

A Quick Overview of IPv6

Networks Three

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OSI Model

- Application
- Presentaion
- Session
- Transport
- **Network**
- Data Link
- Physical

- IPv4 was released in 1980¹ - 1981².
- It has been tremendously successful and will continue to be used for some time.
- It has some problems:
 - address exhaustion
 - complicated routing
 - poor support for security, QoS

¹RFC 760

²RFC 791

A new protocol was needed

- By the early 1990s it was clear that we needed a new protocol
- In 1992-1993, the IETF began looking into a version of IP.
- Relevant RFCs began to come out in 1996.

Some features of IPv6

- Larger address space
- Simplified headers
- Hierarchical addressing and routing
- Improved device autoconfiguration
- IPSec

IPv6 addresses

- IPv6 addresses are 128 bits long.
- The first 64 bits are used to identify the network.
- The second 64 bits are used for the host.
- Example: 2001:0DB8:AC10:FE01:0000:0000:0000:01A6
2001:DB8:AC10:FE01::1A6

Address types

- Unicast
 - Global
 - Link-Local
- Multicast
- Anycast
- N.B.: No broadcast

Address autoconfiguration

- Manual configuration and DHCP are still available for IPv6
- Very briefly, autoconfiguration works like this:
 - 1 a device determines its link-local address
 - 2 it sends *router solicitation* messages
 - 3 it receives *router advertisements* in response
 - 4 from these the device determines its *network prefix*
 - 5 it appends its 64 bit interface id to produce its address

- An IPv6 interface typically uses EUI-64 to obtain its interface ID.
- Basically, we take the 48 bit MAC address and stretch it out to 64 bits.
- Example:
 - 1 Start with a MAC address: 39:A7:97:07:CB:D0
 - 2 Insert FFFE into the middle: 39:A7:97:FF:FE:07:CB:D0
 - 3 Set the seventh³ to 1: 3B:A7:97:FF:FE:07:CB:D0

³The universal-local bit

Simplified Routing

