

TEE 843 – Sistem Telekomunikasi

11. Internet dan Jaringan Konvergensi



universitas
MALIKUSSALEH

Muhammad Daud Nurdin

mdaud@unimal.ac.id, syechdaud@yahoo.com

**Jurusan Teknik Elektro FT-Unimal
Lhokseumawe, 2019**

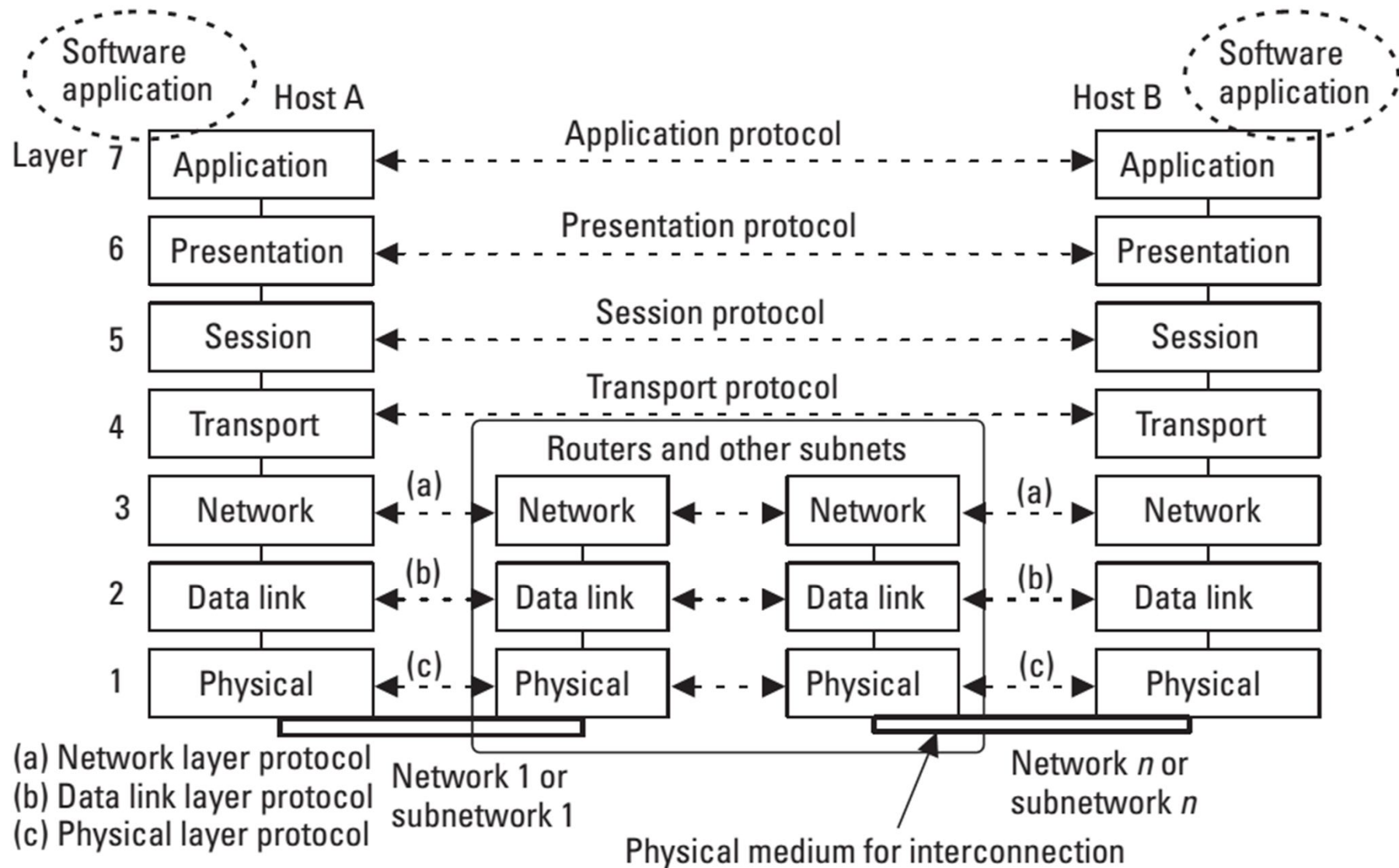


Internet dan Jaringan Konvergensi

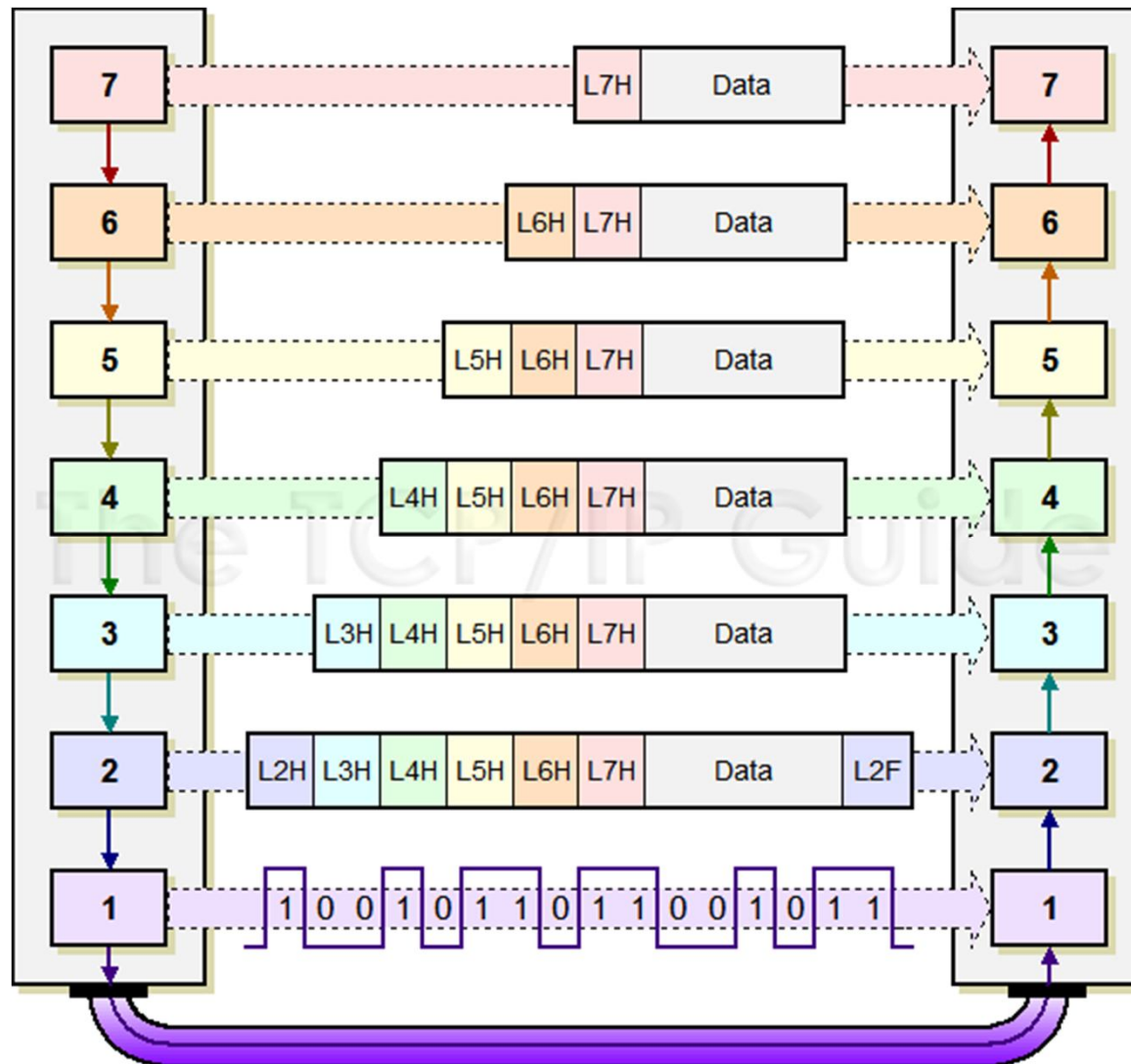
- OSI Reference Model
vs TCP/IP Protocol Stack
- Internet Protocol Suite
(TCP/IP Protocol Stack)
 - Network Interface Layer
 - Internet Layer
 - Transport Layer
 - Application Layer
- Converged Network



