

E3-E4 CFA IP Concepts

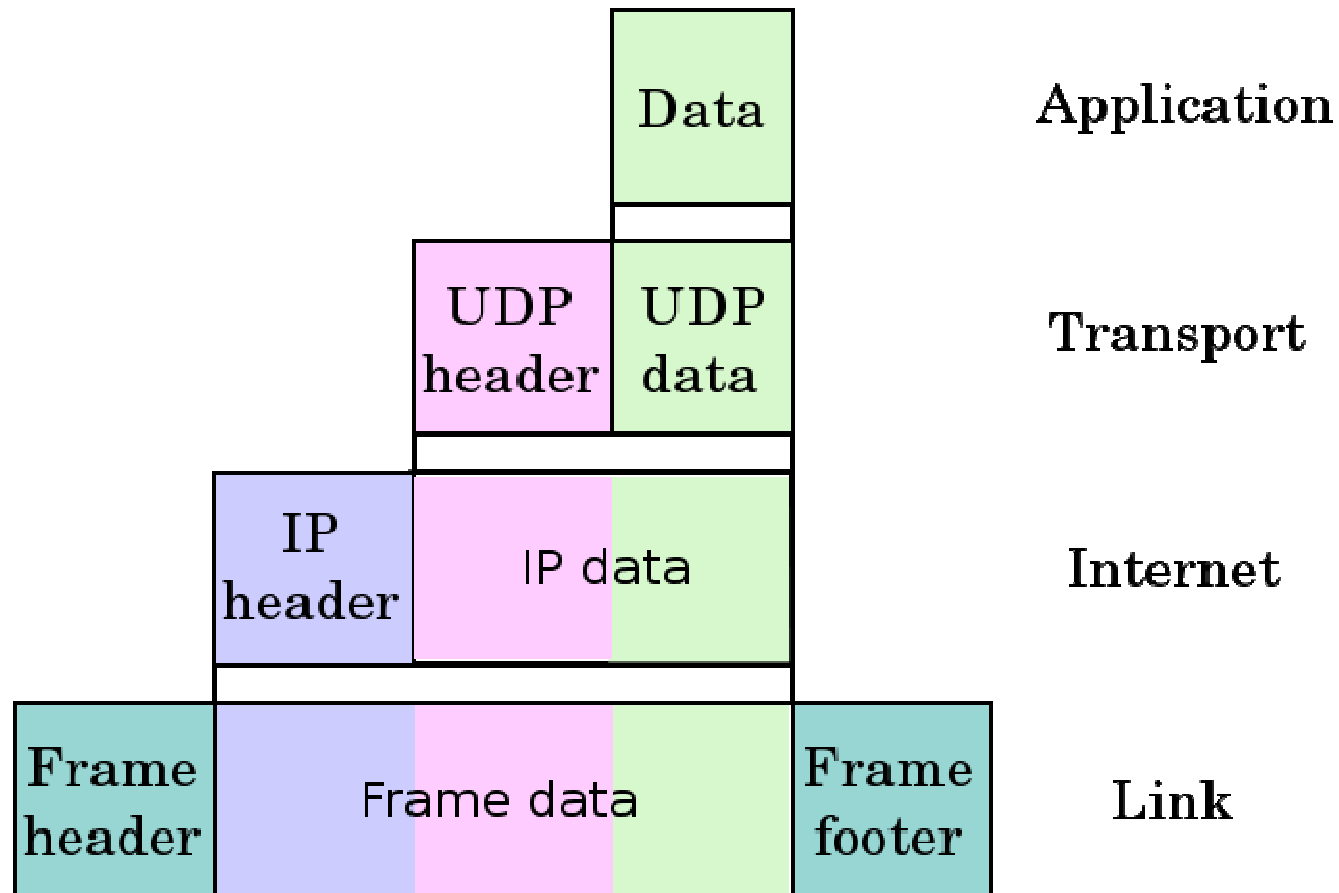
AGENDA



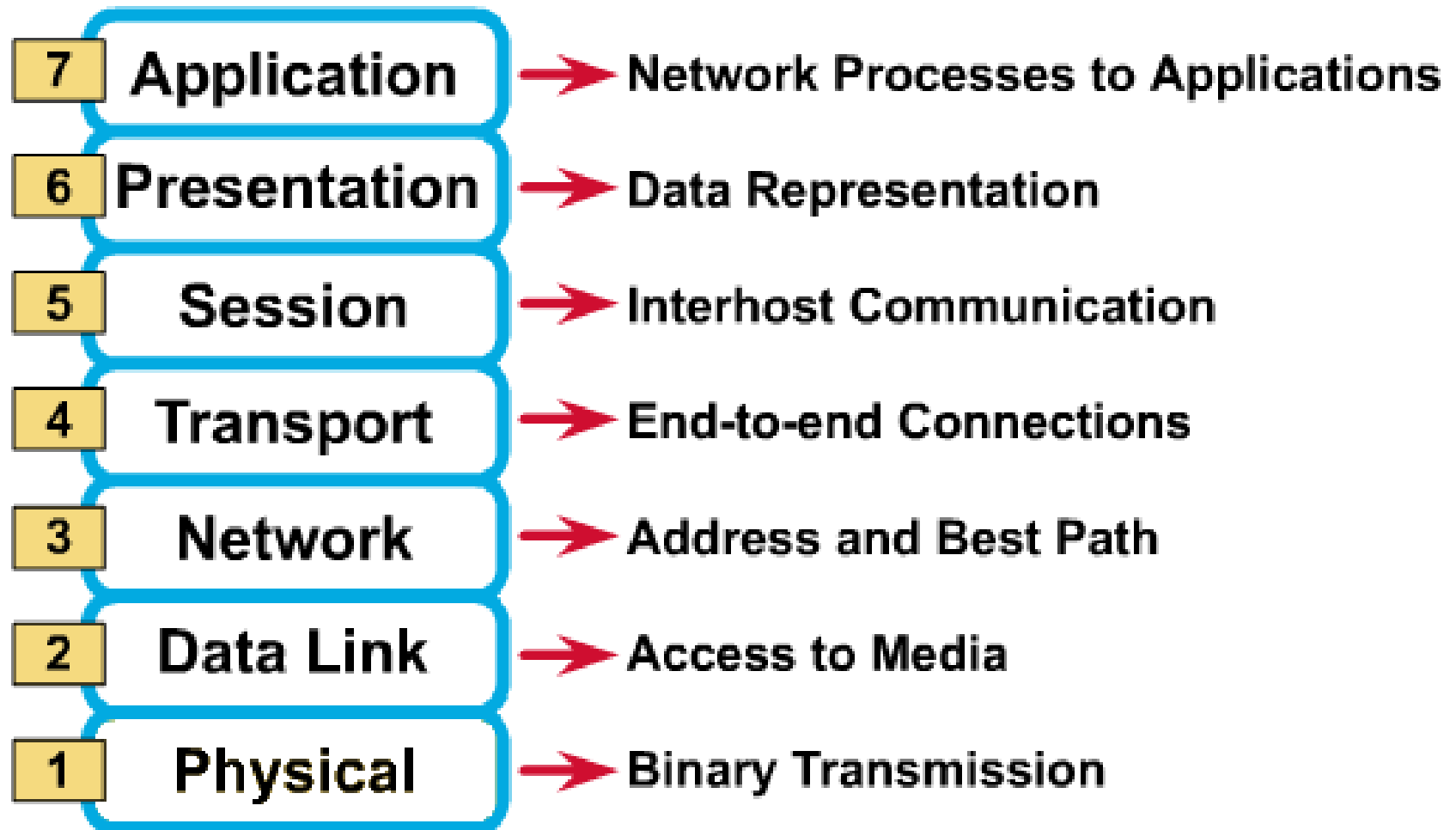
- IP overview
- TCP/UDP
- IP Addressing

- Internet architecture : layered design.
- Layers interact with each other.
- One layer uses the service of its next lower layer and provides the service to the next higher layer.
- Header information.
- Encapsulation.

TCP layers and encapsulation method



Function of Layers



TCP/IP Model

Application Layer

Application programs using the network

Transport Layer (TCP/UDP)

Management of end-to-end message transmission, error detection and error correction

Network Layer (IP)

Handling of datagrams : routing and congestion

Data Link Layer

Management of cost effective and reliable data delivery, access to physical networks

