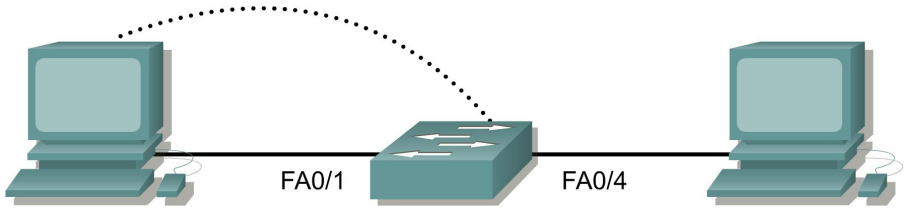
Lab 6.2.3 Managing the MAC Address Table – 2900XL Series



Switch Designation	Switch Name	Enable Secret Password	Enable,VTY, and Console Passwords	VLAN 1 IP Address	Default Gateway IP Address	Subnet Mask
Switch 1	ALSwitch	class	cisco	192.168.1.2	192.168.1.1	255.255.255.0

Straight-through cable	
Serial cable	
Console (Rollover)	
Crossover cable	

Objective

- Create a basic switch configuration.
- Manage the switch MAC table.

Background/Preparation

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 1900 Series switch, which initially displays a User Interface Menu. Select the “Command Line” option from the menu to perform the steps 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 to use the same IP subnet for the address, mask, and default gateway as on the switch.

Step 3 Verify connectivity

a. To verify that hosts and switch are correctly configured, `ping` the switch IP address from the hosts.

b. Were the pings successful? Yes

c. If the answer is no, troubleshoot the hosts and switch configurations.

Step 4 Record the MAC addresses of the host

a. Determine and record the layer 2 addresses of the PC network interface cards.

If running Windows 98, check by using **Start** > **Run** > **`winipcfg`**, then click on **`More info`**.

If running Windows 2000, check by using **Start** > **Run** > **`cmd > ipconfig /all`**.

b. PC1: 08-00-46-06-FB-B6

c. PC4: 00-08-74-4D-8E-E2

Step 5 Determine the MAC addresses that the switch has learned

a. To determine the MAC addresses the switch has learned, use the **`show mac-address-table`** command as follows at the privileged EXEC mode prompt:

```
ALSwitch#show mac-address-table
```

b. How many dynamic addresses are there? 2

c. How many total MAC addresses are there? 51

d. How many addresses have been user defined? None

e. Do the MAC addresses match the host MAC addresses? Yes

Step 6 Determine the show MAC table options

a. To determine the options the **`show mac-address-table`** command has use the **`?`** option as follows:

```
ALSwitch#show mac-address-table ?
```

How many options are available for the **`show mac-address-table`** command? 12

```
ALSwitch#show mac-address-table ?
   address        mac address name
   aging-time     Show address aging time
   count          Show address count
   dynamic        Show 802.1d dynamic addresses
   interface      interface name
   notification   MAC notification parameters and history table
   secure         Show secure addresses
   self           Show system self addresses
   static         Show static addresses
   vlan           vlan name
   |              Output modifiers
   <cr>
```

b. Show only the MAC addresses from the table that were learned dynamically.

c. How many are there? 2

Step 7 Clear the MAC address table

To remove the existing MAC addresses use the **clear mac-address-table** command from the privileged EXEC mode prompt as follows:

```
ALSwitch#clear mac-address-table dynamic
```


Step 8 Verify the results

a. Verify that the **mac-address-table** was cleared as follows:

```
ALSwitch#show mac-address-table
```

b. How many total MAC addresses are there now? 49

c. How many dynamic addresses are there? 0

Step 9 Determine the clear MAC table options

a. To determine the options available use the command **clear mac-address-table ?** at the privileged EXEC mode prompt as follows:

```
ALSwitch#clear mac-address-table ?
```

How many options are there? 8

```
address         mac address name
dynamic         Clear 802.1d dynamic addresses
interface       interface name
notification    Clear MAC notification Global Counters
secure          Clear secure addresses
static          Clear static addresses
vlan            vlan number
<cr>
```

In what circumstances would these options be used?
To remove dynamic MAC address entries

Step 10 Examine the MAC table again

a. Look at the MAC address table again using the **show mac-address-table** command at the privileged EXEC mode prompt as follows:

```
ALSwitch#show mac-address-table
```

b. How many dynamic addresses are there? 2

c. Why did this change from the last display? Probably due to broadcast

d. If the table has not changed yet, ping the switch IP address from the hosts two times each and repeat Step 10.