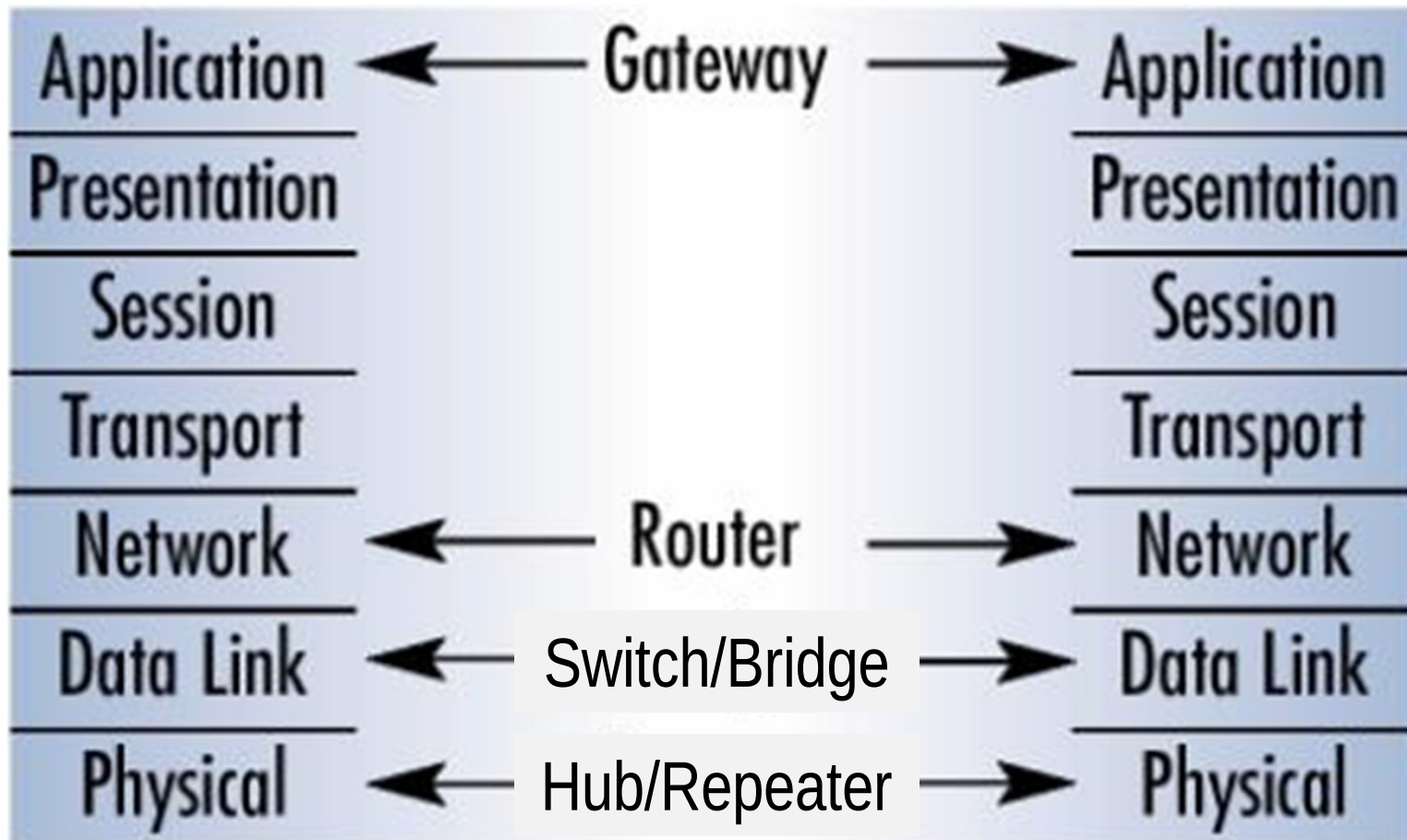
Open System Interconnection (OSI) Reference Model



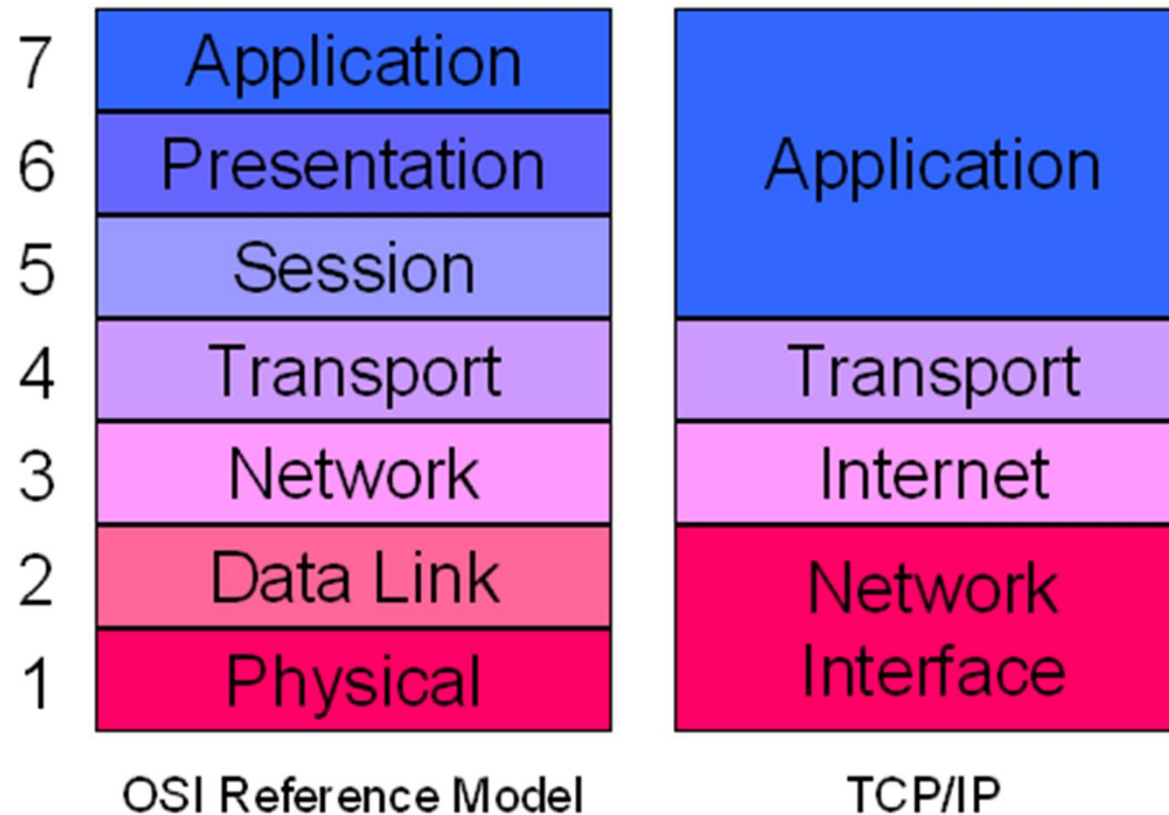
Enkapsulasi/Denkapsulasi pada *OSI Layers*



Devices of Network Connection



OSI Model vs TCP/IP



Catatan:

Istilah utk layer paling bawah pd TCP/IP berbeda-beda antar literatur, misalnya network interface layer, network access layer, link layer, host to network, dll. Ada juga penulis yg membaginya menjadi dua layer: physical layer dan link layer.



