Badji Mokhtar University Annaba
Electronics Department

Lecture 2: Ethernet (LAN)

Contact:
seifallah.nasri@univ-annaba.org

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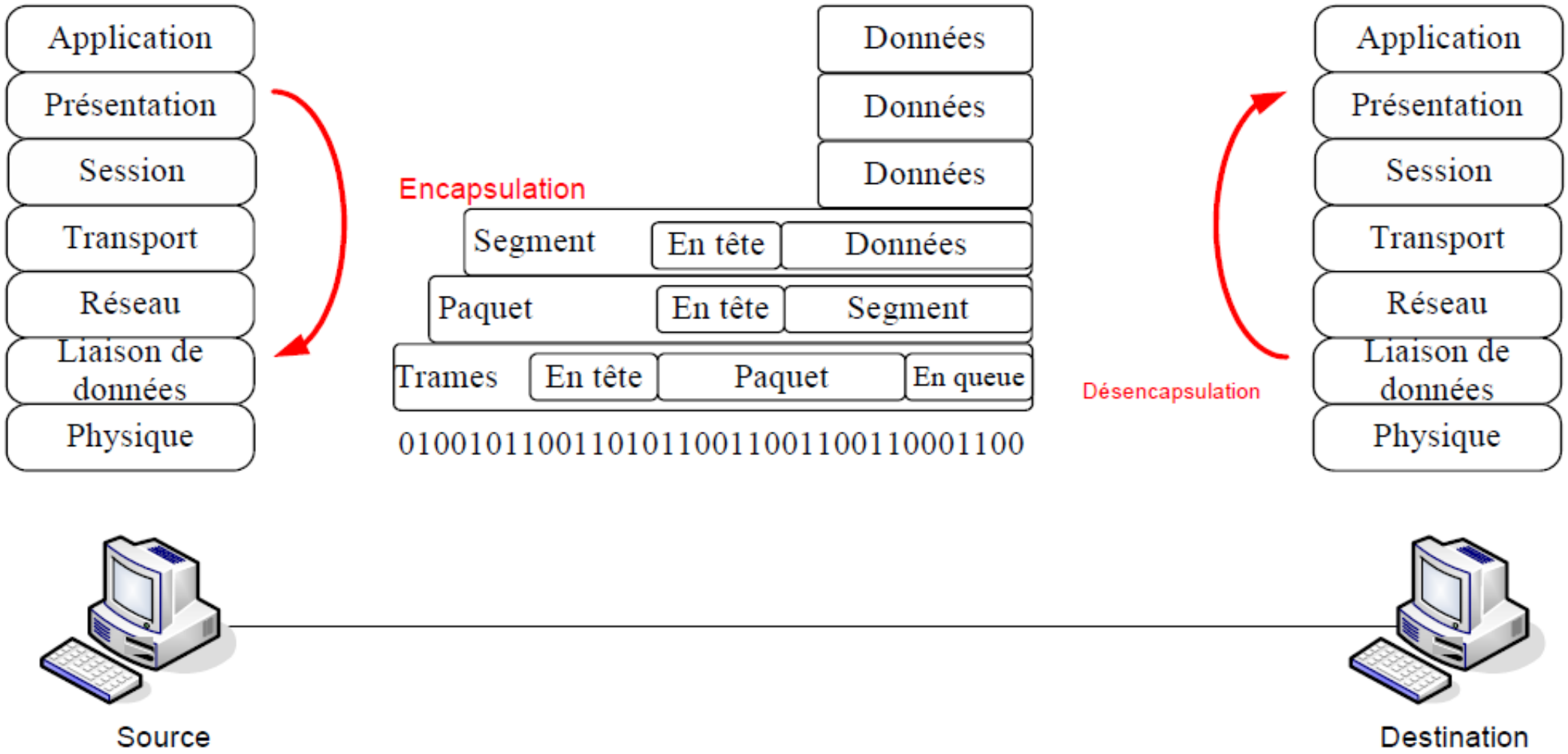
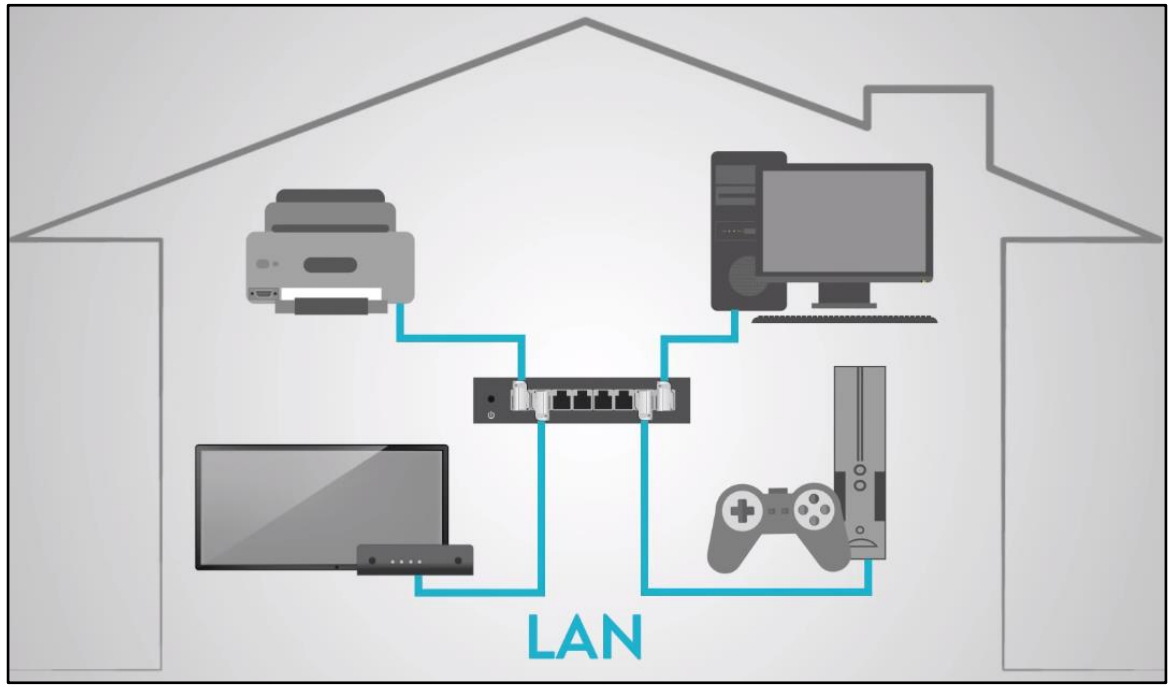

