IPv6 Protocol
(RFC 2460 DS)

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Agenda

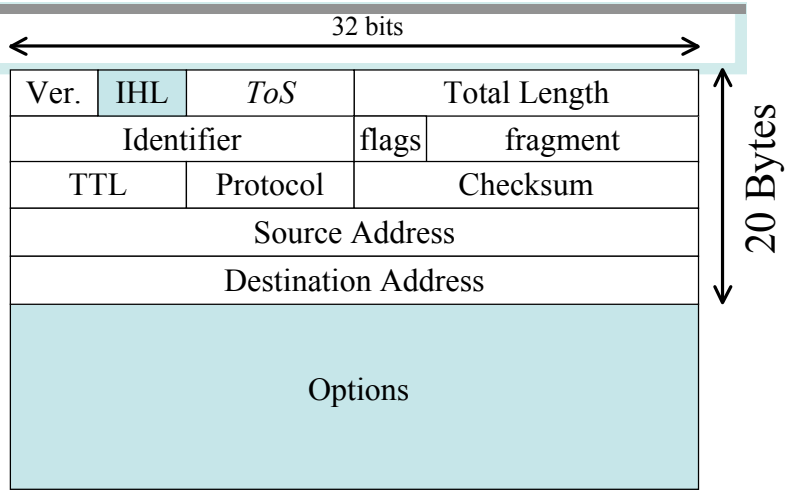
- IPv6 Header
  - Comparison with IPv4
- IPv6 optional headers (extensions)
- Processing IPv6 headers
  - Comparison with IPv4

IPv6 Header

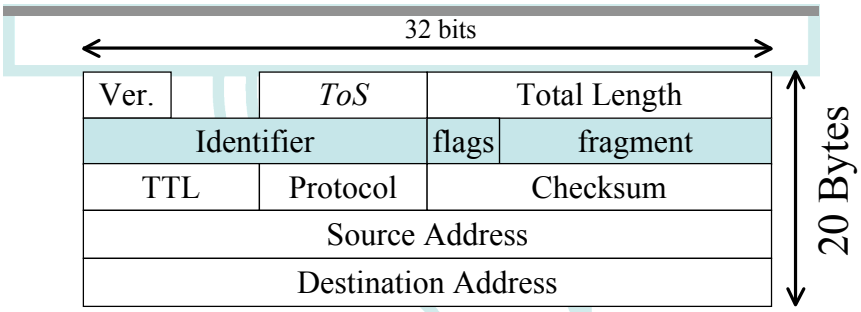
- The IPv6 header is redesigned
- Minimize header overhead and reduce the header process for most of the packets
- Less essential and option fields are moved to extension headers

