

Network Models & Protocols

**Open System
Inter-Connection
Model**



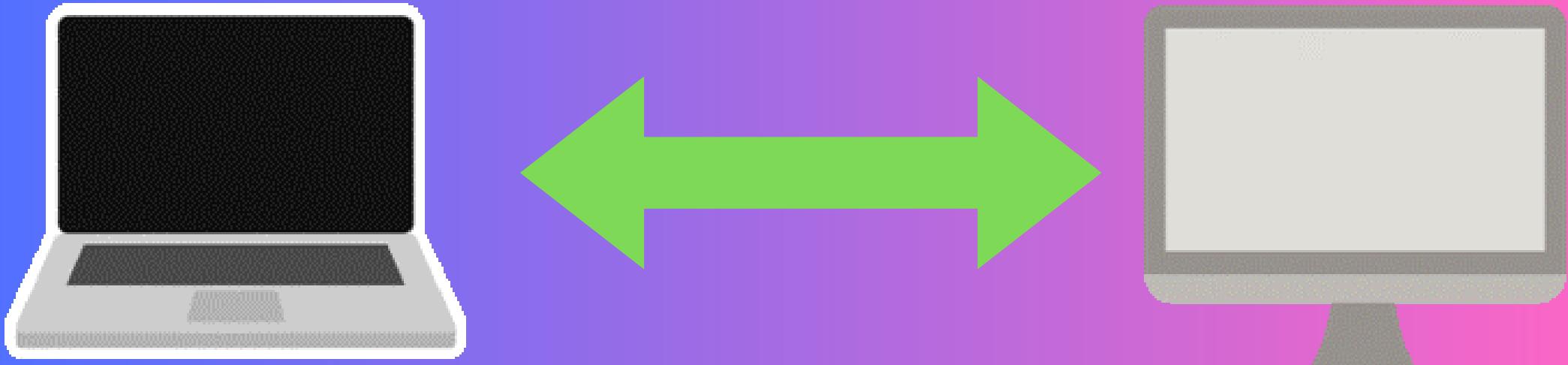


OSI

Model

NEXT ➔

- OSI means connecting two different devices with each other.
- It was introduced in 1983.
- It was adopted by ISO (International Standard Organization) in 1984.



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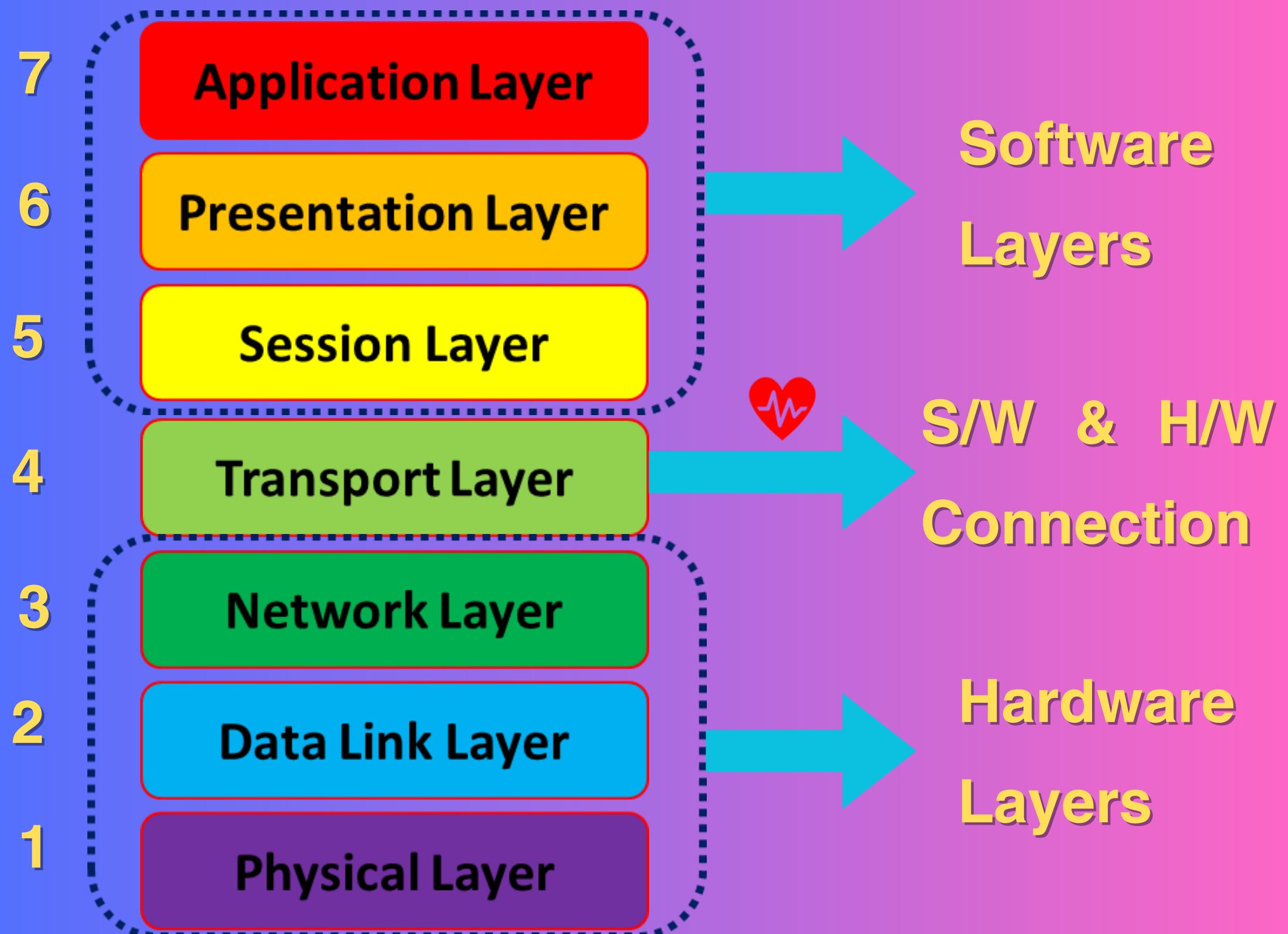
REPOST



