Header Formats and Packet Size Issues

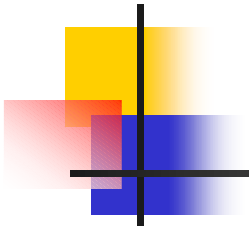
Gregorio Martinez

<gregorio@dif.um.es>

Lecturer

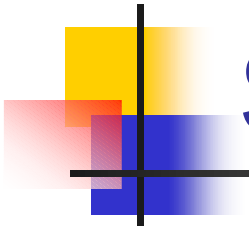
University of Murcia

Departamento de Ingeniería de la Información y las Comunicaciones



IPv6 embodies change in:

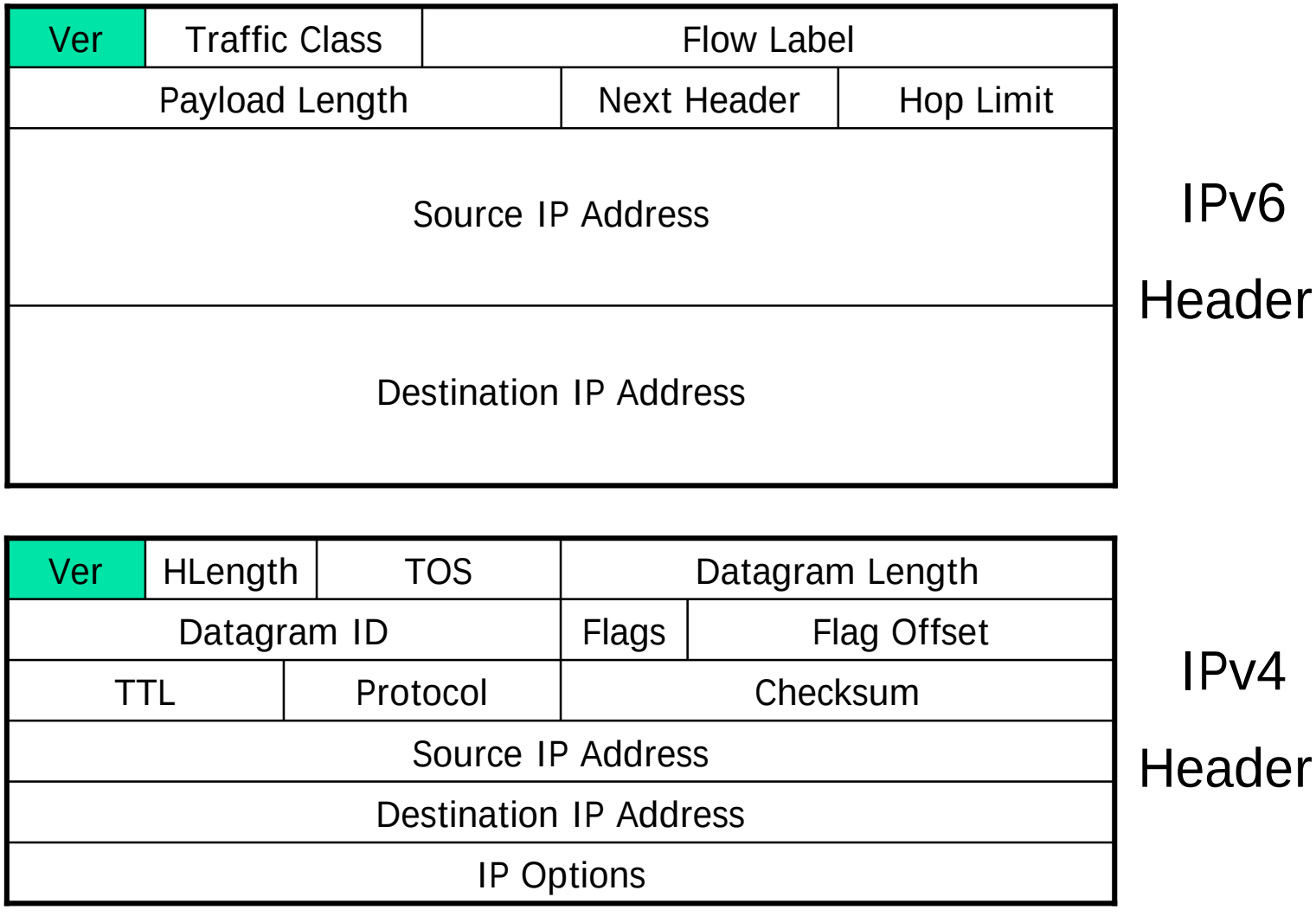
- Expanded addressing
- Simplified header format
- Improved extension and option support
- Flow labelling
- Authentication and privacy
- Mobility
- Others areas (routing, multihoming, ...)



