

Linux Internals & Networking

System programming using Kernel interfaces

Team Emertxe



Networking Fundamentals



Networking

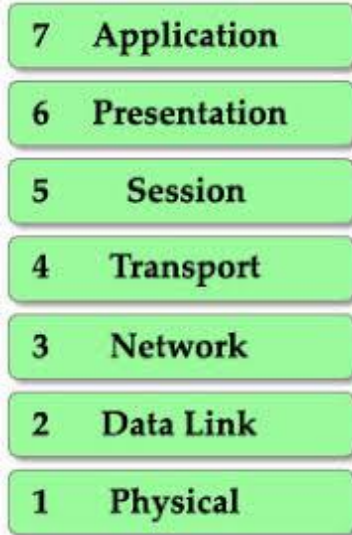
Introduction



- How data can be exchanged between two system over the Internet?
- If one system is having Windows and other is running with Linux, How these two will communicate with each other?
- In order to solve the above issue, ISO came out with OSI Model

Networking

OSI Layer



•Each layer includes a set of protocols

•Ex:

- Application Layer, not only contains the applications like Chrome, Firefox it also contains protocols
- Protocols help the applications to work seamlessly over the Internet

Networking: OSI Layer

Layer-1: Application

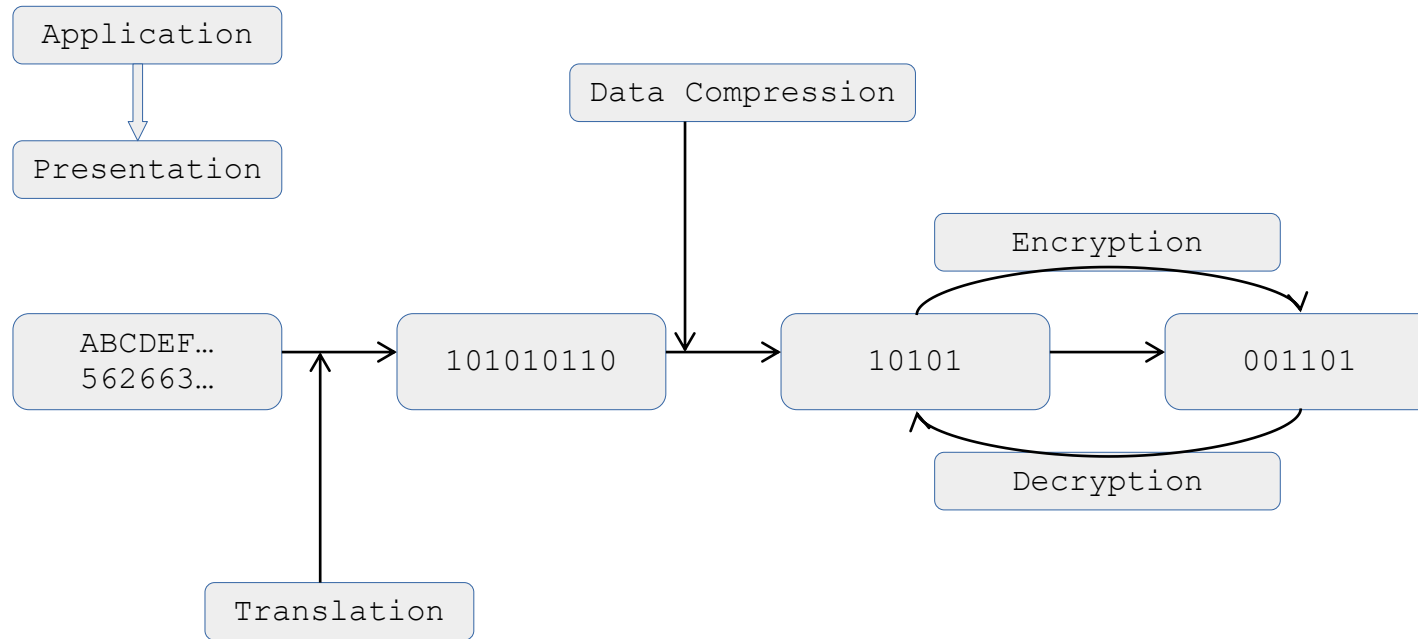


- Applications like chrome, firefox uses HTTP/s protocols present in the application layer to surf the stuff.
- Protocols present in the application layer, helps in

