

# Introduction to networking

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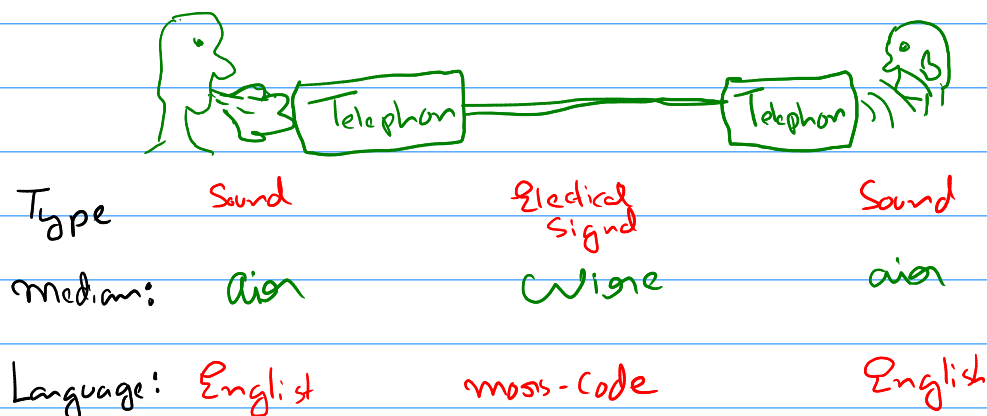
## Content

- Direct human talking
- Compare similar components
- Examine networking models. (OSI model, TCP/IP model)
- High speed data communication.

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## A Brief history of moving information

Networking → Moving information between two or more parties.



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## Dissecting Communication

Local address

Global address

Protocol

→ Set of rules used to move information between two devices.

{ Example: Ethernet, SFTP, FTP, HTTP, HTTPS  
IP, TCP

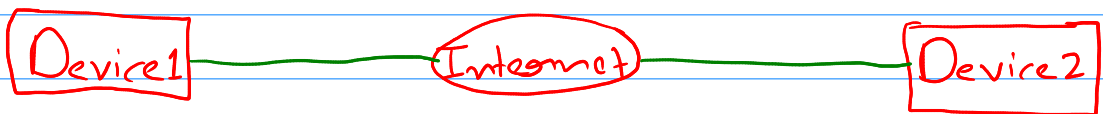
## Communication model

→ Method of Organizing information transfer into components.

## ★ Network Communication model

### Categorizing data transmission

- ① Media : Wires / radio / glass
- ② Local : Ethernet
- ③ Global : Internet Protocol (IP)
- ④ Cues : TCP (Transmission control protocol)
- ⑤ Data : Website / Email



### TCP

{ 3-way  
handshake }

- ① SYN (→) { Synchronization }
- ② SYN-ACK (←) { Synchronization Acknowledge }
- ③ ACK (→)
- ④ Data request (→)
- ⑤ Data (←)

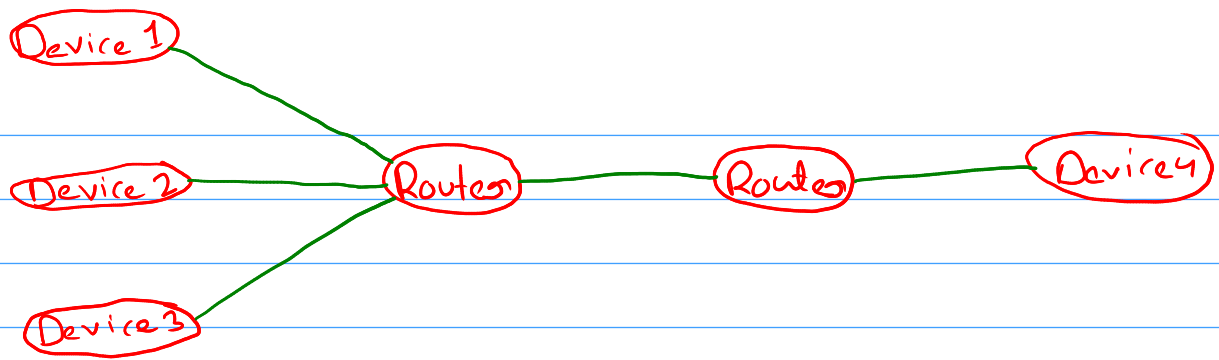
Global address

→ IP address

Local address

→ MAC address

→ { Ethernet MAC address is an identified  
for Ethernet communication locally }



⇒ IP address of router is called default gateway.