IPv6 & IPv4 headers are not interoperable

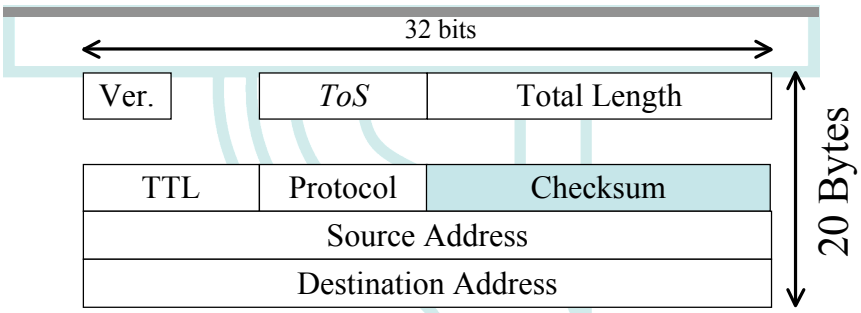
IPv4 Header



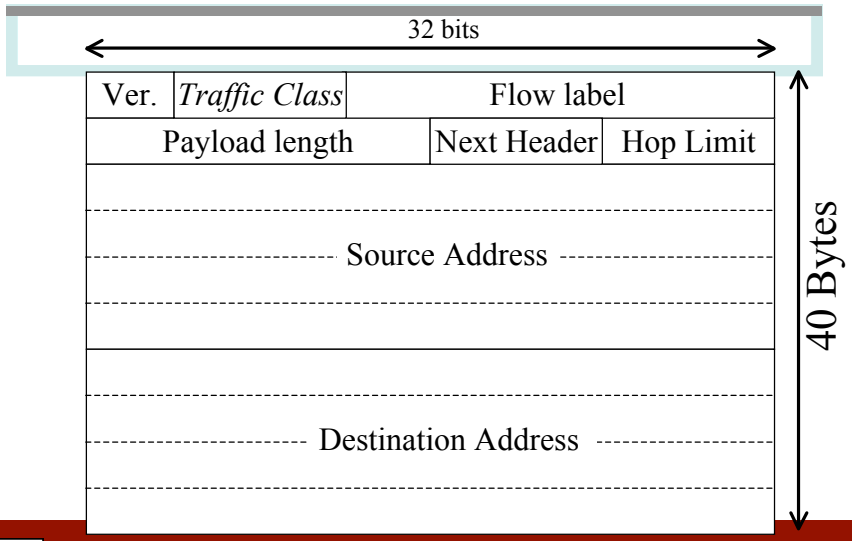
IPv4 Header



IPv4 Header



IPv6: Header simplification



IPv6 header fields

- 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, …**

6 bits	2 bits
DSCP	CU

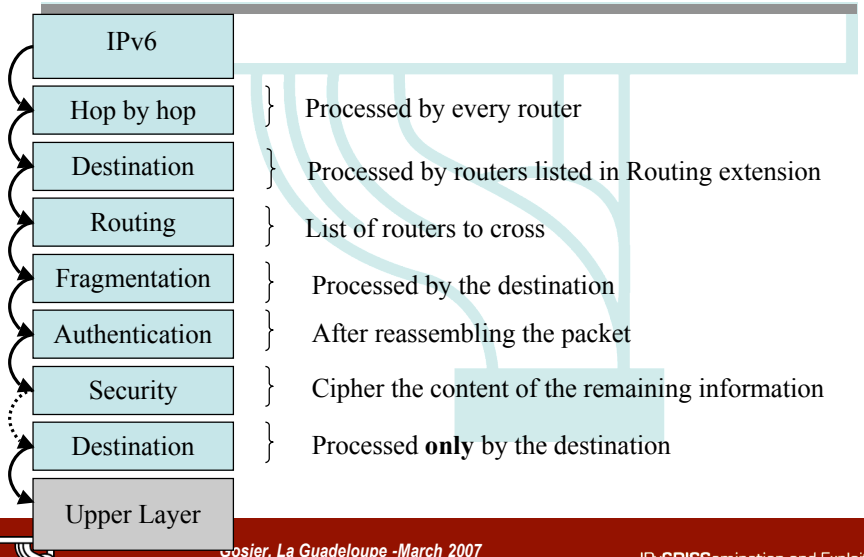
CU is Currently Unused (reserved)

- **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)**

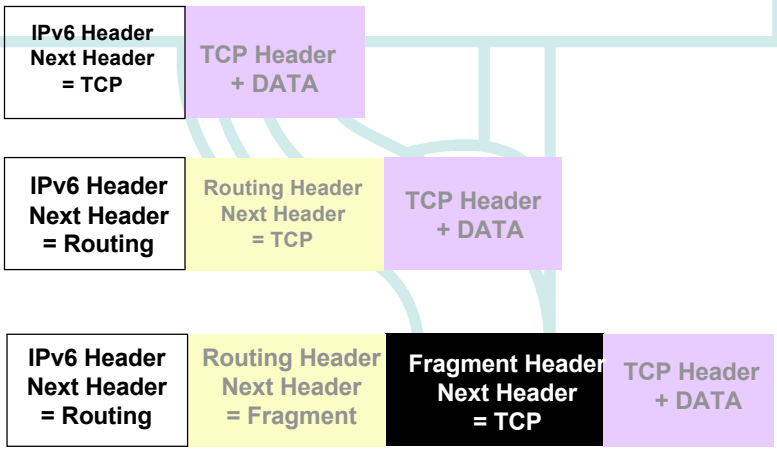
IPv6: Optional extensions

- **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**

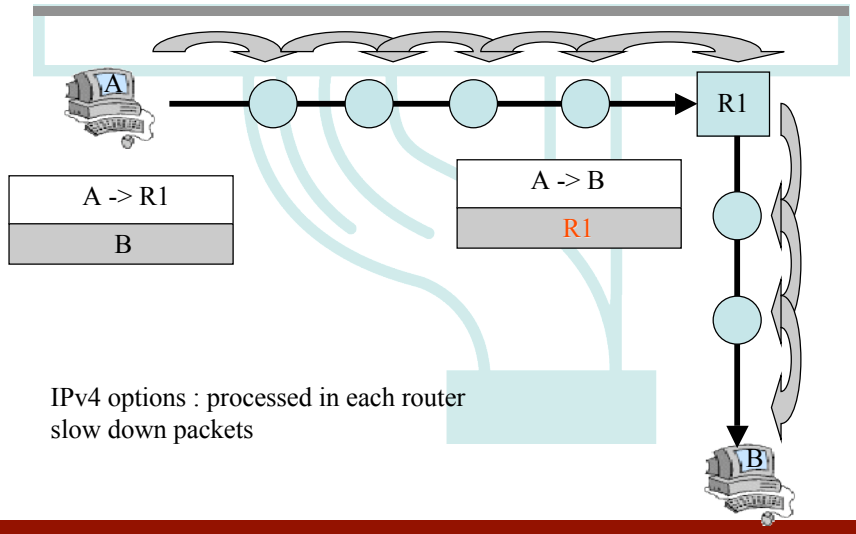
Order is important (RFC 2460)



IPv6: Optional headers

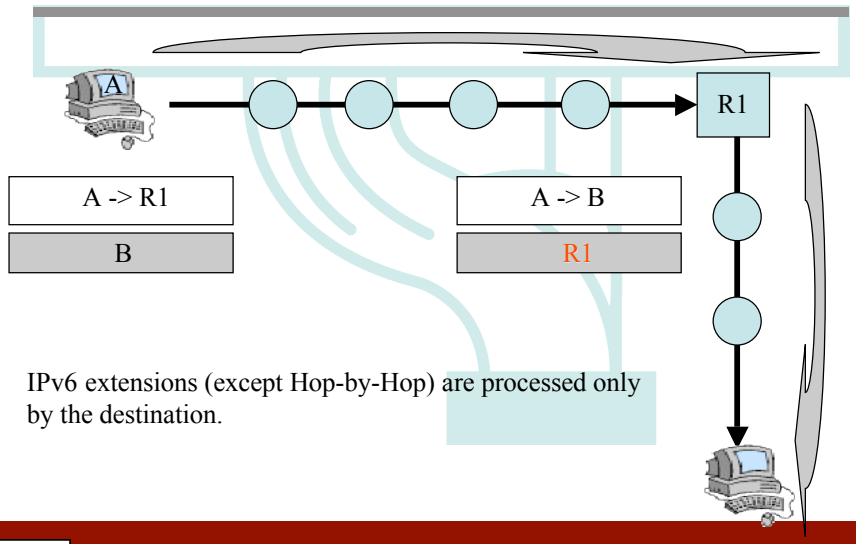


IPv4 header options processing



IPv4 options : processed in each router
slow down packets

IPv6 ext. header processing



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

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Questions …