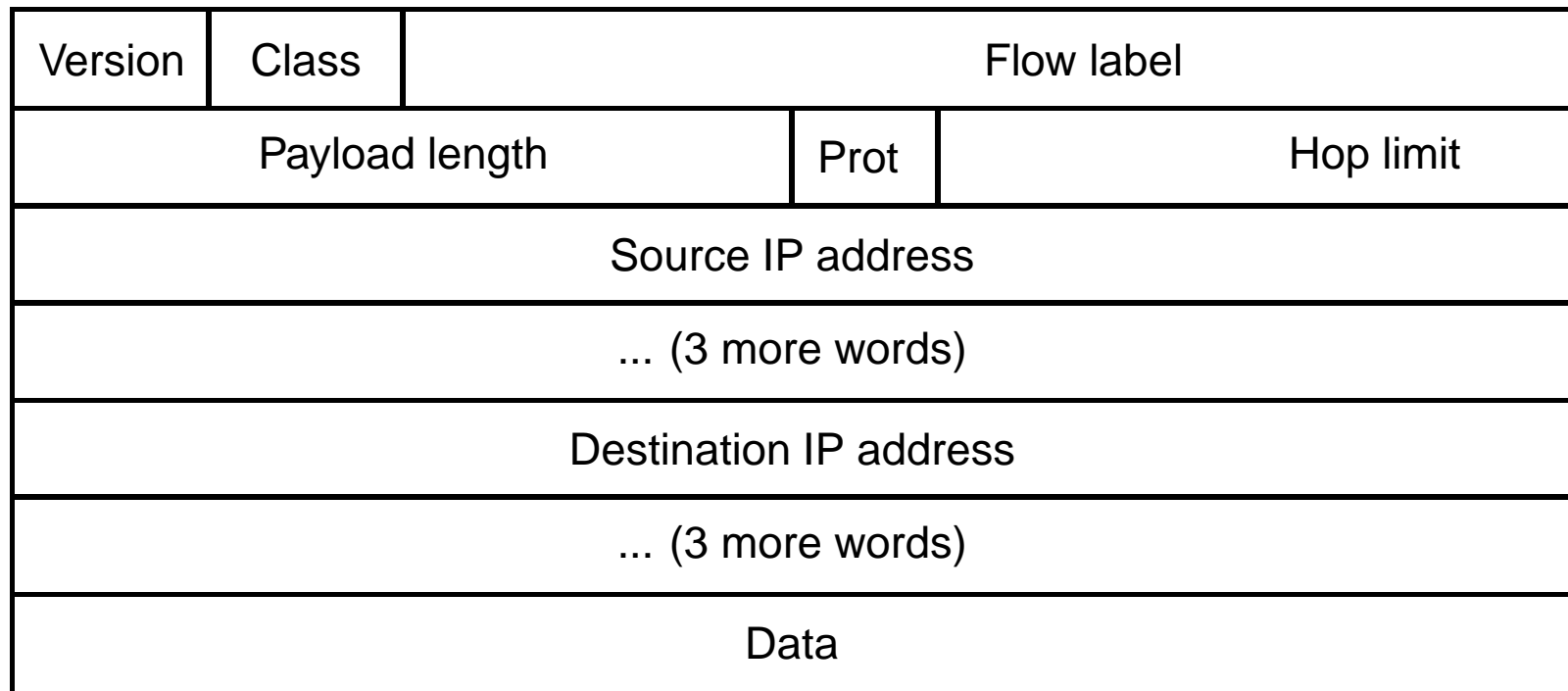# IPv6

- 128–bit addresses.

- Pseudo–connections (*flows*). Details not defined.

- Fixed–size 40 byte header.

- No fragmentation/reassembly, no options, no header checksum.

Datagram

Version	Class	Flow label		
Payload length			Prot	Hop limit
Source IP address				
... (3 more words)				
Destination IP address				
... (3 more words)				
Data				

Compatibility of v4 and v6

Some people make a big deal out of the lack of direct compatibility of v4 and v6. Solutions:

Dual stack: the first 4 bits of the datagram give the version number. Two independent network layer protocols coexist, each handling its version.

Tunnelling: If a v6 datagram has to pass through a network area that has only v4 service, it can be encapsulated in a v4 datagram which is sent to the first v6 router past the cluster of v4 routers. This router recognises the encapsulation, extracts the v6 datagram, and forwards it.

Multiple headers

IPv6 allows multiple headers: the base header (i.e. first) has a field called *Next header* ("Protocol" in the figure). This filed is set to TCP or small UDP if there are no other headers; otherwise, it is set to the type of *extension header* that follows. This can be repeated several times; the last header must indicate a transport layer protocol.

One of the extension header types is *Options*, which is a variable–length header.

Fragmentation

Even though IPv6 does not support fragmentation officially, it really does. See Comer's book for details.