OSI vs TCP/IP

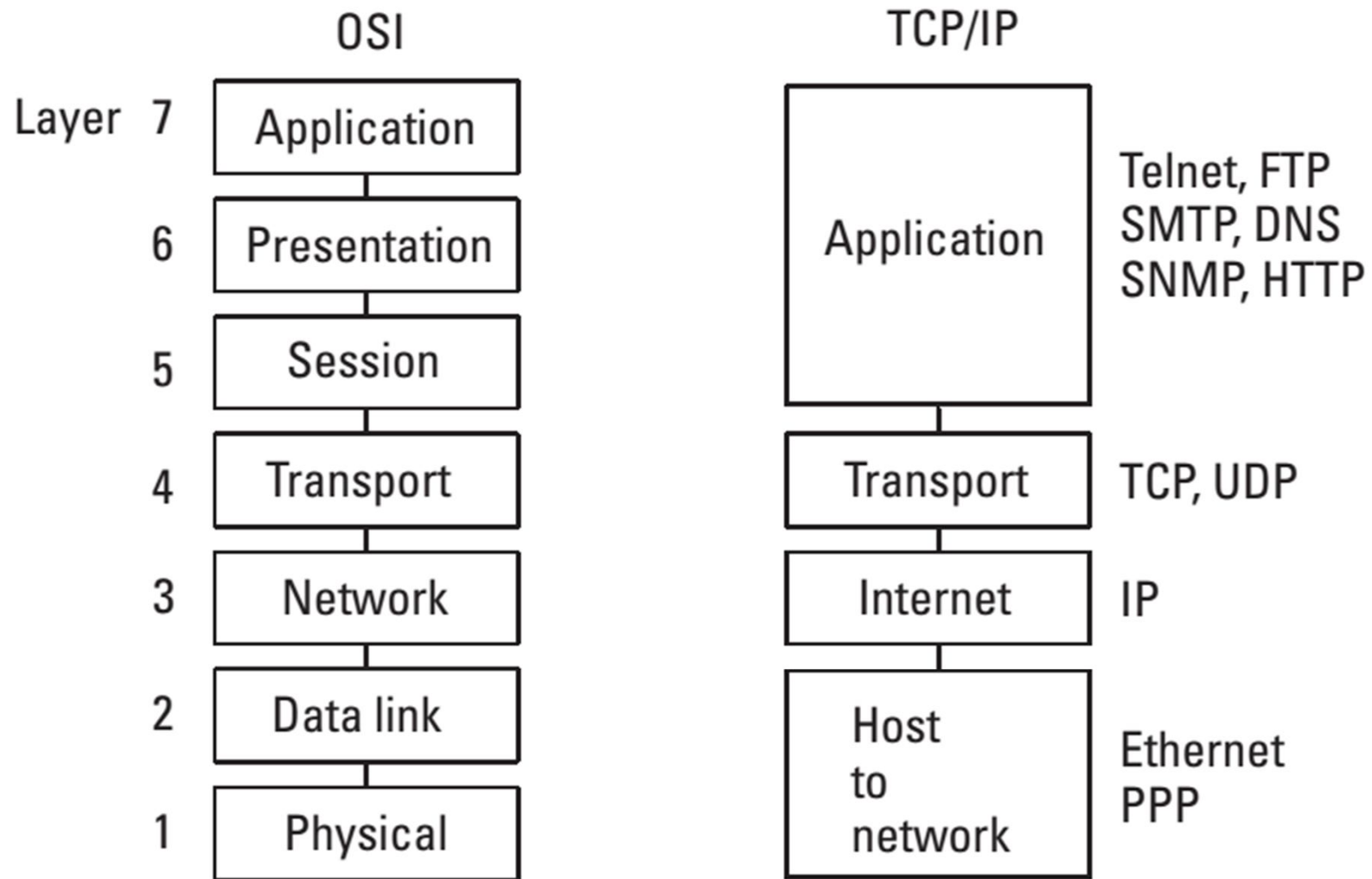


Figure 6.11 The TCP/IP stack and OSI reference model.

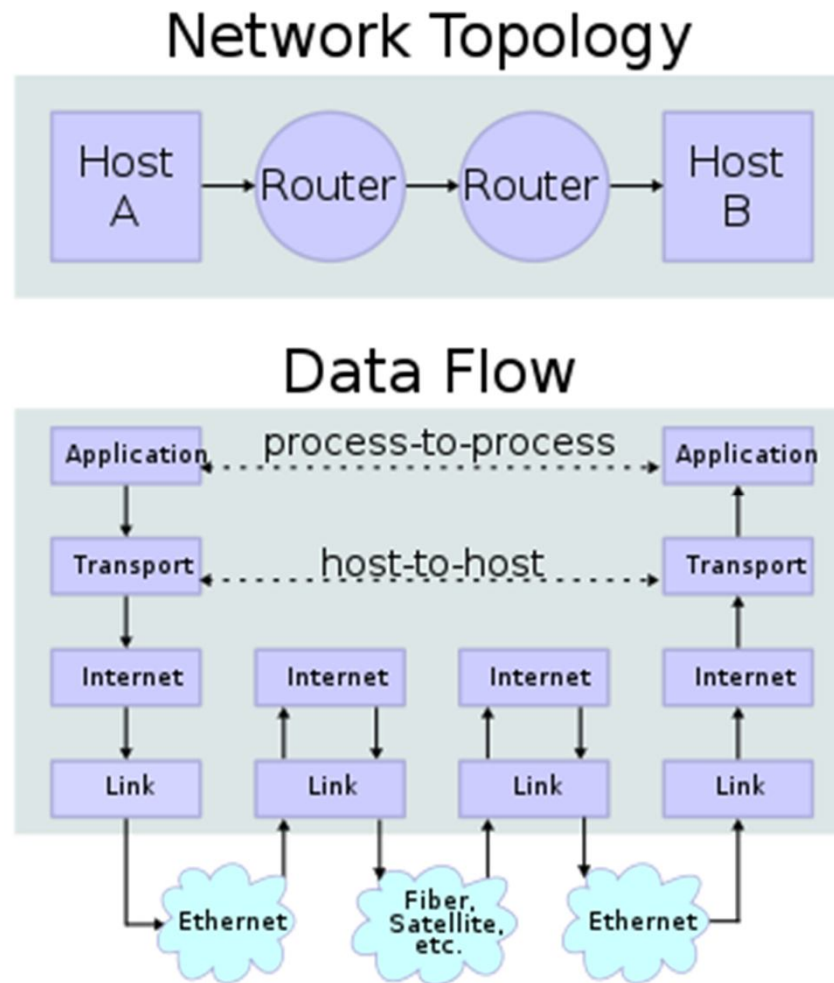


Internet dan Jaringan Konvergensi

- OSI Reference Model
vs TCP/IP Protocol Stack
- **Internet Protocol Suite
(TCP/IP Protocol Stack)**
 - Network Interface Layer
 - Internet Layer
 - Transport Layer
 - Application Layer
- Converged Network

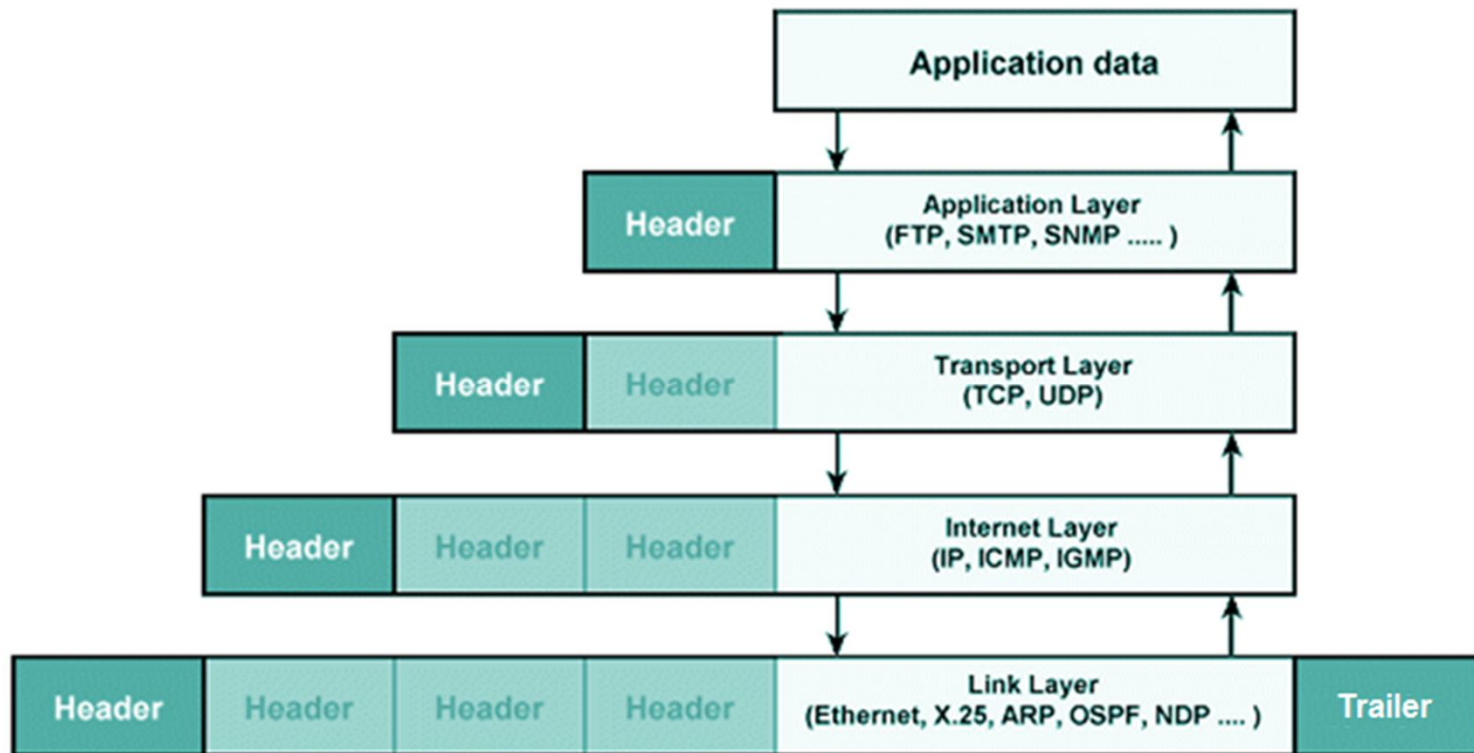
Internet Protocol Suite (TCP/IP Protocol Stack)