Physical Layer

Physical Media

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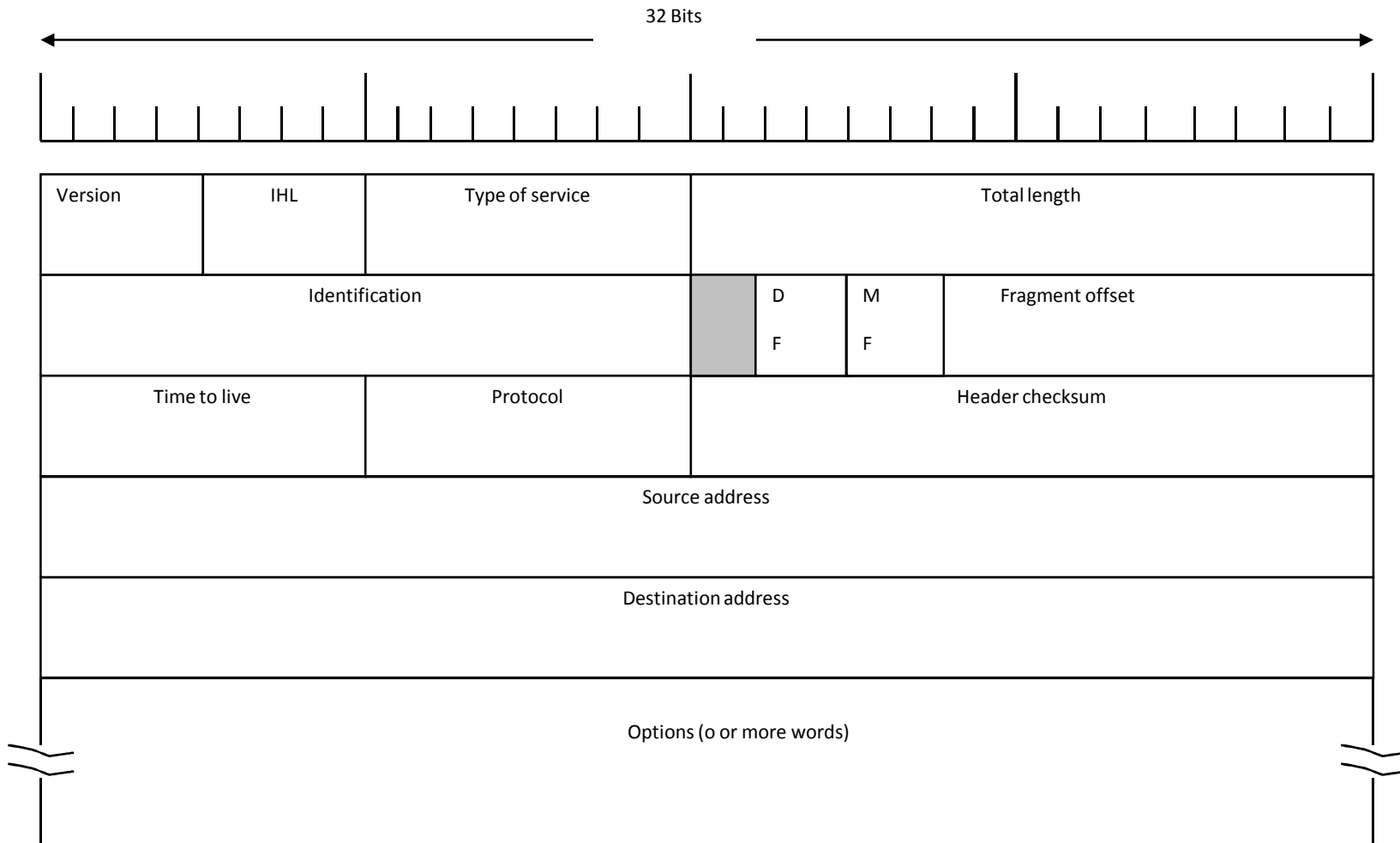
IP-datagram format



-
- **Version – 4 Bit field**
 - **Total Length – 16 Bit field**
 - **Identification – 16 Bit field**
 - **Time to Live (TTL) – 8 Bit field**
 - **Protocol – 8 Bit field**
 - **Checksum – 16 Bit field**
 - **Source Address – 32 Bit field**
 - **Destination Address – 32 Bit field**
 - **Options – variable field**
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IP-datagram format