Service	Protocol
File Transfer	FTP
Web Surfing	HTTP/s
Emails	SMTP
Virtual Terminals	Telnet

Networking: OSI Layer

Layer-2: Presentation



JOB:

1. Translation
2. Data compression + Decompression
3. Encryption + Decryption



Encryption + Decryption happens through SSL(Secure Socket Layer)

Networking: OSI Layer

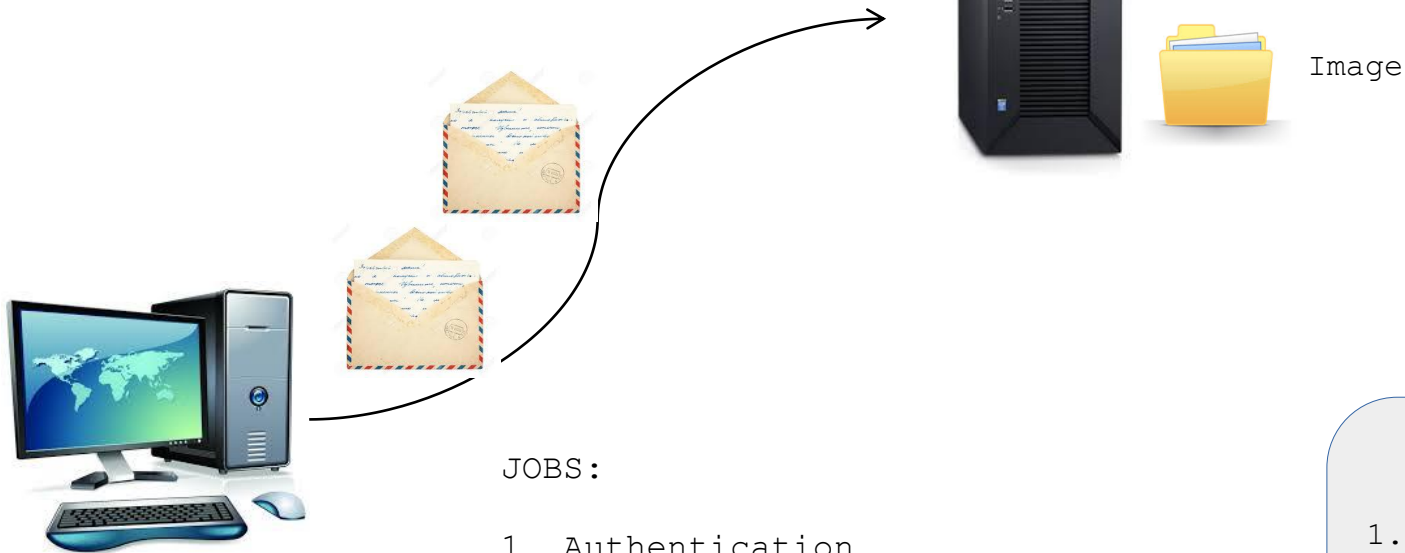
Layer-3: Session



•Deals with

-Connection between two system

-Data exchange (Tx + Rx)



JOB:

1. Authentication
 - Who are you?
Username + Password
2. Authorization
 - Permission to access
3. Session Management

1. Application
2. Presentation
3. Session



Separate Session will be established between Text and Image files

Networking: OSI Layer

Layer-4: Transport



- Mainly responsible for reliability

- JOBS

- Segmentation

- Flow Control

- Error Control

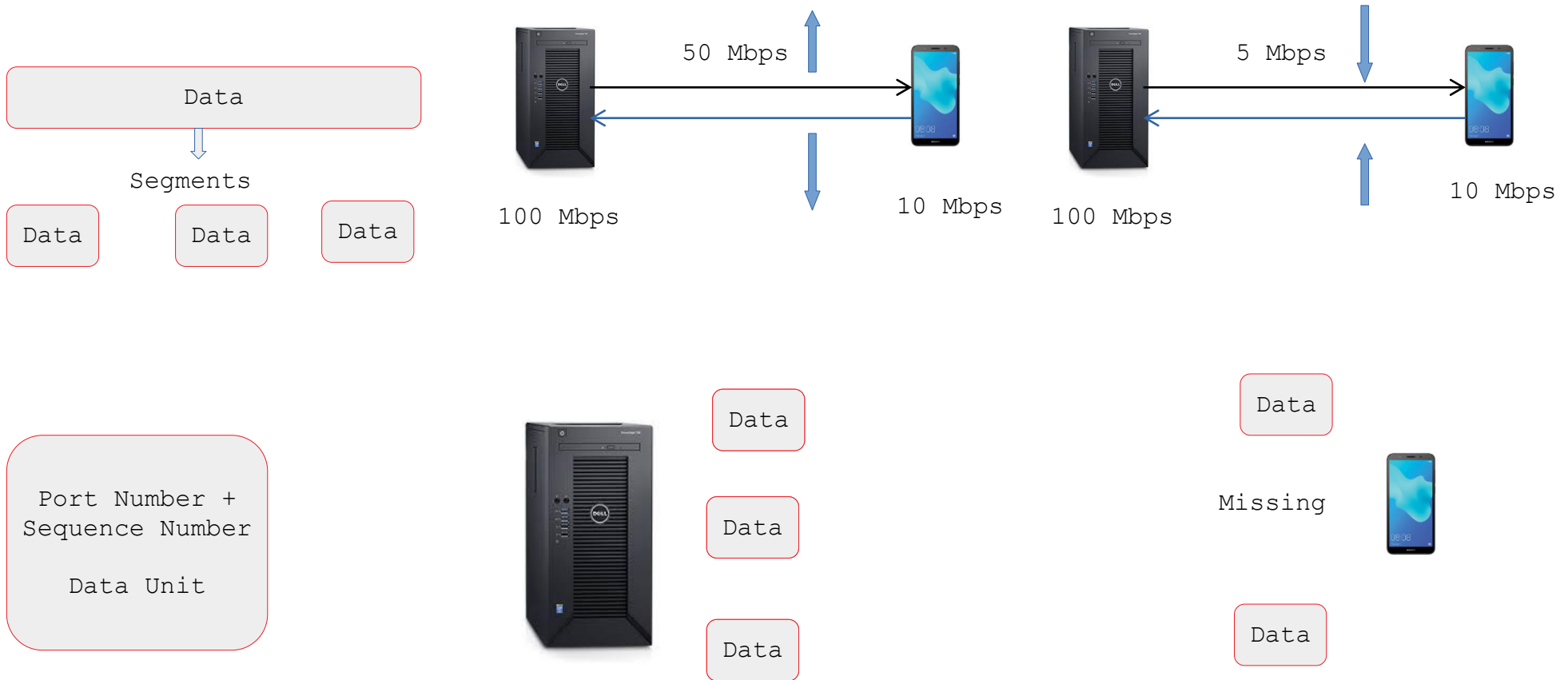
- Connection oriented

- Connection-less Tx



Networking: OSI Layer

Layer-4: Transport: Seg + Flow + Error Control



Port: Helps to direct the packets to right app

Seq: Helps to reorganize the packets at the receiving end

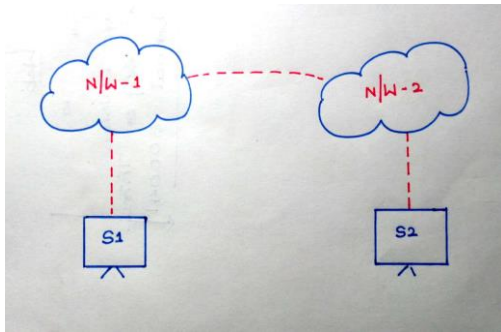
- Automatic Repeat Request
- Checksum for each data unit

TCP	Connection Oriented Protocol - SLOW	Email, tfp etc...
UDP	Connectionless protocol - FAST	Games, Video Streaming, Video conferencing...