This is the place where we send our message when they are going out to the public Internet.

In order to get our message to default gateway we need to know the local address of it



## ★ OSI Model

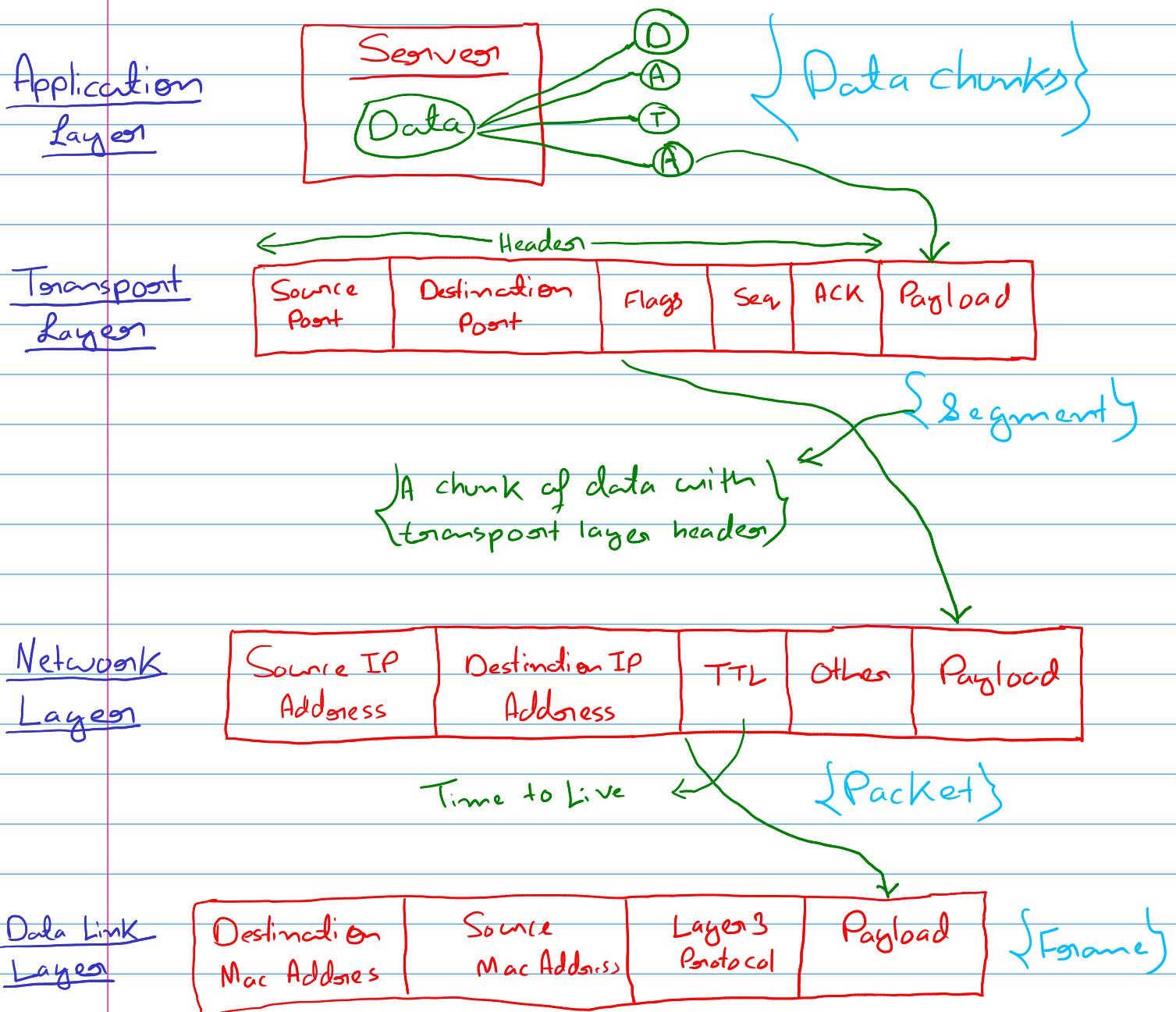
{ Open system Interconnect }

1. Physical Layer { Wire, Radio, Glass etc... }
2. Data Link Layer { Ethernet }
  - ↳ gets data from one device to another device, all within a local network
3. Network Layer { IP }
4. Transport Layer { TCP }
5. Application Layer { Webpage, email etc... }