OSI

Model

NEXT ➔



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OSI

Model

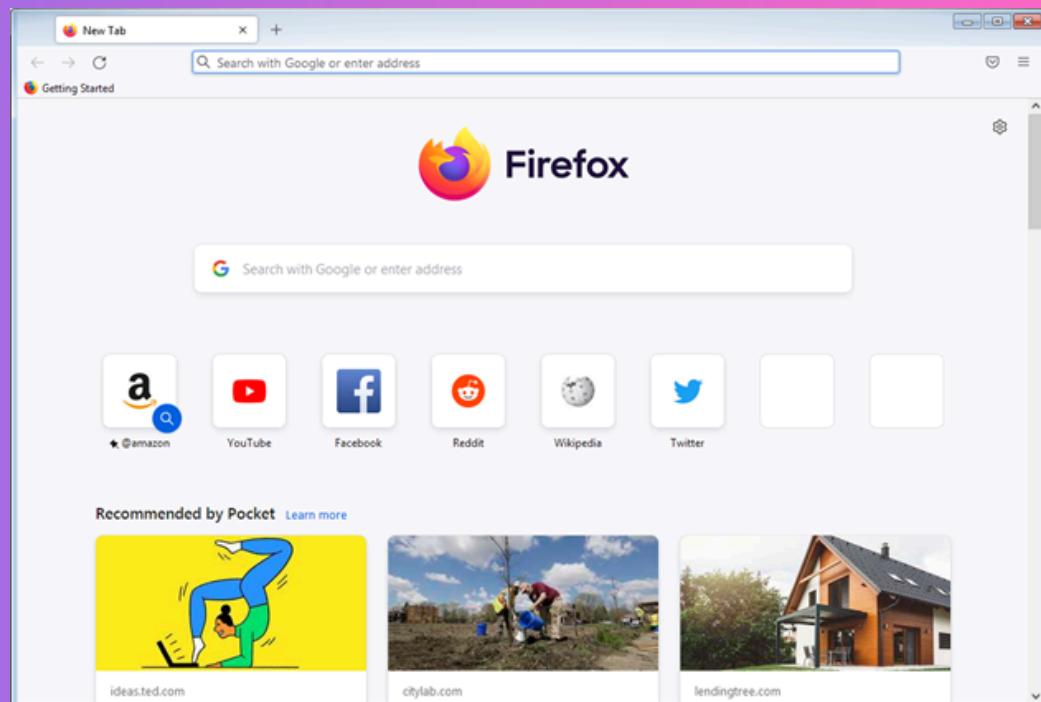
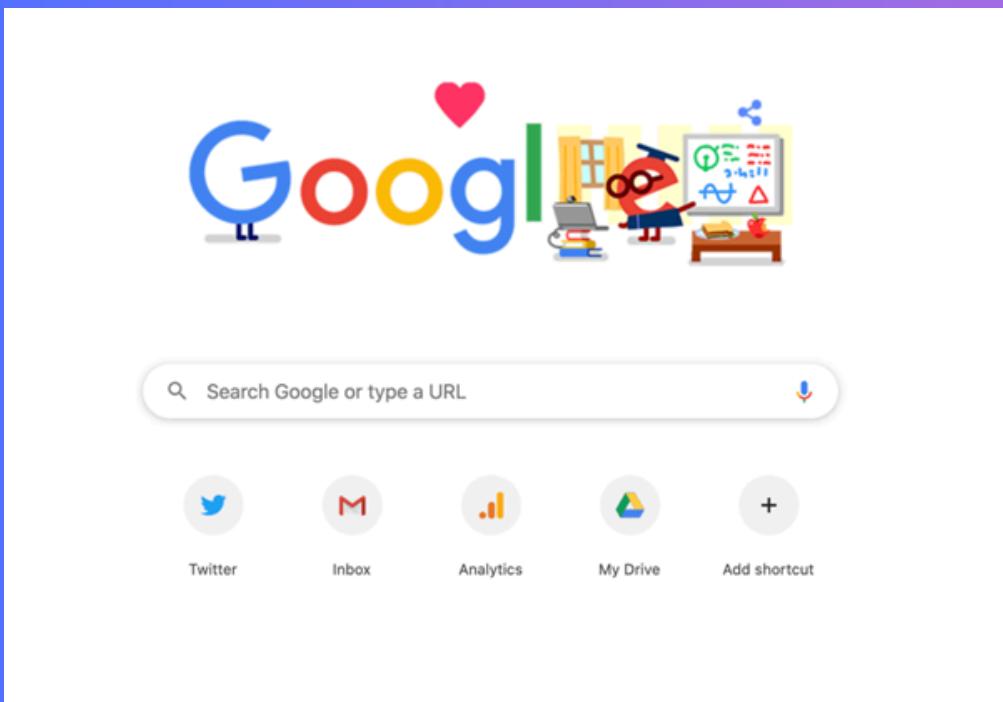
NEXT ➔

