1970s: **ARPAnet**
First large-scale packet switching network

1982: **DNS (Domain Name System)**
To fix a scaling problem

1983: **TCP/IP**
Switch to TCP/IP

mid-1980s: **congestion collapses**
Fix: TCP congestion control mechanism

1990s: **policy routing**
Space needed for increasing commercial traffic
Left classful addressing to classless addressing (CIDR)

1993: **CIDR, WWW**
Transition from academic to commercial
Short-term Problems

• SPAM
  – Rise in Spam over internet telephony (SPIT)
  – Can be contained, but not completely erased

• Security
  – Viruses, worms, phishing, spyware
  – Possible fix: taint-tracking

• Denial-of-Service (DoS) attacks
  – Bots flooding systems with unwanted traffic

• Application Deployment
  – Fitting applications with the Internet architecture
Medium-Term Problems

• Congestion Control
  – TCP congestion control: probes network for traffic
  – Issues with TCP’s limited dynamic range
    • Solution has to take into about: transmission, TCP range and fairness

• Inter-domain Routing (policy routing)
  – Each routing domain can decide which routes to accept and pass on to neighbors
  – BGP to enable policy routing
    • Problem: BGP is slow to converge, error-prone and difficult to debug
Medium-Term Problems (cont.)

• Mobility
  – Mobile IP: support for mobile hosts
  – Problems of deployment

• Multi-Homing
  – Connecting via more than one internet provider
  – Unclear how to deal with a massive increase in routes

• Architectural Stagnation

• **Longer Term: Address Space Depletion**
  – CIDR $\rightarrow$ IPv6