

No, both encapsulation types were dot1q.

d. On the fragment “Trunking VLANs Enable” from the output, what does the word “ALL” mean?

It means that traffic from all VLANs are allowed to cross the trunk link.

What would happen if the two ports of the trunk were using different encapsulation?

It wouldn’t form a trunk.

e. Explain The encapsulation must match on both sides of the link in order for the trunk to form

Step 14 Test the VLANS and the trunk

Ping from the host in Switch_A port 0/12 to the host in Switch_B port 0/12.

a. Was the ping successful? Yes

b. Why? Both hosts are in the same VLAN and the trunk has been configured.

Ping from the host in Switch_A port 0/12 to the switch IP 192.168.1.2.

c. Was the ping successful? No

d. Why? The interfaces belong to different VLANs.

Step 15 Move host.

Move the host in Switch_A from port 0/12 to port 0/8. Wait until the port LED goes green and then go to the next step.

Step 16 Test the VLANS and the trunk

Ping from the host in Switch_A port 0/8 to the host in Switch_B port 0/12.

a. Was the ping successful? No

b. Why? The hosts are on different VLANs

Ping from the host in Switch_A port 0/8 to the switch IP 192.168.1.2.

c. Was the ping successful? No

d. Why? The interfaces belong to different VLANs

Step 17 Move host

Move the host in Switch_B from port 0/12 to port 0/7. Wait until the port LED goes green and then go to the next step.

Step 18 Test the VLANS and the trunk

Ping from the host in Switch_A port 0/8 to the host in Switch_B port 0/7.

a. Was the ping successful? Yes

b. Why? The hosts are now on the same VLAN (VLAN 20).

Ping from the host in Switch_A port 0/8 to the switch IP 192.168.1.2.

c. Was the ping successful? No

d. Why? The interfaces belong to different VLANs.

Step 19 Move hosts

Move the host in Switch_A from port 0/8 to port 0/2. Wait until the port LED goes green and then go to the next step.

Step 20 Test the VLANS and the trunk

Ping from the host in Switch_A port 0/2 to the host in Switch_B port 0/7.

a. Was the ping successful? No

Ping from the host in Switch_A port 0/2 to the switch IP 192.168.1.2.

b. Was the ping successful? Yes

c. Why? Both Interfaces are assigned to the same VLAN (VLAN1).

Step 21 Move host

Move the host in Switch_B from port 0/7 to port 0/3. Wait until the port LED goes green and then go to the next step.

Step 22 Test the VLANS and the trunk

Ping from the host in Switch_A port 0/2 to the host in Switch_B port 0/3.

a. Was the ping successful? Yes

b. Why? Both hosts now belong to the same VLAN

Ping from the host in Switch_B port 0/3 to the switch IP 192.168.1.2.

c. Was the ping successful? Yes

d. Why? Both Interfaces are assigned to the same VLAN (VLAN1).

Ping from the host in Switch_B port 0/3 to the switch IP 192.168.1.3.

e. Was the ping successful? Yes

f. Why? Both Interfaces are assigned to the same VLAN (VLAN1).

g. What conclusions can be drawn from the testing that was just performed in regards to VLAN membership and VLANs across a trunk?

Hosts must be grouped together into the same VLAN before they can communicate with each other. Trunk links carry VLAN traffic across switches.

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

```
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=1ms TTL=255
Reply from 192.168.1.2: bytes=32 time=1ms TTL=255
Reply from 192.168.1.2: bytes=32 time=1ms TTL=255
Reply from 192.168.1.2: bytes=32 time=1ms TTL=255

Ping statistics for 192.168.1.2:
      Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
      Minimum = 1ms, Maximum = 1ms, Average = 1ms

C:\>ping 192.168.1.3

Pinging 192.168.1.3 with 32 bytes of data:

Reply from 192.168.1.3: bytes=32 time=1ms TTL=255
Reply from 192.168.1.3: bytes=32 time=1ms TTL=255
Reply from 192.168.1.3: bytes=32 time=1ms TTL=255
Reply from 192.168.1.3: bytes=32 time=1ms TTL=255

Ping statistics for 192.168.1.3:
      Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
```



```
        Minimum = 1ms, Maximum = 1ms, Average = 1ms
```

```
Switch A#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
10   Accounting                       active
20   Marketing                        active
30   Engineering                      active
1002 fddi-default                     active
1003 token-ring-default               active
1004 fddinet-default                  active
1005 trnet-default                    active

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

