



IPv6 Protocol (RFC 2460 DS)



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Agenda

- IPv6 Header
 - Comparison with IPv4
- IPv6 optional headers (extensions)
- Processing IPv6 headers
 - Comparison with IPv4





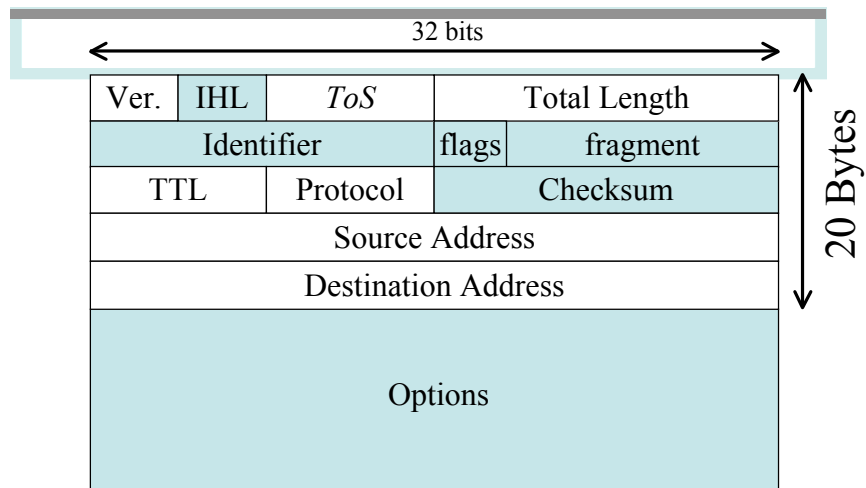
IPv6 Header

- The IPv6 header is redesigned
- Minimize header overhead and reduce the header process for most of the packets
- Less essential and option fields are moved to extension headers

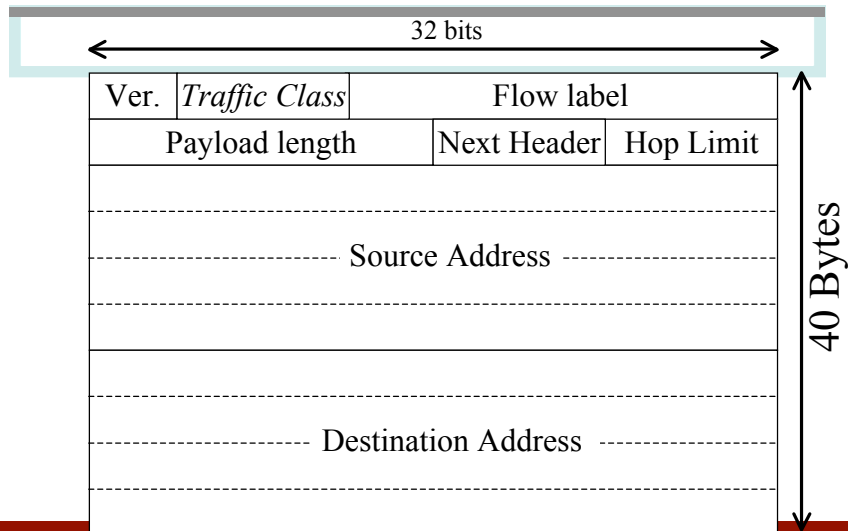
IPv6 & IPv4 headers are not interoperable



IPv4 Header



IPv6: Header simplification



IPv6 header fields

- **Version**
 - 4 bits
- **Traffic class (see next slide)**
 - 8 bits
- **Flow label (see next slide)**
 - 20 bits
- **Payload length**
 - Use Jumbogram for specific cases (payload = 0)
 - 16 bits
- **Hop limit**
 - 8 bits
- **Next header**
 - 8 bits





CoS support in IPv6

- The Traffic Class field: *used as in IPv4*
 - Work done in diffserv wg (closed): RFCs 2474, 2475, 2597, 3260, ...



- The Flow Label field: **designed to enable classification of packets belonging to a specific flow**
 - A flow is a sequence of packets that should receive specific non-default handling from the network
 - Intuitively: 5-tuple of the same source/destination address/port and transport protocol values
 - Without the flow label the classifier must use transport next header value and port numbers
 - Less efficient (need to parse the option headers)
 - May be impossible (fragmentation or IPsec ESP)
 - Further info:
 - RFC 3697 (PS)

