



Cisco Networking Academy
Mind Wide Open

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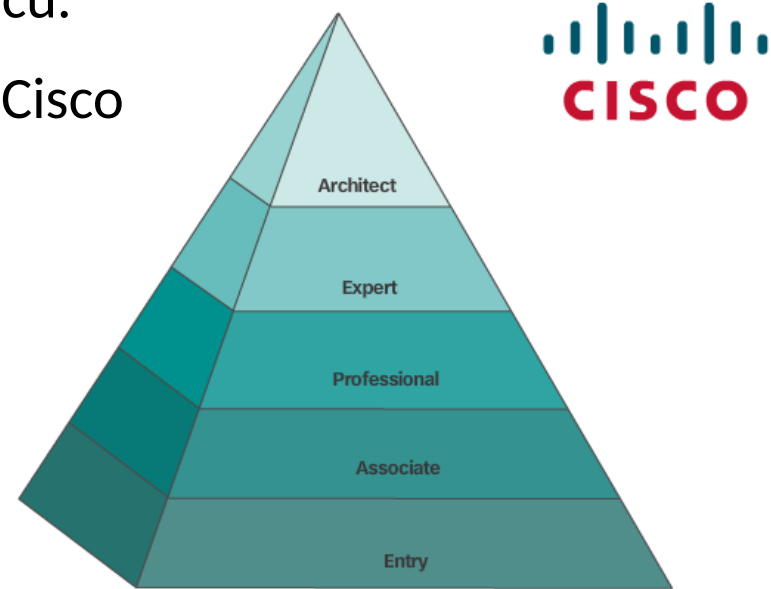
CCNAv7: Introduction to Networks

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- Cíle předmětu
 - Přehled a praktické dovednosti s vytvářením lokálních počítačových sítí. Konfigurace směrovačů, prepínačů.
 - Příprava na oficiální certifikaci firmy Cisco
- Cisco Academy
 - <https://www.netacad.com/>
 - <http://netacad.fit.vutbr.cz/>
- Oficiální certifikace Cisco
 - <http://www.cisco.com/c/en/us/training-events/training-certifications/overview.html>
- Detaily se dozvíte na cvičeních
 - Nezapomeňte se přihlásit



- Přednáška 2h
- Cvičení 2h
- WIS
- NetSpace (<https://www.netacad.com/>)
 - Kurikula
 - Texty
 - Interaktivní úkoly
 - Packet Tracer
 - Modulové testy
- Doplnkové
 - Knihy

Intro to Networks (ITN)
Networking Today
Basic Switch and End Device Configuration
Protocol Models
Physical Layer
Number Systems
Data Link Layer
Ethernet Switching
Network Layer
Address Resolution
Basic Router Configuration
IPv4 Addressing
IPv6 Addressing
ICMP
Transport Layer
Application Layer
Network Security Fundamentals
Build a Small Network

Switching, Routing, and Wireless Essentials (SRWE)
Basic Device Configuration
Switching Concepts
VLANs
Inter-VLAN Routing
STP
Etherchannel
DHCPv4
SLAAC and DHCPv6 Concepts
FHRP Concepts
LAN Security Concepts
Switch Security Configuration
WLAN Concepts
WLAN Configuration
Routing Concepts
IP Static Routing
Troubleshoot Static and Default Routes



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Module 3: Protocols and Models

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Layering in packet networks

Communications Fundamentals

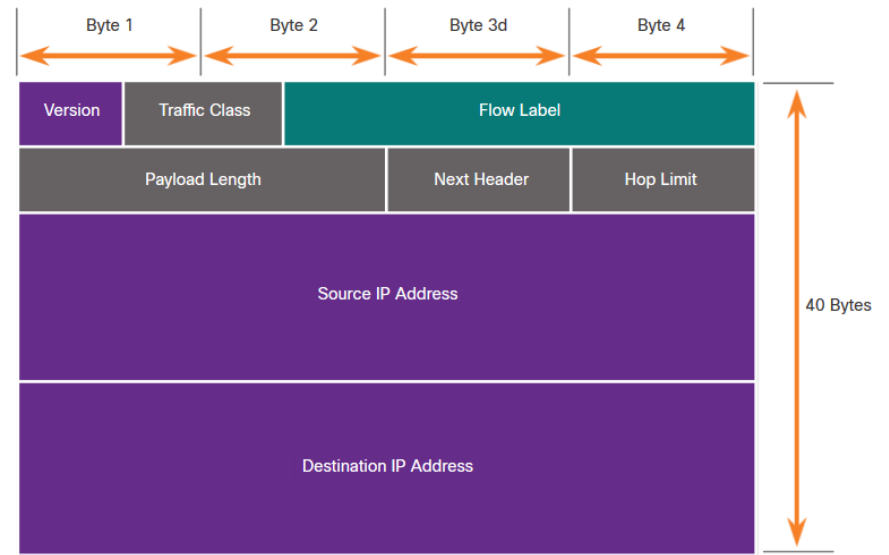
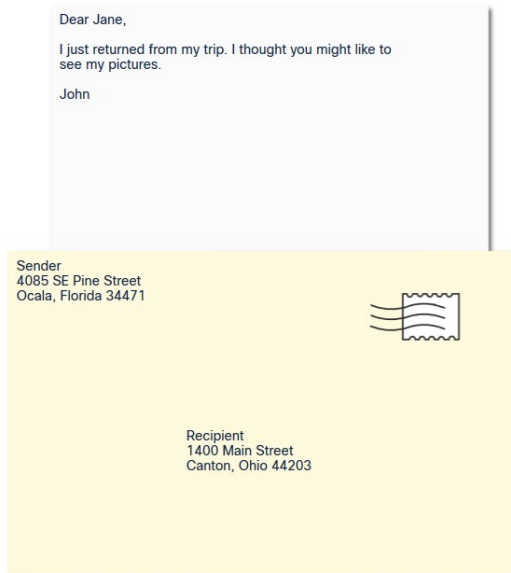
Networks can vary in size and complexity. It is not enough to have a connection, devices must agree on “how” to communicate.

There are three elements to any communication:

- There will be a source (sender).
- There will be a destination (receiver).
- There will be a channel (media) that provides for the path of communications to occur.

Message Formatting and Encapsulation

- When a message is sent, it must use a specific format or structure.
- Message formats depend on the type of message and the channel that is used to deliver the message.

