IPv6: Where Are We Going?

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IPv6 History

- IPv6 was proposed as part of rfc1752 January, 1995

    - Address space depletion was predicted

    - Version 5 was set aside for Internet Stream Protocol (rfc1190)

- Expanded address-size from 32 to 128 bits

- Provides built-in ability to add extensions (Security, etc)

IPv6 Today

- Asia and Europe are big IPv6 players
- US-DOD announced intent to convert to IPv6 June, 2003
- IPv6 service offerings growing in US
  - Verio offering native IPv6
  - Many providers of Tunneled IPv6 services
    - Hurricane Electric (Free)
    - Sprint

IPv6 Advantages

- No need for NAT to conserve address space
- Can solve one-way communication issues
- Hierarchal approach to address allocation
  - TLA (Top Level Aggregator)
  - NLA (Next level Aggregator)
  - SLA (Site level Aggregator)
- Extensible packet format
- QoS extensions built-in
- Can coexist with IPv4

Network Support

- Equipment
  - Cisco IOS - since 12.2 (2001)
  - Foundry - since Ironware 1.0 (2003)
  - Juniper - since 5.1 (2002)
- Forwarding Performance
  - Not all hardware can do IPv6 at line-rate
    - Some forwarding is done in software-path
  - Forwarding can be computationally expensive

OS Support for IPv6

- OS Support
  - Solaris 8 and newer
  - Linux 2.2 and newer
  - Windows 2000, XP
  - FreeBSD 4.0
  - OpenBSD 2.7
  - NetBSD 1.5

IPv6 Traffic Statistics

- Difficult to track on native IPv6 links
- Tunneled traffic peaks around 3Mb/s
- Lots of R&E SMTP & HTTP

Driving IPv6 Growth

- No 'Killer App' yet
- Multicast?
- Mobile/3G?
- VoIP?
- Government?
- Address Space Exhaustion?
  - Now Estimated For 2020-2041