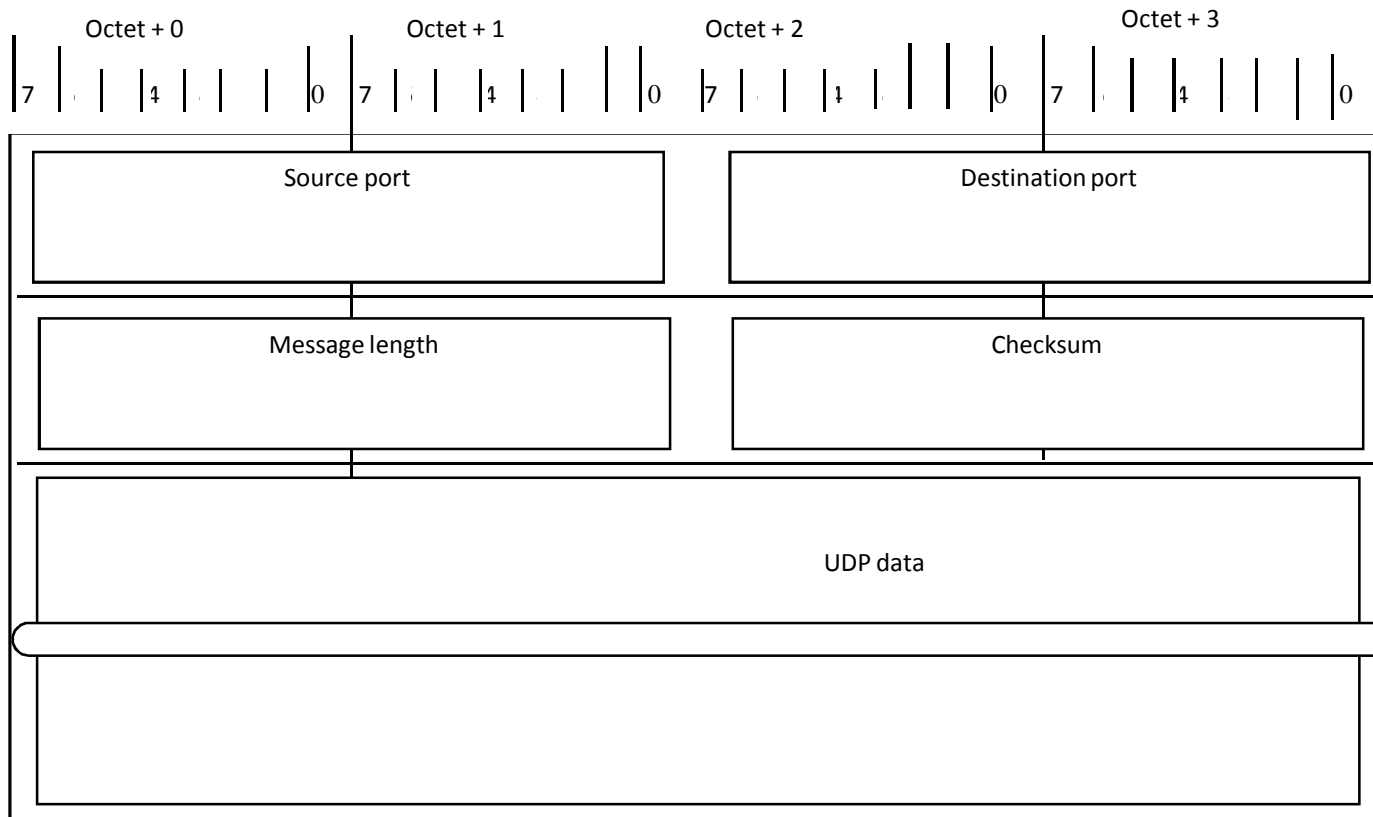
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TCP/IP Transport Layer Protocols

