

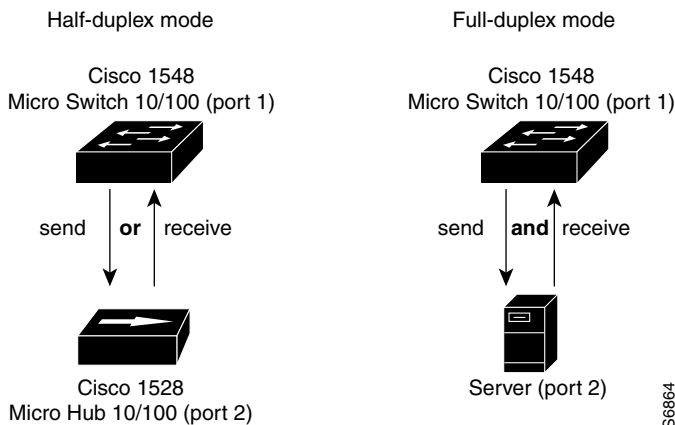
# Concepts

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 Mode

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 port 2 and receive data from port 2, doubling the throughput between ports 1 and 2.

**Figure A-1 Half- and Full-Duplex Mode**



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# Autonegotiation

The switch supports the autonegotiation of both speed and duplex mode. As a result, when the switch is connected to another network device that is capable of autonegotiation, the two devices communicate common speeds and duplex modes to each other. Then, the highest common capabilities for both devices become the operating modes.

You cannot disable the autonegotiation of speed and duplex mode on the switch.

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 1528 Micro Hub 10/100, upon startup, the switch and the hub communicate the following capabilities to each other:

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

Because both devices can run at either 100 and 10 Mbps, 100 Mbps is chosen 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 chosen.

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 will do the following:

- Use the operating speed of the other device
- Use 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. You might expect full duplex to be the mode used and be surprised that the throughput is less than that associated with full-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

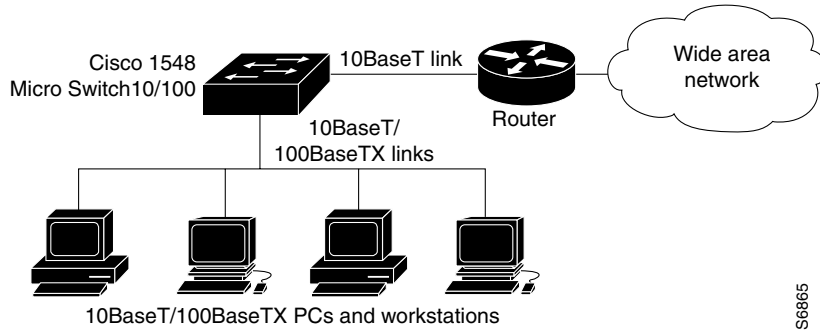
This section describes two common examples of how you can use the switch:

- 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**



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# 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**