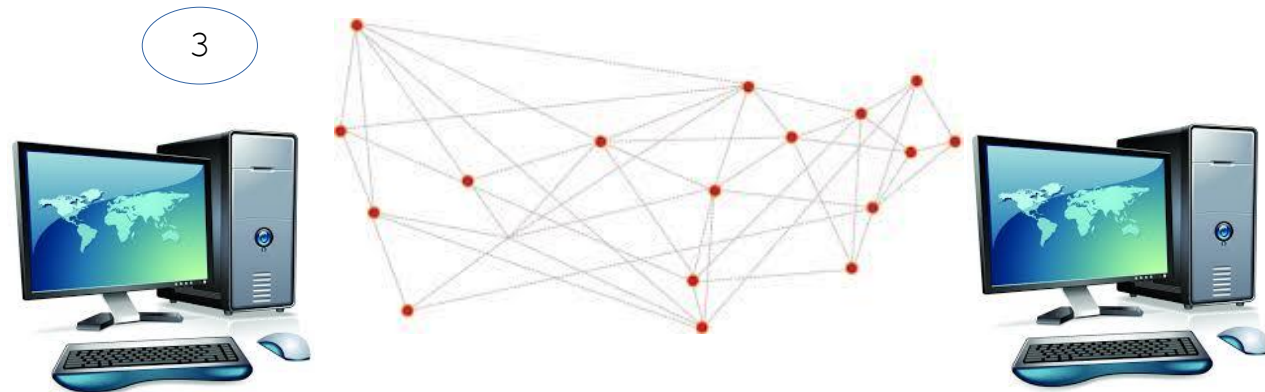
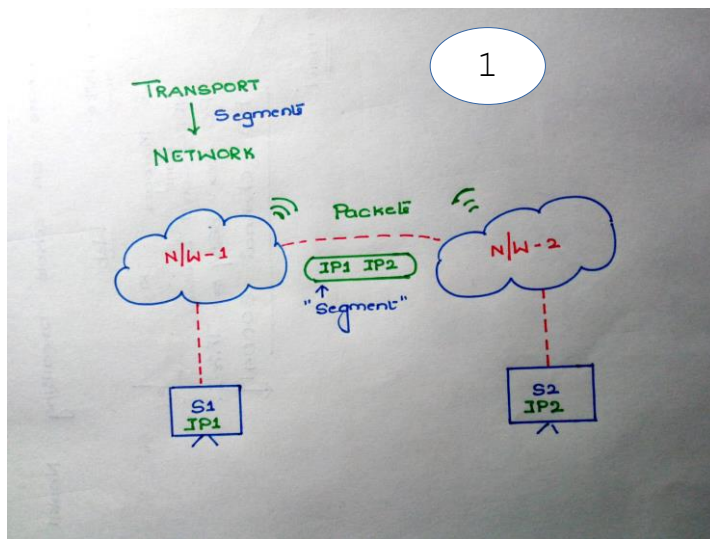
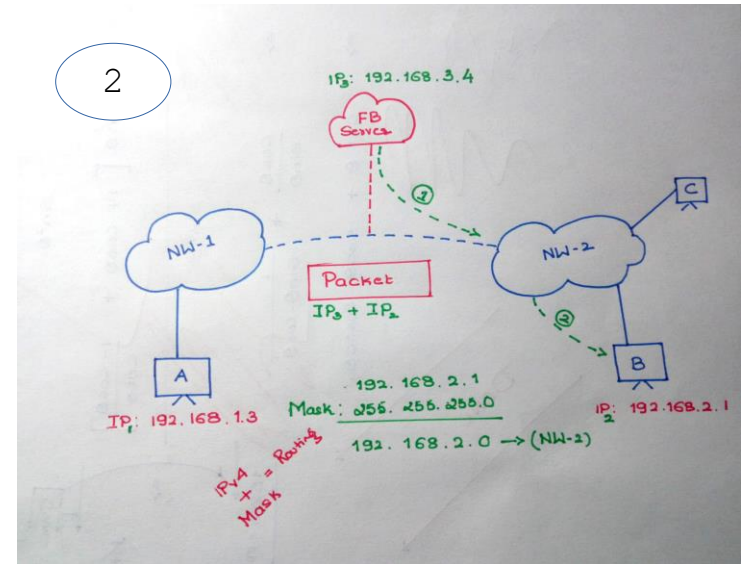
Networking: OSI Layer

Layer-5: Network



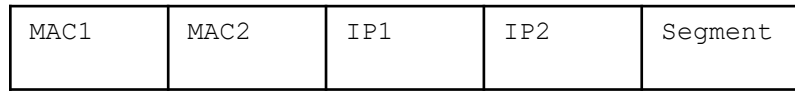
JOB:

1. Logical Addressing
2. Routing
3. Path Determination



Networking: OSI Layer

Layer-6: Data Link



Frame

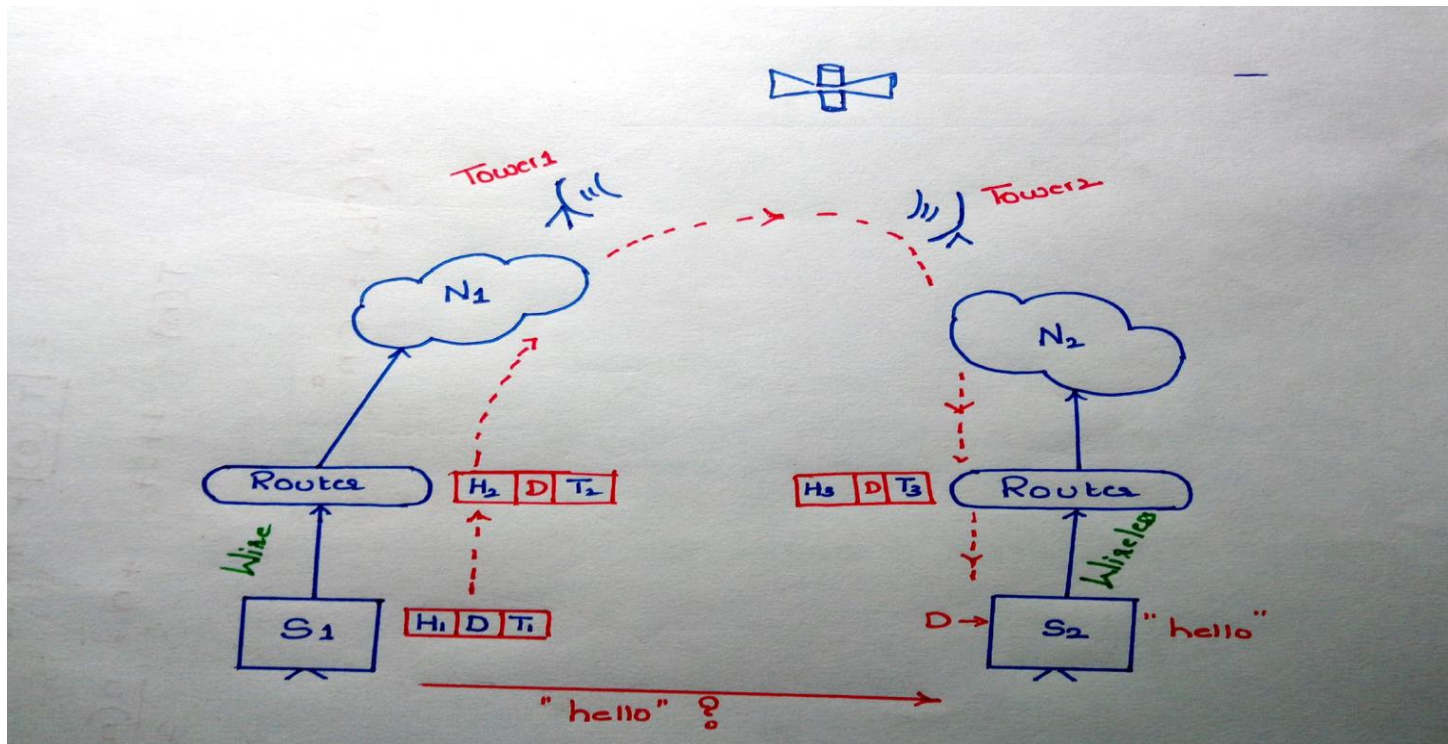


MAC2

JOB:

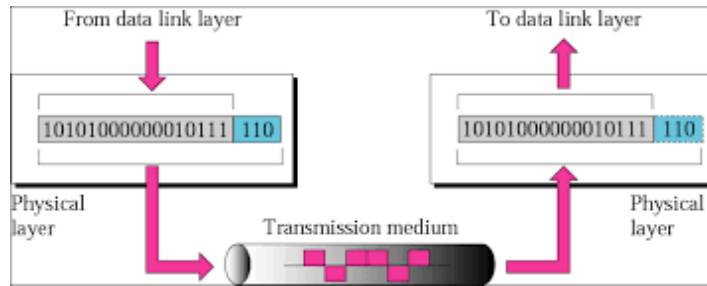
1. Medium access Control (Framing)
2. Error Detection etc..