Application
Présentation
Session
Transport
Réseau
Liaison de données
Physique
Encapsulation
Données
Données
Données
Segment
En tête
Données
Paquet
En tête
Segment
Trames
En tête
Paquet
En queue
0100101100110101100110011001100011 00
Désencapsulation
Application
Présentation
Session
Transport
Réseau
Liaison de données
Physique
Source
Destination

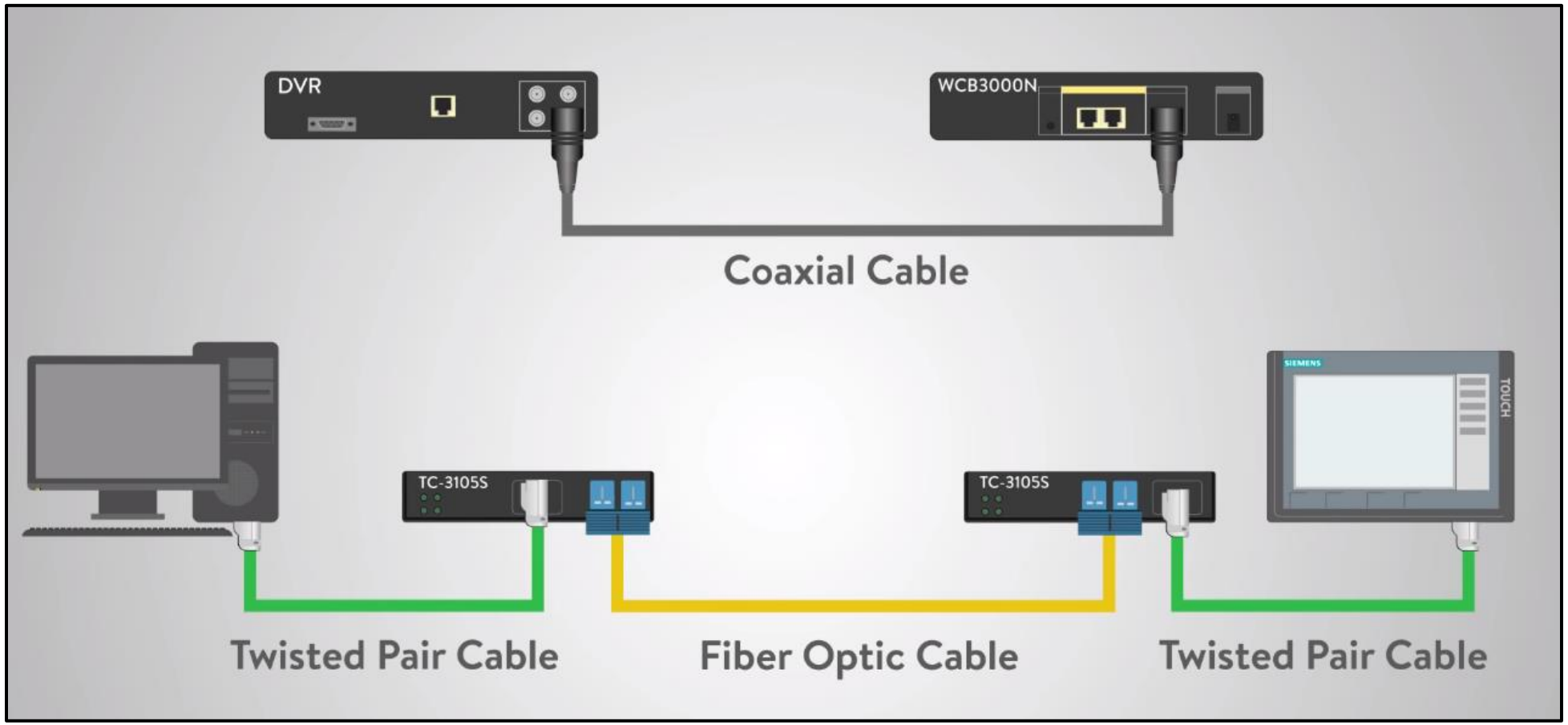

IEEE 802.3
Ethernet

Ethernet



Local Area Network

Ethernet


DVR
WCB3000N
Coaxial Cable
TC-3105S
TC-3105S
SIEMENS
TOUCH
Twisted Pair Cable
Fiber Optic Cable
Twisted Pair Cable

Ethernet

Ethernet

IEEE 802.3

1983

Ethernet

Data Link layer

Physical layer

OSI

Open Systems Interconnection

Ethernet

IEEE 802.3

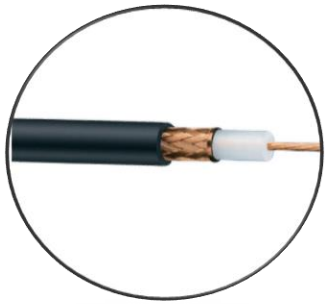
7	Application
6	Presentation
5	Session
4	Transport
3	Network
2	Data Link
1	Physical