7

Application Layer

Role of Application Layer:

- Provides user interface, so that the user can access the network.



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Application Layer

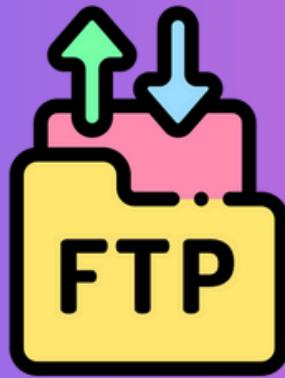
NEXT ➔

7

Application Layer

Role of Application Layer:

- All of the web browsers are the part of application layer.
- Application layer uses different protocols like HTTP, FTP, SMTP etc. to transfer the data to the destination device.



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Presentation Layer

NEXT ➔

Application Layer

Presentation Layer



6 Presentation Layer

Role of Presentation Layer:

- Presentation layer reformats/translates the data using different character encoding schemes.

UNICODE
A
0000 0000
0100 0001

**DATA
TRANSLATION**



ASCII
A
0100 0001



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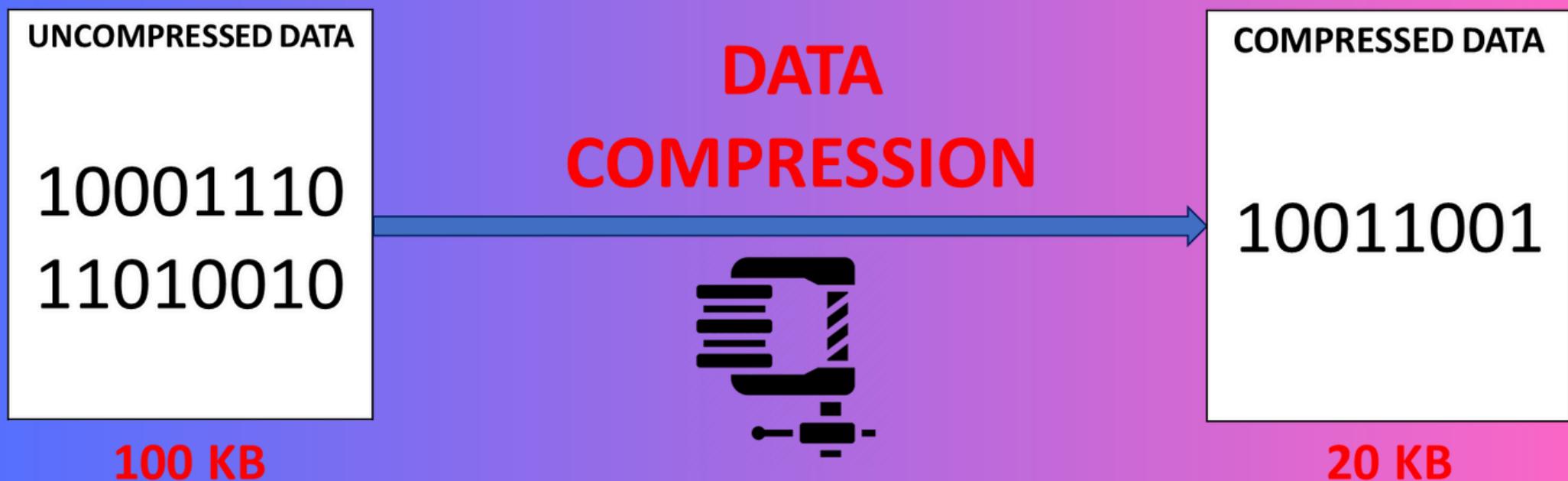
Presentation Layer

NEXT ➔

6 Presentation Layer

Role of Presentation Layer:

- Presentation layer also compresses the data to reduce the size of the data, so that more data can be transferred in less time.



