

Cisco Exploration 1

Module 2 – Communicating Over the Network

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Elements of Communication

All communication methods have this in common:

1. Sender
2. Receiver
3. Channel

Definition network: data or information networks capable of carrying many different types of communications, including traditional computer data, interactive voice, video, and entertainment products

Communicating the Messages

Segmentation benefits:

It is preferable to break messages into smaller pieces to allow for multiple messages to be sent. To help prevent the corruption of some data, this would ruin a large continuous stream of data. This method of **segmentation** helps make networks more reliable because data can travel different paths to one destination.

Segmentation downside:

Segmentation introduces another level of complexity to the network.

End Devices and their Role on the Network

End devices are devices most people are familiar with, for example computers, network printers, VoIP phones, security cameras, and mobile devices such as PDA's, cell phones, and iPods. We can also refer to these devices as **hosts** on the network because they are either the sender or receiver of information over a network. Note that both clients and servers are considered end devices or hosts.

Intermediary Devices and their Role on the Network

Intermediary devices provide connectivity and allow or prevent the flow of data across a network or networks. These devices connect hosts to a network and connect networks together. Examples of intermediary devices are:

1. Network Access (hubs, switches, wireless access points)
2. Internetworking Devices (router)
3. Communication Servers and Modems
4. Security Devices (firewall)

These devices use the destination host address to make decisions on where to send data.

Network Media

Modern networks use the following three types of media to communicate: copper, fiber glass, and wireless.

Networks

An individual network usually spans a single geographical area, providing services and applications to people within a common organizational structure, such as a single business, campus or region. This type of network is called a **Local Area Network (LAN)**.

Networks that connect LANs in geographically separated locations are referred to as Wide Area Networks (WANs).

Network Representations

1. Network Interface Card (NIC)
2. Physical Port
3. Interface

Network Protocols

At the human level we have basic rules of communication that should be followed. At the network level there also exist rules of communication. These rules are called **protocols**. These protocol suites (sets of rules) are sometimes proprietary or open to everyone.

A **standard** is a process or protocol that has been endorsed by the networking industry and ratified by a standards organization, such as the Institute of Electrical and Electronics Engineers (IEEE) or the Internet Engineering Task Force (IETF).

Example Protocol Stack: HTTP, TCP, IP, Ethernet

Protocols and Reference Models

Open Systems Interconnection (OSI) Model: Application, Presentation, Session, Transport, Network, Data Link, Physical

TCP/IP Model: Application, Transport, Internet, Network Access

Protocol Data Units and Encapsulation

The form that a piece of data takes at any layer is called a Protocol Data Unit (PDU).

- Data - The general term for the PDU used at the Application layer
- Segment - Transport Layer PDU (header)
- Packet - Internetwork Layer PDU (header)
- Frame - Network Access Layer PDU (header and trailer)
- Bits - A PDU used when physically transmitting data over the medium