Computer Networking

ATM

IP Switching

Gigabit Ethernet

RSVP

?

Differentiated Services

Raj Jain
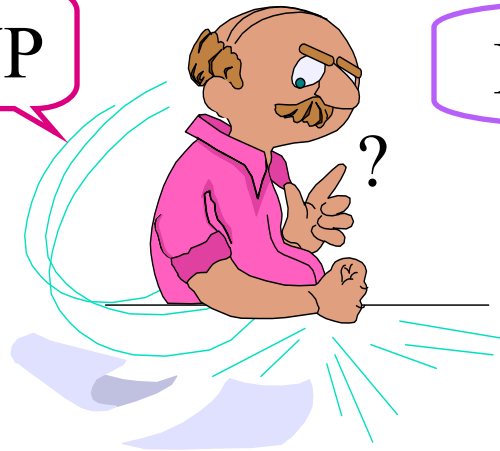
Prof‌essor‌ ‌of‌ ‌Computer‌ ‌and‌ ‌Information‌ ‌Sciences

Raj Jain is now at
Washington University in Saint Louis
Jain@cse.wustl.edu
http://www.cse.wustl.edu/~jain/

Raj Jain

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
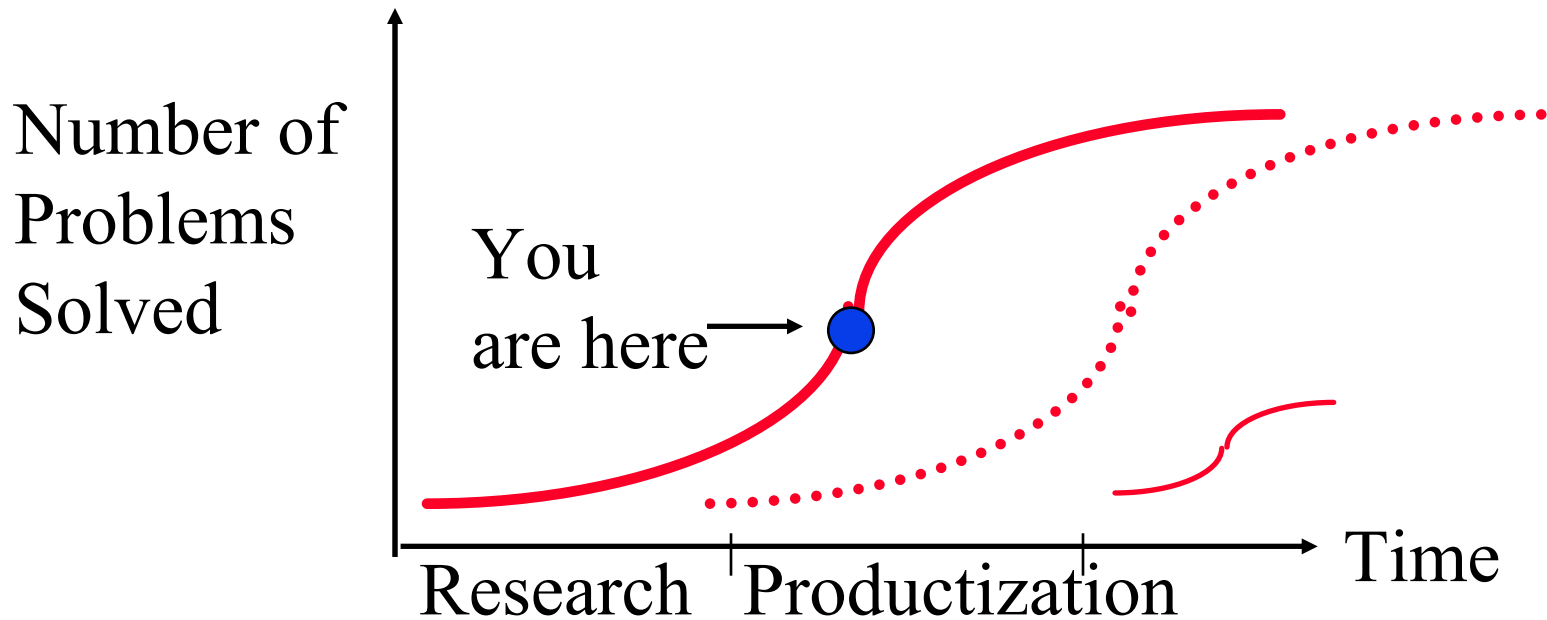
Internet Technology
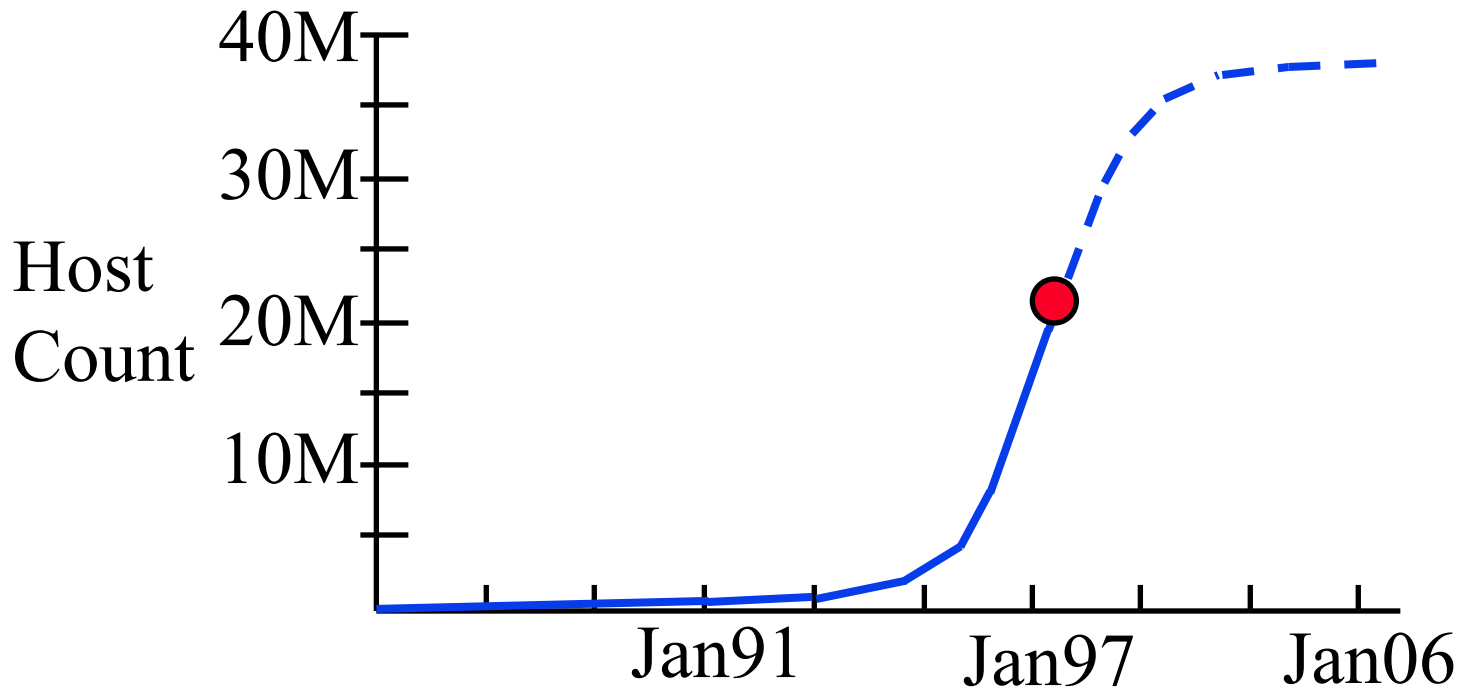
❑ **New Challenges**: Exponential growth in number of users. Exponential growth in bandwidth per user. Traffic management, Security, Usability, ...

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