Network Protocols

Internet Protocol version 6 (IPv6)
Motivation for IPv6

• The overriding need was for a larger address space
• Other potentially useful things were done:
  • simpler header format
  • fragmentation by the network is not allowed
  • header checksumming is no longer done
  • multiple addresses and scopes per interface
    • not fully ironed out how all this will be done
• Note, at this time, routing is essentially unchanged
IPv6 datagram format
IPv6 Options
Fragmentation changes
Changes to other protocols

- ICMP streamlined, combined with IGMP
- Upper layers need to know about IPv6 addresses
- New DNS record types (e.g. AAAA)
- RIP updated, RIPng
- OSPF updated, OSPFv3
- DHCPv6
IPv6 transition

- When, if ever?
- 6Bone and tunneling
- Dual stacks
- Address translation
- Software/stack changes required
Transition issues

- Colon hexadecimal notation with 0's compression
  - e.g. 2001:435:e201::1
- IPv4 addresses can be encoded with 96 leading 0's
  - e.g. ::140.192.5.1
- Assignment and encoding strategies
  - auto-configuration
    - EUI-64 encoded (use MAC in host id portion)
  - privacy extensions, geographical encoding, etc.