

Principles of Internetworking

Requirements for Internetworking

The overall requirements for an internetworking facility are:

1. Provide a link between networks. At minimum, a physical and link control connection is needed.
2. Provide for the routing and delivery of data between processes on different networks.
3. Provide an accounting service that keeps track of the use of the various networks and routers and maintains status information.
4. Provide the services just listed without requiring modifications to the networking architecture of constituent networks. This means accommodating the following differences:

- Different addressing schemes: e.g., naming (DNS), DHCP.
- Different maximum packet size: e.g., segmentation, ATM cells.
- Different network access mechanisms: e.g., Ethernet, FDDI, ATM.
- Different timeouts: longer with multiple networks.
- Different error recovery services: some networks will have it, others won't.
- Internetwork error recovery should be independent of individual networks.
- Different status reporting: how and whether this information can be shared.
- Different routing techniques: may depend on fault detection and congestion control techniques. Coordination is needed.
- Different user access control: authorization for use of the network.
- Connection-oriented vs. connectionless

Motivation for Internetworking

- Sharing of computer resources across a number of communications networks
- The use of multiple networks allows for network isolation when needed. This is critical to network performance as failure is contained within one network. Also, a network can be shielded from intrusion (Security).
- Contain the amount of traffic sent between the networks (e.g., Routing domains)

- Network Management that provides centralized support and troubleshooting capabilities in an internetwork.

Components of an Internetwork

- Campus Network: locally connected users in a building or group of buildings. It generally uses LAN technologies.
- Wide Area Networks (WANs): distant campuses connected together usually through connection providers such as a telephone company.
- Remote connections: linking branch offices and mobile users to a corporate campus. They are generally dial-up links or low bandwidth dedicated WAN links.

Routing domains

A routing domain is an administrative entity. Its goal is to establish boundaries for the dissemination of routing information.

- It is also useful for security administration.
- Provides accounting, billing, and revenue services (i.e., Accounting Management).
- Overcome the “flat network” problem by providing a routing hierarchy