Badji Mokhtar University Annaba
Electronics Department

Lecture 2: Ethernet (LAN)

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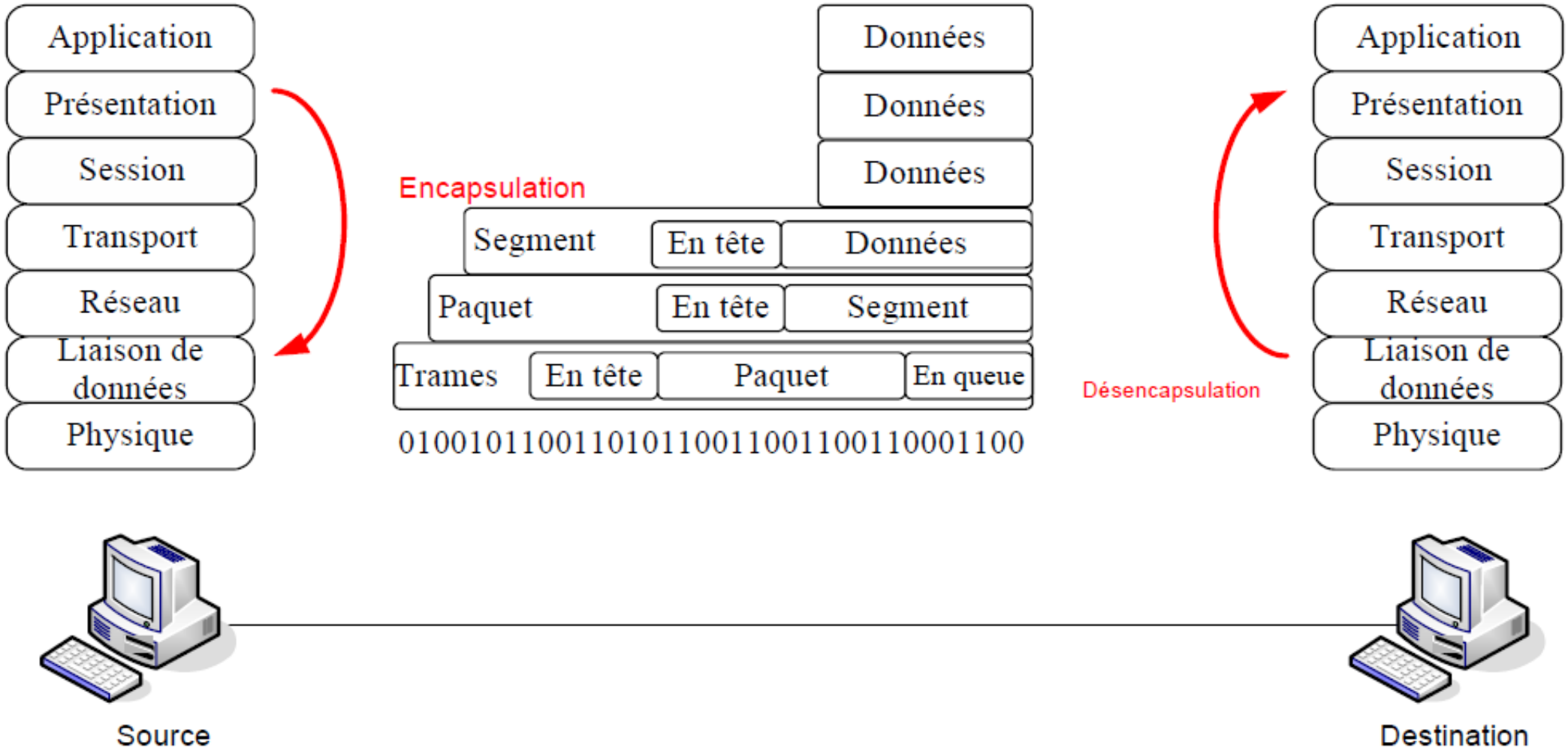
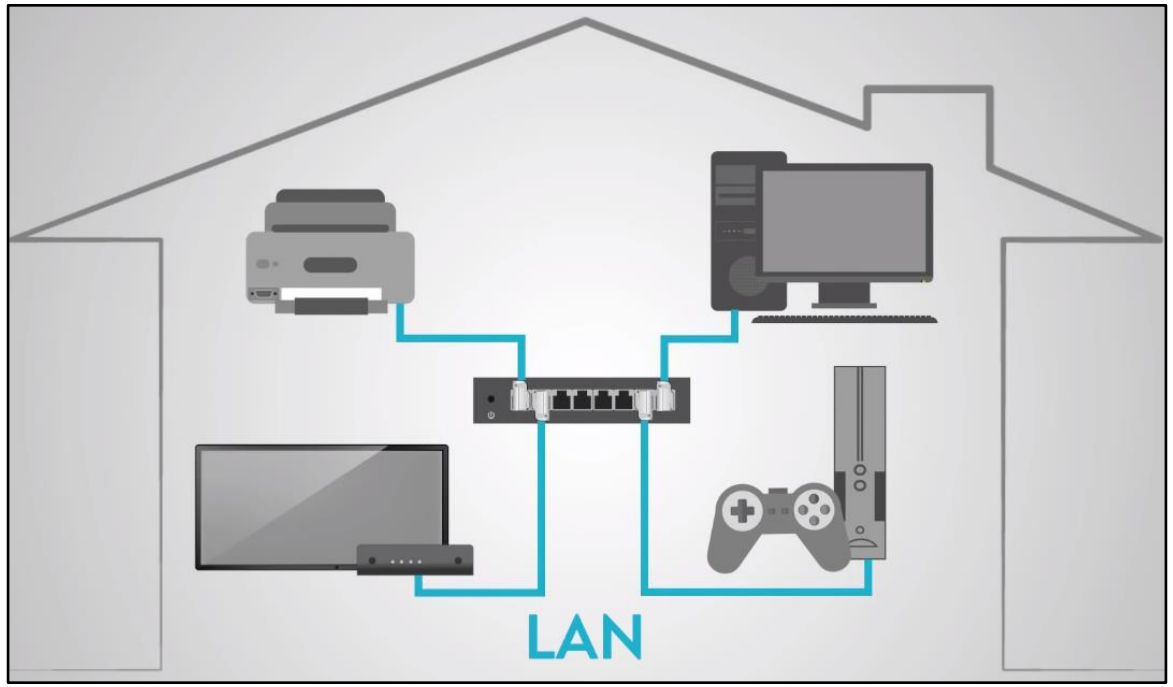

