

Date

[MIT WIT[18]]

## FINAL TERM

week # 03

Protocol and Models

Communication

transmitted

various

sender

transmission system

destination

Protocol:

rules of communication

Syntax: order, formate

Semantic: meaning

Protocol must account the following requirements

→ An identified sender and receiver

→ Common language and grammar

→ speed and timing of delivery

→ Confirmation or acknowledgement requirement

PCM

signal

Analogy → Digital

1) Electric

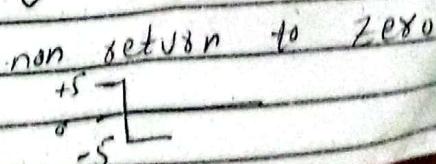
2) optical

3) electromagnetic

Protocol Requirements

Common computer protocols

→ message encoding (NRZ, NRZL, Manchester)



Date

manchester

slide

(25)

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PES (Advance F  
Date

two transition in one bit -

- message framing and encapsulation
- message size - (minimum and maximum need to be defined)
- message timing -
- message delivery options - (simplex, Half duplex, full duplex)

readive  
productive

Protocol :-

- 1) return
- 2) secu
- 3) data
- 4) CII
- 5) Con

Message encoding:-

Convert message into another acceptable form - e.g. -

Message formats:-

format important -

message size:-

small chunks because of starvation.

Message timing:-

Flow Control:-

messages define the rate of data transmission and defines how much information can be sent and the speed at which it can be delivered.

e.g Tap, ,

Response timeout:-

Manage how long a device waits when it does not hear a reply from

2) Ro

fi

3) Ne

Access method:-

→ control method (Mice)

→ contention method.

1000  
0-0  
C00

C

WEEK # 001

LECTURE # 02

primitive (CSMA/CD) → detect collision  
primitive (CSMA/CA) → Avoid collision

Protocol:-

- 1) Network Security
  - secure data to provide authentication, data integrity, and data encryption-
  - CIP Confidentiality (sensitive information only shared between authorized individuals)

Integrity

data not altered or change if ~~change~~ then received knew.

Availability:-

service available when needed.  
to authorized user.

2) Routing

finding best path - (algorithm dijkstra)

3) Network Communications:-

enable two or more devices to communicate.

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- 4) Service discovery:-  
use for the automatic detection  
of devices or services -

### Protocol functions:-

Addressing (identify sender and receiver)

Reliability (guaranteed delivery)

Flow control (speed up or slow sender)

sequencing (uniquely label every packet)

Error detection (CRC parity check, checksum)

Application interface (Whatsapp, start and other application  
on server (process to process)  
communication).

### Protocol Suite:-

group of protocol co-ordinated to  
perform a function -

OR

its set of rules that work together.

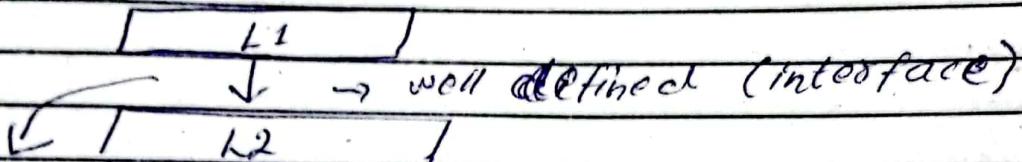
call the back up ~~form~~  
OS of switch

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Week # 02

Lecture # 01



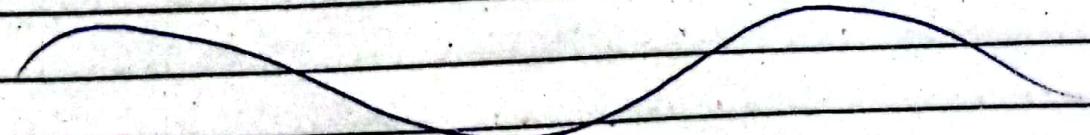
→ because every layer ~~have~~ know what type of data i have to receive -

→ because of this interface layers are independent -

→ we call out today operating system as (NOS) network operating system because of TCP/IP implemented -

→ top three layers are implemented on OS -

→ SDN (Software define networking)



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Week #03

Lecture #11

standard

university accepted guidelines

IIEEE

Data link layer standard

responsible e.g.

802.3, 802.11

IETF

Transport Layer and network Layer

IANA:

IPV4 and IPV6, register port

802.15 → bluetooth

802.16 → vimax

open standard

proprietary standard

defective standard

standard has flaws  
such as being poorly  
designed.

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Week # 03  
Lecture # 02

Benefits of Layer:-  
assist in protocol design

functions of Layers:-

Application Layer:-

process to process communication

Presentation Layer:-

Compression, encryption, formatting

Session:-

It initiate and end sessions

Transport Layer:-

- segment data and reassemble data
- demultiplex and multiplex
- flow control

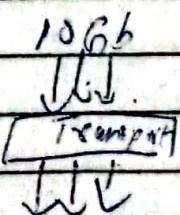
Network Layer:-

best path, gives name

Data Link Layer:-

- contain media, encoding
- convert frame to signal

Encapsulation:-



Segmenting:-

- no starvation
- no overflow

→ sequence

Date \_\_\_\_\_

[M T W T F S]

→ reasuble the will always  
caused at end devices.

protocol data unit up to 60 byte

→ TCP protocol 20 byte, UDP 8 byte

→ data link layer 4 byte trailer  
and 14 byte header

hexact (16 bit)

electromagnetic signal

charge in electric make magnetic  
and then charge in magnetic  
create electric -

MAC

1 2 3 1 2 3 1

↓

↓

OUT DEVICE ID -

IPV4

[Network Host]

IPV6

[Prefix Interface Id]

Date

WEEK # 04

MTWTF

CHAPTER # 04

### Physical Layer:-

→ RJ45 connectors, RJ11

→ Coaxial connectors → BNC

→ T-connectors

→ optical fibers → ST, SC

→ Repeaters, hub

Guided → copper, coaxial  
medium

Unguided → Air, sea water, free space

### Guided:-

Direction known

### Un-Guided:-

Direction un-known

→ throughput, goodput, bandwidth technologies  
of physical layer.