MAC1



Networking: OSI Layer

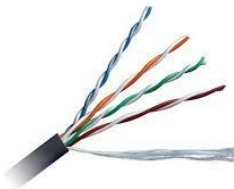
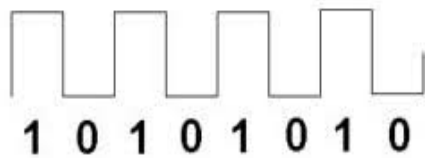
Layer-7: Physical



JOB:

1. Convert Binary data to re

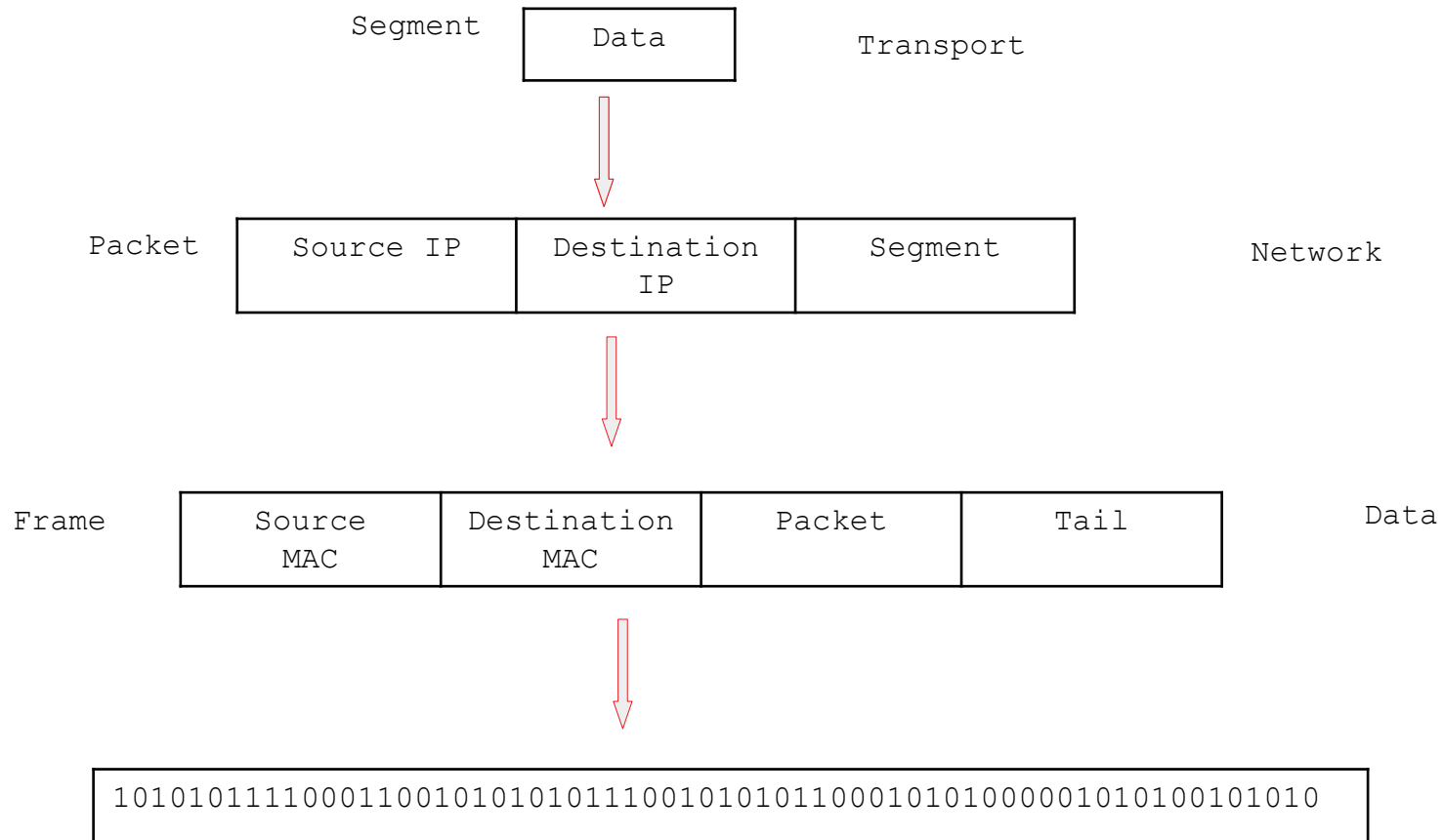
digital



AIR

Networking: OSI Layer

Layers: Brief



Thank You