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Presentation Layer

NEXT ➔

6 Presentation Layer

Role of Presentation Layer:

- Presentation layer also encrypts the data using different encryption algorithms to convert the data into such form which can't be read/decoded if it gets intercepts during the transmission.



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Session Layer

NEXT ➔

Presentation Layer

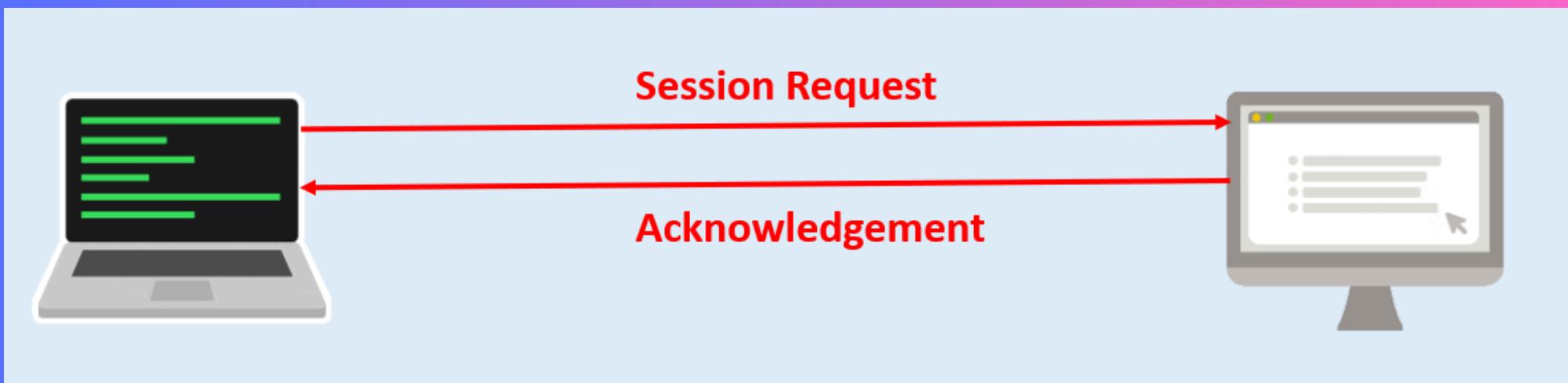
Session Layer



5 Session Layer

Role of Session Layer:

- Session layer is responsible for creating, managing and maintaining the sessions for the data transfer.