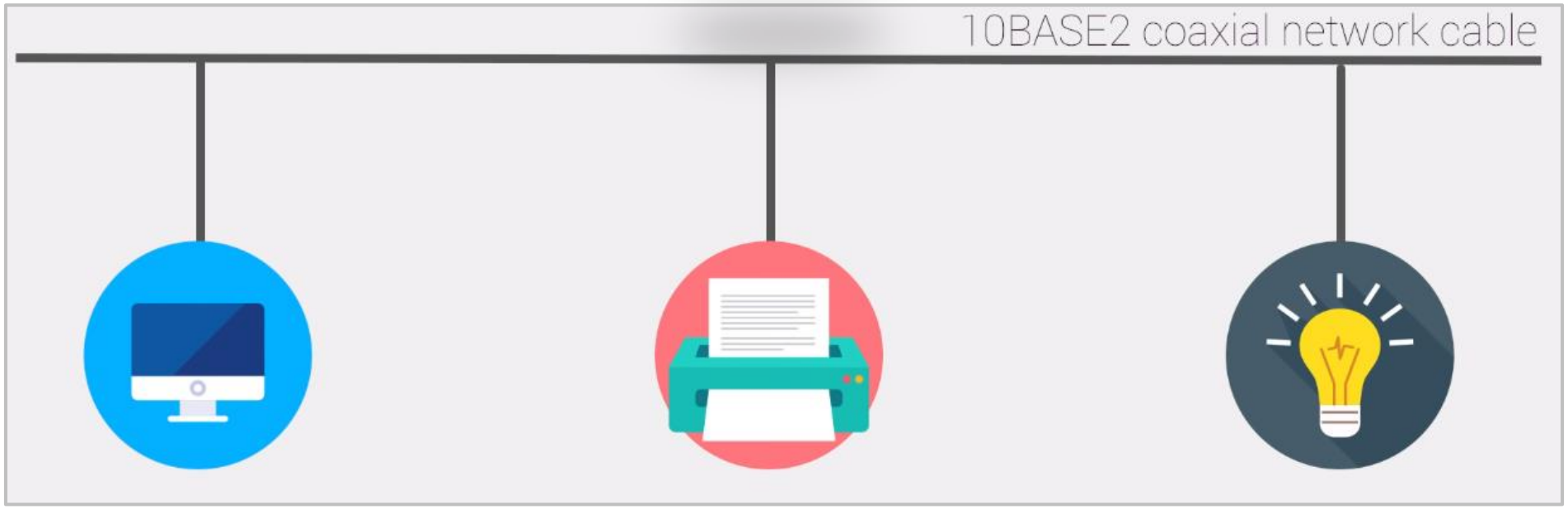
Ethernet

- Data Link layer
- Physical layer
  - Cabling
  - Devices

Physical Layer

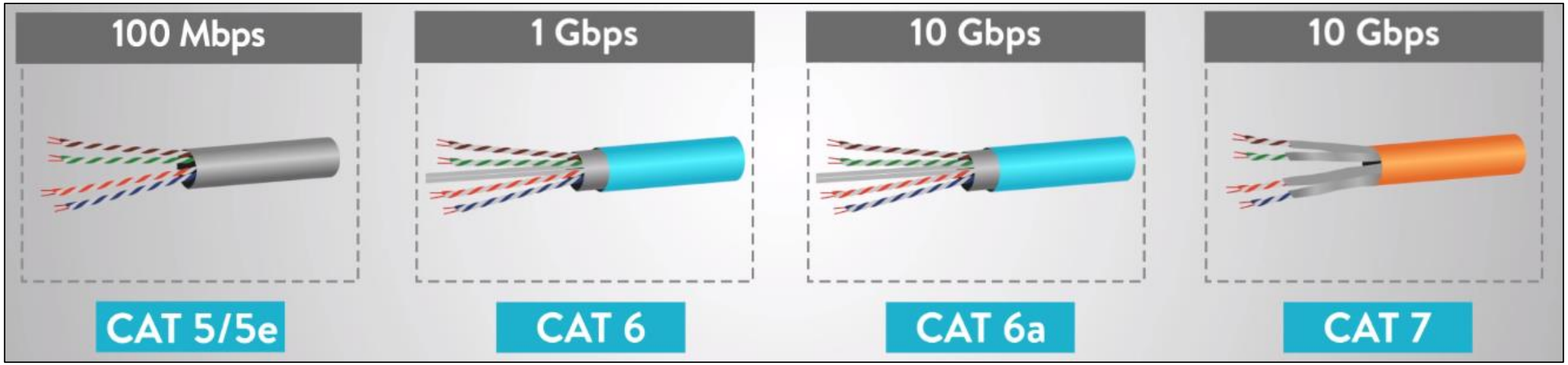
Cabling