```
Switch A#show vlan
VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                          active    Fa0/1, Fa0/2, Fa0/3
10   Accounting                       active    Fa0/4, Fa0/5, Fa0/6
20   Marketing                        active    Fa0/7, Fa0/8, Fa0/9
30   Engineering                      active    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
30   enet  100030     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#show interface fastEthernet 0/1 switchport
Name: Fa0/1
Switchport: Enabled
Administrative mode: trunk
Operational Mode: trunk
```



```
Administrative Trunking Encapsulation: isl
Operational Trunking Encapsulation: isl
Negotiation of Trunking: Disabled
Access Mode VLAN: 0 ((Inactive))
Trunking Native Mode VLAN: 1 (default)
Trunking VLANs Enabled: ALL
Trunking VLANs Active: 1,10,20,30
Pruning VLANs Enabled: 2-1001

Priority for untagged frames: 0
Override vlan tag priority: FALSE
Voice VLAN: none
Appliance trust: none
Self Loopback: No


C:\>ping 192.168.1.2

Pinging 192.168.1.2 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 192.168.1.2:
      Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),


C:\>ping 192.168.1.11

Pinging 192.168.1.11 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 192.168.1.11:
      Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),


C:\>ping 192.168.1.11

Pinging 192.168.1.11 with 32 bytes of data:

Reply from 192.168.1.11: bytes=32 time<1ms TTL=128
Reply from 192.168.1.11: bytes=32 time<1ms TTL=128
Reply from 192.168.1.11: bytes=32 time<1ms TTL=128
Reply from 192.168.1.11: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.1.11:
      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=1ms TTL=255
Reply from 192.168.1.2: bytes=32 time=1ms TTL=255
Reply from 192.168.1.2: bytes=32 time=1ms TTL=255
Reply from 192.168.1.2: bytes=32 time=1ms TTL=255

Ping statistics for 192.168.1.2:
      Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
      Minimum = 1ms, Maximum = 1ms, Average = 1ms

C:\>ping 192.168.1.3

Pinging 192.168.1.3 with 32 bytes of data:

Reply from 192.168.1.3: bytes=32 time=3ms TTL=255
Reply from 192.168.1.3: bytes=32 time=1ms TTL=255
Reply from 192.168.1.3: bytes=32 time=1ms TTL=255
Reply from 192.168.1.3: bytes=32 time=1ms TTL=255

Ping statistics for 192.168.1.3:
      Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
      Minimum = 1ms, Maximum = 3ms, Average = 1ms


Switch_A#show running-config
Building configuration...

Current configuration:
!
version 12.0
no service pad
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname Switch_A
!
enable secret 5 $1$TfUF$i/GuiCfqHwPXFg6.bt44p1


!
ip subnet-zero

!
interface FastEthernet0/1
 switchport mode trunk
!
interface FastEthernet0/2
!
interface FastEthernet0/3
!
interface FastEthernet0/4
 switchport access vlan 10
!
interface FastEthernet0/5
 switchport access vlan 10
!
interface FastEthernet0/6
```



```
  switchport access vlan 10
!
interface FastEthernet0/7
  switchport access vlan 20
!
interface FastEthe
  switchport access vlan 20
!
interface FastEthernet0/9
  switchport access vlan 20
!
interface FastEthernet0/10
  switchport access vlan 30
!
interface FastEthernet0/11
  switchport access vlan 30
!
interface FastEthernet0/12
  switchport access vlan 30
!
interface VLAN1
  ip address 192.168.1.2 255.255.255.0
  no ip directed-broadcast
  no ip route-cache
!
ip default-gateway 192.168.1.1
!
line con 0
  password cisco
  login
  transport input none
  stopbits 1
line vty 0 4
  password cisco
  login
line vty 5 15
  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.