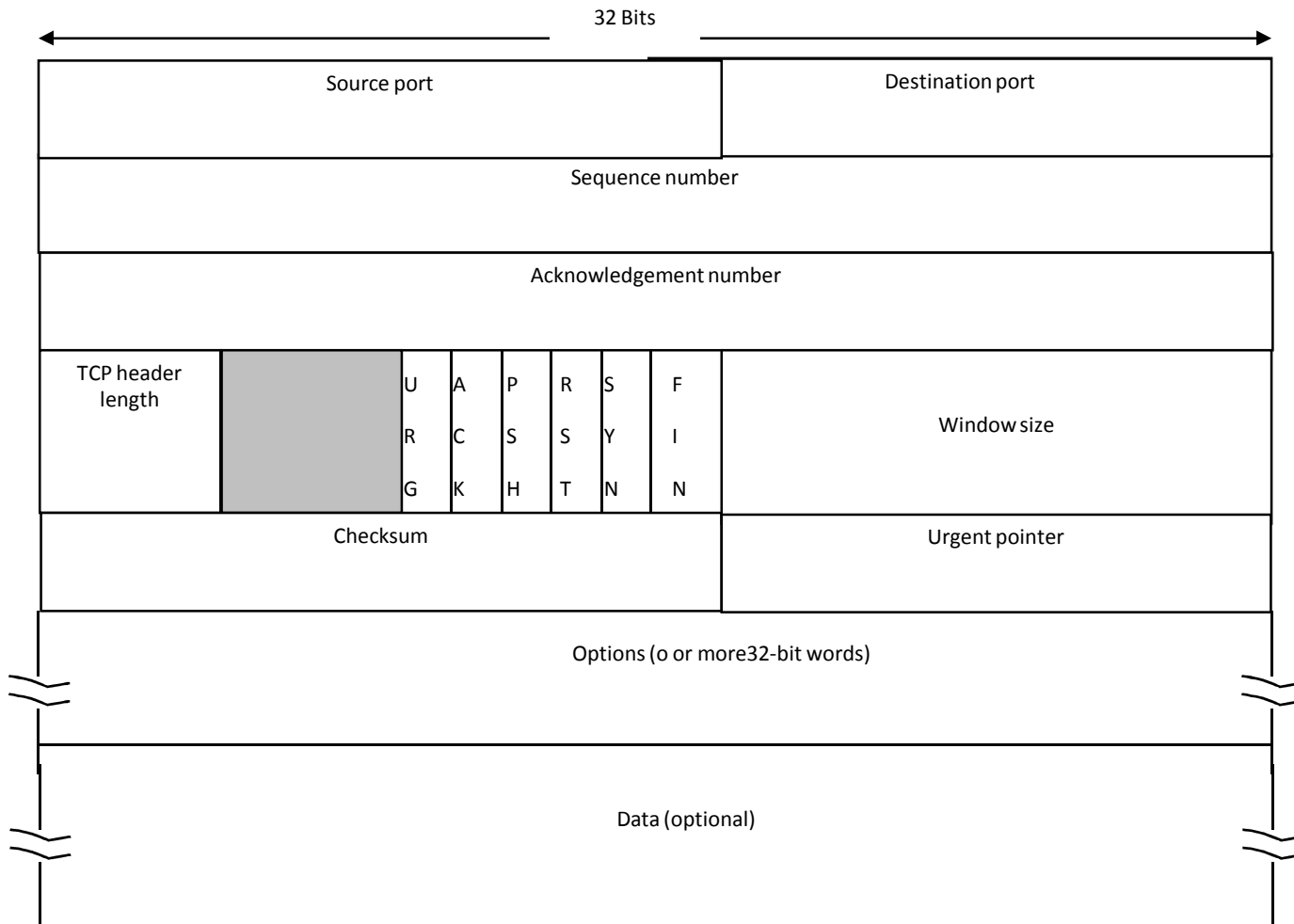


- **USER DATAGRAM PROTOCOL (UDP)**
- **TRANSMISSION CONTROL PROTOCOL (TCP)**
- **INTERNET CONTROL MESSAGE PROTOCOL (ICMP)**
- **INTERNET GROUP MANAGEMENT PROTOCOL (IGMP)**

UDP datagram format



TCP datagram format



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IP Addressing



- 32-bit integer address.
- Dotted decimal notation.
- IP address : network, host, class, subnet mask.

IP Address Classes

Class	Networks	Hosts
A	126	16,777,214
B	16,384	65,534
C	2,097,152	254

- **Private Subnets**

- 10.0.0.0/8,
- 172.16.0.0/12, and
- 192.168.0.0/16.

Subnetting

- Subnetting : For control network traffic, organization, use of different physical media, preservation of address space, and security.
- **Default Subnet masks:**
 - **Class A** - 255.0.0.0 - 11111111.00000000.00000000.00000000
 - **Class B** - 255.255.0.0 - 11111111.11111111.00000000.00000000
 - **Class C** - 255.255.255.0 - 11111111.11111111.11111111.00000000

IP v6 addressing:



- Address size:128 bits or 16 octets.
- Designed to
 - provide sufficient quantity of addresses.
 - allow efficient aggregation for routing.

- Example of an IPv6

address:2001:0df8:85a7:08d3:1319:8a2e:0370:7334



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