Application
Présentation
Session
Transport
Réseau
Liaison de données
Physique
Encapsulation
Données
Données
Données
Segment
En tête
Données
Paquet
En tête
Segment
Trames
En tête
Paquet
En queue
0100101100110101100110011001100011100
Désencapsulation
Application
Présentation
Session
Transport
Réseau
Liaison de données
Physique
Source
Destination

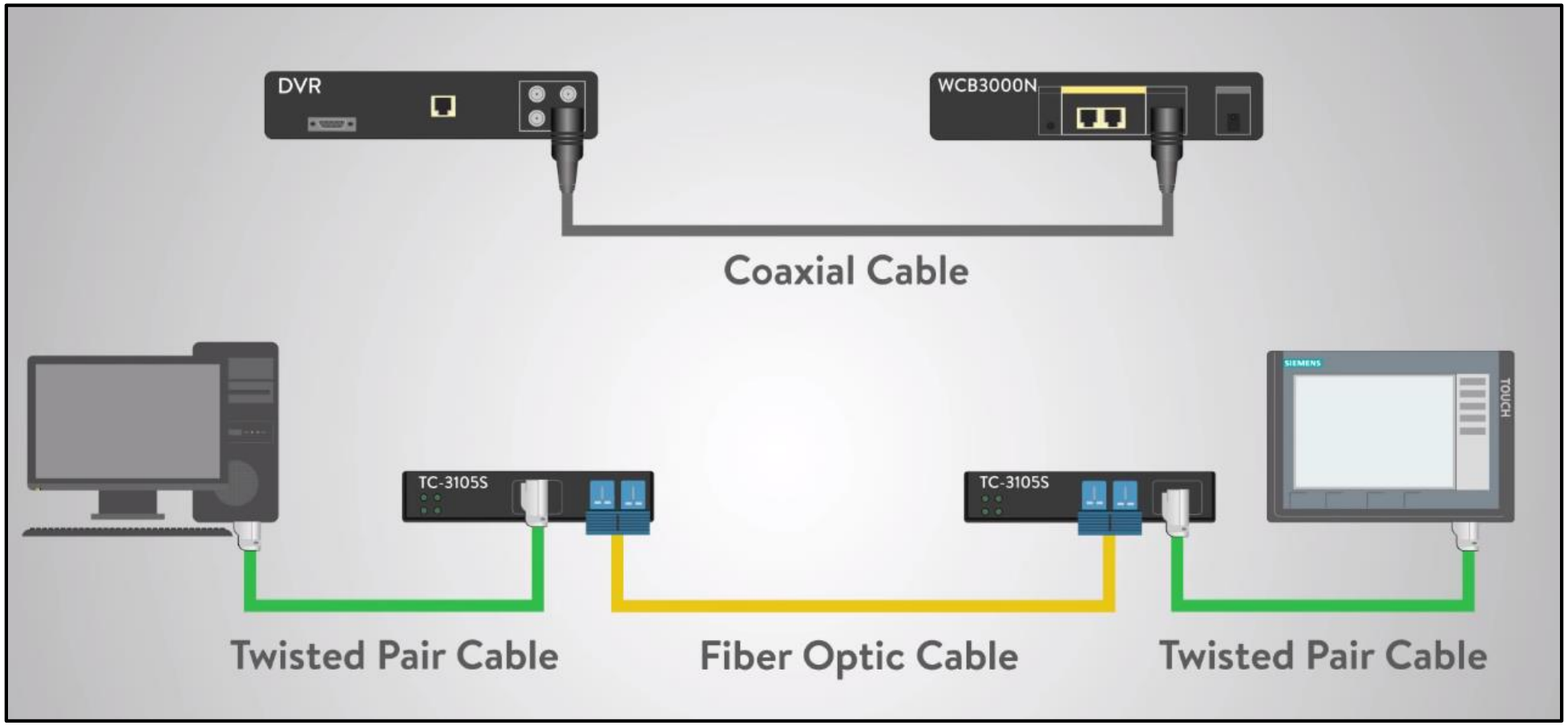

IEEE 802.3
