

- Version** (4 bits) · Always set to 6
- Traffic Class** (8 bits) · A DSCP value for QoS
- Flow Label** (20 bits) · Identifies unique flows (optional)
- Payload Length** (16 bits) · Length of the payload in bytes
- Next Header** (8 bits) · Header or protocol which follows
- Hop Limit** (8 bits) · Functions as IPv4's time to live field
- Source Address** (128 bits) · Source IP address
- Destination Address** (128 bits) · Destination IP address

Address Types

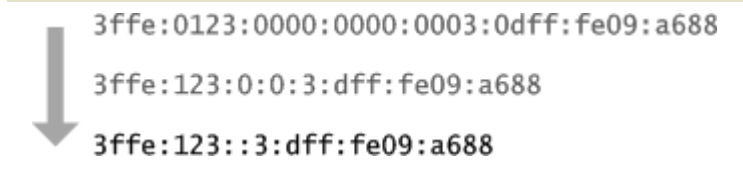
- Unicast** · One-to-one communication
- Multicast** · One-to-many communication
- Anycast** · An address configured in multiple locations

Special-Use Ranges

::/0	Default route
::/128	Unspecified
::1/128	Loopback
::/96	IPv4-compatible*
::FFFF:0:0/96	IPv4-mapped
2001::/32	Teredo
2001:DB8::/32	Documentation
2002::/16	6to4
FC00::/7	Unique local
FE80::/10	Link-local unicast
FEC0::/10	Site-local unicast*
FF00::/8	Multicast

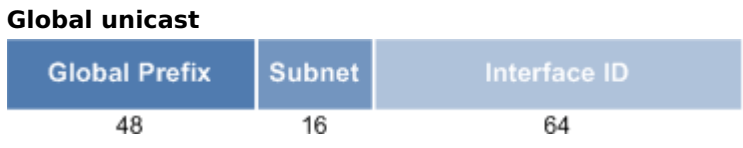
* Depreciated

Address Notation

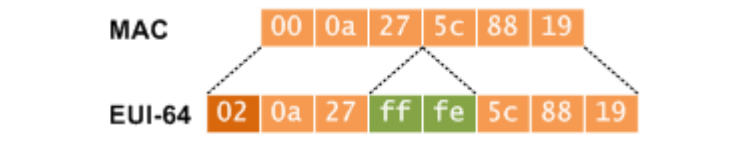


- Step 1** · Eliminate all leading zeros
- Step 2** · Replace up to one set of consecutive zeros with a double-colon

Address Formats



EUI-64 Formation



- Step 1** · Insert 0xfffe between the two halves of the MAC
- Step 2** · Flip the seventh bit (universal/local flag) to 1

Extension Headers

- Hop-by-hop Options** (0) · Carries additional information which must be examined by every router in the path
- Routing** (43) · Provides source routing functionality
- Fragment** (44) · Included when a packet has been fragmented by its source
- Encapsulating Security Payload** (50) · Provides payload encryption (IPsec)
- Authentication Header** (51) · Provides packet authentication (IPsec)
- Destination Options** (60) · Carries additional information which pertains only to the recipient

Transition Methods

- Dual Stack** · Running IPv4 and IPv6 on all devices simultaneously
- Tunneling** · IPv6 packets are encapsulated into IPv4 using IPv6-in-IP, UDP (Teredo), or Intra-Site Automatic Tunnel Addressing Protocol (ISATAP)
- Translation** · Stateless IP/ICMP Translation (SIIT) translates IP header fields and NAT Protocol Translation (NAT-PT) maps between IPv6 and IPv4 addresses