IT 4505
Section 3.5

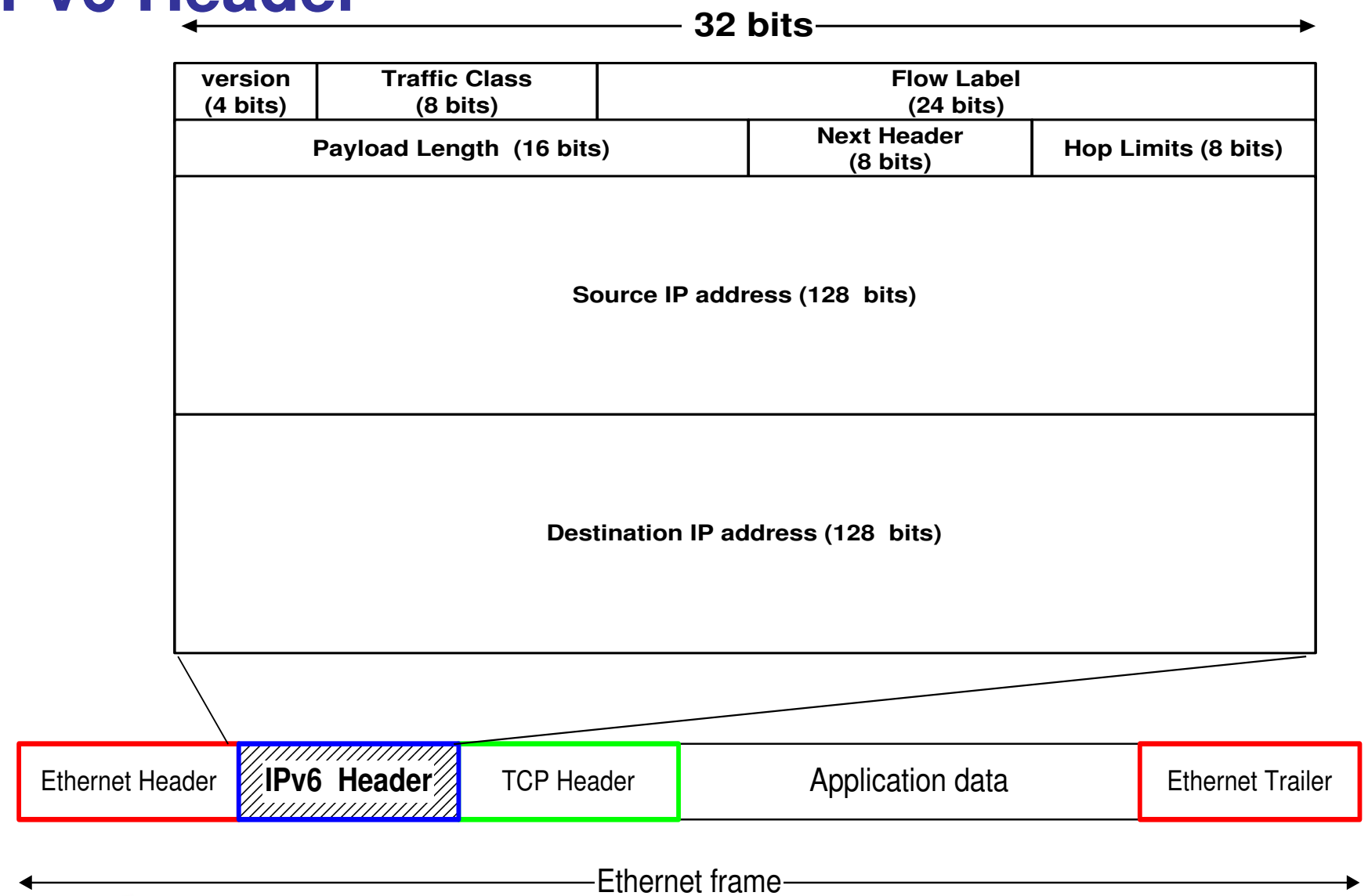
IP Version 6

3.5.1 IPv6 - IP Version 6

- **IP Version 6**
  - Is the successor to the currently used IPv4
  - Specification completed in 1994
  - Makes improvements to IPv4 (no revolutionary changes)

- One (not the only !) feature of IPv6 is a significant increase in of the IP address to **128 bits (16 bytes)**
  - IPv6 will solve – for the foreseeable future – the problems with IP addressing
  - 10^{24} addresses per square inch on the surface of the Earth.

IPv6 Header



Notation of IPv6 addresses

- **Convention**: The 128-bit IPv6 address is written as **eight 16-bit integers** (using hexadecimal digits for each integer)

  CEDF:BP76:3245:4464:FACE:2E50:3025:DF12

- **Short notation:**
- Abbreviations of leading zeroes:

  CEDF:BP76:0000:0000:009E:0000:3025:DF12
  → CEDF:BP76:0:0:9E :0:3025:DF12

- ":0000:0000:0000" can be written as "::"

  CEDF:BP76:0:0:FACE:0:3025:DF12

  → CEDF:BP76::FACE:0:3025:DF12

- IPv6 addresses derived from IPv4 addresses have 96 leading zero bits. Convention allows to use IPv4 notation for the last 32 bits.

  ::80:8F:89:90 → ::128.143.137.144

3.5.2 IPv6 vs. IPv4: Address Comparison

- **IPv4** has a maximum of
  - $2^{32} \approx$ 4 billion addresses
- **IPv6** has a maximum of
  - **$2^{128} = (2^{32})^4 \approx$ 4 billion x 4 billion x 4 billion x 4 billion addresses**

IPv6 vs. IPv4 cont.