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Session Layer

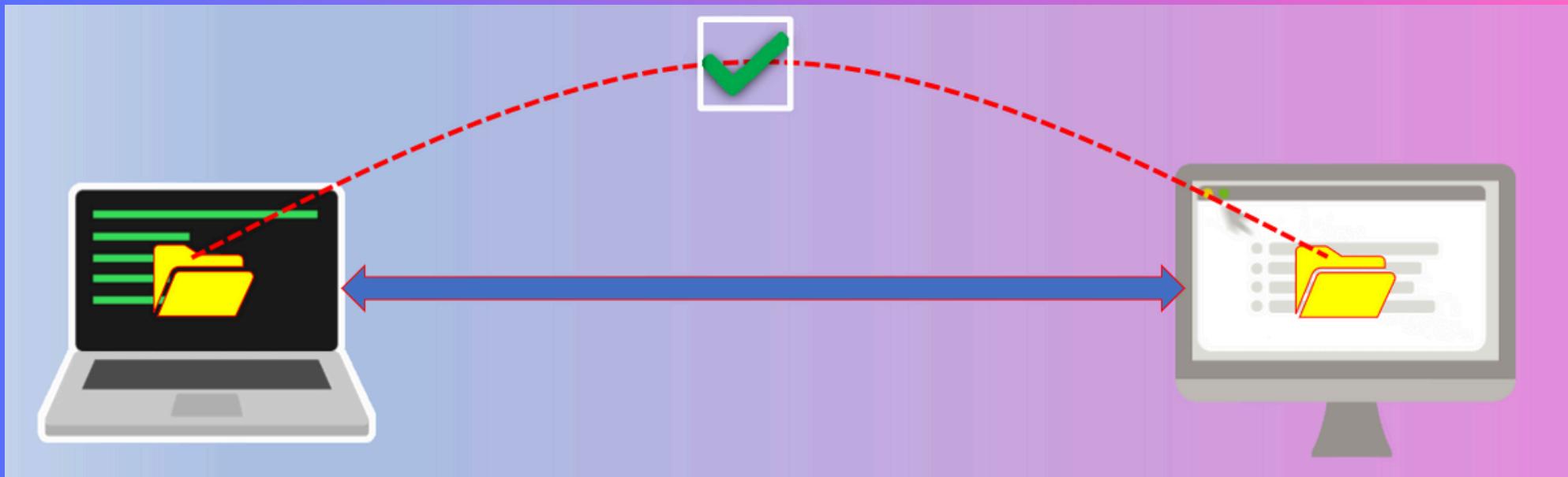
NEXT ➔

5

Session Layer

Role of Session Layer:

- Session layer creates, manages and maintains the session until the user logouts.
- Session layer also puts the check points in the data transmission.



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Session Layer

NEXT ➔

5

Session Layer

Role of Session Layer:

- Session layer also puts the check points in the data transmission to handle the errors during the data transfer.
- In case of any errors in the data transmission or due to software crash the data transfer may get affected.
- In case cases session layer resumes the data transfer from the last check point instead of transmitting the entire data again.
- Session layer terminates the session when the data transfer gets completed.



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Transport Layer

NEXT ➔

Session Layer

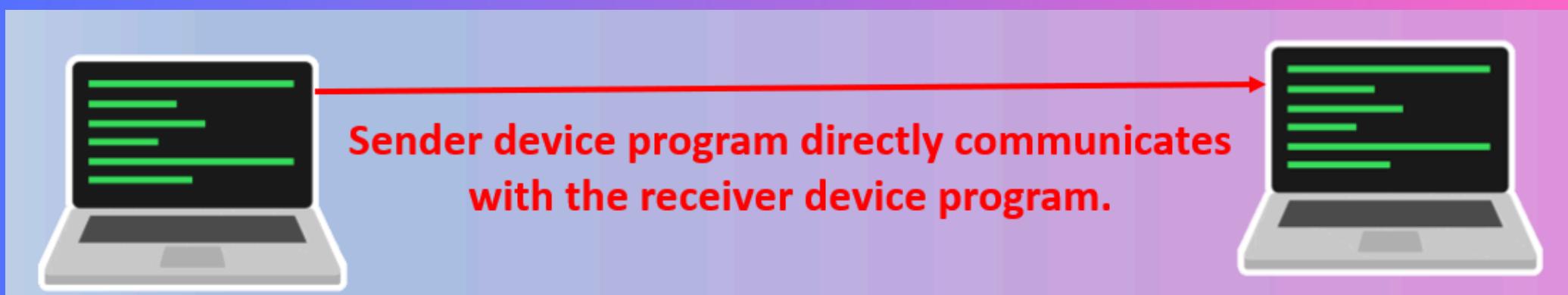
Transport Layer



4 Transport Layer

Role of Transport Layer:

- Transport layer is a service to service layer which is responsible for controlling the data transportation.



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Transport Layer

NEXT ➔

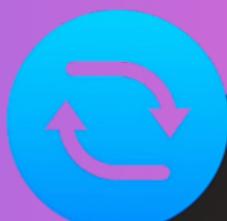
5 Transport Layer

Role of Transport Layer:

- Let's consider you are listening to some music on YouTube and using Facebook as well at the same time in your PC, then how your PC will know which of these incoming data bits are from YouTube and which of these from Facebook?
- It is decided with the help of port number and IP addresses of source & destination, each application listens on different port.
- Transport layer also decides which connection will be used for the data transfer: TCP or UDP ?



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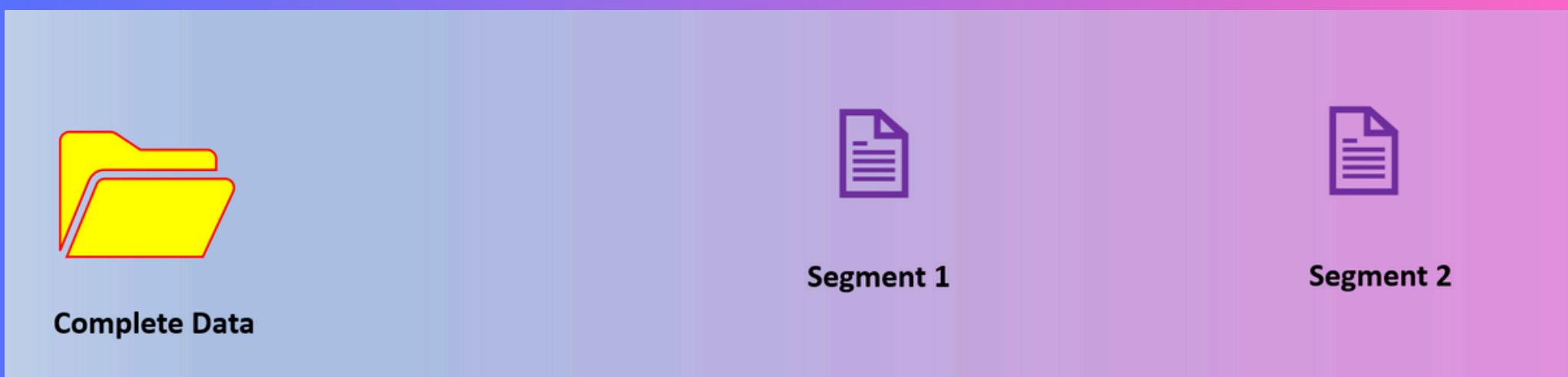
Transport Layer