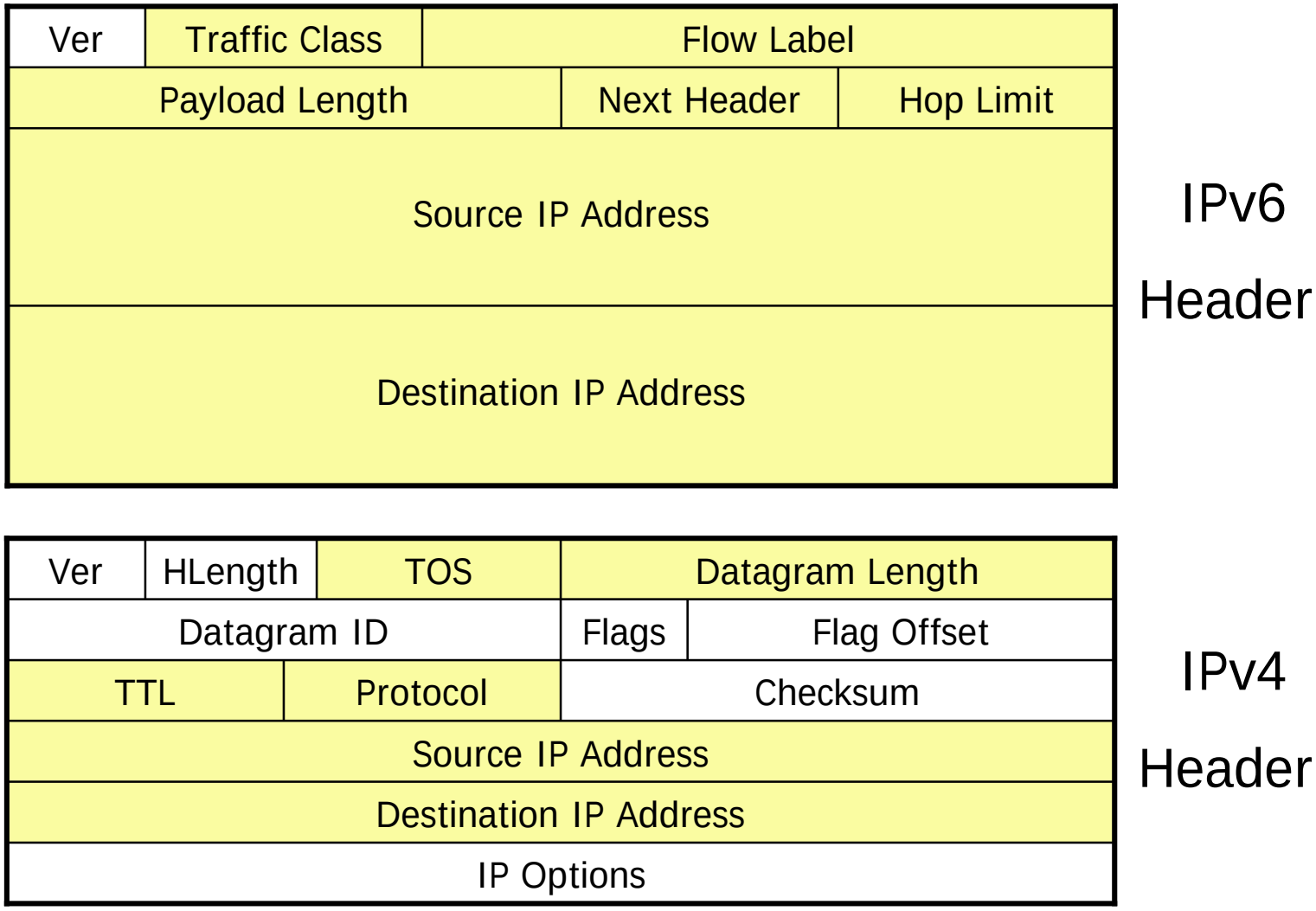
Simplified Header Format

- Description
  - IPv6: eight fields spread over 40 bytes
  - IPv4: *at least* 12 fields (from 20 until 60 bytes)
- Improves routing efficiency
  - Uniformly sized header
  - Fewer fields to examine and process

