



RFC 2460

There are several changes to the header format with IPv6. The diagrams below give a high-level view of the basic comparison between the IPv4 and IPv6 headers.

Figure 1

IPv4 Header



IPv6 Header





Fields not kept in IPv6

Name and position changed in IPv6



Streamlined

- Fragmentation fields moved out of base header
- IP options moved out of base header
- Header checksum eliminated
- Header length field eliminated
- Length field excludes IPv6 header
- Alignment changed from 32 to 64 bits

Revised

- Time to live -> hop limit
- Protocol -> next header
- Precedence and TOS -> traffic class
- Addresses increased 32 bits -> 128 bits

Extended

Flow label field added

Figure 2

IPv6 Header Options

IPv6 Header Next Header = TCP	TCP Header + Data		
IPv6 Header Next Header = Routing	Routing Header Next Header = TCP	TCP Header + Data	
IPv6 Header Next Header = Routing	Routing Header Next Header = Fragment	Fragment Header Next Header = TCP	Fragment of TCP Header + Data

Header options processed only by node are identified in the IPv6 destination address field, except the hop-by-hop option. Eliminates the IPv4 40-octet limit on options. In IPv6, the limit is the total packet size or max valued from the path MTU. Headers are linked together by populating the next header (8-bit) field.





When more than one extension header is used in the same packet, it is recommended that those headers appear in the following order:

- IPv6 header
- · Hop-by-hop options header
- Destination options header (routing header associations)
- Routing header
- Fragment header
- Authentication header
- Encapsulating security payload header
- Destination options header (options processed by final destination)
- Upper-layer header





Table 1. Summary of Header Types and Values

Header Type	Next Header Value	
Hop-by-Hop Options Header	0	
Destination Option Header	60	
Routing Header	43	
Fragment Header	44	
Authentication Header (RFC 1826 and ESP Header (RFC 1827)	5) 51	
Upper-Layer Header	6 (TCP)	
	17 (UDP)	
Mobility Header	135	

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