NEXT ➔

5 Transport Layer

Role of Transport Layer:

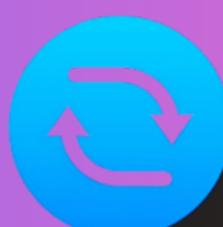
- Transport layer also divides the data into segments so that data can be transported easily.



- Transport layer also controls the flow of data, correct the errors & makes necessary synchronisation in case of difference in speeds of the sender & receiver.



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Network Layer

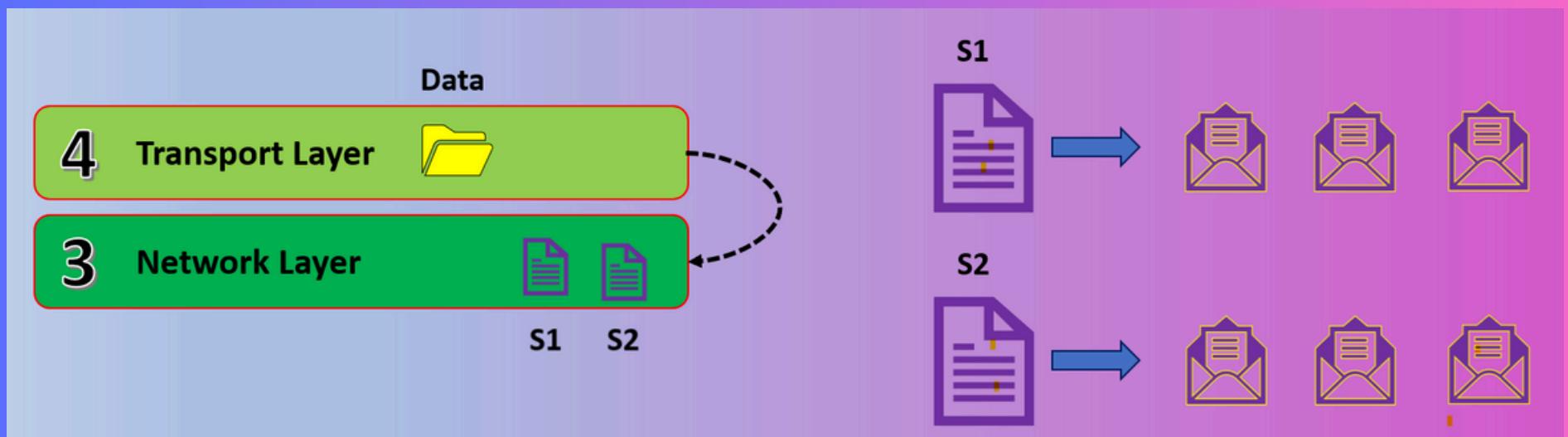
NEXT ➔



3 Network Layer

Role of Network Layer:

- Network layer receives the data from the transport layer in form of segments, which are then converted into packets.



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Network Layer

NEXT ➔

3

Network Layer

Role of Network Layer:

- Single segments may be further divided into several packets.
- Network layer selects the most quick path with the help of routers.
- Network layer selects the most quick path in between networks with the help of routers & IP addresses.