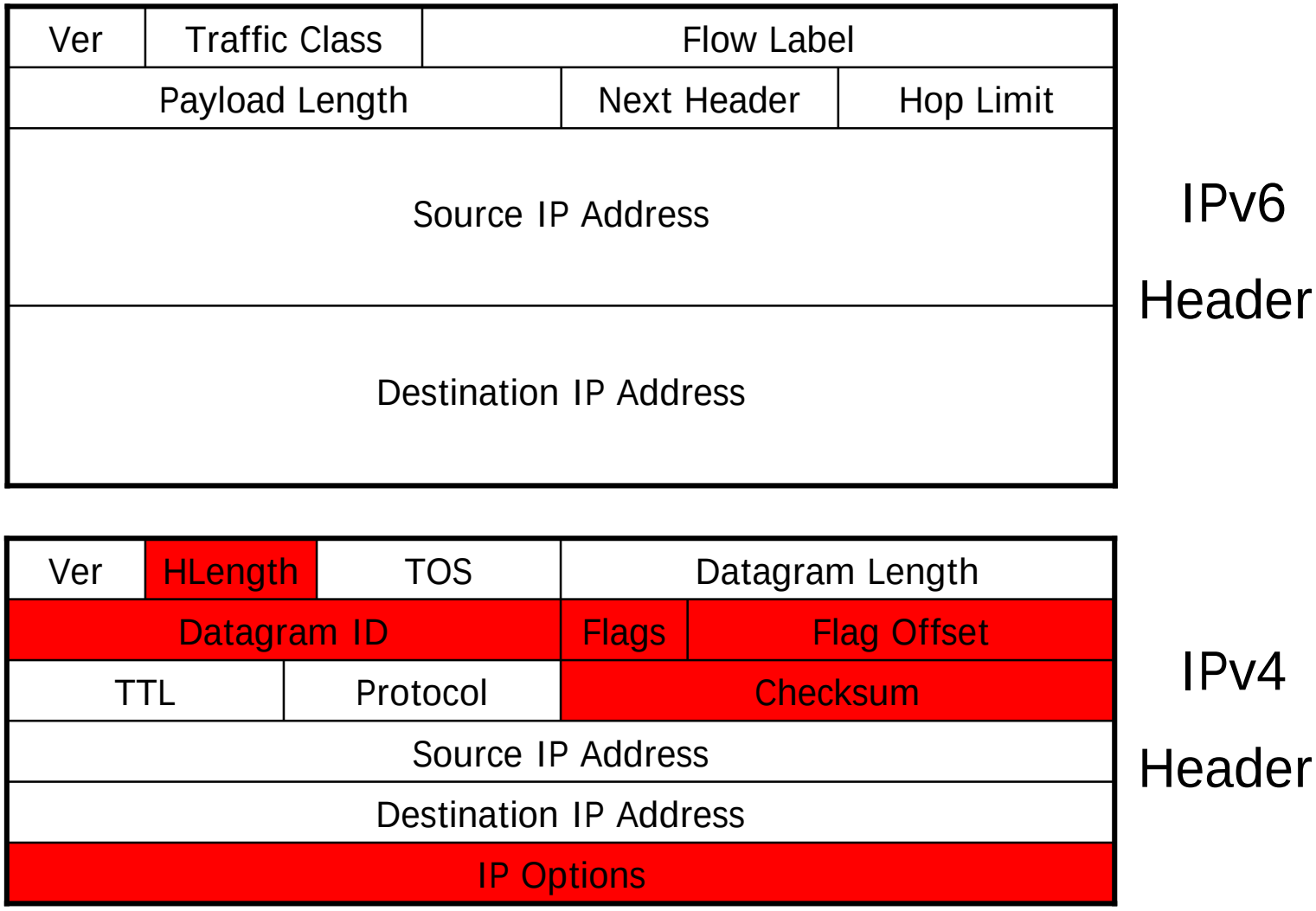
Unchanged Fields



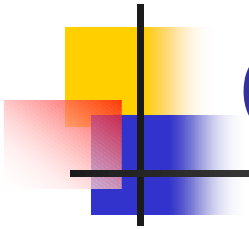
“Similar/Evolving” Fields



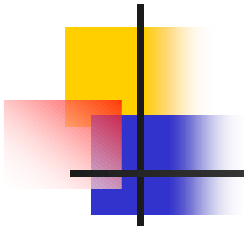
Removed Fields



Improved Extension and Option Support

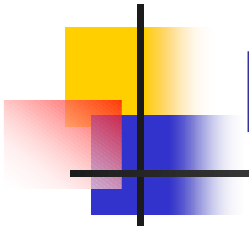


- Options
  - IPv4: at the end of IP header
  - IPv6: **extension headers**
- Extension headers
  - Only processed as necessary (e.g. routers only process *hop-by-hop options* header)
  - Easier to define new extensions and options



Extension Headers (Ordered)

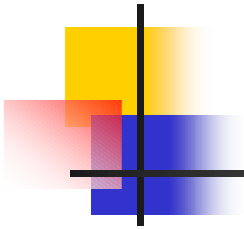
- IPv6 Extension Headers
  - Hop-by-hop Options Header
  - Destination Options Header
  - Routing Header
  - Fragment Header
  - Authentication Header (AH)
  - Encapsulating Security Payload (ESP) Header
  - (Destination Options Header)