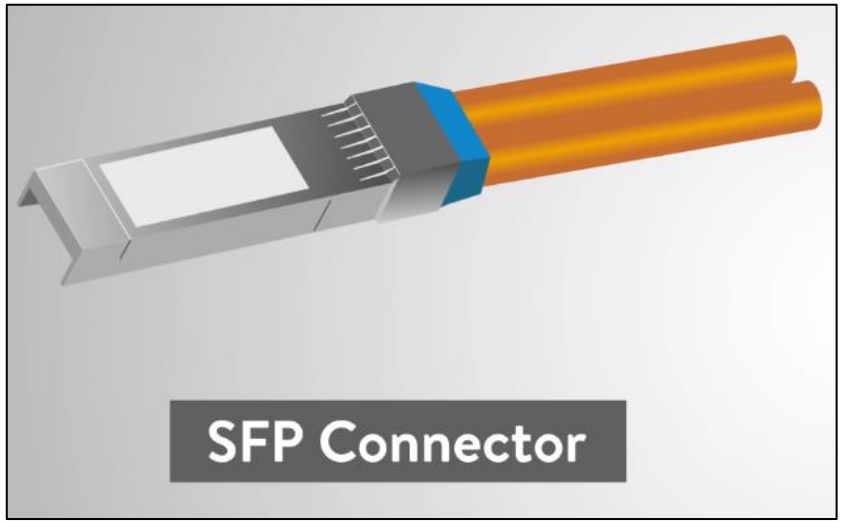




Physical Layer

Cabling

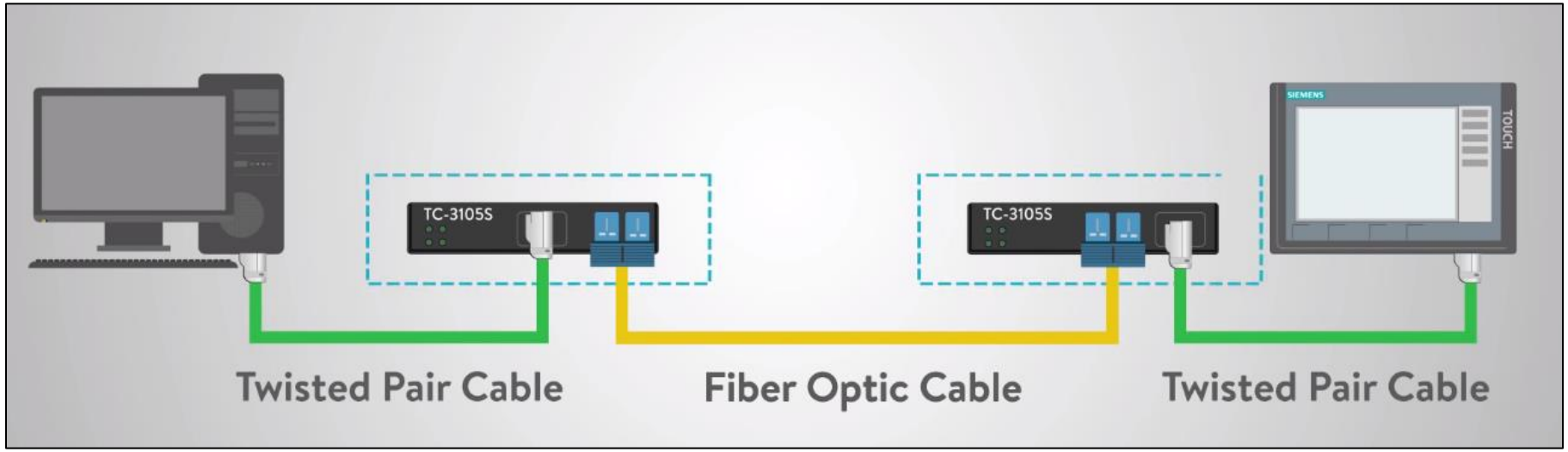



SFP Connector


SC Connector

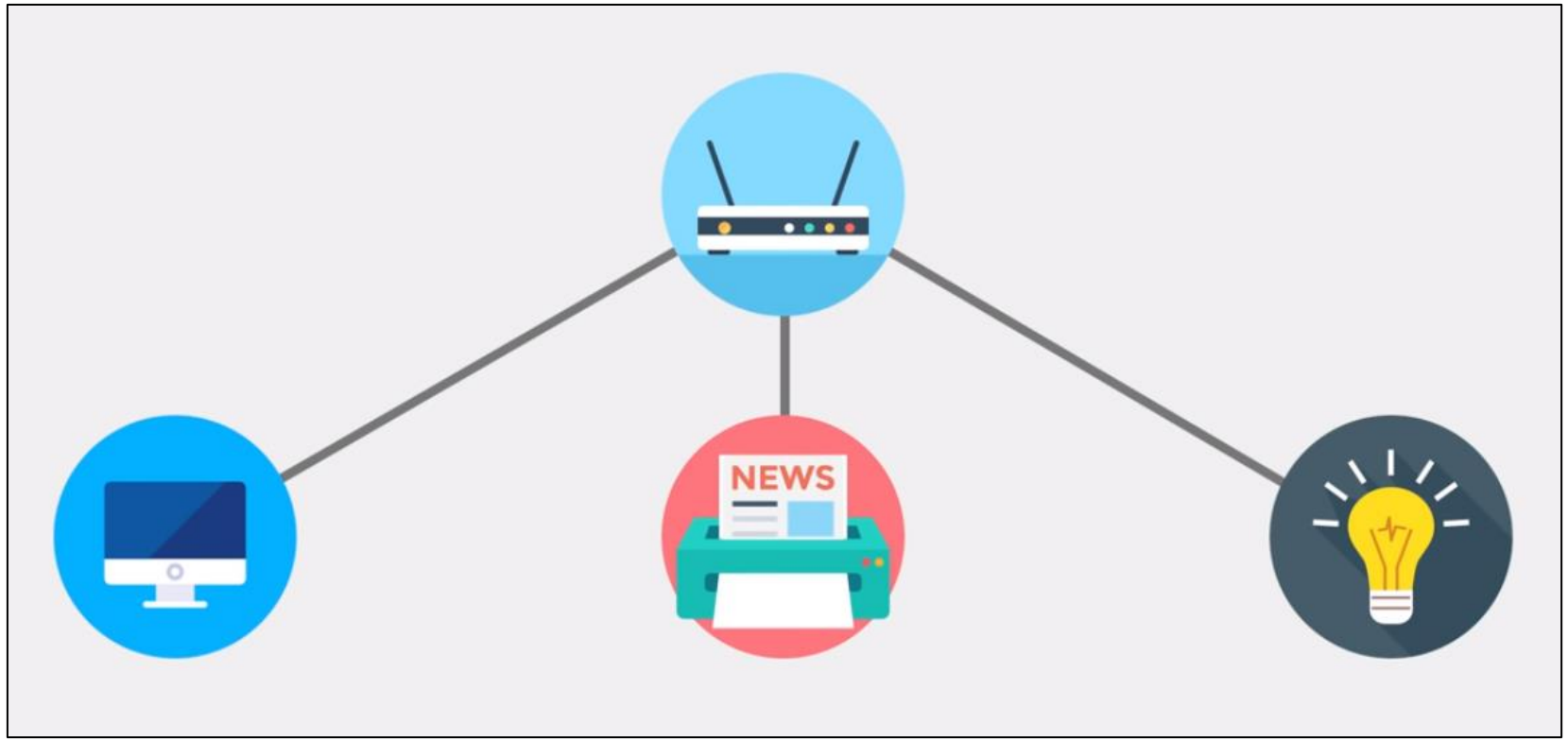
Physical Layer

Cabling



Physical Layer