Ethernet

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

IEEE 802.3

1983

Ethernet

Data Link layer

Physical layer

OSI

Open Systems Interconnection

Ethernet

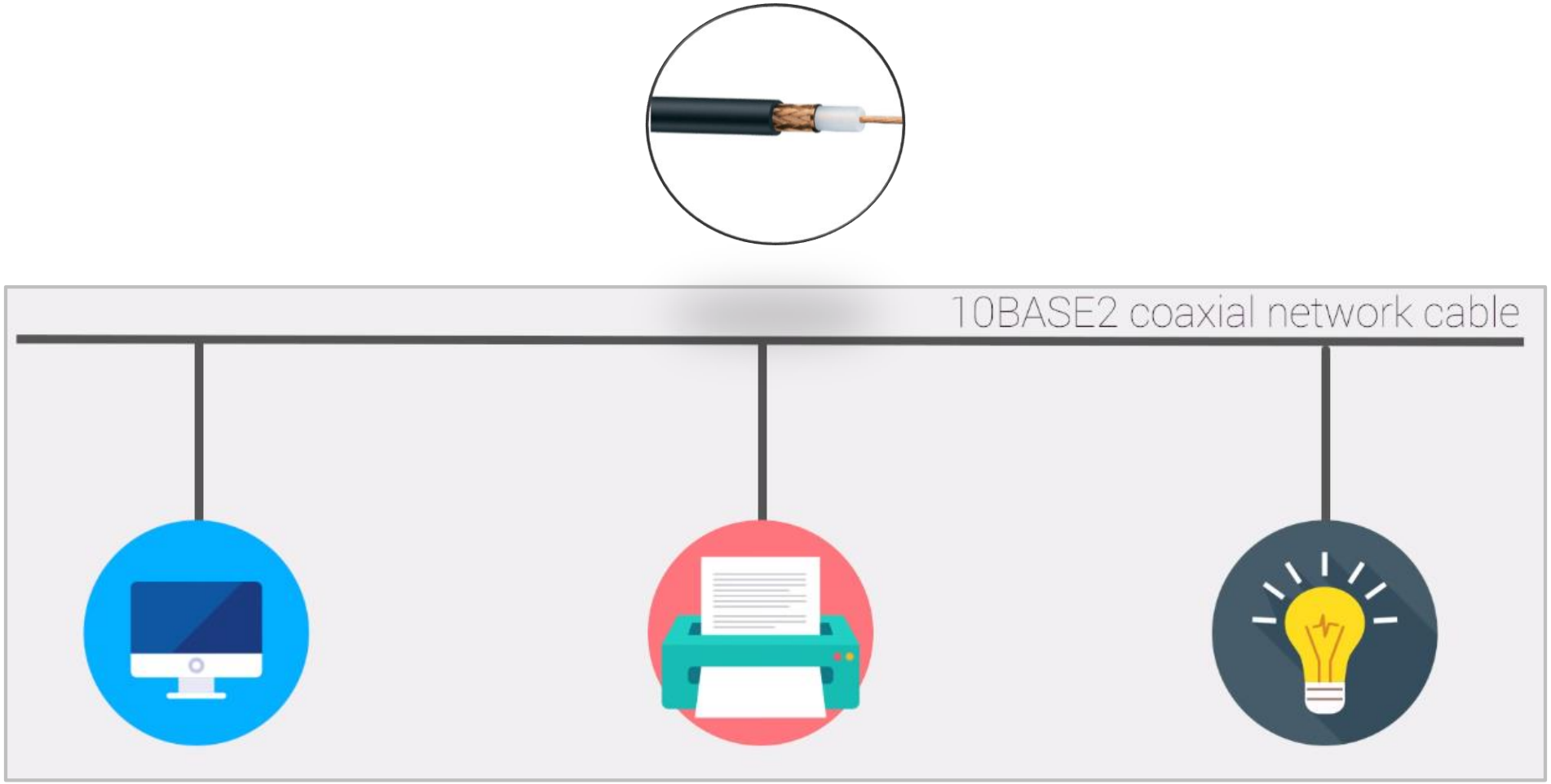
IEEE 802.3

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

Ethernet

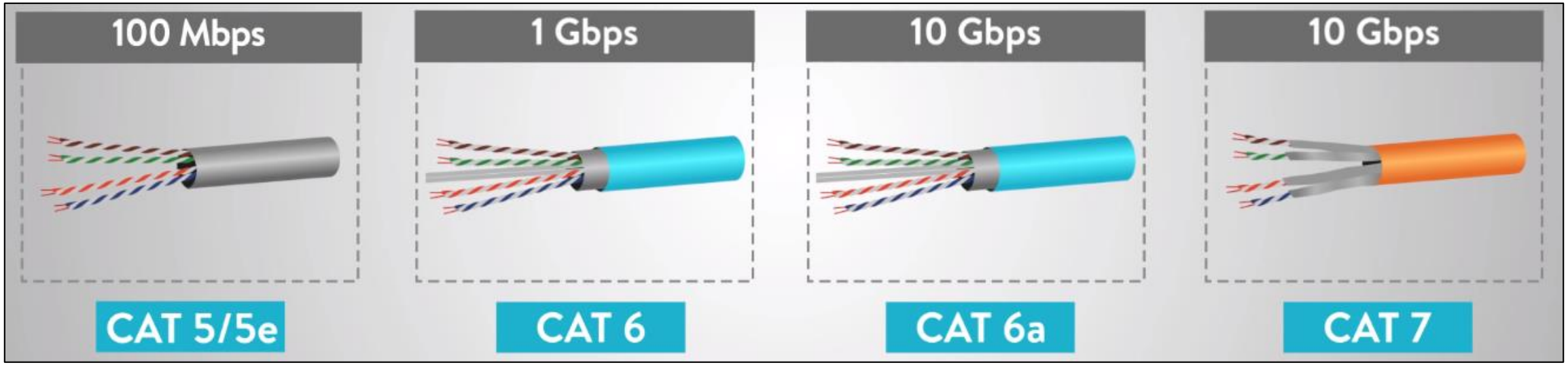
- Data Link layer
- Physical layer
  - Cabling
  - Devices