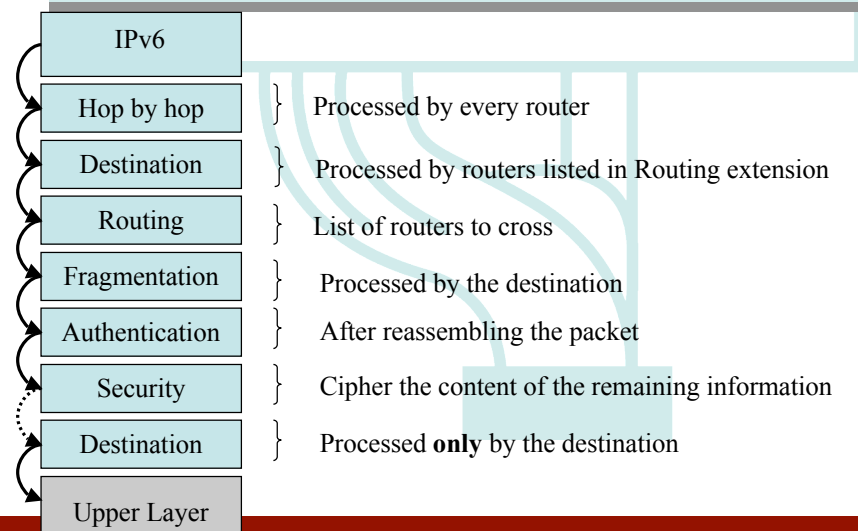


IPv6: Optional extensions

- Hop-by-hop (jumbogram, router alert)
 - Always the first extension
 - Replace IPv4 options,
 - Analyzed by every router.
- Destination
- Routing (loose source routing)
- Fragmentation
- Authentication
- Security



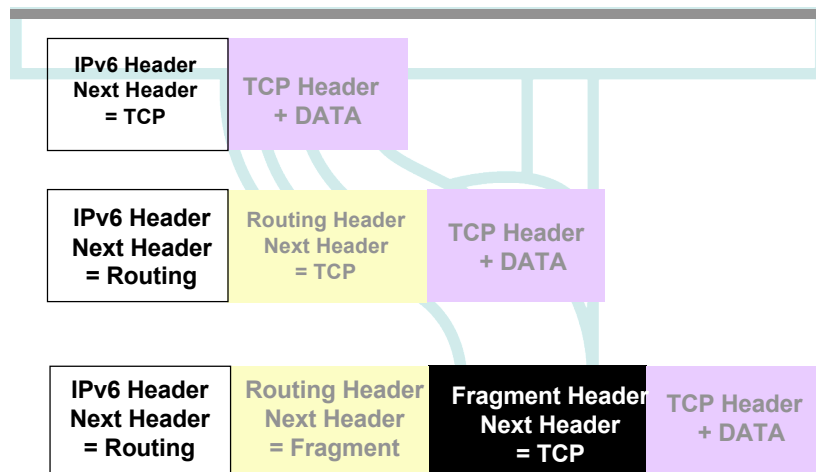
Order is important (RFC 2460)



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IPv6: Optional headers

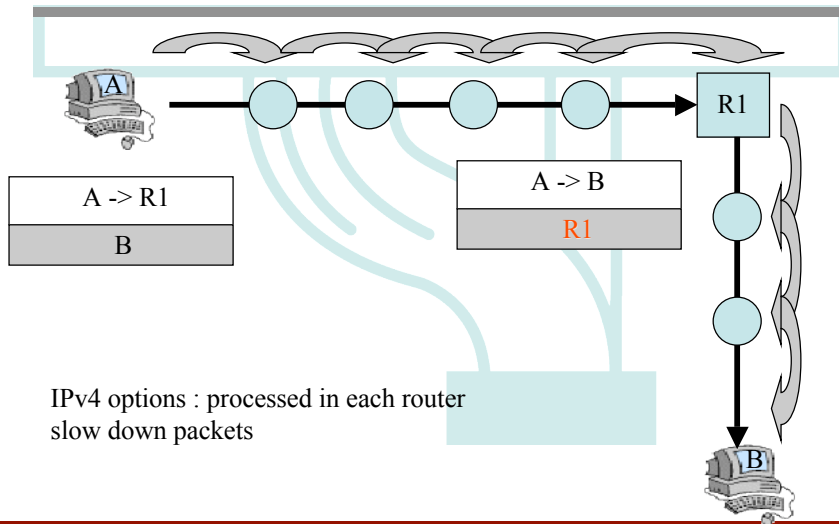


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IPv4 header options processing

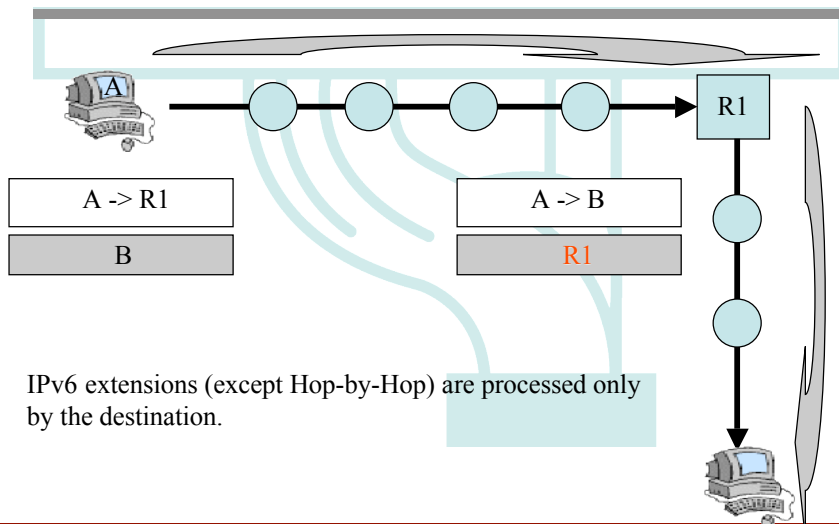


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IPv6 ext. header processing



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