Devices



Data Link Layer

Logical Link Control (LLC)

Media Access Control (MAC)

Logical Link Control (LLC)

- The Logical Link Control layer controls frame synchronisation, flow control and error checking.

Media Access Control (MAC)

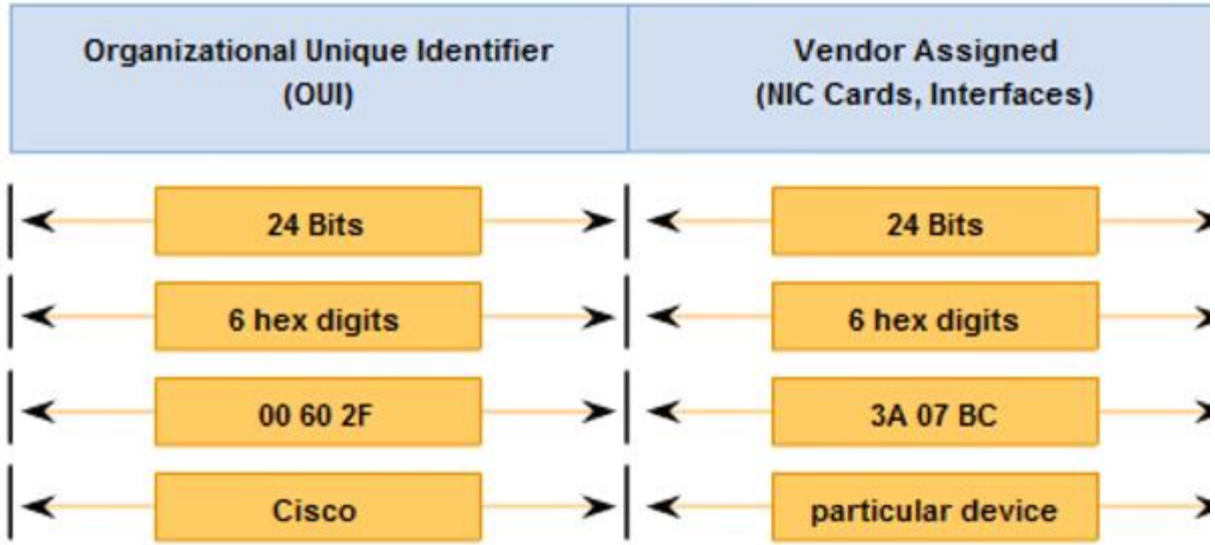
Manufacturer ID	Serial Number
00:10:D9 : D7:52:7A	
0000 0000 0001 0000 1101 1001 1101 0111 0101 0010 0111 1010	

