Computer Networking

ATM  IP Switching  Gigabit Ethernet
RSVP  Differentiated Services

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Stone Age to Networking Age

- Microwave ovens, stereo, VCRs, had some effect. But, Stone, iron, ..., automotive, electricity, telephone, jet plane, ..., networks caused a fundamental change in our life style.
- In 1994, 9% of households with PC had Internet link. By 1997, 26%. Soon 98% ... like TV and telephone.
- URL is more important than a company's phone number. (54 URLs in first 20 pages of March’97 Good Housekeeping.)
- Email is faster than telegrams.
Life Cycles of Technologies

Number of Problems Solved

Research  Productization  Time

You are here

You are here
New Challenges: Exponential growth in number of users. Exponential growth in bandwidth per user. Traffic management, Security, Usability, ...
Overview

- Review of Networking: Ethernet, Bridging
- Datalink Control: Flow/Error control, HDLC, PPP
- IP: Addressing, forwarding, fragmentation
- Address Resolution Protocol
- IP Next Generation
- ICMP
- TCP & UDP
- Domain Name System
Overview (Cont)

- Network Management: SNMP, MIB
- Network Security: Firewalls
- Mobile IP
- Routing Algorithms: Dykstra and Bellman Ford
- Route Discovery Protocols: RIP, OSPF, BGP
- Multicasting: RPF, DVMR
- ATM, Frame Relay
- Multiprotocol Label Switching
- Multimedia over IP: RSVP, Integrated/differentiated Services
Day 1: Schedule (Tentative)

- 8:30-9:00  Course Introduction
- 8:30-10:15 Review of Networking: Ethernet
- 10:15-10:30 Coffee Break
- 10:15-12:00 Datalink Control: HDLC+PPP
- 12:00-1:00 Lunch Break
- 1:00-2:30 Internet Protocol (IP) + ARP
- 2:30-2:45 Coffee Break
- 2:45-4:30 IP Next Generation
# Day 2: Schedule (Tentative)

- **8:30-9:00**  | ICMP
- **9:00-10:15** | TCP and UDP
- **10:15-10:30** | Coffee Break
- **10:15-12:00** | Domain Name System
- **12:00-1:00** | Lunch Break
- **1:00-2:30**  | Network Management: SNMP, MIB
- **2:30-2:45**  | Coffee Break
- **2:45-4:00**  | Network Security
- **4:00-4:30**  | Mobile IP
Day 3: Schedule (Tentative)

- 8:30-9:30  Route Determination Algorithms
- 9:30-10:15  Route Discovery Protocols
- 10:15-10:30  Coffee Break
- 10:15-11:00  Route Discovery Protocols (Cont)
- 11:00-12:00  IP Multicast
- 12:00-1:00  Lunch Break
- 1:00-2:30  ATM Networks + Frame Relay
- 2:30-2:45  Coffee Break
- 2:45-3:30  IP Switching + MPLS
- 3:30-4:00  Multimedia over IP: RSVP, Diffserv
- 4:00-4:30  Final Review
Pre-Test

- Check if you know the difference between:
  - CSMA/CD and Aloha
  - Bit stuffing and Byte Stuffing
  - Stop-and-Wait and Window flow control
  - Go-back-N and Selective Reject
  - MTU and MSS
  - Link-local and Site-local addresses
  - Dot-decimal vs hex-colon notation
  - Slow start and Fast retransmit and Recovery
  - Port and Sockets
  - Autonomous System and Area
Pretest (Cont)

- Home agent and Foreign agent
- Proxy server and Firewall
- SNMP and RMON
- Distance vector vs Link State
- Dykstra vs Bellman-Ford
- Reverse path forwarding and core-based trees
- PIM dense mode and PIM Sparse Mode
- AAL5 and AAL2
- Committed Information Rate and Access Rate
- Integrated services and differentiated services
- Number of items checked ______
Pre-Test (Cont)

- If you checked more than 10 items, you may not gain much from this course.
- If you checked only a few or none, don’t worry. This course will cover all this and much more.
Disclaimers

- This course covers a lot of topics
- These topics are normally taught in 3 quarter-courses
- Fundamental and basics will be covered
- You will need to read RFC’s for detailed info
- This course has been designed specifically for you. Please feel free to ask questions, make comments, agree or disagree.
- More discussion ⇒ More relevant topics