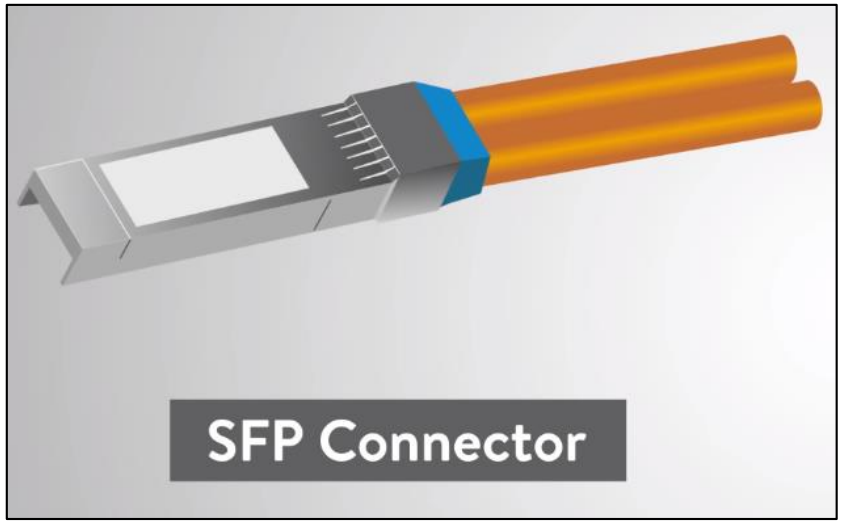
Physical Layer | Cabling



Physical Layer

Cabling

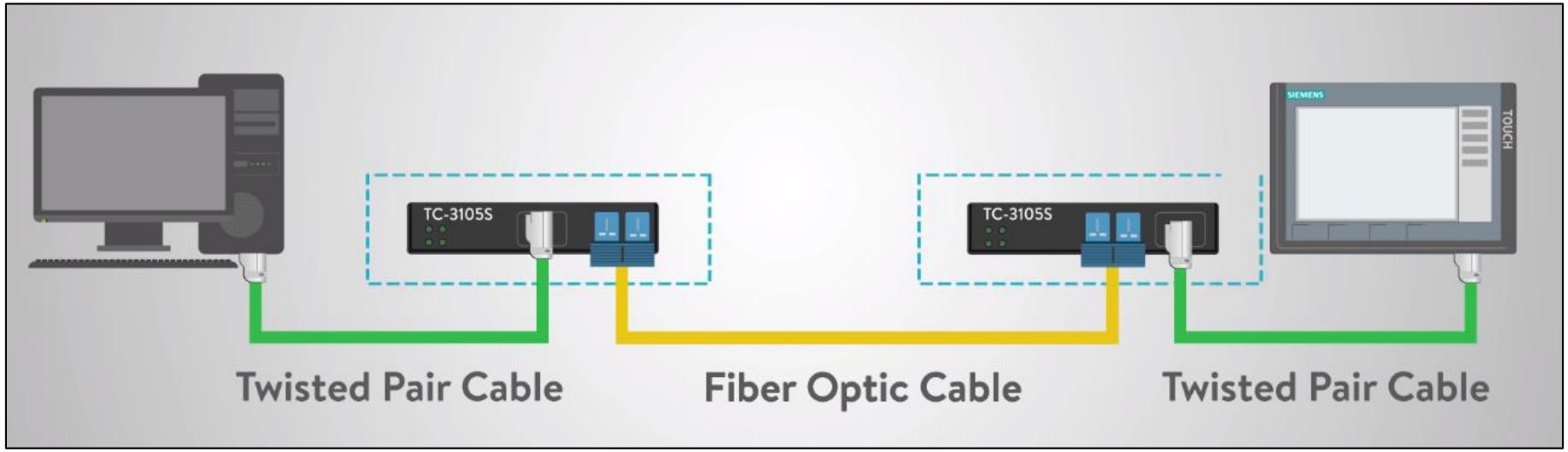



SFP Connector


SC Connector

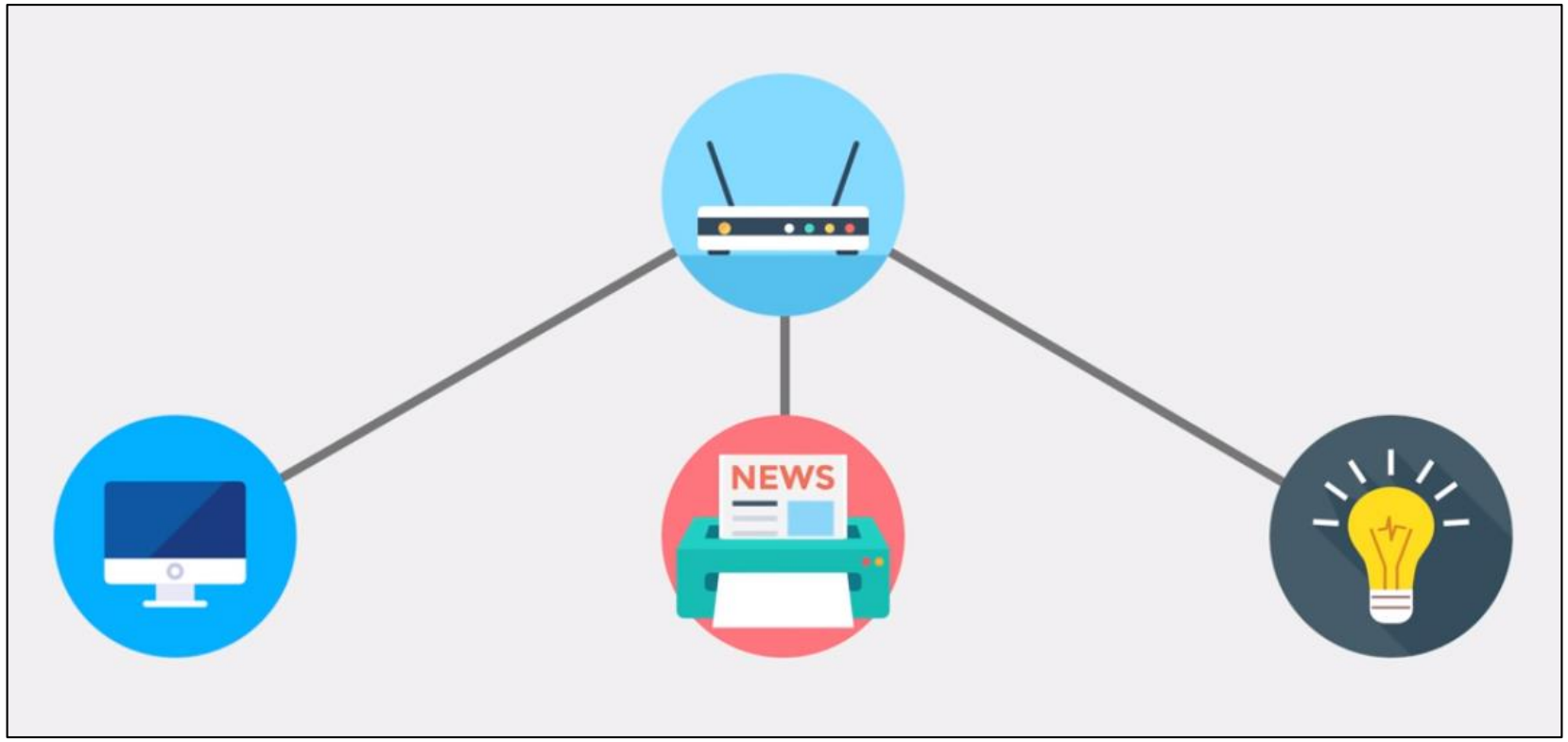
Physical Layer

Cabling



Physical Layer

Devices



Data Link Layer

Logical Link Control (LLC)

Media Access Control (MAC)

Data Link Layer

Logical Link Control (LLC)