Converting and transferring signals  
is the work of physical  
layer -

physical layer standard → IEEE  
data layer → IETF

### Physical Components:-

1) physical components

2) Encoding → electrical, light, electromagnetic

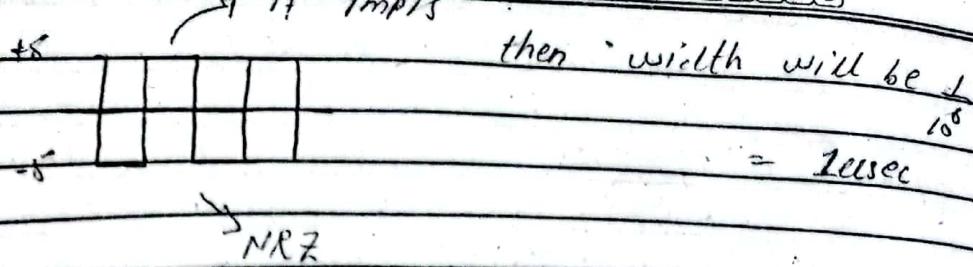
3) signalling → telecom networks

↓  
SST

↓  
Signalling

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Manchester

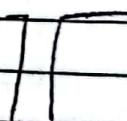
0 → high to low

1 → low to high

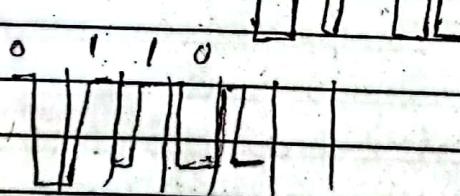
bandwidth

double bandwidth 2aya

0 1 1 0 0



0 1 1 0 0



lat



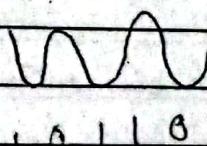
Bandwidth:

frequency → Hz → cycle per second

bitrate

BPS

BPS



0 1 1 0

6

Week # 04

Lecture # 02

presentation Layer encoding  
characters  $\rightarrow$  bits.

physical layer encoding  
bits  $\rightarrow$  signal

VoIP

circuit switching  
 $\hookrightarrow$  it is packet switching       $\hookrightarrow$  dedicated link (SIP)

latency

- 1) transmission delay
- 2) propagation delay
- 3) processing delay
- 4) queuing delay

time

(d)

throughput

DAT  $\rightarrow$  headers  
D+H  
sec

Goodput:-

Data  
sec

disortion opposite  
and offset cancel

Date \_\_\_\_\_

M T W T F S

→ 12.5 micron

rotating

elliptical

cable

CS-NET

single mode

only one mode long distance

multimode

multiple modes short distance

Week # 05

Lecture 01

Data Link Layer → Forwarding

MAC sub-Layer

→ standardize by IEEE

→ hardware

LLC sub-Layer

→ operating system px implement  
→ tell the upper layer which  
hardware technology use.

wifi

2304 byte

etherenet

1518 byte

→ MAC Layer do encapsulation - (Add header)  
→ Frame

Date \_\_\_\_\_

TCP  
IPV6  
IPV4

M T W T F S

1st mac sec mac) ↑ payload  
Type | Type | ECN |  
6byte 6byte 2byte 4byte

→ Varia

Polynomial:

more than one term

CRC

modulo - 2

XOR

Checksum is net correct

If modub → 6

mechan → 7

varia → 8

21 → again

10101011 → polynomial

Length → 3

IPV4 20B , 32 bit , octet (8bit)

IPV6 40B , 128 bit , hextet (16bit)

Key role: Routing (best path)

→ IP Connectionless

→ media independent

→ IP headers not change just

→ source address can be change  
NAT



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7 variation in voice is jitter -

Ethernet

MTU

64 → 1518 after it jumbo frame  
less will runt frame

WiFi

64 - 2304B

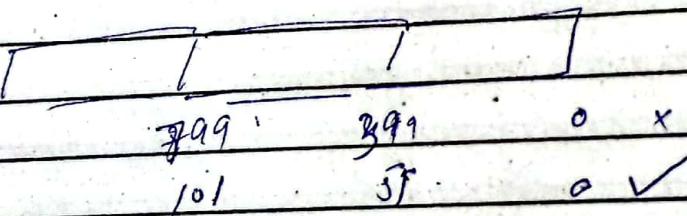
serial (even)

518

Fragmentation offset:-

13 bit

400 byte



400 400

8 - 2<sup>3</sup>

W.137.16.101

108.139.60.28

IPv6 (40 byte)flow label (2bit)sip ⇒ rip