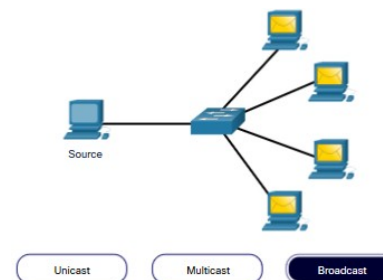
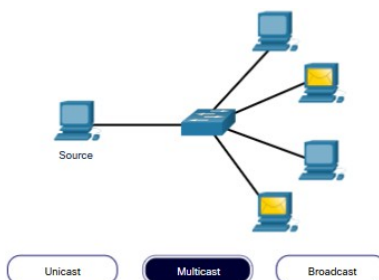
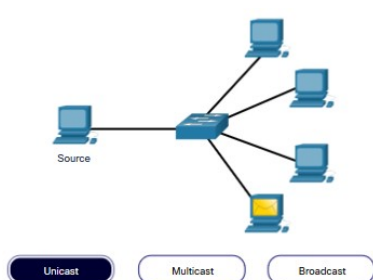


Message Delivery Options

Message delivery may use one of the following methods:

- **Unicast** – one to one communication
- **Multicast** – one to many, typically not all
- **Broadcast** – one to all

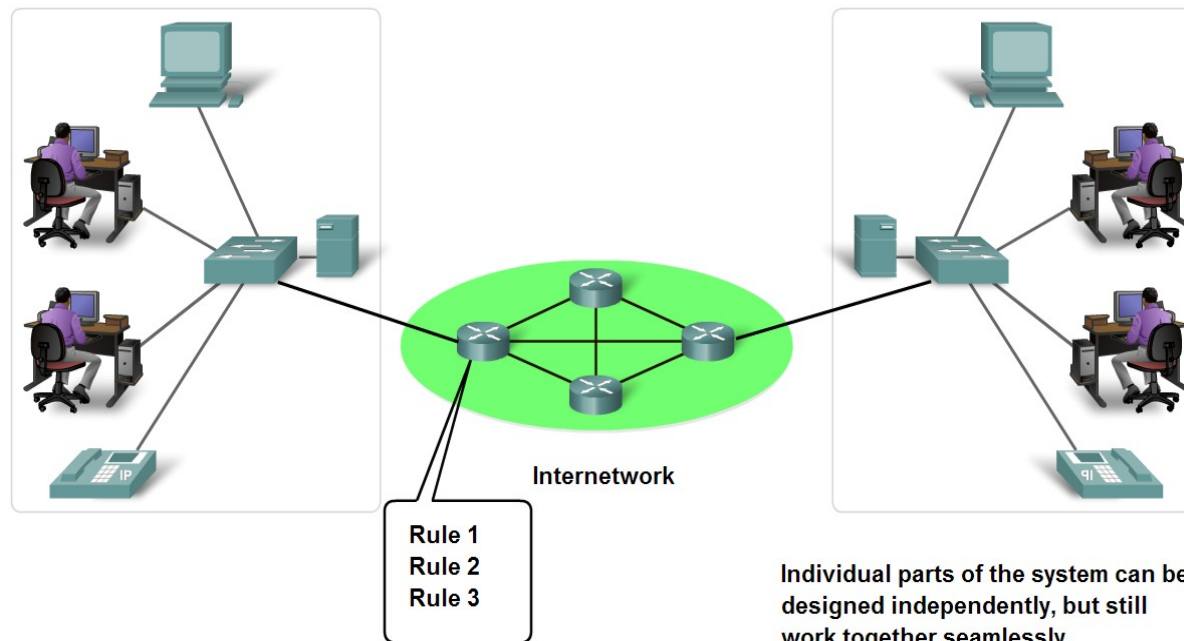
Note: Broadcasts are used in IPv4 networks, but are not an option for IPv6. Later we will also see “Anycast” as an additional delivery option for IPv6.



Benefits of using a layered model

- assists in protocol design
- fosters competition
- changes in one layer do not affect other layers
- provides a common language

Using a layered model helps in the design of complex, multi-use, multi-vendor networks.

