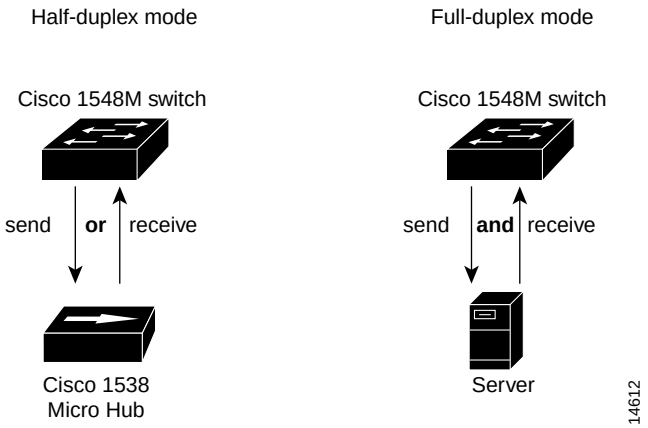
Concepts

This appendix provides further explanation of concepts related to the switch. It also provides information on how to use the switch in your network.

Half- and Full-Duplex Autonegotiation

Each switch port can operate in either half-duplex or full-duplex mode. As shown in Figure A-1, when port 1 is in half-duplex mode, at a given time, it can either send data to port 2 or receive data from port 2. When port 1 is in full-duplex mode, it can simultaneously send data to and from the port, doubling the throughput between ports.

Figure A-1 Half- and Full-Duplex Mode



Autosensing and Autonegotiation

The switch supports the autosensing of wire speed and the autonegotiation of duplex mode. As a result, when the switch is connected to another network device, it can sense the highest speed and determine the duplex mode that the connected device is capable of. The highest common capabilities for both devices then become the operating modes.

The switch has the following operating priorities:

1. 100 Mbps, full-duplex mode
2. 100 Mbps, half-duplex mode
3. 10 Mbps, full-duplex mode
4. 10 Mbps, half-duplex mode

For example, if the switch is connected to a Cisco 1538 series Micro Hub, upon startup, the switch and the hub communicate the following capabilities to each other:

- The switch and hub both support autonegotiation.
- The switch and hub can both run at 100 and 10 Mbps. (The operating priority of the switch is 100 Mbps.)
- The switch can run in full- and half-duplex mode. The hub can run in half-duplex mode only.

Because both devices can run at either 100 or 10 Mbps, 100 Mbps is selected because it is the highest priority for both switch and hub. Because the hub can run only in half-duplex mode, half-duplex mode is selected.

In the previous example, both the switch and the hub are capable of autonegotiation. However, if the switch is connected to a device that is not capable of autonegotiation, the switch does the following:

- Uses the operating speed of the other device
- Uses half-duplex mode

However, if the nonautonegotiating device connected to the switch can run in full-duplex mode, the following might occur:

- The throughput of the connection might be less than what you expect. (Although both the switch and the nonautonegotiating device can run in full-duplex mode, the switch uses a default of half-duplex mode.)
- Excessive collisions. (If the nonautonegotiating device is running in full-duplex mode, it might attempt to transmit data at the same time that the switch is attempting to transmit data, thereby causing data collisions.)

To prevent either of these situations from occurring, Cisco recommends that you set the duplex mode on the nonautonegotiating device to half-duplex mode.

Network Examples of the Switch

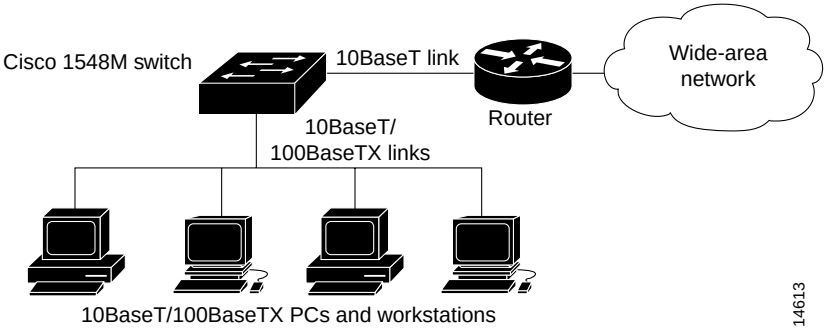
This section describes two common examples of how you can use the switch:

- High-performance desktop
- Network backbone

High-Performance Desktop

You can build a network for your small business or workgroup by using a switch and other network devices such as a router, PCs, or workstations. Figure A-2 shows an example of such a network.

Figure A-2 High-Performance Desktop



Network Backbone

You can build a network backbone for your small business or workgroup by using a switch and other network devices such as a router, a server, hubs, PCs, and workstations. Figure A-3 shows an example of such a network.

Figure A-3 Network Backbone