Hop-by-hop Options Header

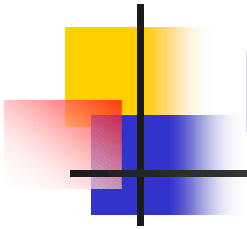
- Just after the IPv6 header
- Information examined by every node
- Example of option: jumbo payload option

Next Header	0	194	Opt Data Len
Jumbo Payload Length			



Destination Options Header

- Mechanism to deliver optional information
- Example: options for Mobile IPv6, padding options

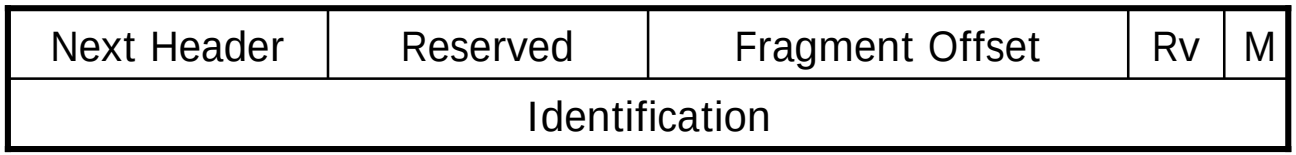


Routing Header

- Replaces IPv4 Source Routing
  - Maximum of 10 routers
  - Slow process
- IPv6 ➔ generic routing extension header
  - Two one-byte fields
    - Routing type field
    - Segments-left field
  - Type-specific data

Fragment Header

- IPv6
  - Fragmentation only by source node
  - Only part of the IPv6 header
  - Use of *path MTU discovery* recommended



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