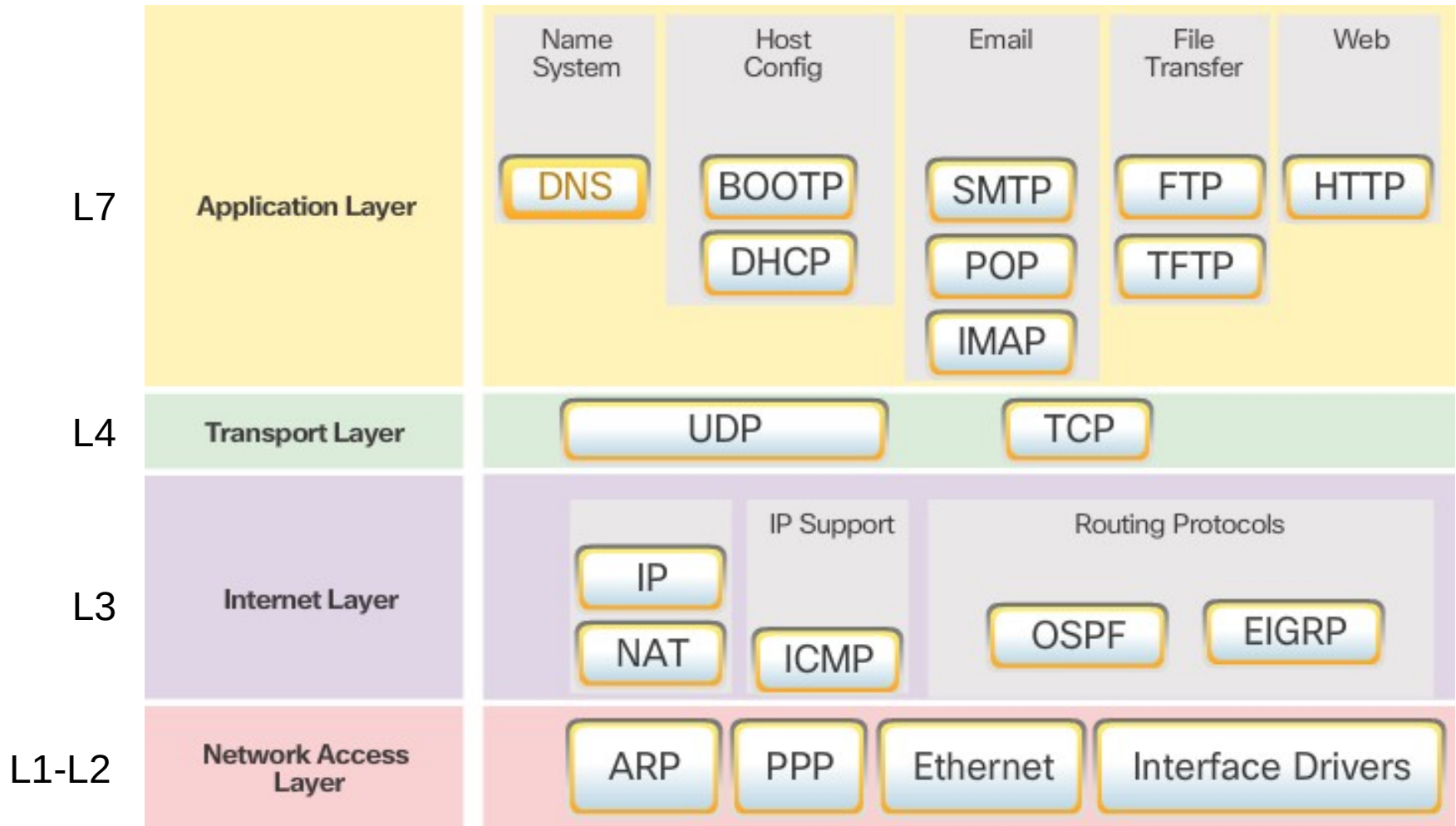


The OSI Reference Model

OSI Model



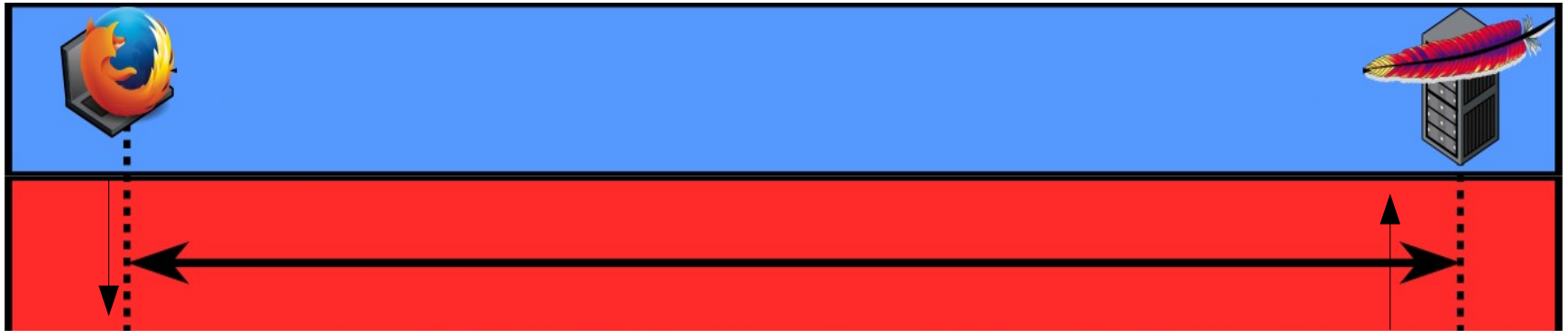
TCP/IP Protocol Suite



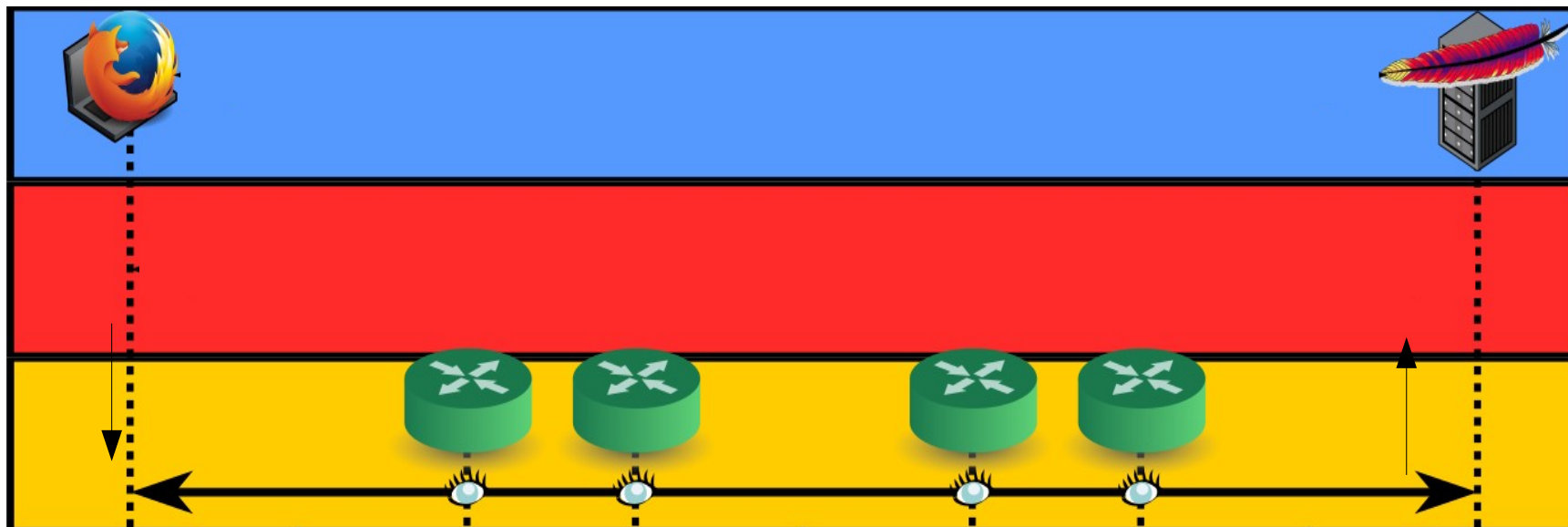
Komunikace na aplikační vrstvě



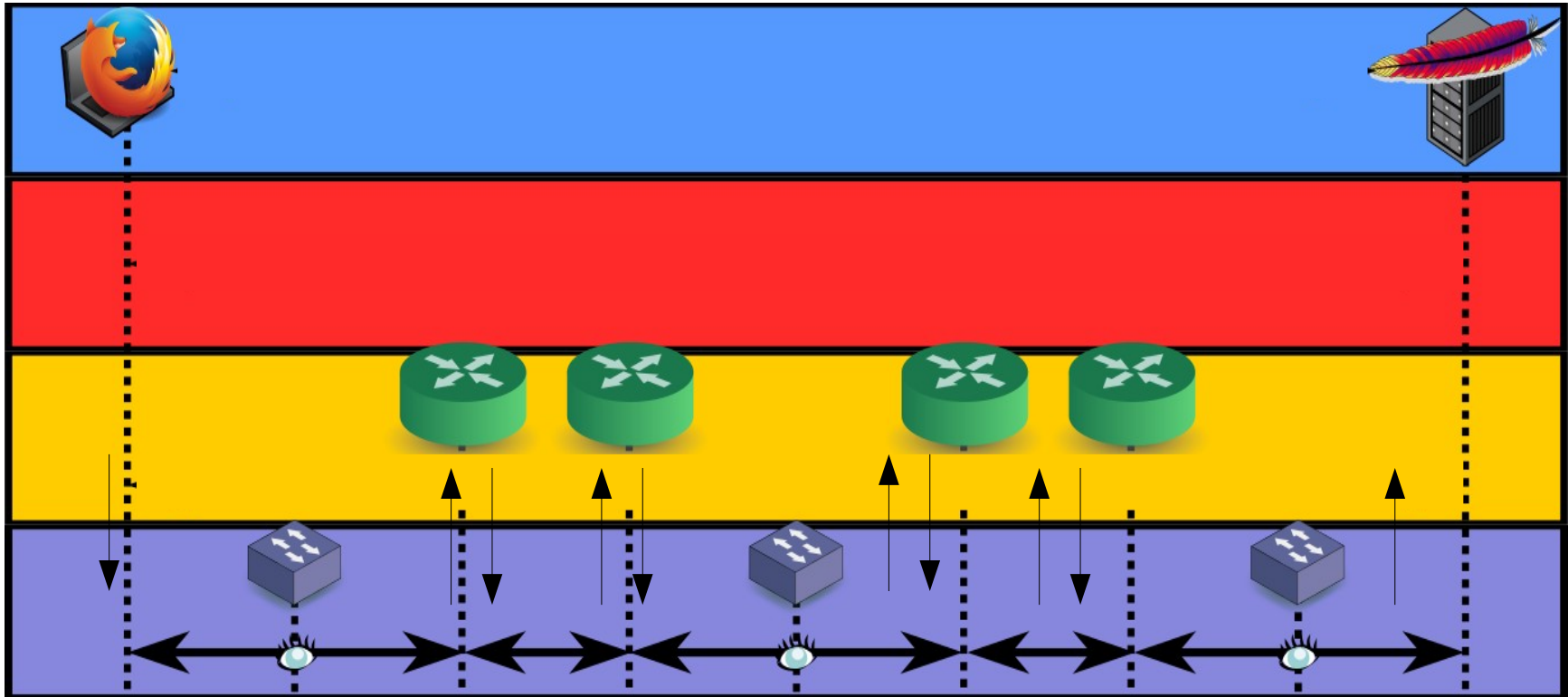