Contoh:



TCP = *Transmission Control Protocol*, IP = *Internet Protocol*

Enkapsulasi/Denkapsulasi Data pada TCP/IP



Data flow through TCP/IP

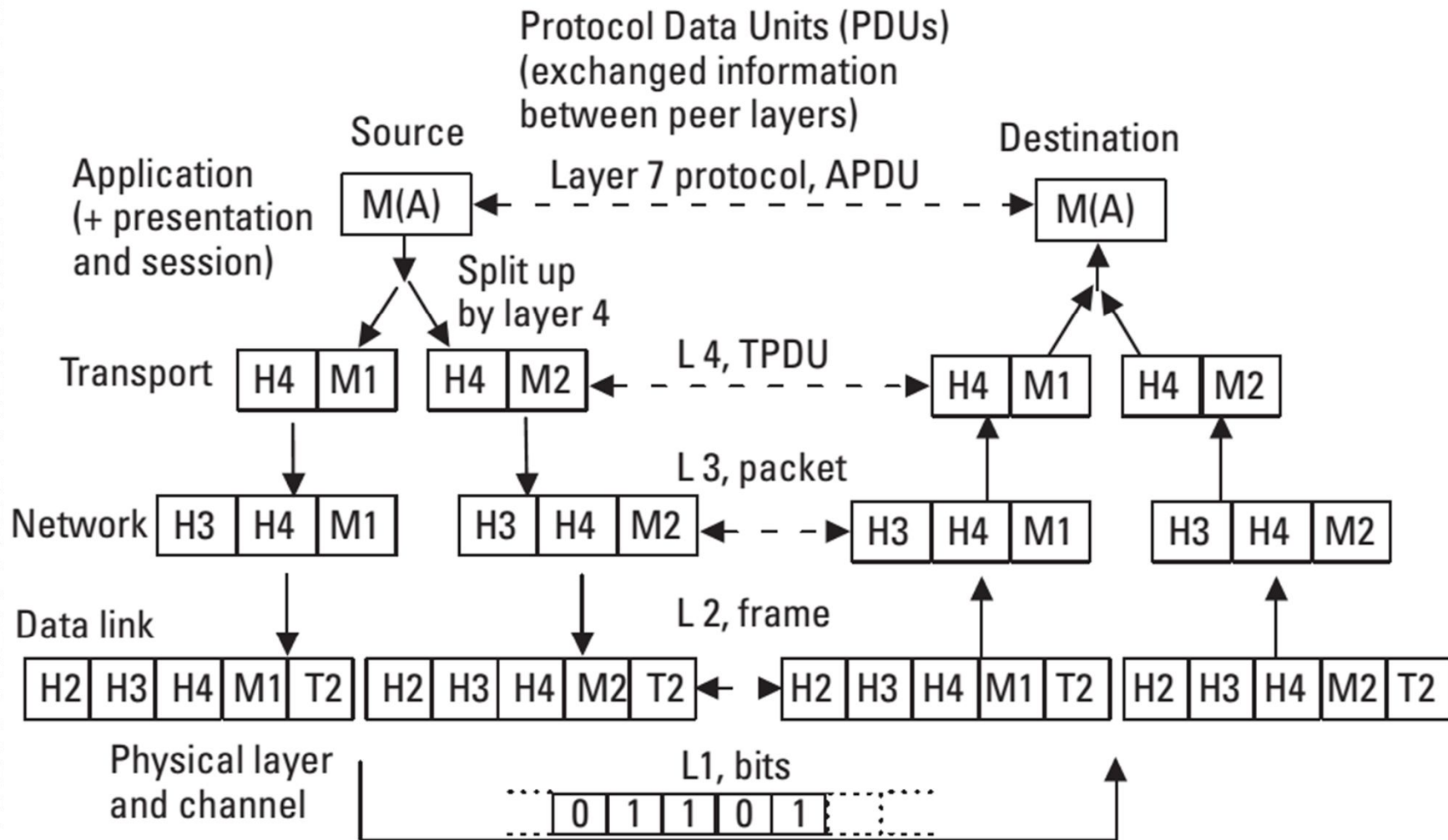
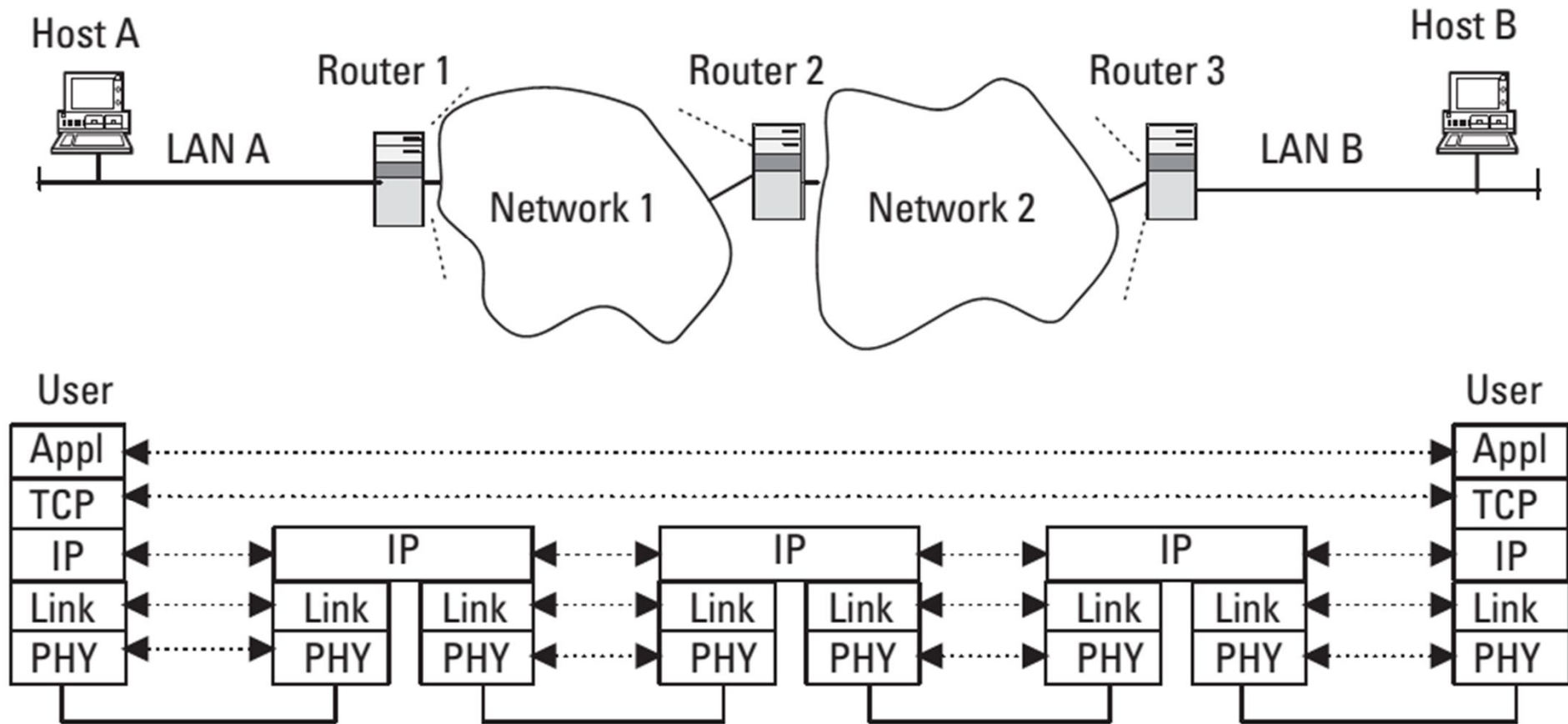


Figure 6.12 Data flow through a protocol stack.

