Introduction to Networking II

Internet Access Technologies

Popular services for home users / small offices:
(1) Broadband cable
(2) Broadband asymmetric digital subscriber line (ADSL)
(3) Metro Ethernet [Wireless WAN]
(4) Mobile services

Organizations need → To support IP phones, video conferencing connections & data center storage

Business-class interconnections: usually provided by service providers (SP)
(1) Business Symmetric DSL (SDSL)
(2) Leased lines
(3) Metro Ethernet

Home / Small office Internet Connections

Cable	- high bandwidth - always on - internet offered by cable television SP
DSL	- high bandwidth - always on - internet connection that runs over a telephone line
Cellular	- uses a cell phone network to connect to the internet
Satellite	- major benefit to rural areas without ISP

Dial-up telephone	- an inexpensive, low bandwidth option using a modem

Business Internet Connections

Corporate business connections : (1) higher bandwidth
(2) dedicated connections
(3) managed services

Dedicated Leased line	- Reserved circuits within SP's networks - Connect distant offices with private voice/ data networking
Metro Ethernet WAN	- Extended LAN access technology into the WAN
SDSL	- Available in various formats
Satellite	- Provide a connection when a wired solution is not available

The Converging Network

Before : (1) Separately cabled for telephone, video & data
(2) Each network would use different technologies to carry the signal
(3) Each technology would use a different set of rules and standards

After : Converged data networks carry multiple services on 1 link
(1) data (2) voice (3) video
* Uses the same set of rules and standards

Network Architecture

4 basic characteristics of reliable network :
(1) Fault Tolerance
(2) Scalability
(3) Quality of Service (QoS)
(4) Security

Fault Tolerance

- Fault tolerant network limits the impact of a failure by limiting the number of affected devices

* Multiple paths are required for fault tolerance

Packet switching : splits traffic into packets that are routed over a network

(Each packet could theoretically take a different path to the destination)

* Not possible with circuit-switched networks which establish dedicated circuits

Scalability

Scalable Network :
(1) Can expand quickly
(2) Easily to support new users / applications without impacting the performance of services to existing users

Follow accepted standards/protocols → To make the networks scalable

Quality of Service (QoS)

- The primary mechanism used to ensure reliable delivery of content for all users

- QoS policy in place → Router can more easily manage the flow of data/voice traffic

Network Security

2 main types : (1) Network Infrastructure Security

- Physical security of network devices preventing unauthorized access to the devices

(2) Information Security

- Protection of the info/data transmitted over the network

3 goals of network security : (1) Confidentiality
(2) Integrity
(3) Availability

Network Trends

- Bring Your Own Device (BYOD)
- Online collaboration
- Video communications
- Cloud computing

Cloud computing : allows us to store personal files/backup

our data on servers over the internet

Advantages: (1) Apps can also be accessed using the Cloud
(2) Allows businesses to deliver to any device anywhere in the world

Made possible by data centers (less server, storage)

4 types of Clouds: (1) Public Clouds
(2) Private Clouds
(3) Hybrid Clouds
(4) Custom Clouds [private / public]

Powerline Networking

- Allow devices to connect to a LAN where data network cables / wireless communications are not a viable option
- Especially useful when WAPs cannot reach all the devices in the home