MAC

MAC Address: Ethernet Identity

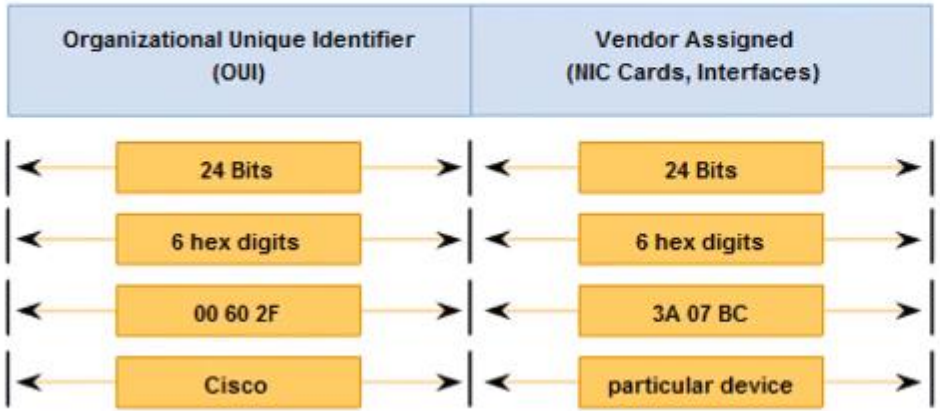
- Layer 2 Ethernet MAC address is a 48-bit binary value expressed as 12 hexadecimal digits IEEE requires a vendor to follow two simple rules:

1. The first 3 bytes are uniquely assigned to the vendor OUI
2. All MAC addresses with the same OUI must be assigned a unique value in the last 3 bytes



