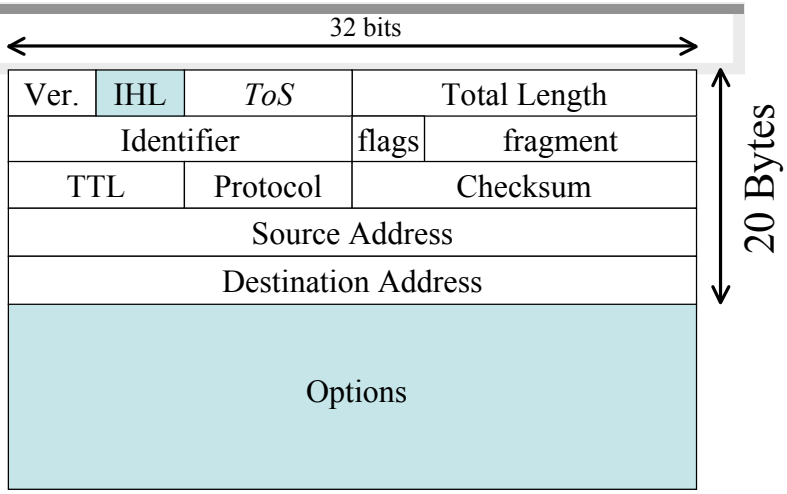
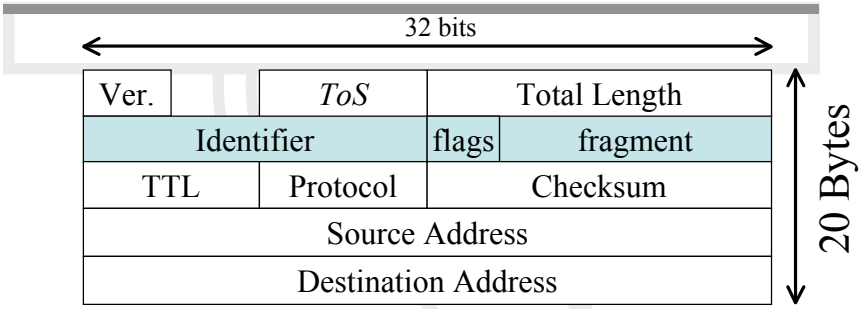
IPv6
Protocol
(RFC 2460 DS)