M = Message; H = Header



Example Internet connection



TCP/IP Protocols

Process or
application
protocol

Transport
layer, host-to-
host protocol

Network
layer
protocol

Bearer network,
data link and
physical layer
protocol

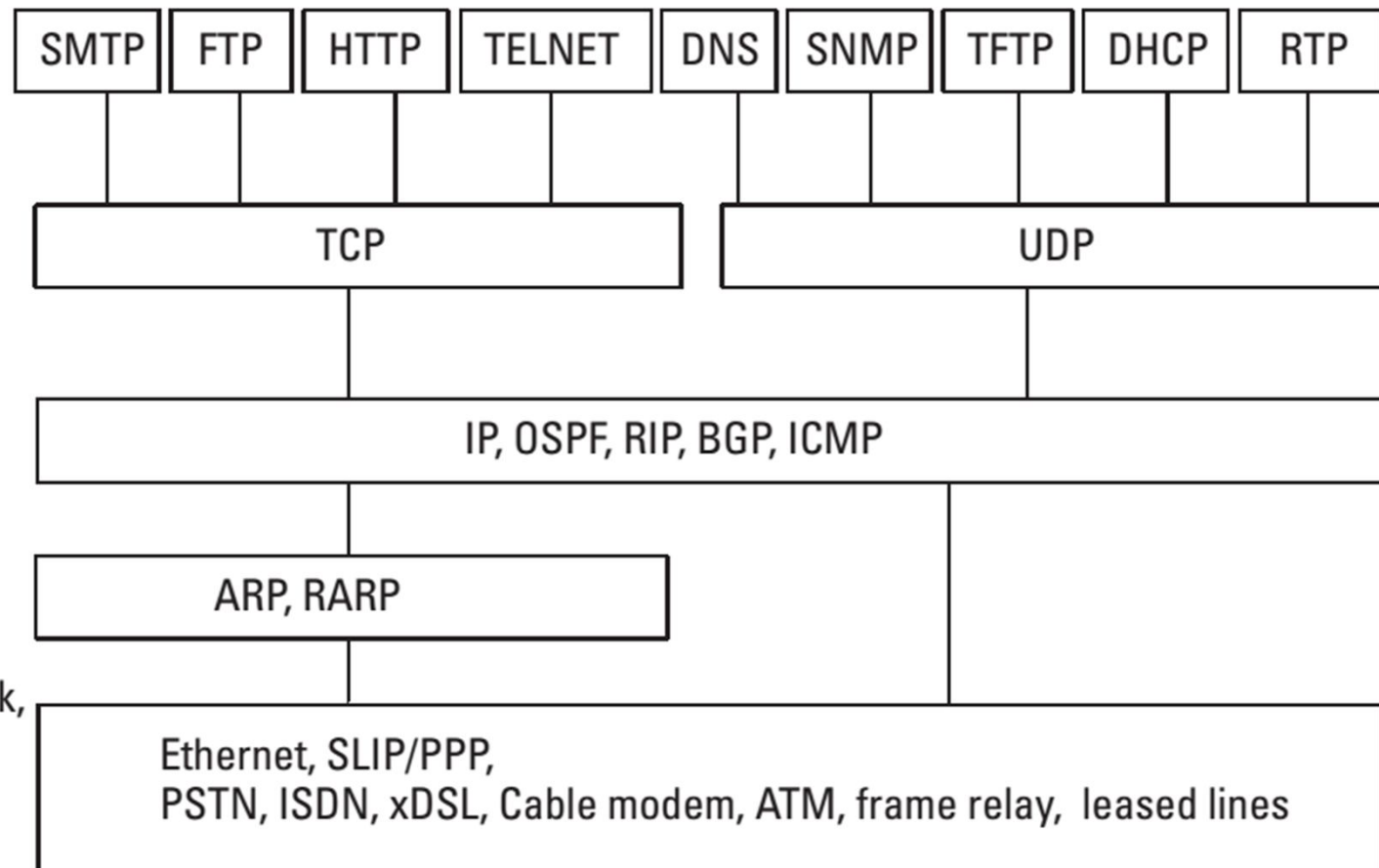


Figure 6.36 TCP/IP protocols and their interrelationship with the OSI reference model.

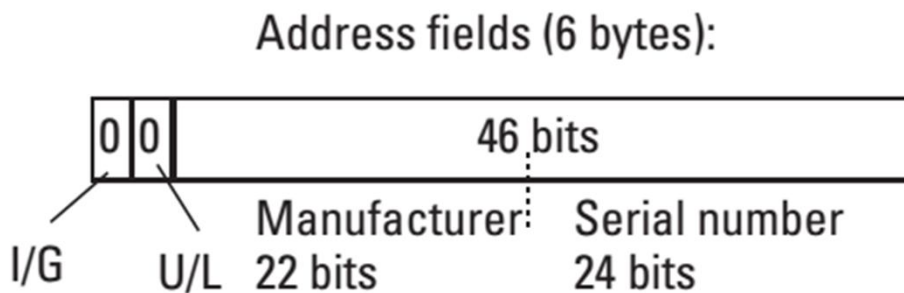
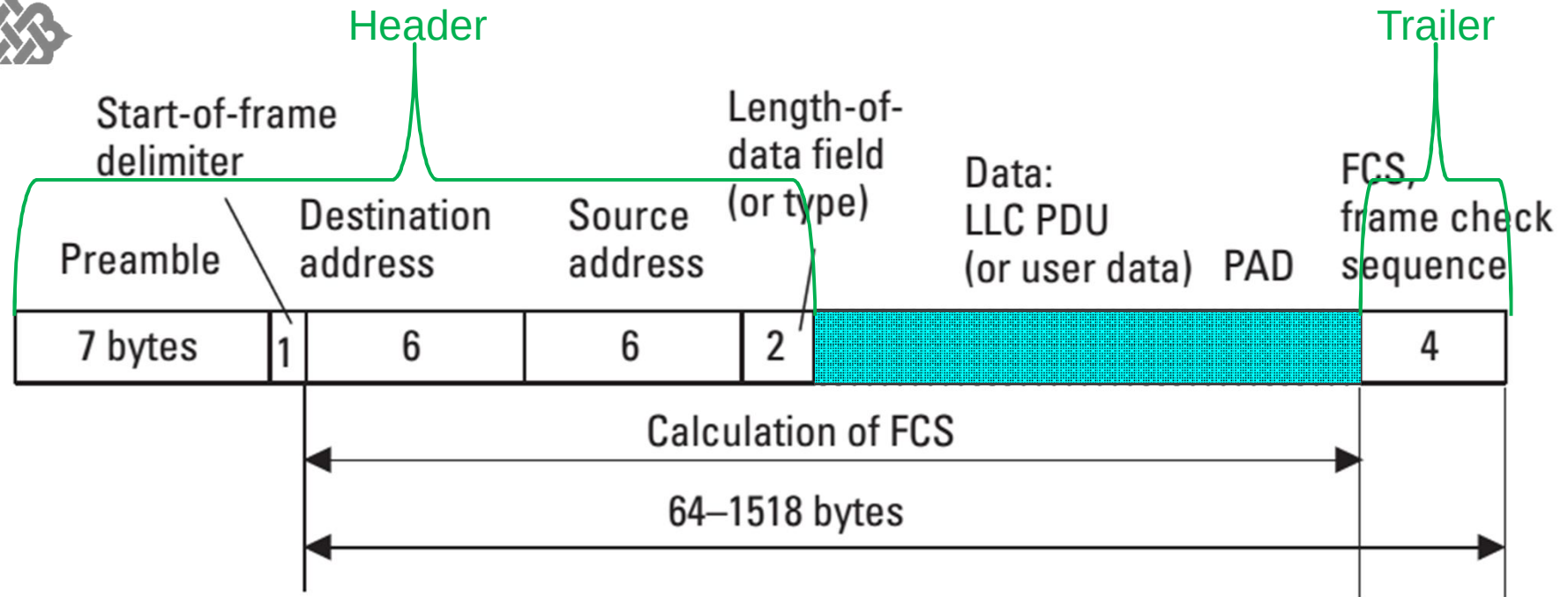


Network-Interface Layer Protocols

- **Network-Interface Layer** pd TCP/IP menjalankan fungsi gabungan Layer 1 (Physical) dan Layer 2 (Data Link) pd OSI
- **Contoh protokol:**
 - IEEE 802.3; CSMA/CD or Ethernet LAN
 - IEEE 802.4; Token Bus LAN
 - IEEE 802.5; Token Ring LAN
 - IEEE 802.11; WLAN → WiFi
 - IEEE 802.16; Broadband Wireless Access → WiMAX
 - Address Resolution Protocol (ARP);
 - Reverse Address Resolution Protocol (RARP);
- **Ingat:** Layer 2 (Data Link) pd OSI dibagi mjd dua sublayer, yaitu: MAC sublayer dan LLC sublayer.



Example: Ethernet Frame



I/G = Individual/group address
= 0; Address of individual workstation
= 1; Address of a group of workstations
U/L = Universal/local address
= 0; Global address
= 1; Local address

Figure 6.27 Frame structure of the Ethernet (MAC).