MAC

MAC Address Format

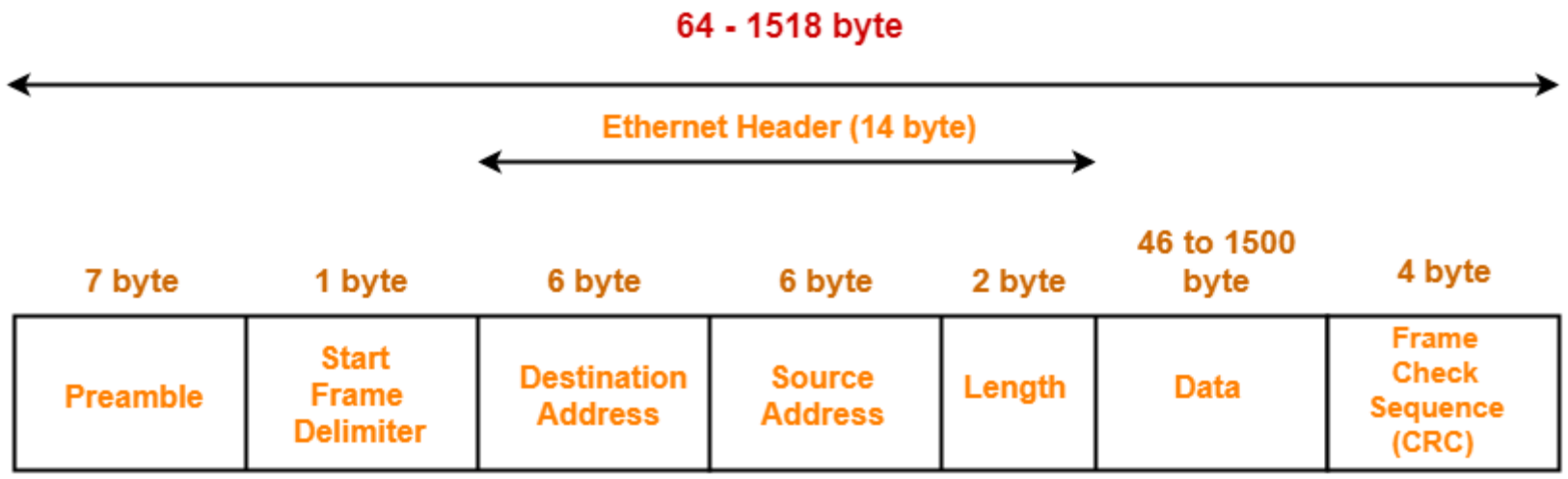


Dec	Bin	Hex	Dec	Bin	Hex
0	0000	0	8	1000	8
1	0001	1	9	1001	9
2	0010	2	10	1010	A
3	0011	3	11	1011	B
4	0100	4	12	1100	C
5	0101	5	13	1101	D
6	0110	6	14	1110	E
7	0111	7	15	1111	F

OUI Unique

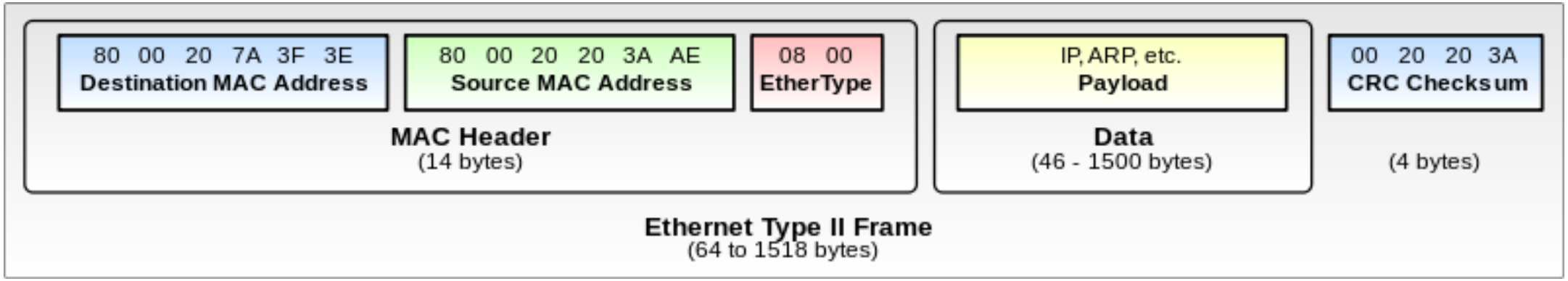
- An Intel MAC address: 00 - 21 - CC - BA - 44 - C4
- 0000 0000 - 0010 0001 – 1100 1100 - 1011 1010 – 0100 0100 – 1100 0100
- https://standards.ieee.org/products-services/regauth/index.html

Ethernet Frame



IEEE 802.3 Ethernet Frame Format

Ethernet Frame



Ethernet Frame

A typical Ethernet Version 2 frame looks like this:

P	P	P	P	P	P	P	P	D	D	D	D	D	D	S	S	S	S	S	S	T	T	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	F	F	F	F

P = Preamble
D = Destination MAC Address
S = Source MAC Address
T = Ether Type
x = data unit
F = Frame Check Sequence (FCS)

Ethernet Frame

A typical IEEE 802.3 Ethernet frame looks like this:

P	R	R	R	R	R	R	R	D	D	D	D	D	D	S	S	S	S	S	S	L	L	d	s	c	c	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	F	F	F	F

P = Preamble
R = STA **R**T Frame Delimiter
D = Destination MAC Address
S = Source MAC Address
<u>802.2 LLC Header</u>
L = Length
d = DSAP
s = SSAP
c = Control
x = data unit
F = Frame Check Sequence (FCS)

Thank you for your attention