Step 11 Exit the switch

a. Type **exit**, as follows to leave the switch welcome screen.

```
Switch#exit
```

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

```
Switch>enable
Switch#configure terminal
```



```
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#hostname ALSwitch
ALSwitch(config)#enable secret class

ALSwitch(config)#line con 0
ALSwitch(config-line)#password cisco
ALSwitch(config-line)#login
ALSwitch(config-line)#line vty 0 15
ALSwitch(config-line)#password cisco
ALSwitch(config-line)#login
ALSwitch(config-line)#interface Vlan1
ALSwitch(config-if)#ip address 192.168.1.2 255.255.255.0
ALSwitch(config-if)#ip default-gateway 192.168.1.1
ALSwitch(config)#exit

ALSwitch#show mac-address-table ?

  address        mac address name
  aging-time     Show address aging time
  count          Show address count
  dynamic        Show 802.1d dynamic addresses
  interface      interface name
  notification   MAC notification parameters and history table
  secure         Show secure addresses
  self           Show system self addresses
  static         Show static addresses
  vlan           vlan name
  |              Output modifiers
  <cr>

ALSwitch#show mac-address-table
Dynamic Address Count:                   2
Secure Address Count:                    0
Static Address (User-defined) Count:     0
System Self Address Count:              49
Total MAC addresses:                    51
Maximum MAC addresses:                2048
Non-static Address Table:
Destination Address  Address Type  VLAN  Destination Port
-------------------  ------------  ----  --------------------
0008.744d.8ee2       Dynamic          1  FastEthernet0/4
0800.4606.fbb6       Dynamic          1  FastEthernet0/1


ALSwitch#show mac-address-table dynamic
Non-static Address Table:
Destination Address  Address Type  VLAN  Destination Port
-------------------  ------------  ----  --------------------
0008.744d.8ee2       Dynamic          1  FastEthernet0/4
0800.4606.fbb6       Dynamic          1  FastEthernet0/1

ALSwitch#clear mac-address-table

ALSwitch#show mac-address-table
Dynamic Address Count:                   0
Secure Address Count:                    0
Static Address (User-defined) Count:     0
System Self Address Count:              49
Total MAC addresses:                    49
```



```
Maximum MAC addresses:                    2048

ALSwitch#clear mac-address-table ?
   address        mac address name
   dynamic        Clear 802.1d dynamic addresses
   interface      interface name
   notification   Clear MAC notification Global Counters
   secure         Clear secure addresses
   static         Clear static addresses
   vlan           vlan number
   <cr>

ALSwitch#show mac-address-table
Dynamic Address Count:                    2
Secure Address Count:                     0
Static Address (User-defined) Count:      0
System Self Address Count:                49
Total MAC addresses:                      51
Maximum MAC addresses:                    2048
Non-static Address Table:
Destination Address  Address Type  VLAN  Destination Port
-------------------  ------------  ----  --------------------
0008.744d.8ee2       Dynamic          1  FastEthernet0/4
0800.4606.fbb6       Dynamic          1  FastEthernet0/1
ALSwitch#exit



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=255
Reply from 192.168.1.2: bytes=32 time<10ms TTL=255
Reply from 192.168.1.2: bytes=32 time<10ms TTL=255
Reply from 192.168.1.2: bytes=32 time<10ms 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 = 0ms, Maximum =  0ms, Average =  0ms

C:\>ipconfig /all

Windows 2000 IP Configuration

   Host Name . . . . . . . . . . . . : laptop
   Primary DNS Suffix  . . . . . . . :
   Node Type . . . . . . . . . . . . : Broadcast
   IP Routing Enabled. . . . . . . . : No
   WINS Proxy Enabled. . . . . . . . : No

Ethernet adapter Local Area Connection:

   Connection-specific DNS Suffix  . :
   Description . . . . . . . . . . . : Intel 8255x-based PCI Ethernet
      Adapter (10/100)
   Physical Address. . . . . . . . . : 08-00-46-06-FB-B6
   DHCP Enabled. . . . . . . . . . . : No
   IP Address. . . . . . . . . . . . : 192.168.1.10
```



```
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Default Gateway . . . . . . . . . : 192.168.1.1
   DNS Servers . . . . . . . . . . . :


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=255
Reply from 192.168.1.2: bytes=32 time<10ms TTL=255
Reply from 192.168.1.2: bytes=32 time<10ms TTL=255
Reply from 192.168.1.2: bytes=32 time<10ms 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 = 0ms, Maximum =  10ms, Average =  2ms

C:\>ipconfig /all

Windows 2000 IP Configuration

   Host Name . . . . . . . . . . . . : inspiron1
   Primary DNS Suffix  . . . . . . . : cisco.com
   Node Type . . . . . . . . . . . . : Hybrid
   IP Routing Enabled. . . . . . . . : No
   WINS Proxy Enabled. . . . . . . . : No

Ethernet adapter Local Area Connection:

   Connection-specific DNS Suffix  . :
   Description . . . . . . . . . . . : 3Com 3C920 Integrated Fast
         EthernetController (3C905C-TX Compatible)
   Physical Address. . . . . . . . . : 00-08-74-4D-8E-E2
   DHCP Enabled. . . . . . . . . . . : No
   IP Address. . . . . . . . . . . . : 192.168.1.20
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Default Gateway . . . . . . . . . : 192.168.1.1
   DNS Servers . . . . . . . . . . . :
C:\>
```