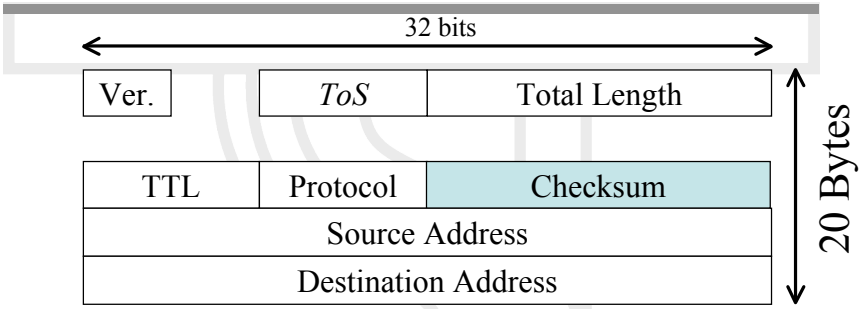
IPv4 Header



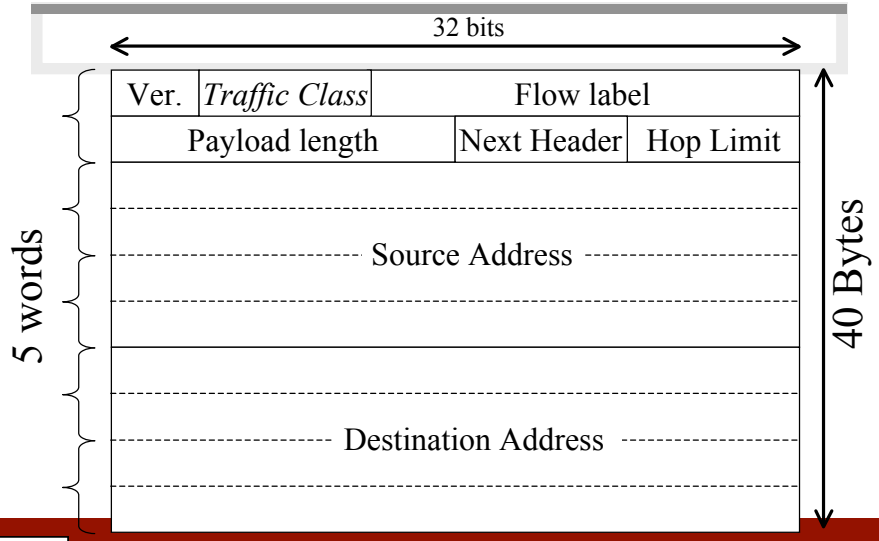
IPv4 Header



IPv4 Header



IPv6: Header simplification



IPv6 header

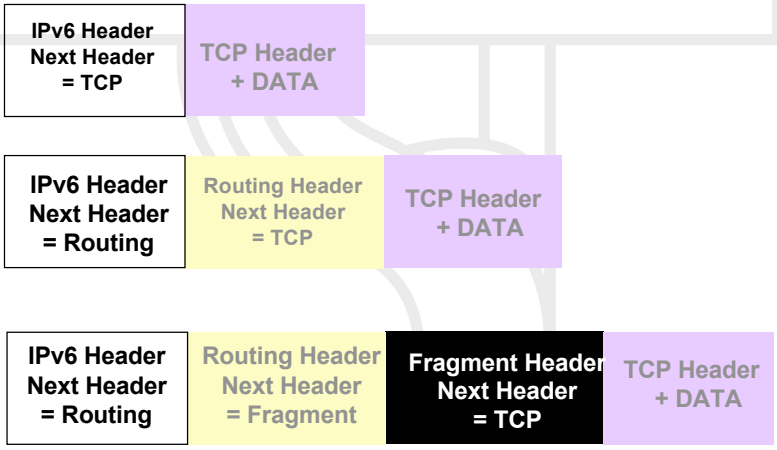
- Version
- Traffic class
  - *Next slide*
- Flow label
  - RFC 3697
- Payload length
  - Use Jumbogram for specific cases (payload = 0)
- Hop limit
- Next header

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)

