

INET001 – Networking Essentials

Chapter 1: Basics

Composition of Network

The Internet is the world's largest network, a network of networks consisting of public and private networks. It is not owned by any entity ensuring effective communication with standardised application and recognised technologies

Participants:

- **Clients:** Computer that **request** information
- **Servers:** Computer that **provide** information

Client-Server Architectures:

Peer-Peer:

Client server software runs on the same computer, allowing each computer to be a server and client at the same time

Advantages:

- Easy to set up
- Less complex
- Cheap
- Can be used for simple task

Disadvantage:

- Less secure
- No centralised file
- Not Scalable (grow and manage)
- Slows down the performance (multitasking)

Components of Network Infrastructure:

- **Devices:** Hardware
 - o **End Devices:** The destination or source of the data, distinguished by an address
 - o **Intermediary Devices:** Connects end devices and networks together
- **Media:** Medium
 - o **Metallic Wires:** encoded into pulses of electricity
 - o **Fibre/Glass Wires:** encoded into pulses of light
 - o **Wireless:** encoded into wavelengths
- **Services:** Network applications

Topology Diagrams:

- **Physical:** Identify the physical location
- **Logical:** identify ports, devices and addressing schemes

Types of Networks:

Area covered, and users connected

- **LAN:** Cover small area, high speed & bandwidth and single admin
- **MAN:** Covers area larger than LAN but smaller than WAN
- **WAN:** Covers large area, low speed between LAN and multiple admin

Area of Responsibility:

- **Storage Area Network (SAN):** Storage of data

Number and Type of Service:

- **WLAN:** Wireless LAN

Scope:

- **Intranet:** Internal network with limited access to internal organisation (within)
- **Extranet:** Connection to access intranet data for authorised outsiders

Type of Data transfer Supported:

- **Separated Network:** multiple services on multiple networks. (traditional)
- **Converged Network:** different services over the same network.

Connecting to the Internet:

Need to use ISP (Internet Service Provider):

A. Home & Small Businesses:

- 1) **Cable:** connected using television cable with high bandwidth
- 2) **DSL:** Digital Subscriber Line using telephone cable
 - o **ADSL:** Asymmetric, Download speed > upload speed
- 3) **Cellular:** using phone network, limited to phone network reception
- 4) **Satellite:** Use satellite dishes (for remote location)
- 5) **Dial up phone:** using phone line and modem with low bandwidth

B. Businesses:

- 1) **Dedicated Leased Line (DLL):** Leased lines reserved in provider for large businesses, rented monthly expensively and connect separate offices with high traffic
- 2) **Ethernet WAN:** Extend Ethernet LAN into WAN (new)
 - **SDSL:** Symmetric, Download speed = upload speed
- 3) **Satellite:** Used in satellite dish

User's expectation of network Standards:

- **Fault Tolerance:** quick recovery and limits failure effect
 - **Packet Switched network:** splits failure to multiple paths
 - **Circuit Switch network:** dedicated line, no option during failure
- **Scalability:** Expand quickly without effecting performance
- **Quality of Service:** Ensuring the quality of the network (avoids congestion)
- **Security:** Ensures integrity, confidentiality and availability of network

Trends:

- **BYOD:** Bring Your Own Devices for flexibility, freedom and communication
- **Collaboration:** Act of Working Together
- **Video Communications**
- **Cloud Computing:** Allows expansion with effective cost and less effort
- **Powerline networking:** Efficient use of electricity using networks

Network Security:

- **Antivirus:** protect from harmful software
- **Basic Firewall:** Basic filtering and limit access
- **Dedicated Firewall**
- **Access Control List (ACS):** Filter traffic
- **Intrusion Prevention List (IPS):** identify spreading threats
- **Virtual Private Network (VPN):** Secure access to workers