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**.

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

```
Switch>enable
```


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.

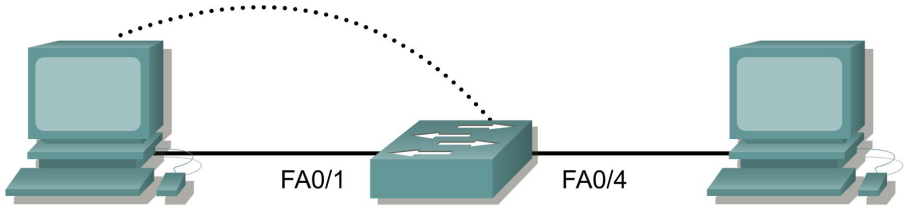
```
#delete nvram
```

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 6.2.3 Managing the MAC Address Table – 2950 Series



Switch Designation	Switch Name	Enable Secret Password	Enable,VTY, and Console Passwords	VLAN 1 IP Address	Default Gateway IP Address	Subnet Mask
Switch 1	ALSwitch	class	cisco	192.168.1.2	192.168.1.1	255.255.255.0

Objective

- Create a basic switch configuration.
- Manage the switch MAC table.

Background/Preparation

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 1900 Series switch, which initially displays a User Interface Menu. Select the “Command Line” option from the menu to perform the steps 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 to use the same IP subnet for the address, mask, and default gateway as on the switch.

Step 3 Verify connectivity

a. To verify that hosts and switch are correctly configured, `ping` the switch IP address from the hosts.

b. Were the pings successful? Yes

c. If the answer is no, troubleshoot the hosts and switch configurations.

Step 4 Record the MAC addresses of the host

a. Determine and record the layer 2 addresses of the PC network interface cards.

If running Windows 98, check by using **Start** > **Run** > **`winipcfg`**, then click on **`More info`**.

If running Windows 2000, check by using **Start** > **Run** > **`cmd > ipconfig /all`**.

b. PC1: 00-01-02-76-8E-EC

c. PC4: 00-01-02-76-90-DD

Step 5 Determine the MAC addresses that the switch has learned

a. To determine the MAC addresses the switch has learned, use the **`show mac-address-table`** command as follows at the privileged EXEC mode prompt:

```
ALSwitch#show mac-address-table
```

b. How many dynamic addresses are there? 2

c. How many total MAC addresses are there? 6

d. How many addresses have been user defined? None

e. Do the MAC addresses match the host MAC addresses? Yes

Step 6 Determine the show MAC table options

a. To determine the options the **`show mac-address-table`** command has use the **`?`** option as follows:

```
ALSwitch#show mac-address-table ?
```

How many options are available for the **`show mac-address-table`** command? 11

```
ALSwitch#show mac-address-table ?
  address       address keyword
  aging-time    aging-time keyword
  count         count keyword
  dynamic       dynamic entry type
  interface     interface keyword
  multicast     multicast info for selected wildcard
  notification  MAC notification parameters and history table
  static        static entry type
  vlan          VLAN keyword
  |             Output modifiers
  <cr>
```

b. Show only the MAC addresses from the table that were learned dynamically.

c. How many are there? 2

Step 7 Clear the MAC address table

To remove the existing MAC addresses use the **clear mac-address-table** command from the privileged EXEC mode prompt as follows:

```
ALSwitch#clear mac-address-table dynamic
```


