

IPv4 vs IPv6

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Why IPv6?

- Need for larger address space
 - IPv4 has 32-bit address field
- Support for new applications like real-time audio and video that require network guarantees in the network
 - header format helps speed processing/forwarding
 - header changes to facilitate QoS
 - new “anycast” address: route to “best” of several replicated servers

IPv6 Rationale

- Larger address space
- Efficient address allocation
- Simpler header processing
- Autoconfiguration
- Support for QoS
- Support for security
- Header TCP Payload

IPv4 Address Space Exhaustion
Currently, about 75% of the total IPv4 address space is either assigned or reserved.

IPv6: Benefits (1): Address length

- 32 bits in IPv4 , 128 bits in IPv6
- 340282366920938463463374607431768211456 addresses
- restores end-to-end transparency
- New possibilities for applications (p2p, voip, . . .)
- Static network assignments for every customer
- dynamic addresses still possible (privacy reasons)
- IPSec
- QoS capabilities

IPv6: new address format

- IPv4:
 - 32 bits, 4 x 8 bits, decimal notation, separated by '.'
 - { examples: 203.178.141.194, 195.30.0.2, 10.0.0.1
- IPv6:
 - { 128 bits, 8 x 16 bits, hexadecimal notation, separated by ':'
 - { leading zeroes can be left away ('0123:0001' = ':123:1')
 - { exactly one series of zeroes can be reduced to '::'
 - { examples:
 - 2001:200:0:8002:203:47ff:fea5:3085
 - 2001:608::2
 - fe80::210:60ff:fe80:3a16