

- Each segment defines a collision domain.
- All devices connected to the same bridge or switch belong to the same broadcast domain.

Network Layer Functions

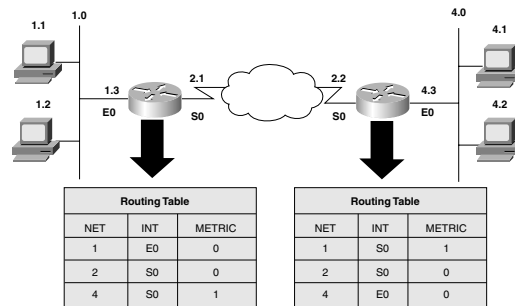
Network traffic must often span devices that are not locally attached or that belong to separate broadcast domains. Two pieces of information are needed to do this:

- A logical address associated with the source and destination stations
- A path through the network to reach the desired destinations

Router Operation at the Network Layer

Routers operate by gathering and trading data on different networks and selecting the best path to those networks. Routing tables contain the following information:

- **Network addresses**—32-bit addresses.
- **Interface**—The port used to reach a given destination.
- **Metric**—Criteria used to influence path selection when multiple paths exist. Metrics include hops, time, and speed.



Transport Layer Functions

A logical connection (session) must be established to connect two devices in a network. The transport layer

- Allows end stations to multiplex multiple upper-layer segments into the same data streams
- Provides reliable data transport (guaranteed delivery) between end stations (on request)

Lower Layers Summary

- The physical layer specifies the media type, connectors, signaling, voltage level, data rates, and distances required to interconnect network devices.
- Hubs allow several end stations to communicate as if they were on the same segment.
- A collision occurs when two stations transmit at the same time.
- Hubs have a single collision domain and a broadcast domain.
- The data link layer determines how data is transported.
- Bridges and Layer 2 switches function at the data link layer.
- All devices connected to a bridge or Layer 2 switch belong to the same broadcast domain.
- All devices connected to a single segment of a Bridge or Layer 2 switch belong to the same collision domain.
- The network layer defines how to transport traffic between devices that are not locally attached.
- The transport layer defines session setup rules between two end stations.
- Routers use routing tables to navigate paths to distant networks.

Assembling and Cabling Cisco Devices

LAN Specifications and Connections

The term *Ethernet* encompasses several LAN implementations. Physical layer implementations vary, and all support various cabling structures. There are three main categories:

- **Ethernet (DIX) and IEEE 802.3**—Operate at 10 Mbps over coaxial cable, UTP, or fiber.
- **100 Mbps Ethernet (Fast Ethernet IEEE 802.3u)**—Operates over UTP or fiber.
- **1000 Mbps Ethernet**—Gigabit Ethernet that operates over fiber.

Data Link (MAC layer)	Ethernet	802.3						
Physical		10Base2	10Base5	10BaseT	10BaseF	100BaseTX	100BaseFX	100BaseT4
DIX Standard		802.3 Specifications for 10 Mb Ethernet				802.3u Specifications for 100 Mb (Fast) Ethernet		