Data Communication and Networking

The computer network

A computer network is a group of computers/devices(Nodes) that use a set of common communication protocols over digital interconnections for the purpose of sharing resources located on or provided by the network nodes.

The nodes of a computer network may include personal computers, servers, networking hardware, or other specialized or general-purpose hosts

The interconnections between nodes are formed from a broad spectrum of telecommunication network technologies, based on physically wired, optical, and wireless technologies.

A communications protocol is a set of rules for exchanging information over a network

The advantages/uses of network

Simultaneous access

There are moments in any business when several workers may need to used the same data at the same time

Shared peripheral devices

Personal communications

Video conferencing

Voice over internet protocol transmits the sound of voice over a computer network using the internet protocol rather than sending

1. NIC Card
2. Repeater
3. Hub
4. Switch
5. Bridge
6. Router
7. Gateway
8. Firewall

Communication protocols

Also called TCP/IP, is the foundation of all modern networking.

It defines the addressing, identification and routing specifications for ipv4 and ipv6

It is the defining set of protocols for the internet

IEEE 802

It is a family of IEEE standards in dealing with local area networks and metropolitan area networks

They operate mostly at levels 1 and 2 of the osi model.

TCP/IP protocol suite

HTTP

FTP

SMTP

DNS

RIP

SNMP

SONET/SDH

Synchronous optical networking SONET and synchronous digital hierarchy sdh are standardized multiplexing protocols that transfer multiple digital bit steams over optical fibre using lazers

Asynchronous transfer module ATM

It uses asynchronous time division multiplexing and encodes data into small fixed sized cells

Good choice for a network tht handle both traditional high throughput something

TYPES OF NETWORK

1. (PAN) personal area network
2. (LAN) local area network
3. (CAN) campus area network
4. (MAN) metropolitan area network
5. Wan
6. San

What is a webpage?

Content(Words and images)

Structure(Html)

Style(Css)

Behavior(Javascript & server programs)

The world wide web

Web server: software that listens for webpage requests

* Apache
* Microsoft internet information server (IIS)(part of windows)

Web browser: fetches /displays documents rom web servers

* Mozilla Firefox
* Google chrome ect

# The internet: A brief history

Began as a us department of defence network called arpanet (1960s-70s)

* Initial services: electronic mail, file transfer
* Opened to commercial interests in the late 80s

WWW created in 1989-91 by tim berners-lee

Popular web browsers released netscape 1994, IE 1995

Key aspects of the internet

* Subnetworks can stand on their own
* Computers can dynamically join and leave the network\
* Build on open standards; anyone can create a new internet device
* Lack of centralized control (mostly)
* Everyone can use it with simple commonly available software

## People and organizations (and companies)

* Internet engineering task force (ietf): internet protocol standards
* Internet corporation for assigned names and numbers (icann) decides top level domain names
* World wide web consortium w3c web standards
* These protocols are carried out in large part by internet service providers

Internet protocol ipv4 ipv6

* A simple protocol for attempting to send data between two computers
* Each device has a 32-bit or 128-bit ip address. For ipv4 this is written as four 8-bit numbers (0-255)

### Domain name system (DNS)

* Think about some domain names you know what do they end with?
* Used to only be .com .org .net .gove .edu .int .mil ….. Then there were two letter extensions lke .uk .es, now everything
* Domain name systems is a set of servers that map written names to ip addresses
* Example: mnu.edu.mv