Komunikace na transportní vrstvě



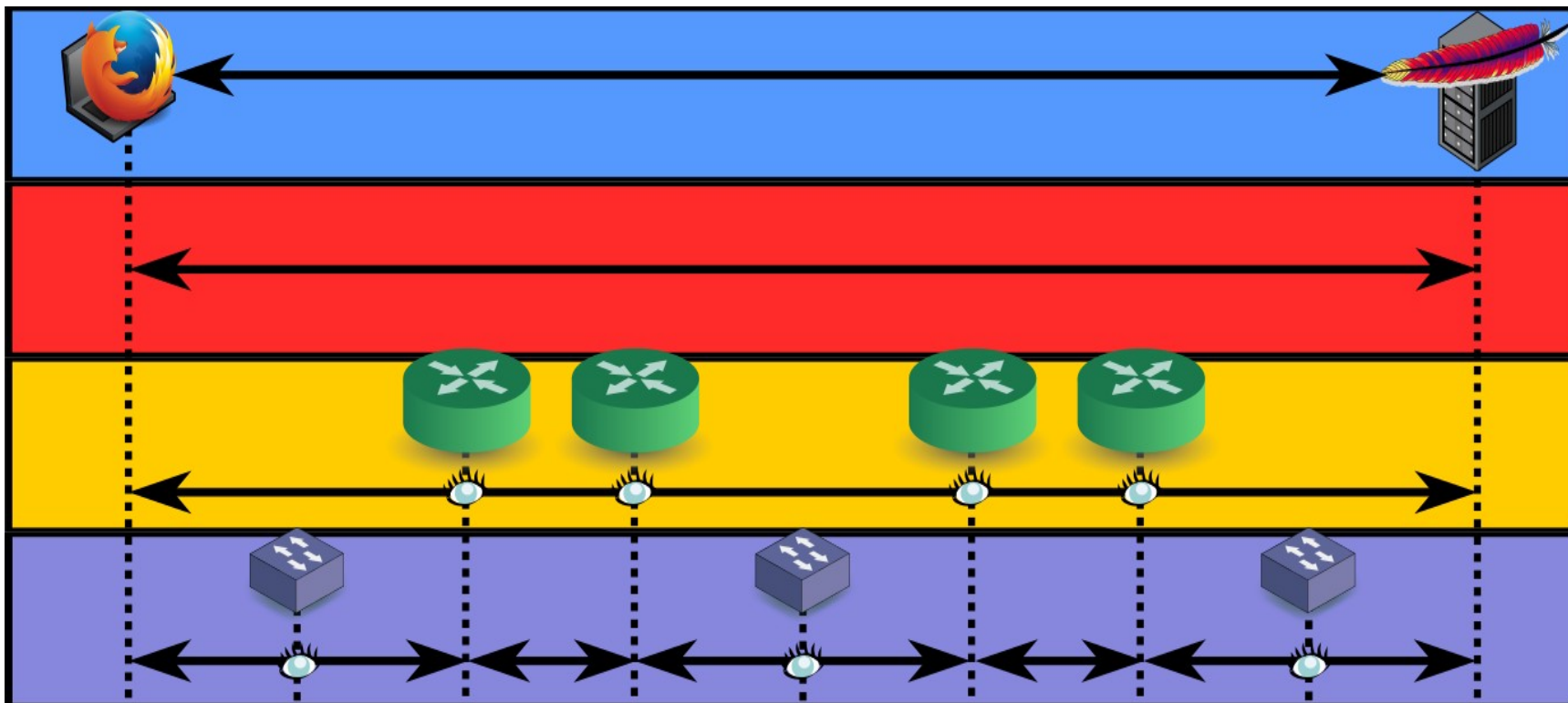
Komunikace na síťové vrstvě



Komunikace na vrstvě síťového rozhraní

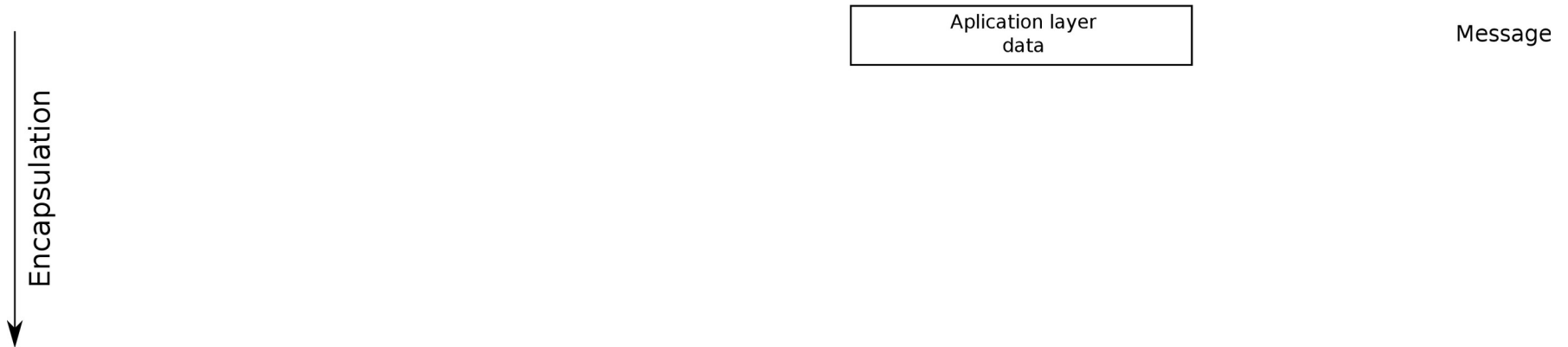


Komunikace na vrstvě síťového rozhraní