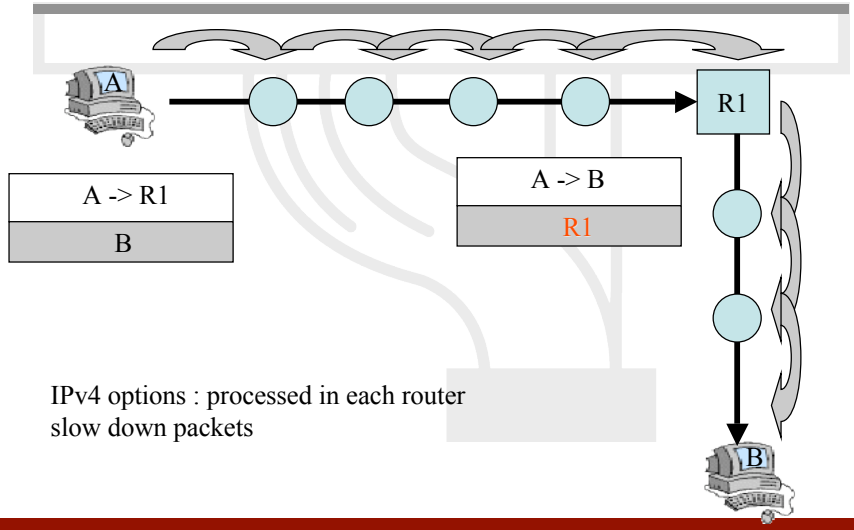
IPv6: Optional headers



IPv6: Optional extensions

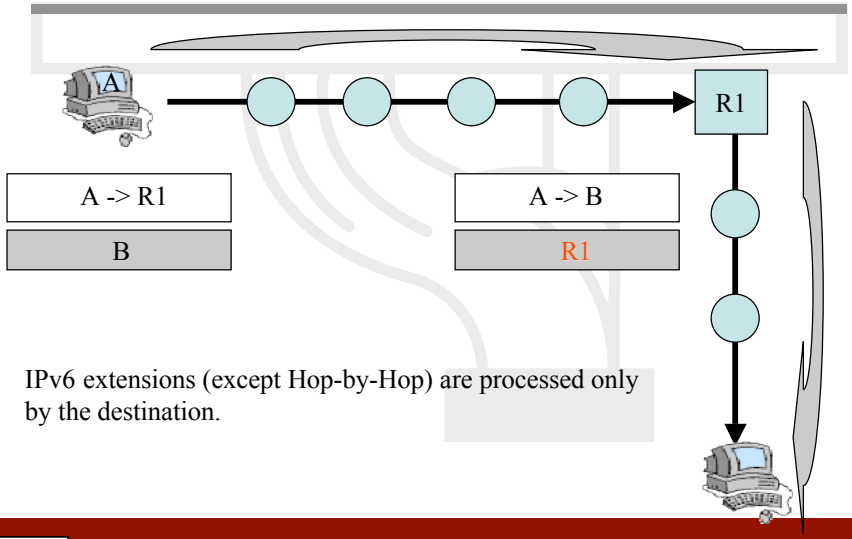
- Hop-by-hop (jumbogram, router alert)
  - Always the first extension
  - Replace IPv4 options,
  - Analyzed by every router.
- Destination
- Routing (loose source routing)
- Fragmentation
- Authentication
- Security

v4 options vs. v6 extensions



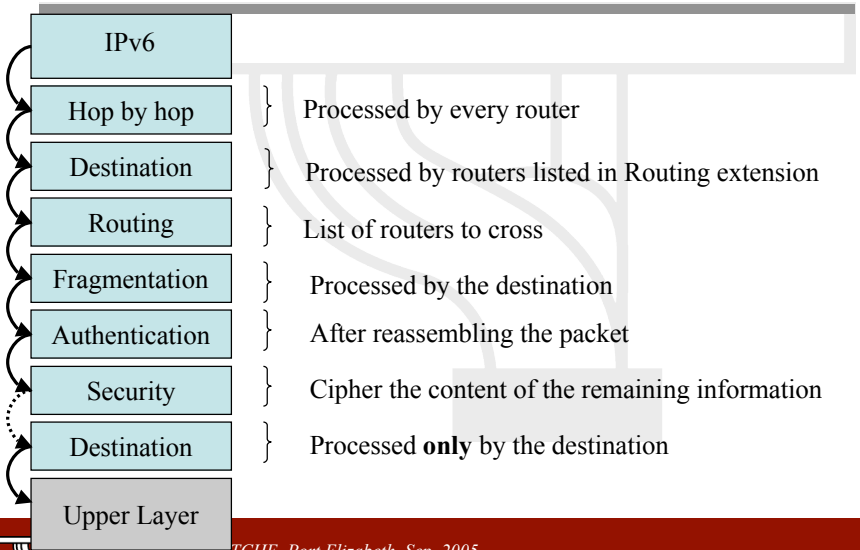
IPv4 options : processed in each router
slow down packets

v4 options vs. v6 extensions



IPv6 extensions (except Hop-by-Hop) are processed only by the destination.

Order is important (RFC 2460)



- Hop by hop: Processed by every router
- Destination: Processed by routers listed in Routing extension
- Routing: List of routers to cross
- Fragmentation: Processed by the destination
- Authentication: After reassembling the packet
- Security: Cipher the content of the remaining information
- Destination: Processed **only** by the destination