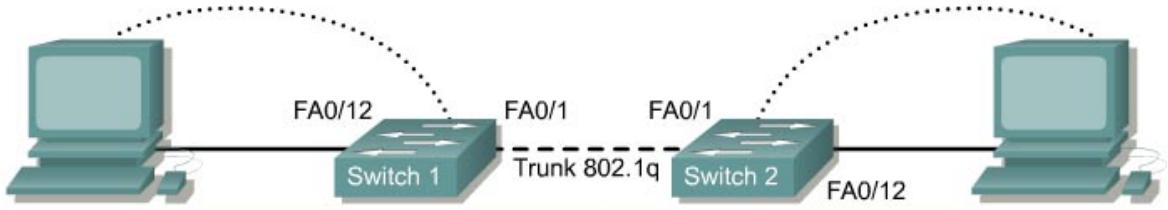
   ```
   #delete nvram
   ```

   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**.

Lab 9.1.5b Trunking with 802.1q – 2950 Series



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
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Switch 2	Switch_B	class	cisco	192.168.1.3	255.255.255.0	VLAN 1 Native VLAN 10 Accounting VLAN 20 Marketing VLAN 30 Engineering	fa0/2 - 0/3 fa0/4 - 0/6 fa0/7 - 0/9 fa0/10 - 0/12

Objective

- Create a basic switch configuration and verify it.
- Create multiple VLANs, name them, and assign multiple member ports to them.
- Create an 802.1q trunk line between the two switches to allow communication between paired VLANs.
- Test the VLANs functionality by moving a workstation from one VLAN to another.

Background/Preparation

Trunking changes the formatting of the packets. The ports need to be in agreement as to which format is being used to transmit data on the trunk or no data will be passed. If there is different trunking encapsulation on the two ends of the link they will not able to communicate. Similar situation will occur if one of the ports is configured in trunking mode (unconditionally) and the other one is in access mode (unconditionally).

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 one of the diagram. The configuration output used in this lab is produced from 2950 series switch. Any other switch used may produce different output. The following steps are intended to be executed on each switch unless specifically instructed otherwise.

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". Do not configure VLANs and trunking yet.

Step 2 Configure the hosts attached to the switch

Configure the IP address, mask, and default gateway on each host. Be sure to choose addresses that are on the same subnet as the switch.

Step 3 Verify connectivity

a. To verify that the host and switch are correctly configured, ping the switch from the hosts.

b. Were the pings successful? Yes

c. If the answer is no, troubleshoot the host and switches configurations.

Step 4 Display the VLAN interface information

On Switch_A, type the command **show vlan** at the Privileged EXEC prompt as follows:

```
Switch_A#show vlan
```

Note: There should be an entry for VLAN 1 and the default VLANs (1002 +). If other VLANs appear, they could be deleted as instructed in Step 2 of the Erasing and Reloading instructions at the end of this lab or refer to the Lab Exercise: Deleting VLAN Configurations.

Step 5 Create and name three VLANs

Enter the following commands to create and name three VLANs:

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Switch_A(vlan)#vlan 30 name Engineering
Switch_A(vlan)#exit
```

Use the **show vlan** command to verify that the VLANs have been created correctly.

Step 6 Assign ports to a VLAN 10

Assigning ports to VLANs must be done from the interface mode. Enter the following commands to add ports 0/4 to 0/6 to VLAN 10:

```
Switch_A#configure terminal
Switch_A(config)#interface fastethernet 0/4
Switch_A(config-if)#switchport mode access
Switch_A(config-if)#switchport access vlan 10
```



```
Switch_A(config-if)#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)#end
```

Step 7 Assign ports to VLAN 20

Enter the following commands to add ports 0/7 to 0/9 to VLAN 20:

```
Switch_A#configure terminal
Switch_A(config)#interface fastethernet 0/7
Switch_A(config-if)#switchport mode access
Switch_A(config-if)#switchport access vlan 20
Switch_A(config-if)#interface fastethernet 0/8
Switch_A(config-if)#switchport mode access
Switch_A(config-if)#switchport access vlan 20
Switch_A(config-if)#interface fastethernet 0/9
Switch_A(config-if)#switchport mode access
Switch_A(config-if)#switchport access vlan 20
Switch_A(config-if)#end
```

Step 8 Assign ports to VLAN 30

Enter the following commands to add ports 0/10 to 0/12 to VLAN 30:

```
Switch_A#configure terminal
Switch_A(config)#interface fastethernet 0/10
Switch_A(config-if)#switchport mode access
Switch_A(config-if)#switchport access vlan 30
Switch_A(config-if)#interface fastethernet 0/11
Switch_A(config-if)#switchport mode access
Switch_A(config-if)#switchport access vlan 30
Switch_A(config-if)#interface fastethernet 0/12
Switch_A(config-if)#switchport mode access
Switch_A(config-if)#switchport access vlan 30
Switch_A(config-if)#end
```

Step 9 Create VLANs on Switch_B

Repeat Steps 5 through 9 on Switch_B to create its VLANs

Step 10 Display the VLAN interface information

a. On both switches, type the command **show vlan** at the Privileged EXEC prompt as follows:

```
Switch_A#show vlan
```

b. Are ports 0/10 through 0/12 assigned to VLAN 30? Yes

Step 11 Test the VLANs

Ping from the host in Switch_A port 0/12 to the host in Switch_B port 0/12.

a. Was the ping successful? Yes

b. Why? They are on the same VLAN (VLAN 30).

Ping from the host in Switch_A port 0/12 to the switch IP 192.168.1.2.

c. Was the ping successful? No

d. Why? Both interfaces are in different VLANs.

Step 12 Create the trunk

On both switches, Switch_A and Switch_B, type the following command at the fastethernet 0/1 interface command prompt. Note that it is not necessary to specify the encapsulation on a 2950, since it only supports 802.1Q.

```
Switch_A(config)#interface fastethernet 0/1
Switch_A(config-if)#switchport mode trunk
Switch_A(config-if)#end

Switch_B(config)#interface fastethernet 0/1
Switch_B(config-if)#switchport mode trunk
Switch_B(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

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

Step 13 Verify the trunk

a. To verify that port Fast Ethernet 0/1 has been established as a trunk port, type **`show interface fastethernet 0/1 switchport`** at the Privileged EXEC mode prompt.

b. What type of trunking encapsulation is shown on the output results? Dot1q

c. According to the output with **`show interface fastethernet 0/1 switchport`** on Switch_B, is there a difference from the Administrative Trunking Encapsulation from the Operational Trunking Encapsulation? No, both encapsulation types were Dot1q.

d. On the fragment “Trunking VLANs Enable” from the output, what does the word “ALL” mean?

It means that traffic from all VLANs are allowed to cross the trunk link.

e. What would happen if the two ports of the trunk were using different encapsulation?

It wouldn’t form a trunk.

f. Explain The encapsulation must match on both sides of the link in order for the trunk to form.

Step 14 Test the VLANS and the trunk

Ping from the host in Switch_A port 0/12 to the host in Switch_B port 0/12.

a. Was the ping successful? Yes

b. Why? Both hosts are in the same VLAN and the trunk has been configured.

Ping from the host in Switch_A port 0/12 to the switch IP 192.168.1.2.

c. Was the ping successful? No

d. Why? The interfaces belong to different VLANs.

Step 15 Move host.

Move the host in Switch_A from port 0/12 to port 0/8. Wait until the port LED goes green and then go to the next step.

Step 16 Test the VLANS and the trunk

Ping from the host in Switch_A port 0/8 to the host in Switch_B port 0/12.

a. Was the ping successful? No

b. Why? The hosts are on separate VLANs

Ping from the host in Switch_A port 0/8 to the switch IP 192.168.1.2.

c. Was the ping successful? No

d. Why? The interfaces belong to different VLANs.

Step 17 Move host

Move the host in Switch_B from port 0/12 to port 0/7. Wait until the port LED goes green and then go to the next step.

Step 18 Test the VLANS and the trunk

Ping from the host in Switch_A port 0/8 to the host in Switch_B port 0/7.

a. Was the ping successful? Yes

b. Why? The hosts are now on the same VLAN (VLAN 20).