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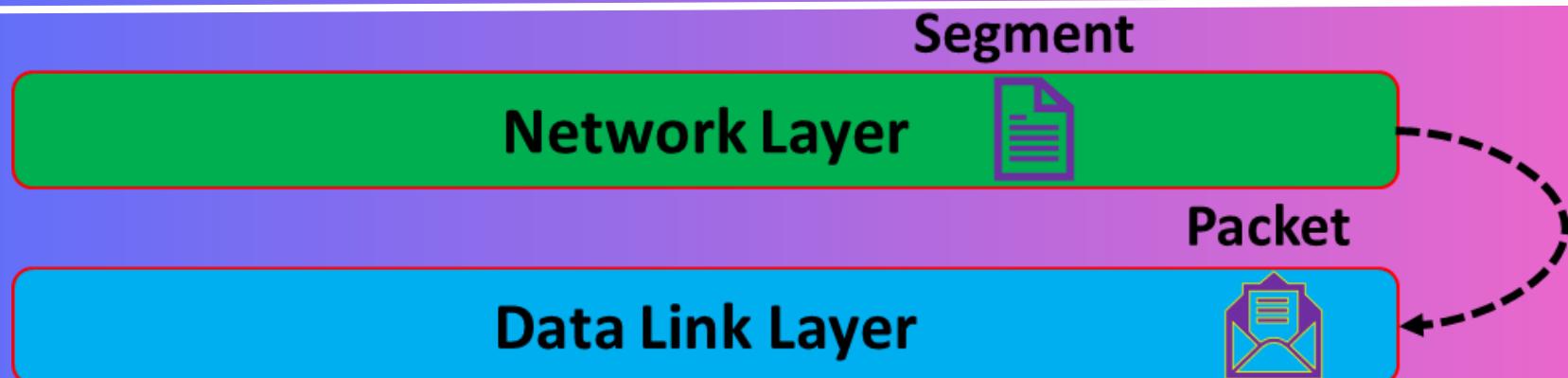


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Data Link Layer

NEXT ➔

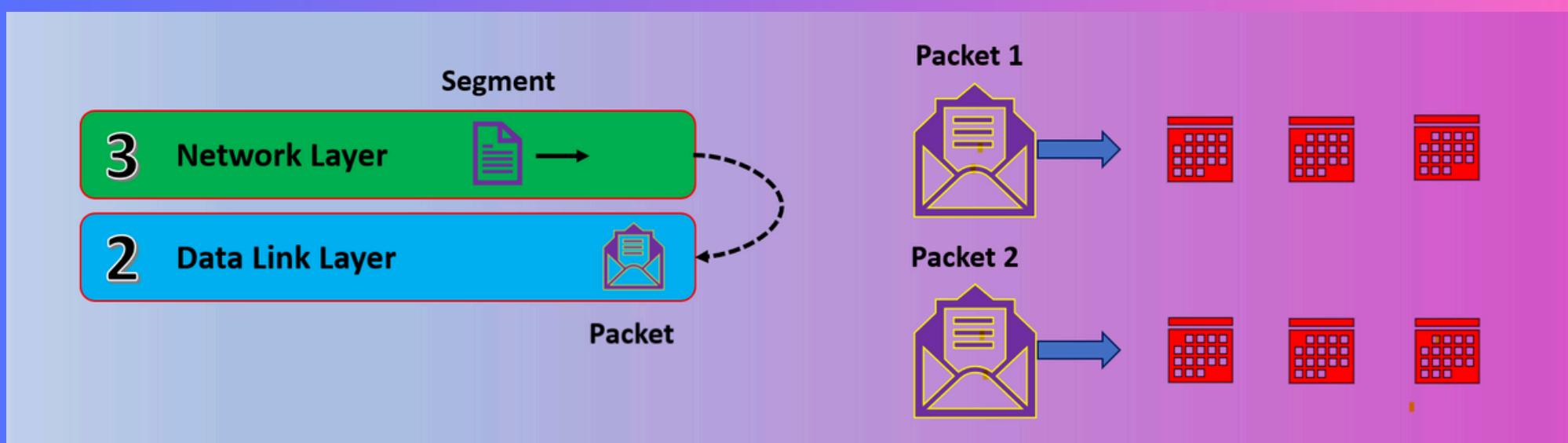


2

Data Link Layer

Role of Data Link Layer:

- Data link layer receives the data from the network layer in form of packets, which are then converted into frames.



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REPOST



Data Link Layer

NEXT ➔

2

Data Link Layer

Role of Data Link Layer:

- Single packet may be further divided into several frames depending on the hardware (NIC).
- Switches & hubs operate under the data link layer, which passes these data frames in sequence.
- MAC address is used in this layer to transfer the data from one system to other (not from source to destination.)
- Data travels from one hop to other in form of frames having size few 100 bytes to few 1000 bytes.



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Data Link Layer

NEXT ➔

2

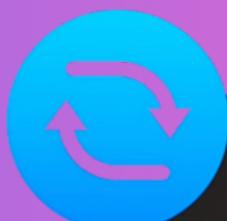
Data Link Layer

Role of Data Link Layer:

- Flow control is maintained in case of speed variations between the devices in this layer.
- In case of any errors, lost frames are retransmitted.
- Data link layer uses a sub layer named as media access control (MAC) in case of shared communication medium.



