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

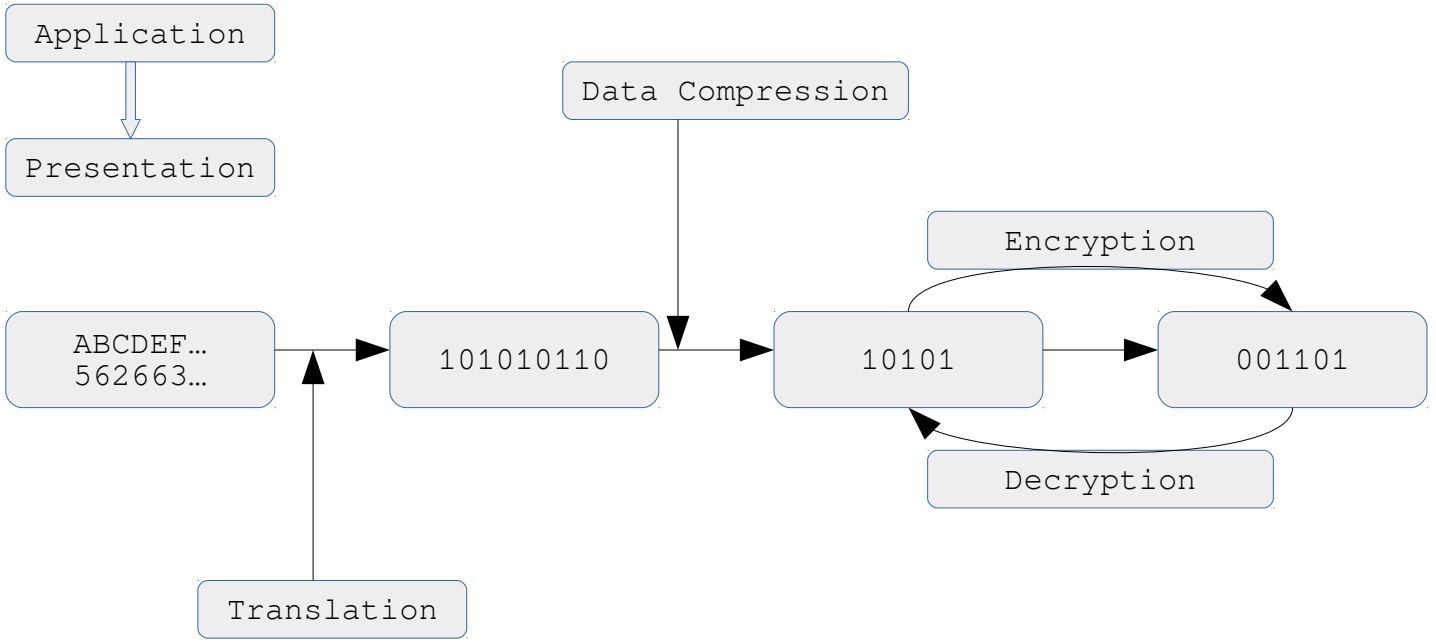
- Each layer includes a set of protocols
- Ex:
  - Application Layer, not only contains the applications like Chrome, Firefox it also contains set of protocols such as HTTP/s
  - Protocols helps the applications to work seamlessly over the Internet

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



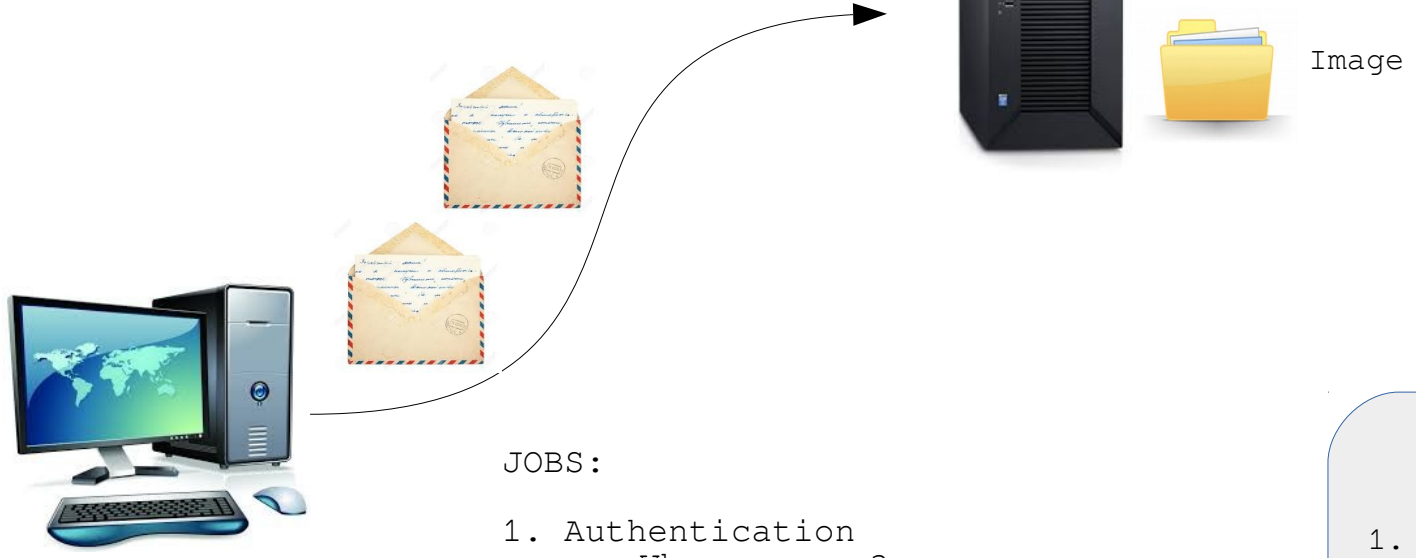
JOBS:

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)



JOBS:

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

1. Application
2. Presentation
3. Session

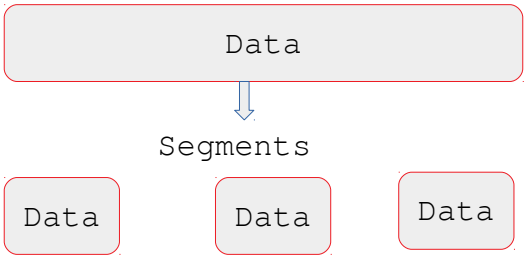
Separate Session will be established between Text and Image files

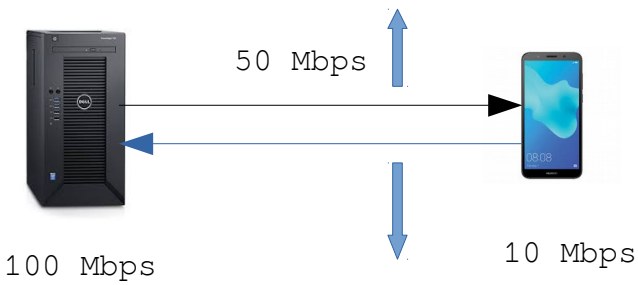
Networking: OSI Layer
Layer-4: Transport

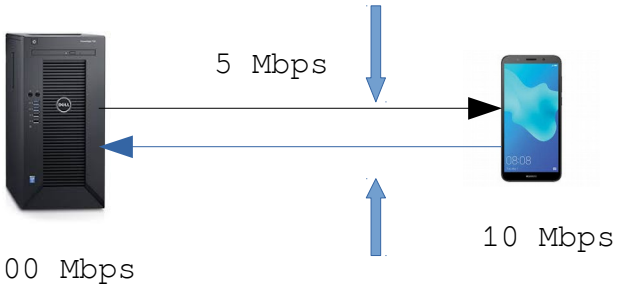
- Mainly responsible for reliability
- JOBS
  - Segmentation
  - Flow Control
  - Error Control
  - Connection oriented
  - Connection-less Tx

Networking: OSI Layer

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

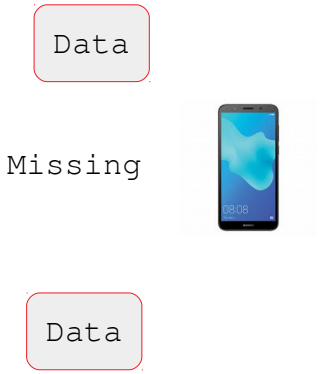






Port Number +
Sequence Number

Data Unit



Port: Helps to direct the packets to right app

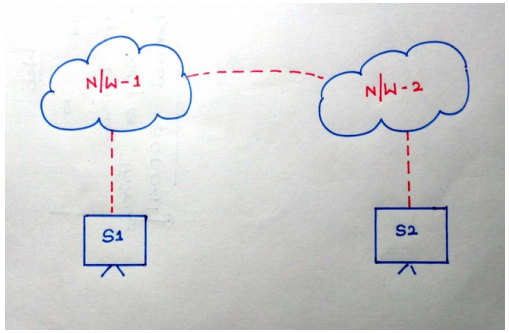
Seq: Helps to reorganize the packets at the receiving end

- 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...

