

CB U4: The Internet, Fault Tolerance, Parallel and Distributed Computing

Internet

The internet responded to computer demands of interconnection. A computer network is a group of interconnected computers capable of sending/receiving data.

Computers send and receive data in packets.

A packet is a small amt of data sent over a network.

Packets are **routed** through **paths** between two computers.

Bandwidth is the max amount of data that can be sent in a computer network in a fixed time.

Networks

Network interface cards allow computers to access the internet. Each computer/NIC is uniquely identified by its MAC Addr.

A packet contains metadata for routing information, including its origin and destination.

LAN: A local area network of a few computers (1-100) WAN: the internet links millions of systems together

The internet is scalable because it is decentralized.

Layers

1. Transport
 1. TCP/UDP facilitate the sending and receiving of packets across the internet.
2. Internet
 1. IP Addr. identifies a computer on a network
 2. Targets
 1. Unicast-specific device
 2. Multicast-range of IPs
 3. Broadcast-all devices
3. Application Layer
 1. DNS resolves domain names into IP addresses to allow communications with servers
 2. HTTP allows sending of website data to web browsers
 3. HTTPS enables secure sending of encrypted data

Fault Tolerance

Fault Tolerance/Redundancy is achieved with multiple ways that result in the same goal.

The internet's many routing options is an example of fault tolerance, it allows the internet to still work even if some devices are down, making it more accessible.

Networks are a connection of many interconnected devices, allowing many routes for data to be transferred.

Parallel Computing.

Parallel processes involve a parallel and sequential portion.

Parallel computing allows algorithms to scale more efficiently and easily.

Distributed computing allows a large network of computers to solve complex problems by joining resources.

Parallel computing has diminishing returns because it depends on some sequential portions.

Parallel computing: doing computations in parallel on one computer.

Distributed computing: doing computations across many computers on a network, and joining the results.