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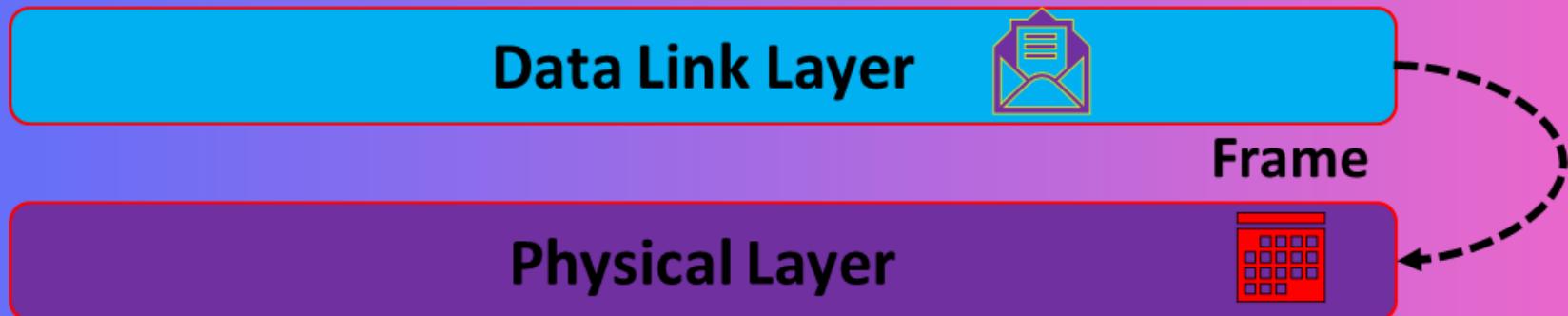


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Physical Layer

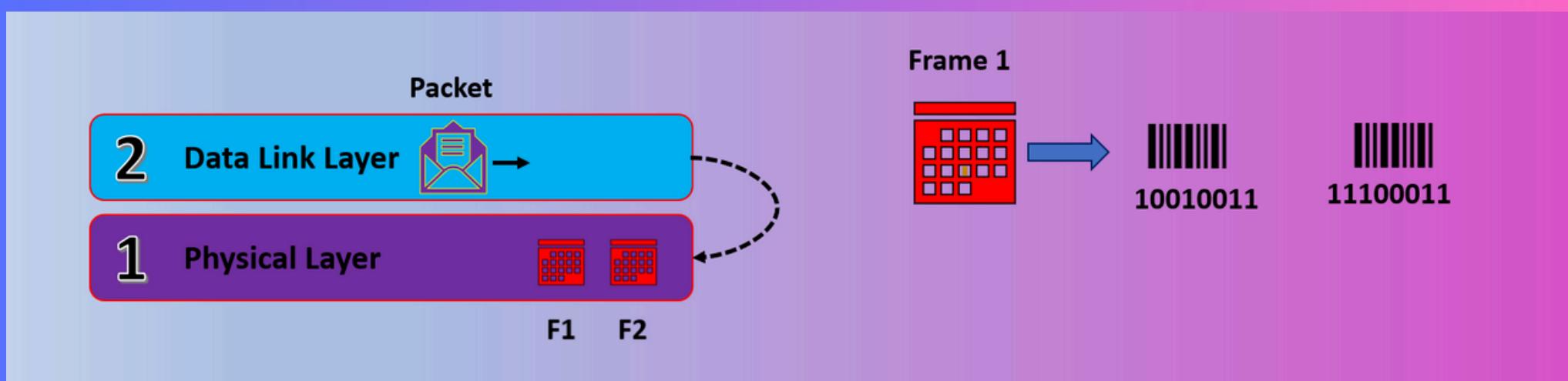
NEXT ➔



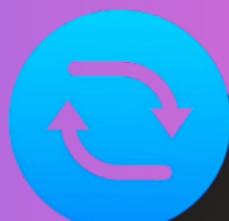
1 Physical Layer

Role of Physical Layer:

- Physical layer receives the data from the data link layer in form of frames, which are then converted into raw bits.



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Physical Layer

NEXT ➔

1

Physical Layer

Role of Physical Layer:

- Single frame may be further divided into several raw bits groups.
- The physical layer receives the data from the data link layer in frames, which are then converted into raw bits.
- Single frame may be further divided into several raw bits groups.
- In the case of wired medium like ethernet cable data bits are transferred in form of electrical signals.
- In case of wireless medium like WiFi data bits are transferred in form of radio frequency signals.



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Physical Layer

NEXT ➔

1

Physical Layer



Role of Physical Layer:

- In the case of an optical medium like OFC data bits are transferred in form of light pulse signals.
- This layer also decided which amplitude level of signal will be considered as 1 and which one will be as 0.
- The life span of one bit is also decided by this layer.
- How many bits will be transferred per second, this is also decided by physical layer.
- Physical layer also identify whether the data bits will flow in one direction only or both.



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