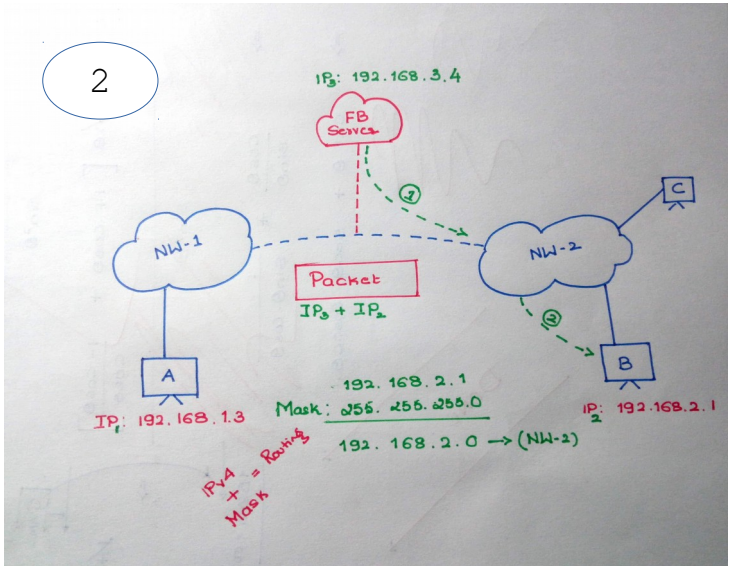
Networking: OSI Layer

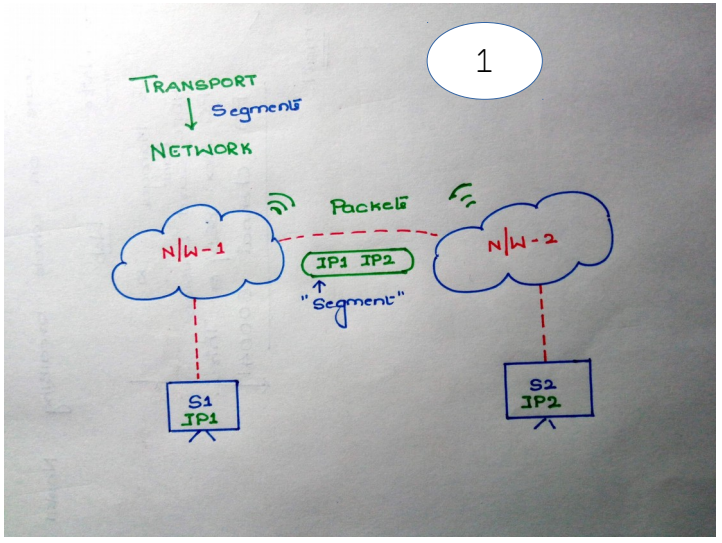
Layer-5: Network

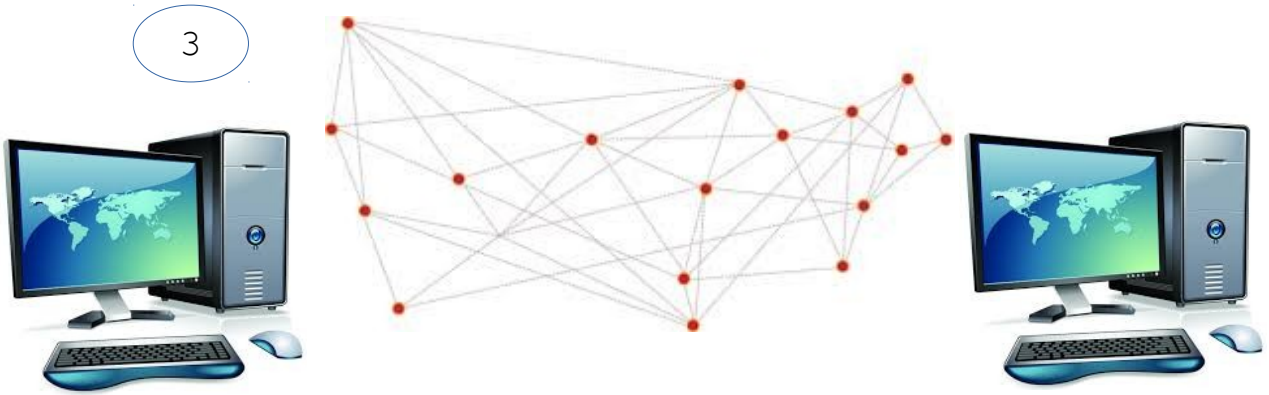


JOBS:

1. Logical Addressing
2. Routing
3. Path Determination







EMERTXE

Networking: OSI Layer
Layer-6: Data Link

MAC1	MAC2	IP1	IP2	Segment

Frame

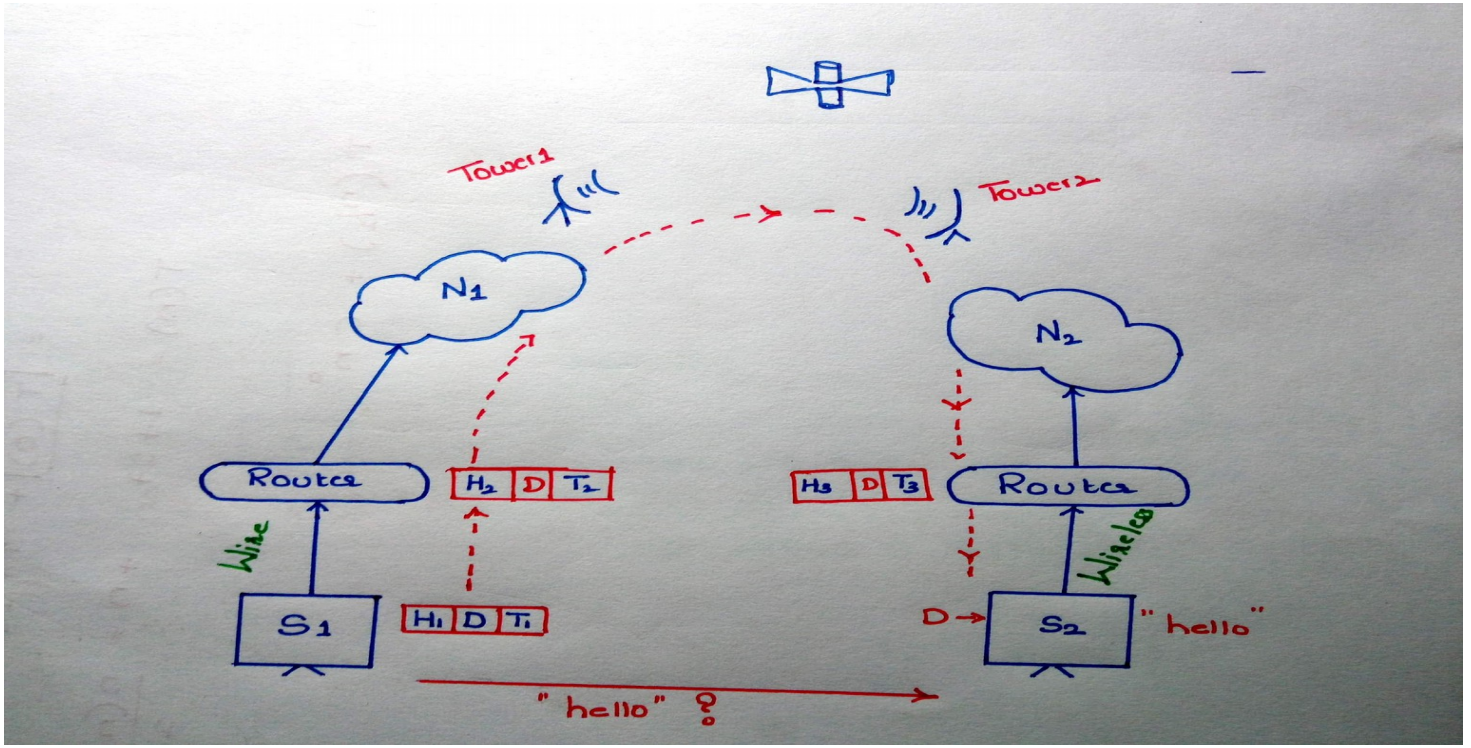
MAC1

MAC2

JOBS:

1. Medium access Control (Framing)

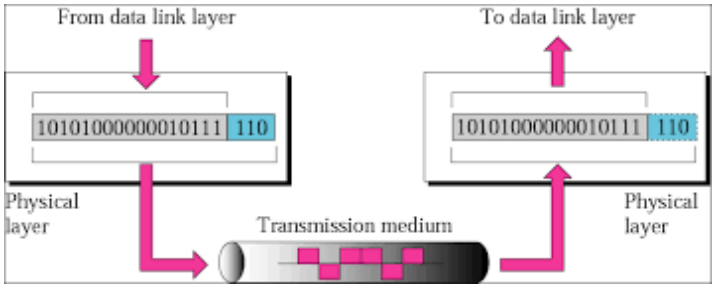
2. Error Detection etc..