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

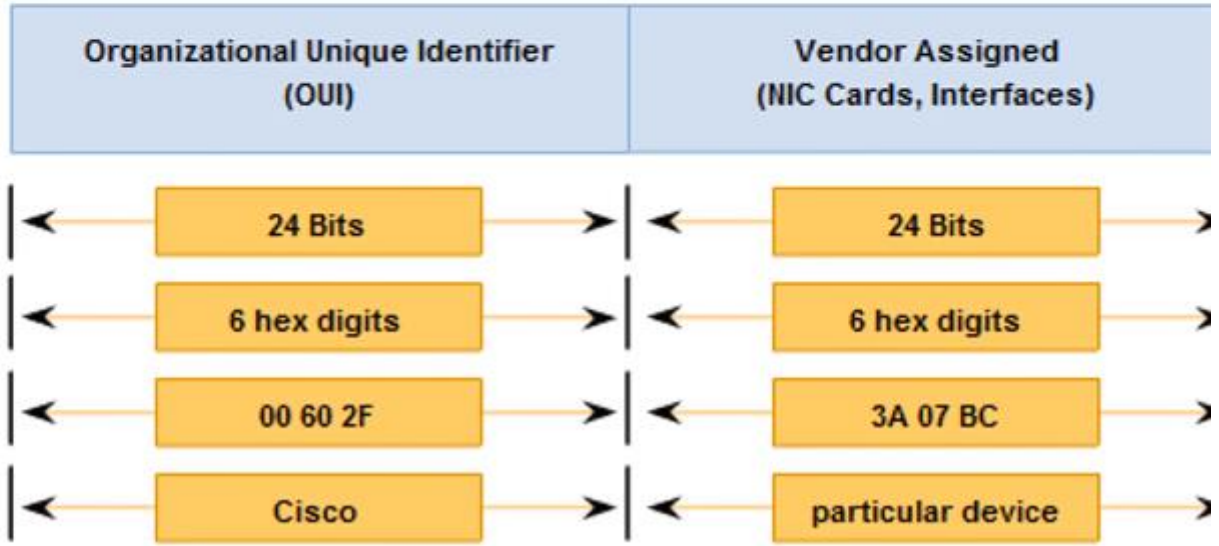
Data Link Layer

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	

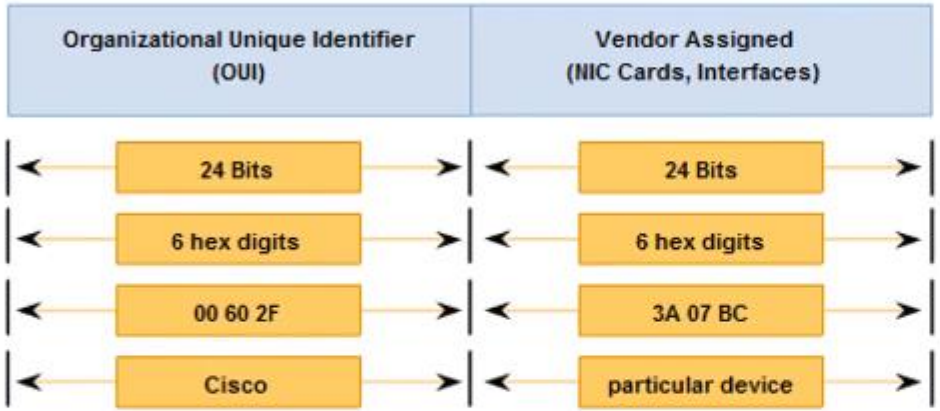
MAC Address: Ethernet Identity

- 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:
  - Must use that **vendor's assigned OUI as the first 3 bytes**
  - All MAC addresses with the same OUI must be **assigned a unique value in the last 3 bytes**



