6.1.3 Device Connection Facts

You must configure an enterprise network switch before you implement it. An *unmanaged switch* is a low-end switches available from many retail stores. To implement an unmanaged switch, plug it into a power outlet and connect your network devices with UTP cables. While unmanaged switches are convenient and easy to implement, they lack many of the advanced management and security features available. It is preferable to use a managed switch instead. A *managed switch* is a switch that must be configured before you can use it.

In-Band Management

In-band management allows you to perform router and switch management tasks using a standard network connection. You do this with management utilities your workstation operating system provides through a network connection. For example, tools such as Telnet and SSH provide in-band management. Using the same network connection for both data and management has several drawbacks:

- You must compete with normal network traffic for bandwidth.
- The network traffic created by the management utilities must have protection from sniffing attacks to ensure that hackers cannot capture sensitive configuration information.
- If the network connection is unavailable or the device is unresponsive to network communications, you cannot perform management tasks.

Out-of-Band Management

Out-of-band management allows you to use a dedicated communication channel that separates management traffic from normal network traffic. Network switches and routers allow you to use console redirection to access the device's console through a built-in serial or USB port. For example, Cisco routers and switches do not use monitors, and you cannot connect a keyboard or a mouse directly to the device. Instead, you connect a standard PC to the device's console port to manage the device.

System Management

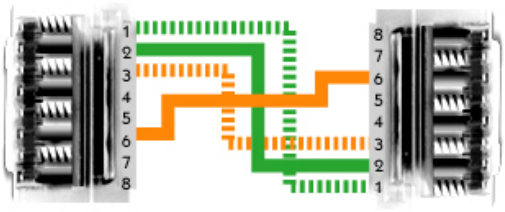
Use the following options to manage a Cisco device:

Cisco Connection Type	Description
Console	A console connection allows for a direct connection through a PC to the console port on the device. The PC needs a terminal emulation program (such as PuTTY) to connect to the device's command line interface. This is an example of out-of-band management. In the terminal emulation program, use the following settings: ▪ 9600 baud (or a rate supported by your router) ▪ Data bits = 8 (default) ▪ Parity = None (default) ▪ Stop bits = 1 (default) ▪ Flow control = None
Virtual Terminal (VTY)	A VTY connection connects through a LAN or WAN interface configured on the device. Use a program (such as PuTTY) to open the command line interface. This is an example of in-band management. The Cisco device must be configured with an IP address before a VTY connection can be made.
Security Device Manager (SDM)	The Cisco SDM allows a web browser connection to the device using HTTPS. When connected, the SDM allows you to manage the security features and network connections through a web-based graphical user interface. This is an example of in-band management. Be aware of the following SDM settings: ▪ 10.10.10.1 is the default IP address of the SDM. ▪ The default value for both the username and password is **cisco**. A new router may not be completely configured for an SDM connection, so you may need to make a console connection first.

Router and Switch Connection

Use the following cable types to make the initial connection to the switch or router for device management:

Cable Type	Pin-outs	Use

 Rollover Ethernet Cable	1 ' 8 2 ' 7 3 ' 6 4 ' 5 5 ' 4 6 ' 3 7 ' 2 8 ' 1	Use a rollover Ethernet cable to connect the device's console port to the serial port on a PC. Connect the RJ45 end to the console port, and connect the serial end to the PC. A rollover cable is also called a *console cable*. Many recently developed Cisco devices use a USB for the console connector, so you can access it with any standard USB cable.
 Straight-Through Ethernet Cable	1 ' 1 2 ' 2 3 ' 3 6 ' 6	Use a straight-through Ethernet cable to connect an Ethernet port on a router to an Ethernet port on a hub or switch. You can then access the router from another PC connected to the same network using a VTY connection. If the router has an AUI port, connect one end to an AUI transceiver before you connect to the router.
 Crossover Ethernet Cable	1 ' 3 2 ' 6 3 ' 1 6 ' 2	Use a crossover Ethernet cable to connect an Ethernet port on a router directly to the NIC in a PC. Establish a VTY session from the PC to connect to the device. If the router has an AUI port, connect one end to an AUI transceiver before you connect to the router.