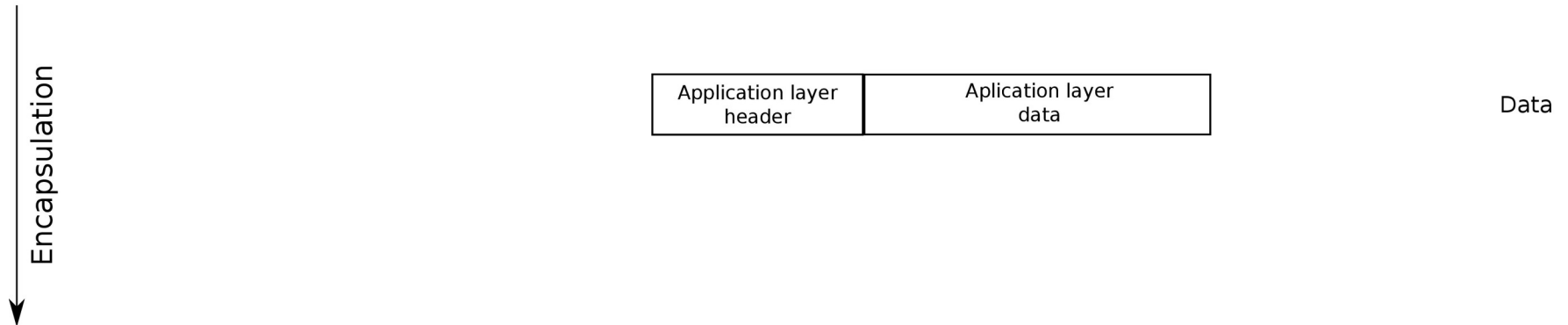
Layers with TCP/IP Model

- Protocol data units (PDU) and encapsulation



Layers with TCP/IP Model

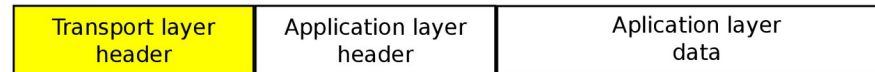
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Layers with TCP/IP Model