EMERTXE

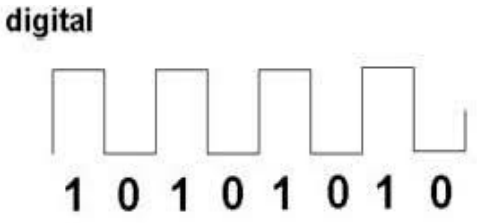
Networking: OSI Layer

Layer-7: Physical



JOBS:

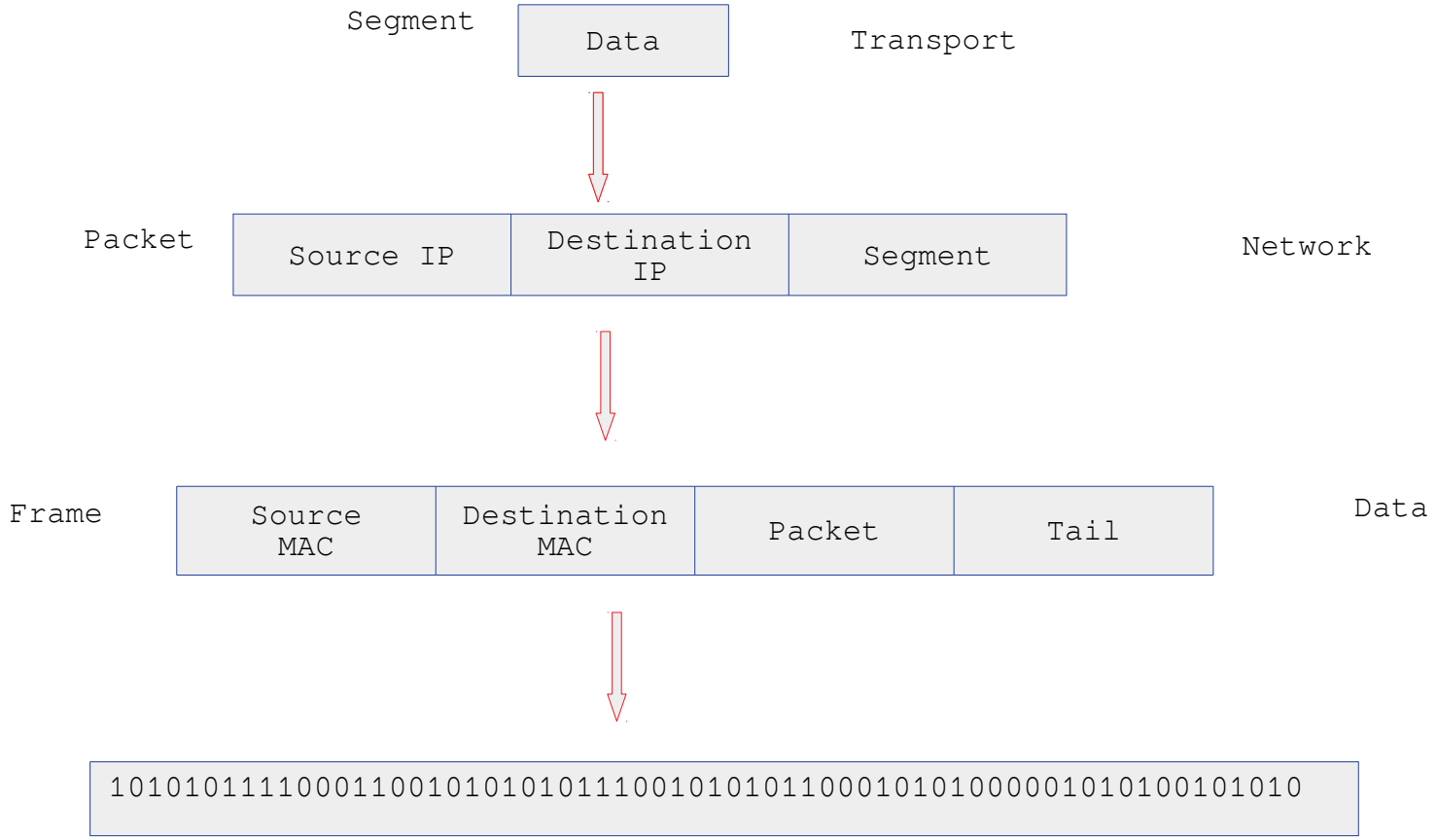
1. Convert Binary data to respective signals



AIR

Networking: OSI Layer

Layers: Brief



Thank You