MAC

MAC Address Format

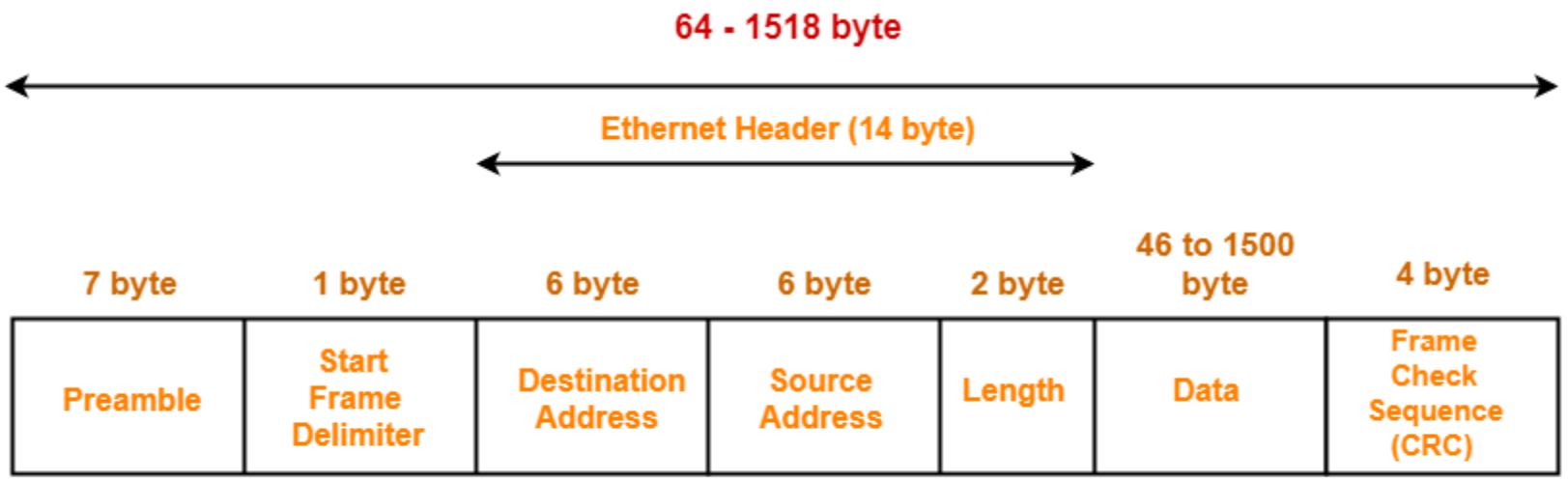


Dec	Bin	Hex	Dec	Bin	Hex
0	0000	0	8	1000	8
1	0001	1	9	1001	9
2	0010	2	10	1010	A
3	0011	3	11	1011	B
4	0100	4	12	1100	C
5	0101	5	13	1101	D
6	0110	6	14	1110	E
7	0111	7	15	1111	F

OUI **unique**

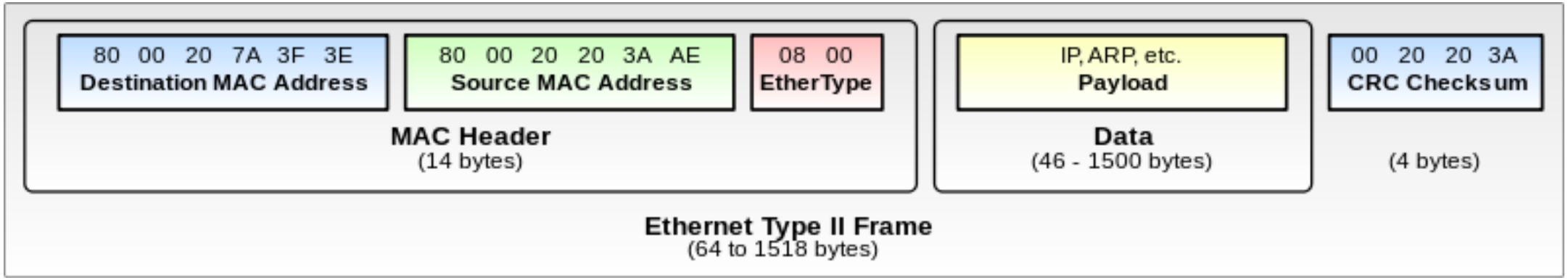
- An Intel MAC address: 00-21-CC-BA-44-C4
- 0000 0000 - 0010 0001 – 1100 1100 - 1011 1010 – 0100 0100 – 1100 0100
- IEEE OUI FAQs: http://standards.ieee.org/faqs/OUI.html

Ethernet Frame



IEEE 802.3 Ethernet Frame Format

MAC


80 00 20 7A 3F 3E
Destination MAC Address
80 00 20 20 3A AE
Source MAC Address
08 00
EtherType
MAC Header
(14 bytes)
IP, ARP, etc.
Payload
Data
(46 - 1500 bytes)
00 20 20 3A
CRC Checksum
(4 bytes)
Ethernet Type II Frame
(64 to 1518 bytes)