- Protocol data units (PDU) and encapsulation

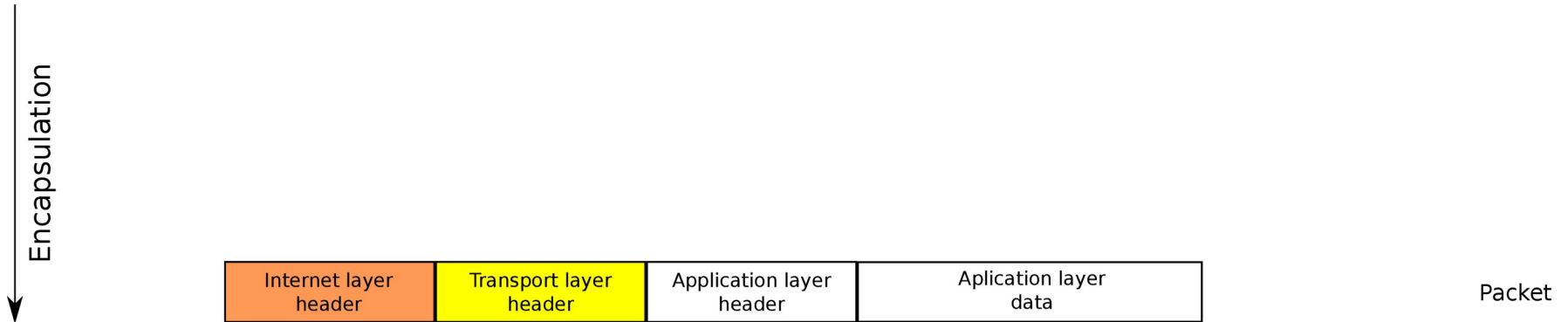
Encapsulation
↓



Segment

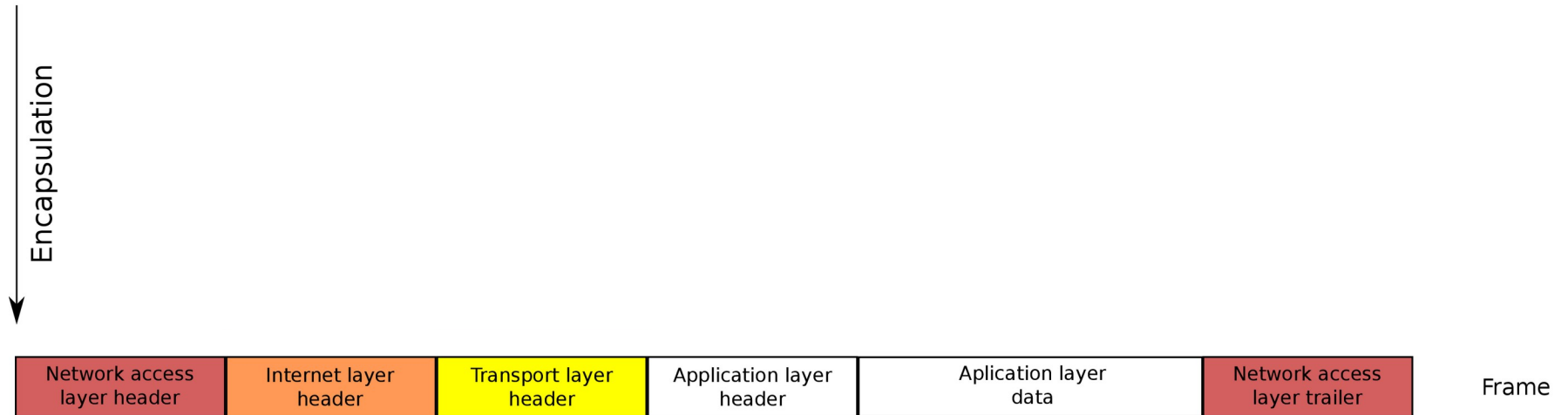
Layers with TCP/IP Model

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Layers with TCP/IP Model

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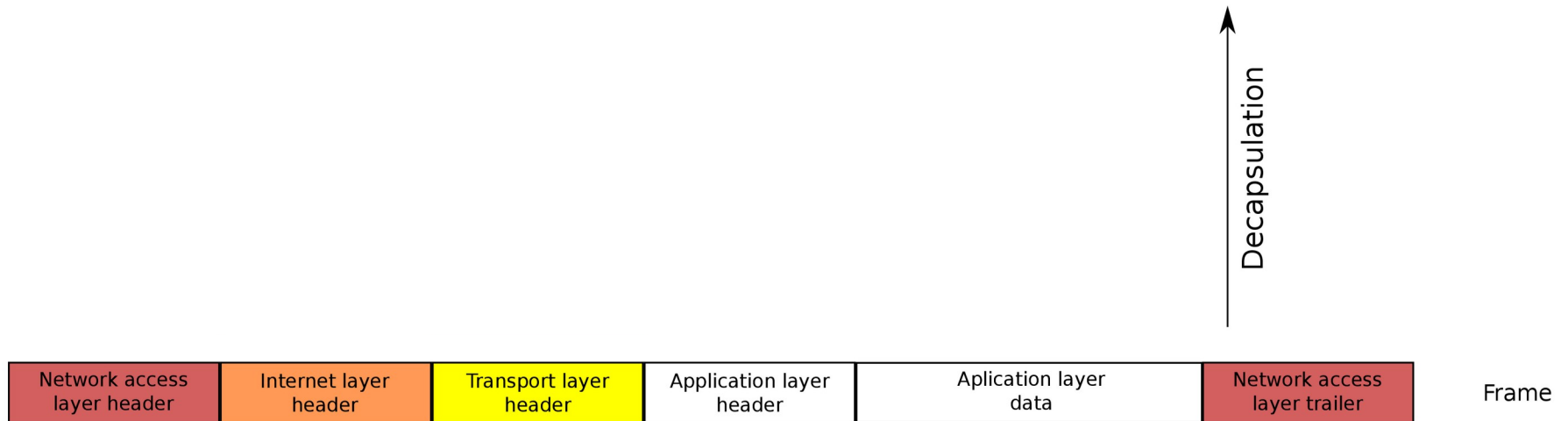