Internet Layer Protocols

- **Internet Layer** pd TCP/IP menjalankan fungsi Layer 3 (Network layer) pd OSI
- Fungsi utama: *addressing* dan *routing*.
- Contoh protokol:
 - Internet Protocol (IP)
 - Open Shortest Path First (OSPF)
 - Routing Information Protocol (RIP)
 - Border Gateway Protocol (BGP)
 - Internet Control Message Protocol (ICMP)

IP Address (Version 4)

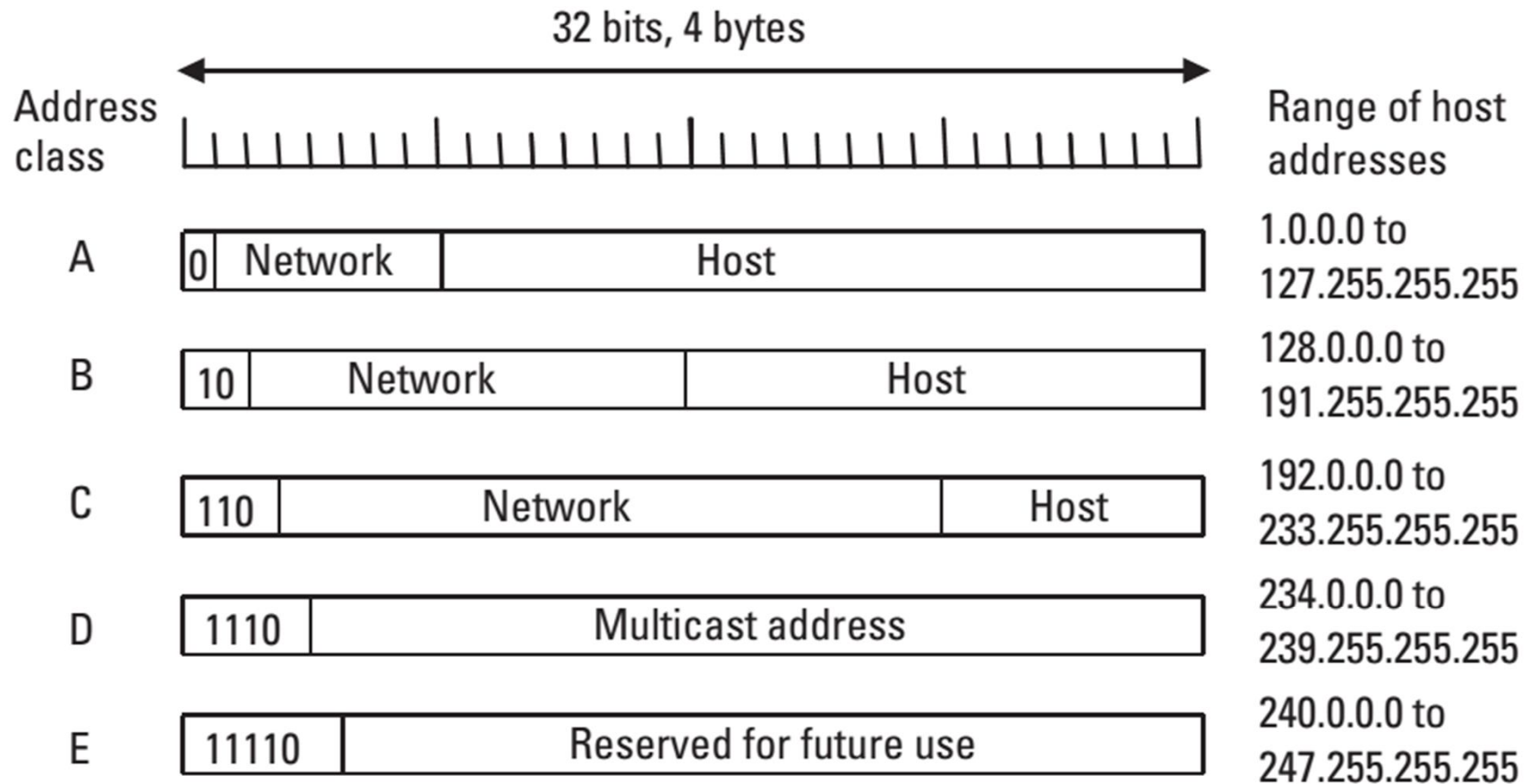


Figure 6.38 IP address format (IPv4).



IP Packet (include IP Header)

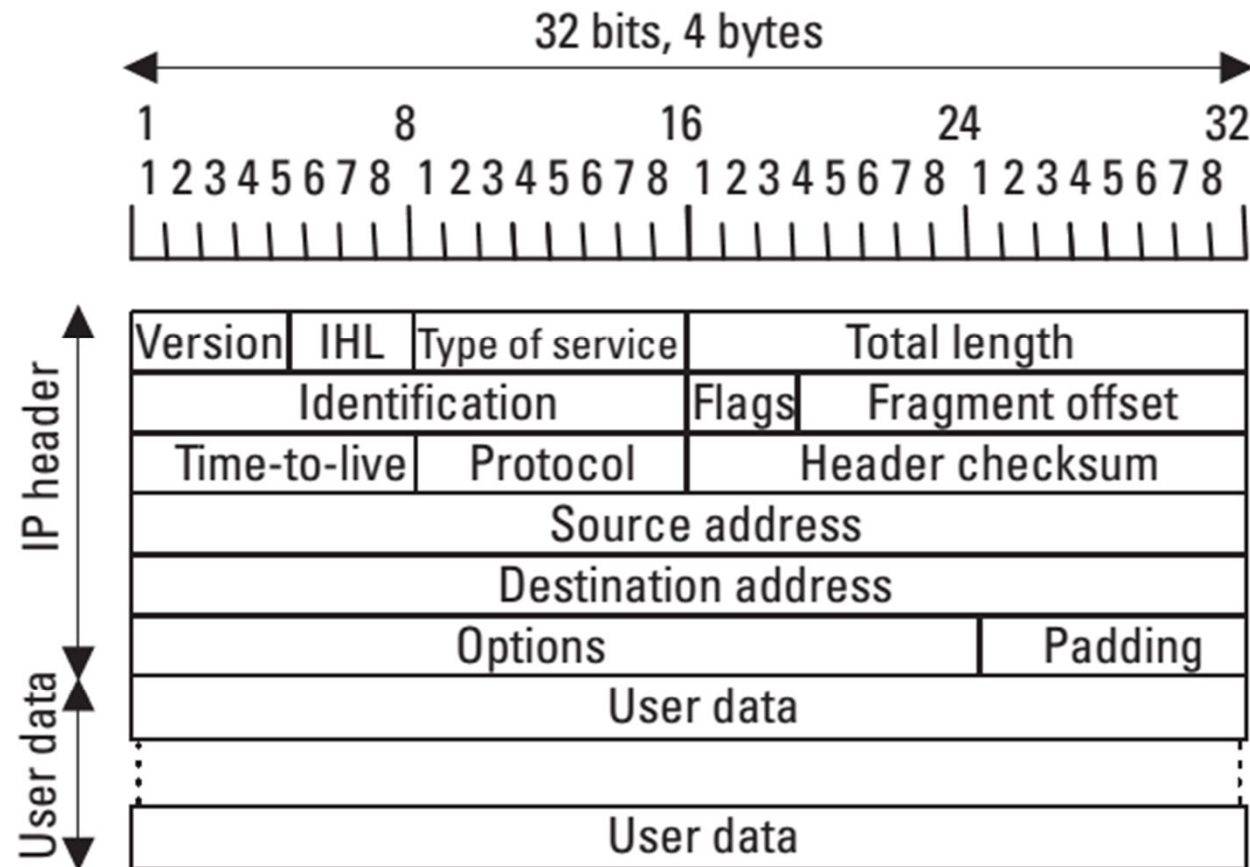
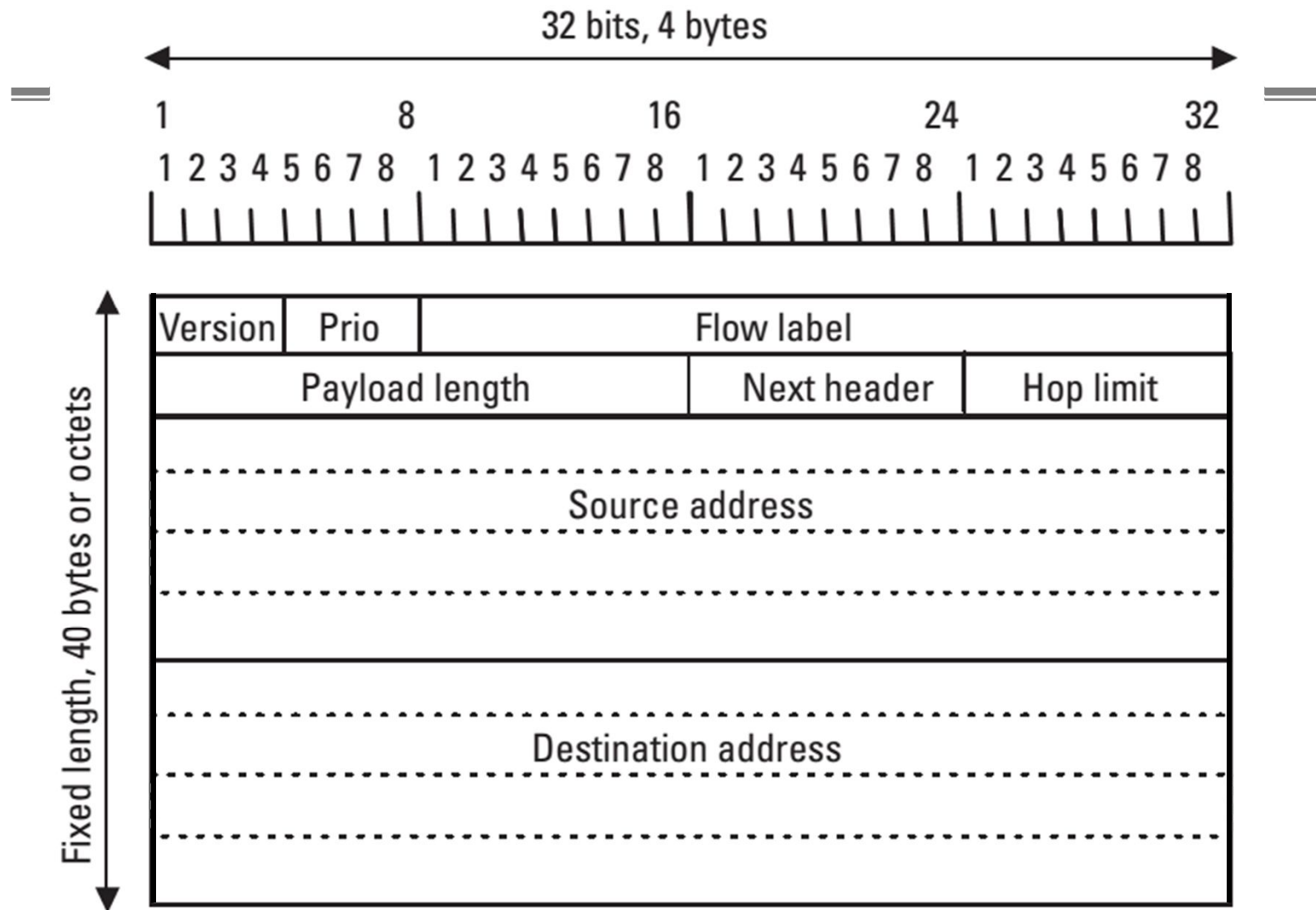