Step 8 Verify the results

a. Verify that the **mac-address-table** was cleared as follows:

```
ALSwitch#show mac-address-table
```

b. How many total MAC addresses are there now? 4

c. How many dynamic addresses are there? 0

Step 9 Determine the clear MAC table options

a. To determine the options available use the command **clear mac-address-table ?** at the privileged EXEC mode prompt as follows:

```
ALSwitch#clear mac-address-table ?
```

How many options are there? 2

```
ALSwitch#clear mac-address-table ?
   dynamic       dynamic entry type
   notification  Clear MAC notification Global Counters
```

In what circumstances would these options be used?
To remove dynamic MAC address entries

Step 10 Examine the MAC table again

a. Look at the MAC address table again using the **show mac-address-table** command at the privileged EXEC mode prompt as follows:

```
ALSwitch#show mac-address-table
```

b. How many dynamic addresses are there? 2

c. Why did this change from the last display? Probably due to broadcast

d. If the table has not changed yet, ping the switch IP address from the hosts two times each and repeat Step 10.

Step 11 Exit the switch

a. Type **exit**, as follows to leave the switch welcome screen.

```
Switch#exit
```

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

```
Switch>enable
Switch#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#hostname ALSwitch
ALSwitch(config)#enable secret class


ALSwitch(config)#line con 0
ALSwitch(config-line)#password cisco
```



```
ALSwitch(config-line)#login
ALSwitch(config-line)#line vty 0 15
ALSwitch(config-line)#password cisco
ALSwitch(config-line)#login

ALSwitch(config-line)#interface Vlan1
ALSwitch(config-if)#ip address 192.168.1.2 255.255.255.0
ALSwitch(config-if)#no shutdown

ALSwitch(config-if)#ip default-gateway 192.168.1.1

ALSwitch(config)#exit

ALSwitch#show mac-address-table

               Mac Address Table
-------------------------------------------

Vlan    Mac Address       Type        Ports
----    -----------       --------    -----
 All    0009.b7f6.61c0    STATIC      CPU
 All    0100.0ccc.cccc    STATIC      CPU
 All    0100.0ccc.cccd    STATIC      CPU
 All    0100.0cdd.dddd    STATIC      CPU
 1    0001.0276.8eec    DYNAMIC     Fa0/1
 1    0001.0276.90dd    DYNAMIC     Fa0/4
Total Mac Addresses for this criterion: 6


ALSwitch#show mac-address-table ?
   address        address keyword
   aging-time     aging-time keyword
   count          count keyword
   dynamic        dynamic entry type
   interface      interface keyword
   multicast      multicast info for selected wildcard
   notification   MAC notification parameters and history table
   static         static entry type
   vlan           VLAN keyword
   |              Output modifiers
   <cr>

ALSwitch#show mac-address-table dynamic

          Mac Address Table
-------------------------------------------

Vlan    Mac Address       Type        Ports
----    -----------       --------    -----
 1    0001.0276.8eec    DYNAMIC     Fa0/1
 1    0001.0276.90dd    DYNAMIC     Fa0/4
Total Mac Addresses for this criterion: 2


ALSwitch#clear mac-address-table ?
   dynamic        dynamic entry type
   notification   Clear MAC notification Global Counters

ALSwitch#clear mac-address-table dynamic
```



```
ALSwitch#show mac-address-table

          Mac Address Table
-------------------------------------------

Vlan    Mac Address        Type         Ports
----    -----------        --------     -----
  All    0009.b7f6.61c0     STATIC       CPU
  All    0100.0ccc.cccc     STATIC       CPU
  All    0100.0ccc.cccd     STATIC       CPU
  All    0100.0cdd.dddd     STATIC       CPU
Total Mac Addresses for this criterion: 4


ALSwitch#show mac-address-table

          Mac Address Table
-------------------------------------------

Vlan    Mac Address        Type         Ports
----    -----------        --------     -----
  All    0009.b7f6.61c0     STATIC       CPU
  All    0100.0ccc.cccc     STATIC       CPU
  All    0100.0ccc.cccd     STATIC       CPU
  All    0100.0cdd.dddd     STATIC       CPU
  1     0001.0276.8eec     DYNAMIC      Fa0/1
  1     0001.0276.90dd     DYNAMIC      Fa0/4
Total Mac Addresses for this criterion: 6
ALSwitch#
```


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**.

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

   ```
   Switch>enable
   ```

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**.

3. 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**.