Ping from the host in Switch_A port 0/8 to the switch IP 192.168.1.2.

c. Was the ping successful? No

d. Why? The interfaces belong to different VLANs.

Step 19 Move hosts

Move the host in Switch_A from port 0/8 to port 0/2. Wait until the port LED goes green and then go to the next step.

Step 20 Test the VLANS and the trunk

Ping from the host in Switch_A port 0/2 to the host in Switch_B port 0/7.

a. Was the ping successful? No

Ping from the host in Switch_A port 0/2 to the switch IP 192.168.1.2.

b. Was the ping successful? Yes

c. Why? Both Interfaces are assigned to the same VLAN (VLAN1).

Step 21 Move host

Move the host in Switch_B from port 0/7 to port 0/3. Wait until the port LED goes green and then go to the next step.

Step 22 Test the VLANS and the trunk

Ping from the host in Switch_A port 0/2 to the host in Switch_B port 0/3.

a. Was the ping successful? Yes

b. Why? Both hosts now belong to the same VLAN

Ping from the host in Switch_B port 0/3 to the switch IP 192.168.1.2.

c. Was the ping successful? Yes

d. Why? Both hosts now belong to the same VLAN

Ping from the host in Switch_B port 0/3 to the switch IP 192.168.1.3.

e. Was the ping successful? Yes

f. Why? Both Interfaces are assigned to the same VLAN (VLAN1).

g. What conclusions can be drawn from the testing that was just performed in regards to VLAN membership and VLANs across a trunk?

Hosts must be grouped together into the same VLAN before they can communicate with each other. Trunk links carry VLAN traffic across switches.

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

```
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=1ms TTL=255
Reply from 192.168.1.2: bytes=32 time=1ms TTL=255
Reply from 192.168.1.2: bytes=32 time=1ms TTL=255
Reply from 192.168.1.2: bytes=32 time=1ms TTL=255

Ping statistics for 192.168.1.2:
      Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
      Minimum = 1ms, Maximum = 1ms, Average = 1ms

C:\>ping 192.168.1.3

Pinging 192.168.1.3 with 32 bytes of data:

Reply from 192.168.1.3: bytes=32 time=1ms TTL=255
Reply from 192.168.1.3: bytes=32 time=1ms TTL=255
Reply from 192.168.1.3: bytes=32 time=1ms TTL=255
Reply from 192.168.1.3: bytes=32 time=1ms TTL=255

Ping statistics for 192.168.1.3:
      Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
      Minimum = 1ms, Maximum = 1ms, Average = 1ms

Switch A#show vlan

VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                          active    Fa0/2, Fa0/3, Fa0/13, Fa0/14
                                                Fa0/15, Fa0/16, Fa0/17, Fa0/18
                                                Fa0/19, Fa0/20,
```



```
                                                Fa0/23, Fa0/24
10   Accounting                         active    Fa0/4, Fa0/5, Fa0/6
20   Marketing                          active    Fa0/7, Fa0/8, Fa0/9
30   Engineering                        active    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
30   enet  100030     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#show interface 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)
Voice VLAN: none
Administrative private-vlan host-association: none
Administrative private-vlan mapping: none
Operational private-vlan: none
Trunking VLANs Enabled: ALL
Pruning VLANs Enabled: 2-1001
Capture Mode Disabled
Capture VLANs Allowed: ALL

Protected: false

Voice VLAN: none (Inactive)
Appliance trust: none


C:\>ping 192.168.1.2

Pinging 192.168.1.2 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.
```



```
Ping statistics for 192.168.1.2:
      Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>ping 192.168.1.11

Pinging 192.168.1.11 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 192.168.1.11:
      Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>ping 192.168.1.11

Pinging 192.168.1.11 with 32 bytes of data:

Reply from 192.168.1.11: bytes=32 time<1ms TTL=128
Reply from 192.168.1.11: bytes=32 time<1ms TTL=128
Reply from 192.168.1.11: bytes=32 time<1ms TTL=128
Reply from 192.168.1.11: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.1.11:
      Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
      Minimum = 0ms, Maximum = 0ms, Average = 0ms
```


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**.