Figure 6.41 IP packet and header (IPv4).

IP Header (Version 6)



Example: 8000:0000:0000:0000:0ABC:DEF1:2345:789A



Transport Layer Protocols

- **Transport layer** pd TCP/IP menjalankan sepenuhnya fungsi layer 4 (Transport layer) pd OSI.
- Fungsi utamanya adalah menjamin *flow control* dan *reliable* untuk *end-to-end transmission*
- Protokol-protokol utamanya:
 - Transmission Control Protocol (TCP)
 - User Datagram Protocol (UDP)

TCP Packet

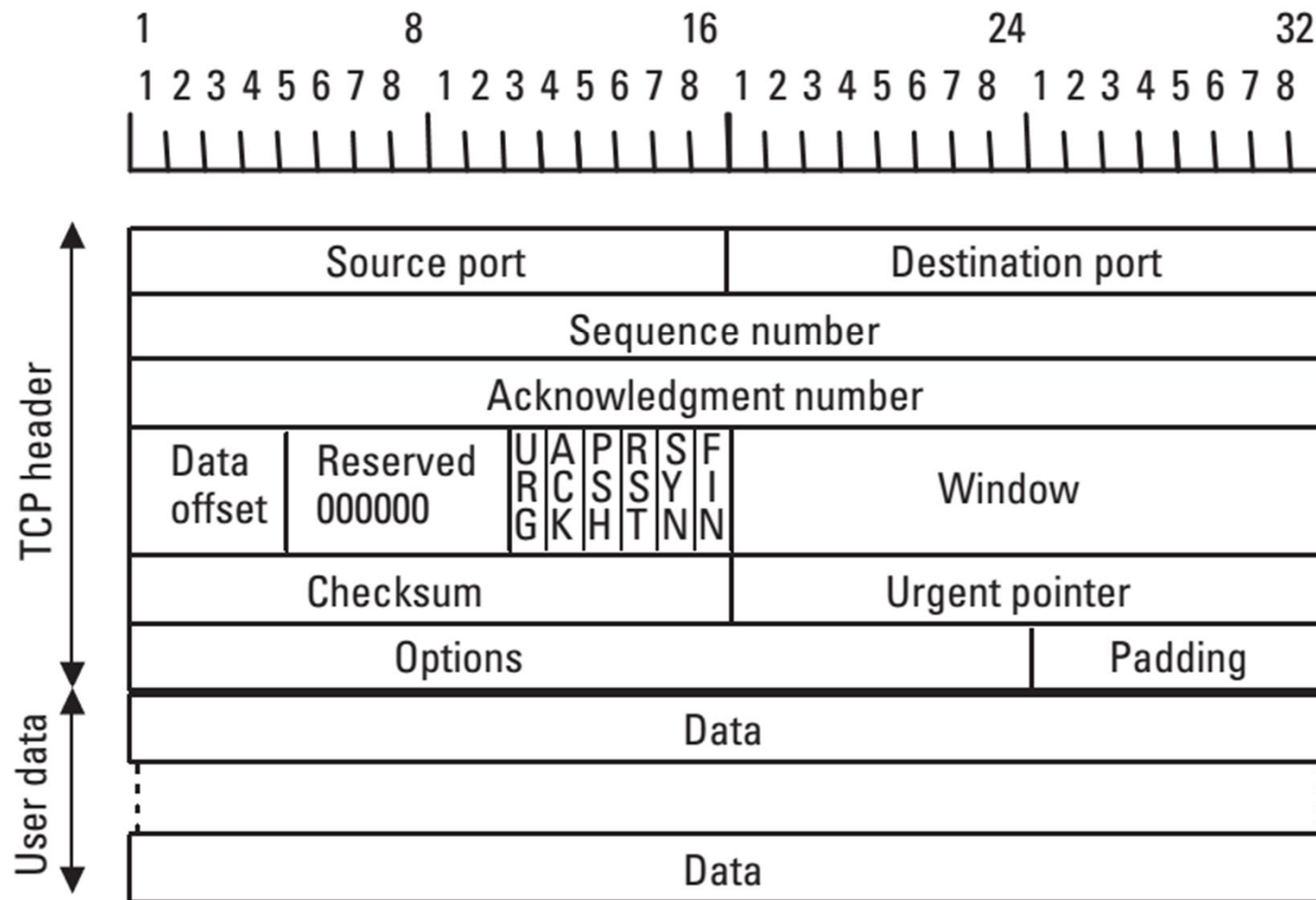
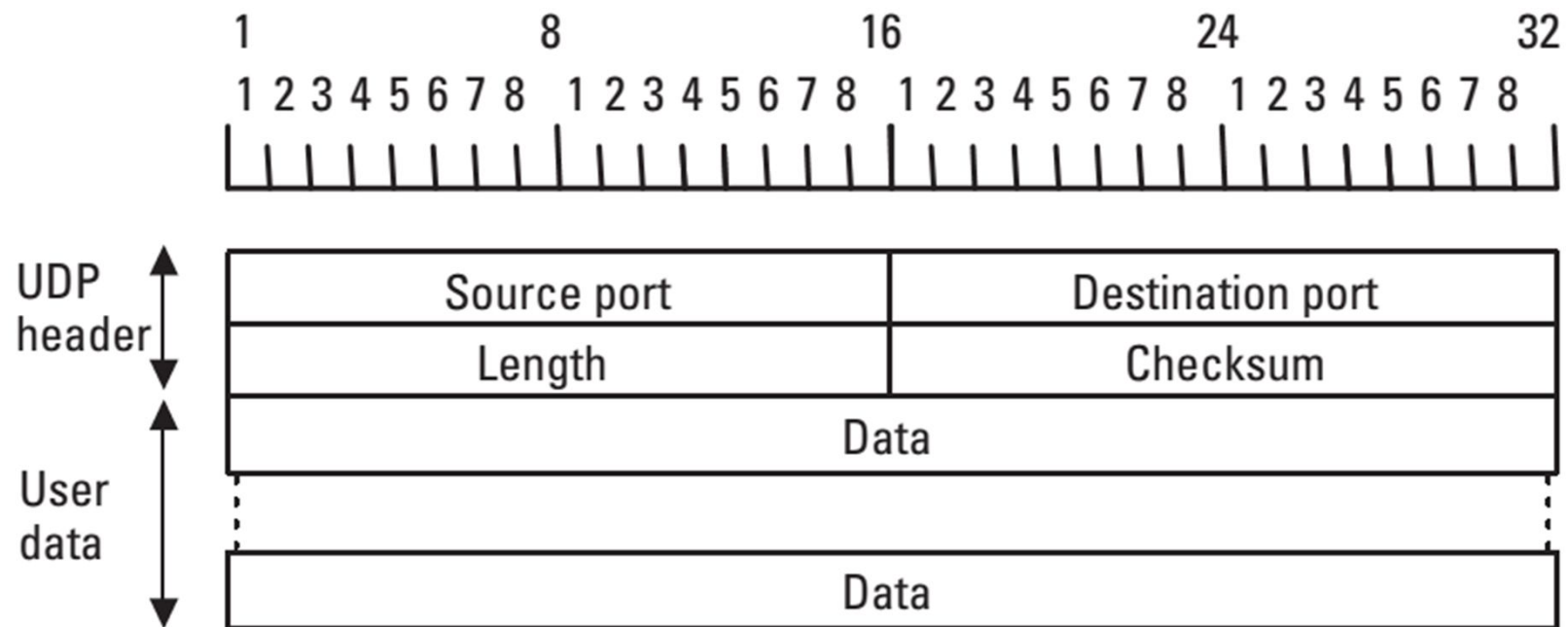