## ★ TCP/IP model

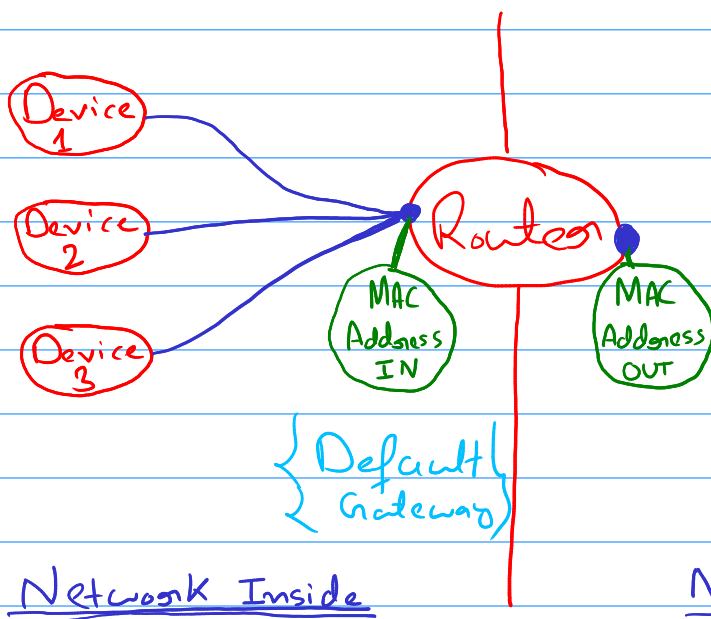
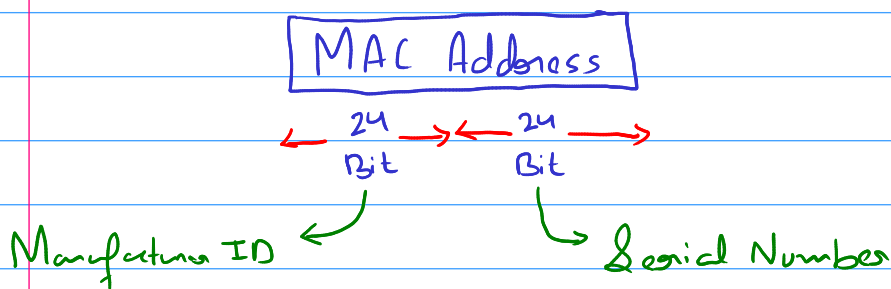
1. Network Interface Layer { Combination of physical layer and data link layer }
2. Internet Layer { Same as Network Layer }
3. Transport Layer { Same as transport layer }
4. Application Layer { Same as application Layer }

## ★ Encapsulation



## ★ Data Networks and Addressing

Local addressing → Addressing used for ethernet is called MAC address.  
→ 48 bit number written in hexadecimal.  
→ MAC address is hard coded into the network interface cards.



⇒ A frame in the Inside Network is only allowed to communicate in the Inside Network.

⇒ A frame in the Outside Network is only allowed to communicate in the Outside Network.

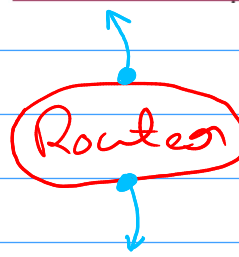
Global address

IP Address

Subnet Mask

Default Gateway

Default Gateway	
MAC -	D76C:C876:2218
	192.168.104.1
	255.255.255.0



Outside	
	D76C:C876:2219
	203.0.113.8
	255.255.255.0

⇒ Job of **router** is to get traffic from one IP network to another IP network.

⇒ Subnet mask divide network and the last portion of the IP Address.

255 → Network  
0 → host

## Utilities

# ping

# ifconfig