Introduction to the Internet and Data Networking

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Goals of the Course

- **Week 1:** Gain a basic understanding of how the Internet was formed.
- **Week 2:** Understand the following networking concepts: LAN/WAN, Seven Layer OSI Model, TCP/IP.
- **Week 3:** Gather an overview of the various core technologies of Data Networking
- ***Week 4:* *Finish Core Data Networking Technologies and Understand what companies, agencies, and organizations are helping to build the Internet today.***
- **Week 5:** Have an ability to discuss the pros/cons of the Internet and why it will change the way we work, live, play, and learn.

Routing – Algorithms

- The goal of a routing algorithm is to route a packet from one point in the network to another point in the network through some set of intermediate routers without "looping," a situation in which a packet is forwarded across the same link several times.
- There are two general algorithms for computing: *distance-vector* and *link-state*.

Distance Vector Routing Protocols

- Distance Vector Algorithms are based on the "*Bellman-Ford*" Algorithm (page 172 of text).
- **RIP** – Routing Information Protocol Version 1
  - Derived from Xerox Network System's (XNS) routing protocol, which was also called RIP. It was bundled with BSD UNIX in 1982 as part of the TCP/IP protocol suite and became the de facto standard for IP routing.
- **RIPv2** - Routing Information Protocol Version 2
  - The following features were added: Authentication, Interpretation of IGP and BGP Routes, Next Hop Field, Multicasting.

Link-State Routing Protocols

- Link-State Algorithms are based on Dijkstra's Shortest Path First Algorithm (page 174 of text).
- Link State Advertisements (LSA) are sent as updates to all other devices including names and cost-metric value of its neighbors.
- Protocols Include: OSPF (Open Shortest Path First), OSI's IS-IS, and Netware's Link Services Protocol.

Common Circuit Speeds

<u>DIGITAL</u>

- DS-0: 64kbps
- DSL: 144k, 384k, 768k, 1.5M, others
- ISDN(BRI): 192kbps
- ISDN(PRI): 1.544Mbps
- T1(DS-1): 1.544Mbps
- T3(DS-3): 44.736Mbps (30 x T1)

<u>SONET</u>

•*OC-n: 51.84Mbps x n*
•OC-3: 155.52Mbps
•OC-12: 622.08Mbps
•OC-48: 2.49Gbps
•OC-192: 9.95Gbps

Common WAN Technologies

- Asynchronous Transfer Mode (ATM)
- Integrated Services Digital Network (ISDN)
- Point-to-Point Protocol (PPP)
- Frame Relay
- X.25
- Switched Multimegabit Data Service (SMDS)
- High-Speed Serial Interface (HSSI)
- Synchronous Data Link Control (SDLC)

Internet Organizations & Societies

- Internet Society (ISOC)
- Internet Architecture Board (IAB)
- Internet Engineering Steering Group (IESG)
- Internet Engineering Task Force (IETF)
- Internet Assigned Number Authority (IANA)
- RFC Editor
- InterNIC

Conclusion:

- Routing Algorithms
- Common Routing Protocols: DV & LS
- Common Circuit Speeds
- Common WAN Technologies
- Internet Organizations & Societies

- PROJECT FOR NEXT WEEK