Figure 6.48 TCP header.

UDP Packet (include Header)



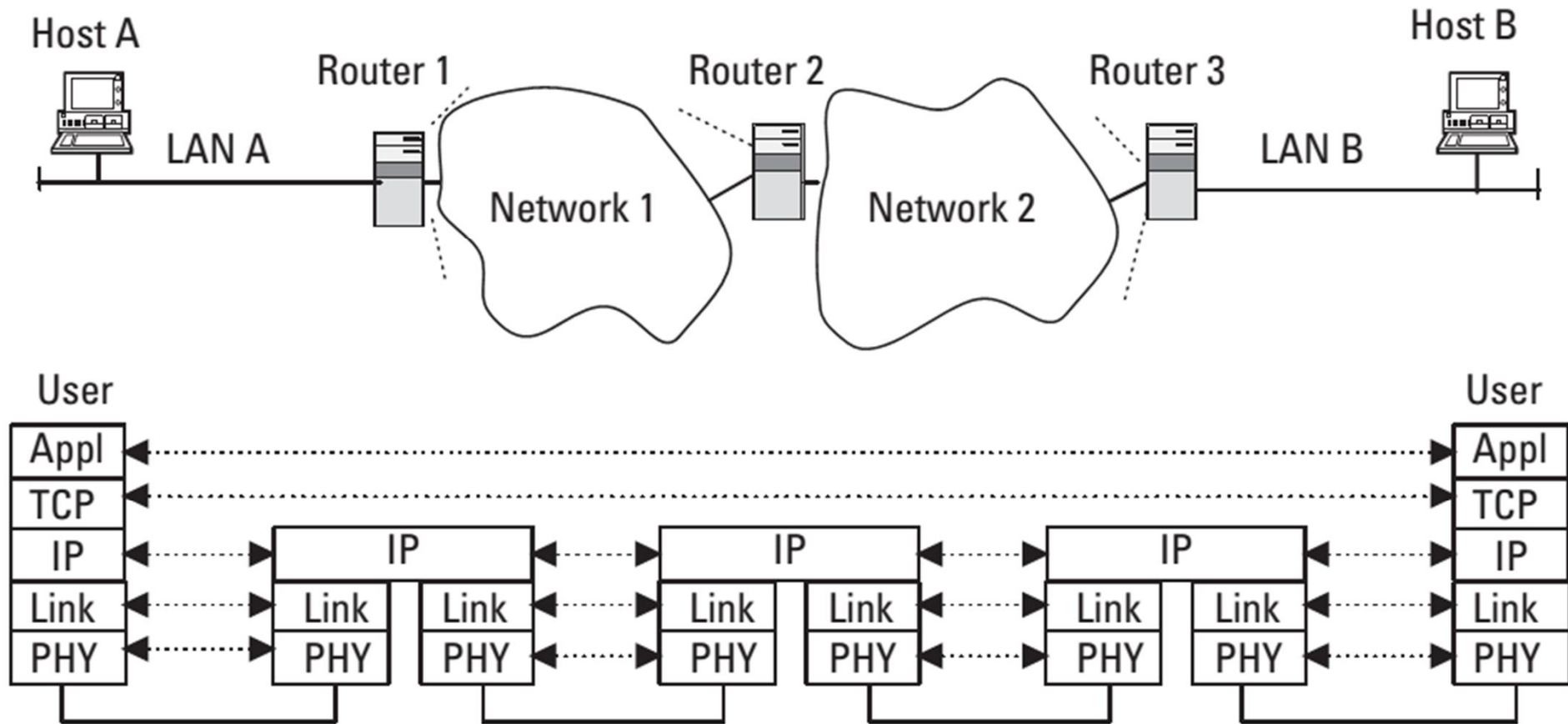


Application Layer Protocols

- **Application Layer** pd TCP/IP menjalankan fungsi gabungan Layer 5 (Session), Layer 6 (Presentation), dan Layer 7 (Application) pd OSI.
- Contoh protokol:
 - Hypertext Transfer Protocol (HTTP);
 - File Transfer Protocol (FTP);
 - Simple Mail Transport Protocol (SMTP);
 - Telnet, Virtual Terminal Protocol;
 - Domain Name System (DNS);
 - Simple Network Management Protocol (SNMP);
 - Trivial File Transfer Protocol (TFTP);
 - Dynamic Host Configuration Protocol (DHCP);
 - Real-Time Transport Protocol (RTP).



Example Internet connection



Example of Encapsulation

Application layer protocol,
example: HTTP



Transport layer protocol,
example: TCP



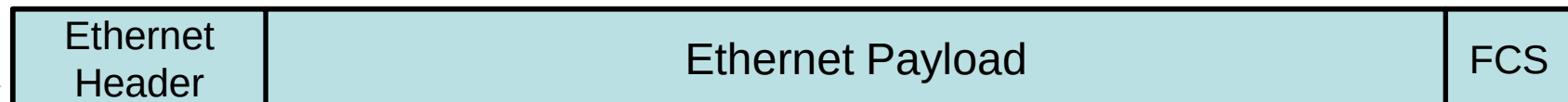
Internet layer protocol,
example: IP



LLC sublayer
protocol,
example: LLC



MAC
sublayer
protocol,
example:
Ethernet





Internet dan Jaringan Konvergensi

- OSI Reference Model vs TCP/IP Protocol Stack
- Internet Protocol Suite (TCP/IP Protocol Stack)
 - Network Interface Layer
 - Internet Layer
 - Transport Layer
 - Application Layer
- **Converged Network**

PR-11

- **Tulislah makalah singkat** tentang **jaringan konvergensi** (*converged network* atau *convergence network*).
- **Isi** makalah **minimal** harus membahas: pengertian, arsitektur, teknologi, aplikasi/layanan, dan contoh jaringan konvergensi serta memiliki minimal satu buah gambar.
- **Format:**
 - Minimal 5 halaman, tidak perlu cover, cukup di-*hecter* saja,
 - Huruf: font Time New Roman ukuran 12,
 - Spasi baris 1.15
 - Margin 3, 2, 3, 2
 - Ukuran kertas A4

- **Gaya Penulisan Kutipan**
 - Setiap kutipan harus dicantumkan sumber rujukannya dengan format *Harvard style*.
- **Daftar Pustaka**
 - Minimal merujuk pd tiga sumber/literatur (**satu buku/ebook, satu makalah dlm jurnal, makalah dlm prosiding, internet, dll.**)
- **Tulis/ketik sendiri, dilarang mencontek, tidak boleh sama!**



Sekian, terima kasih, semoga berkah.

Ada pertanyaan?