Bits

Signal

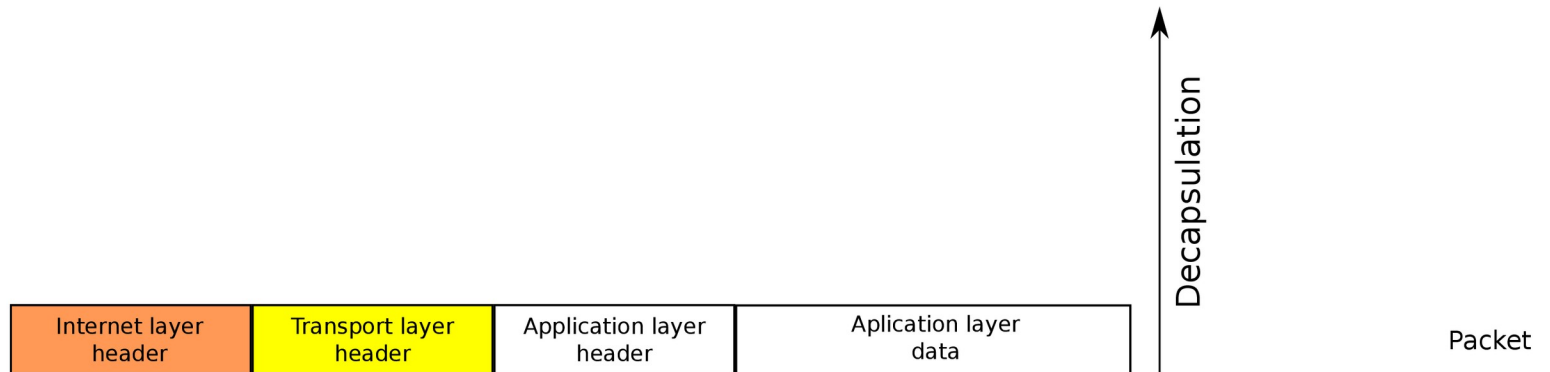
Layers with TCP/IP Model

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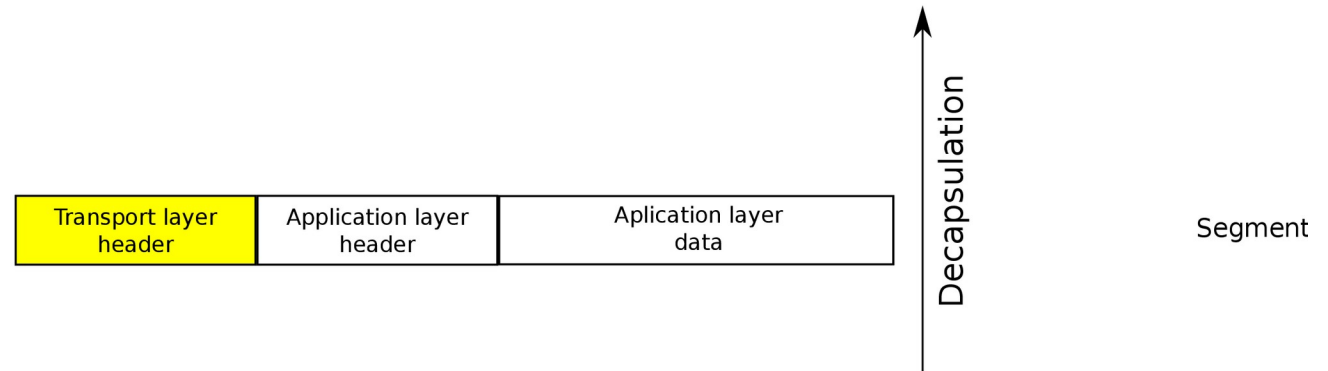
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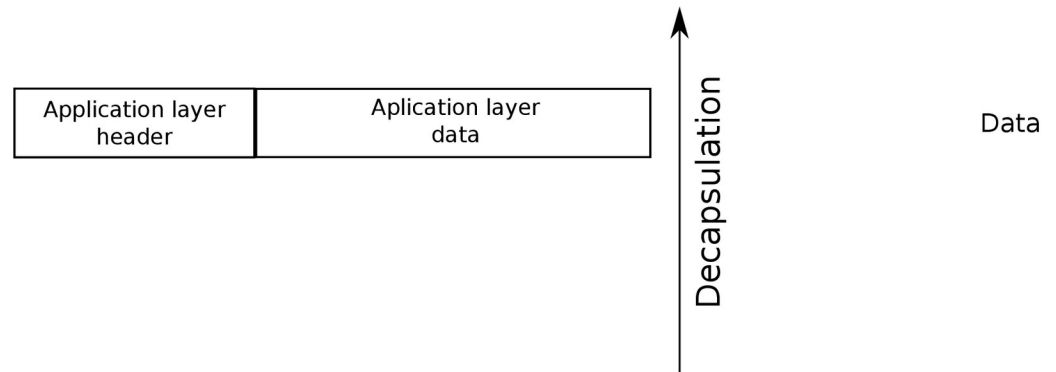
Layers with TCP/IP Model

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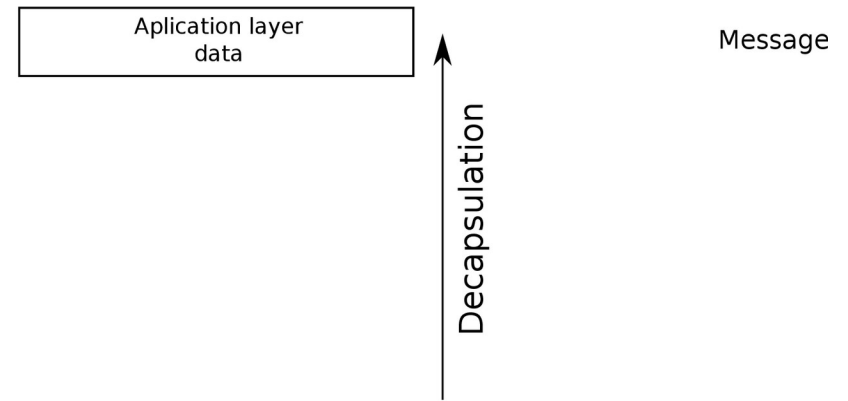
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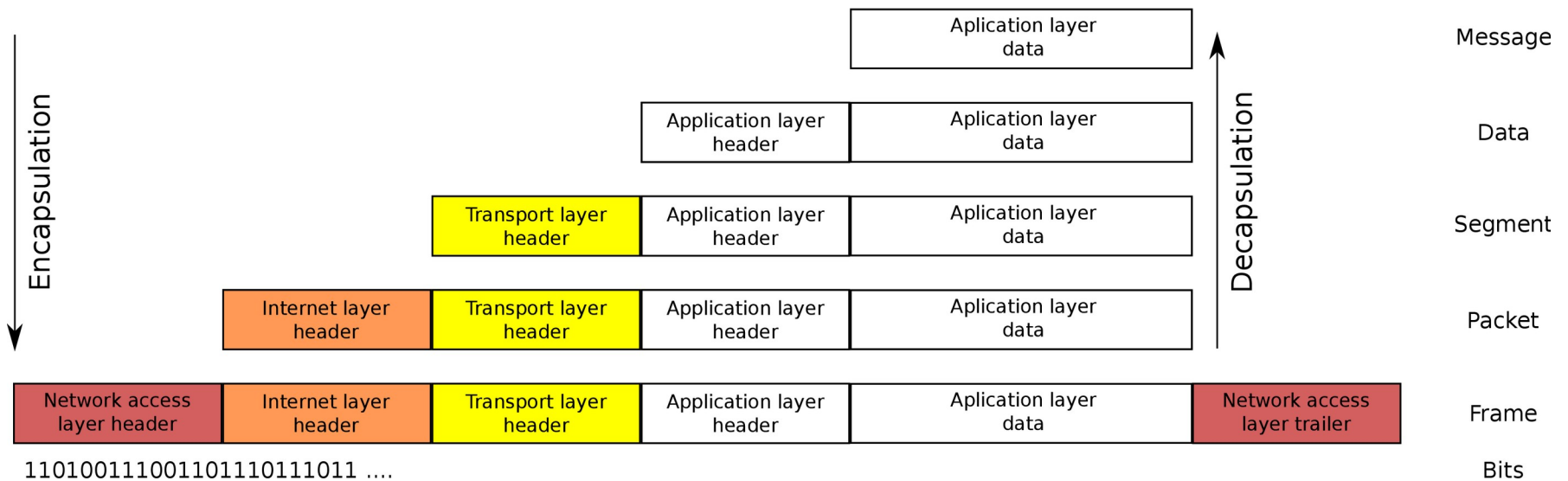
Layers with TCP/IP Model

- Protocol data units (PDU) and encapsulation



Layers with TCP/IP Model

- Protocol data units (PDU) and encapsulation



Standards Organizations

Open Standards



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Open standards encourage:

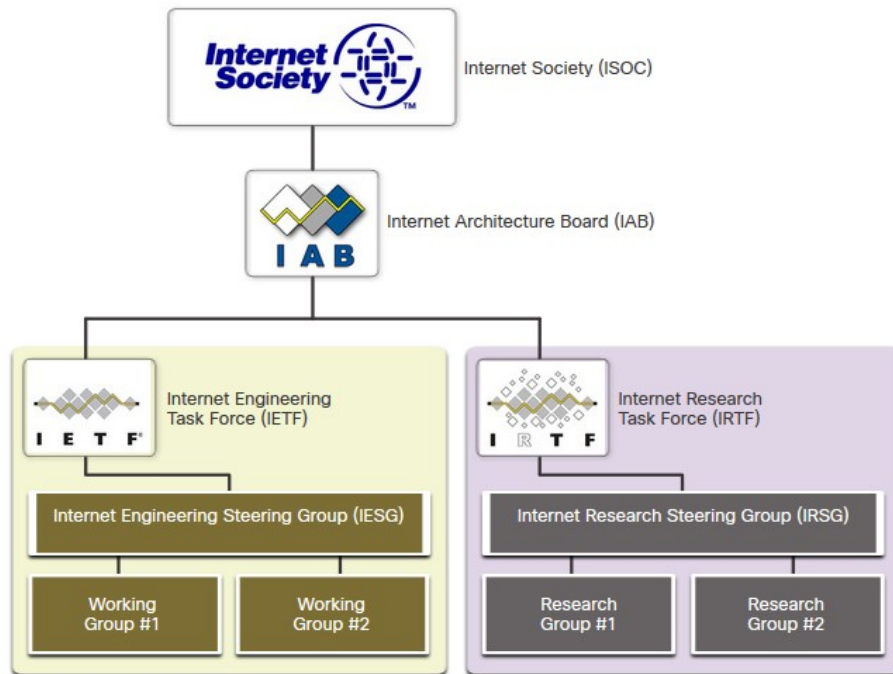
- interoperability
- competition
- innovation

Standards organizations are:

- vendor-neutral
- non-profit organizations
- established to develop and promote the concept of open standards.

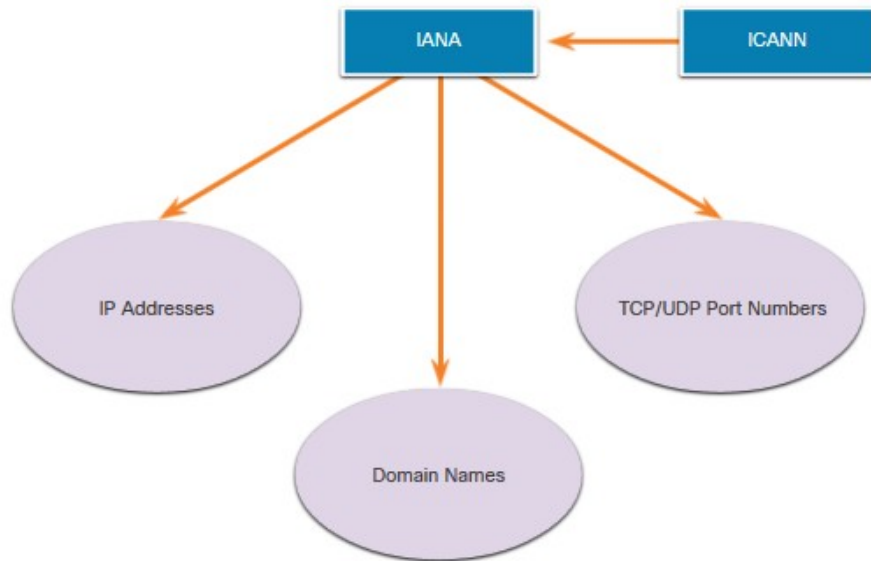
Standards Organizations

Internet Standards



- **Internet Society (ISOC)** - Promotes the open development and evolution of internet
- **Internet Architecture Board (IAB)** - Responsible for management and development of internet standards
- **Internet Engineering Task Force (IETF)** - Develops, updates, and maintains internet and TCP/IP technologies
- **Internet Research Task Force (IRTF)** - Focused on long-term research related to internet and TCP/IP protocols

Internet Standards (Cont.)



Standards organizations involved with the development and support of TCP/IP

- **Internet Corporation for Assigned Names and Numbers (ICANN)** - Coordinates IP address allocation, the management of domain names, and assignment of other information
- **Internet Assigned Numbers Authority (IANA)** - Oversees and manages IP address allocation, domain name management, and protocol identifiers for ICANN

Electronic and Communications Standards

- **Institute of Electrical and Electronics Engineers (IEEE, pronounced “I-triple-E”)**
- dedicated to creating standards in power and energy, healthcare, telecommunications, and networking
- **Electronic Industries Alliance (EIA)** - develops standards relating to electrical wiring, connectors, and the 19-inch racks used to mount networking equipment
- **Telecommunications Industry Association (TIA)** - develops communication standards in radio equipment, cellular towers, Voice over IP (VoIP) devices, satellite communications, and more
- **International Telecommunications Union-Telecommunication Standardization Sector (ITU-T)** - defines standards for video compression, Internet Protocol Television (IPTV), and broadband communications, such as a digital subscriber line (DSL)

Děkuji za pozornost