

OUTCOMES

Upon the completion of this session, the learner will be able to

- ★ Understand layering in computer network.
- ★ Understand the benefits of layering.
- ★ Know the introduction of OSI reference model and TCP/IP model.

LAYERING

Layering means decomposing the problem into more manageable components (Layers).

Advantages:

- ★ It provides more modular design.
- ★ Easy to troubleshoot.

PROTOCOLS

- ★ It is a set of rules that governs data communication.
- ★ The protocols in each layer governs the activities of the data communication.

LAYERED ARCHITECTURES

- ★ The OSI Reference Model.
- ★ The TCP/IP Model.

THE OSI MODEL

- ★ OSI stands for Open System Interconnection.
- ★ It is a model for understanding and designing a network architecture that is flexible, robust, and interoperable.
- ★ Developed by the International Standards for Organizations (ISO).
- ★ The OSI model is not a protocol.
- ★ It is only a guideline and hence it is referred as OSI reference model.

THE OSI MODEL

- ★ The purpose of the OSI model is to show how to facilitate communication between different systems without requiring changes to the logic of the underlying hardware and software.
- ★ The OSI model was never fully implemented.

THE TCP/IP MODEL

- ★ TCP/IP = Transmission Control Protocol/Internet Protocol.
- ★ The TCP/IP protocol suite was developed prior to the OSI model.
- ★ Therefore, the layers in the TCP/IP protocol suite do not exactly match those in the OSI model.
- ★ TCP/IP is a hierarchical protocol made up of interactive modules, each of which provides a specific functionality.

OUTCOMES

Upon the completion of this session, the learner will be able to

- ★ Understand the OSI reference model.
- ★ List various layers in the OSI reference model.
- ★ Understand how each layers interact with other layers.

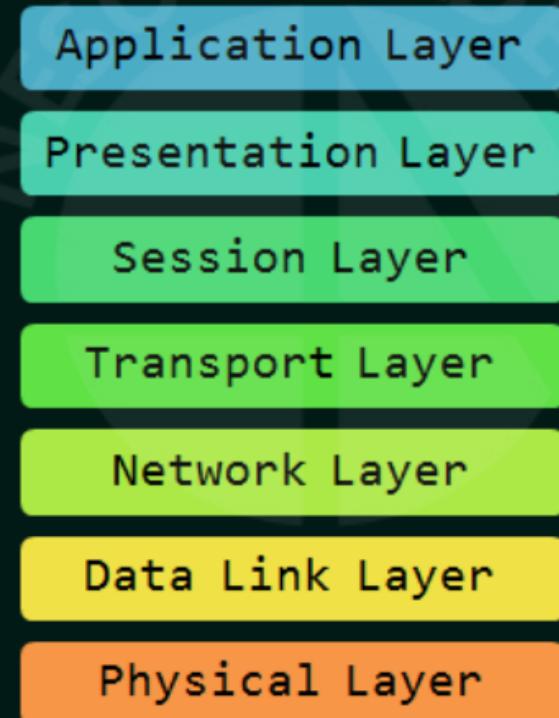
LAYERING – A RECAP

- ★ Layering means **decomposing** the problem of building a network into more manageable components (Layers).
- ★ More modular design and easy to troubleshoot.

THE OSI MODEL

- ★ The purpose of the OSI model is to facilitate communication between different systems without requiring changes to the logic of the underlying hardware and software.

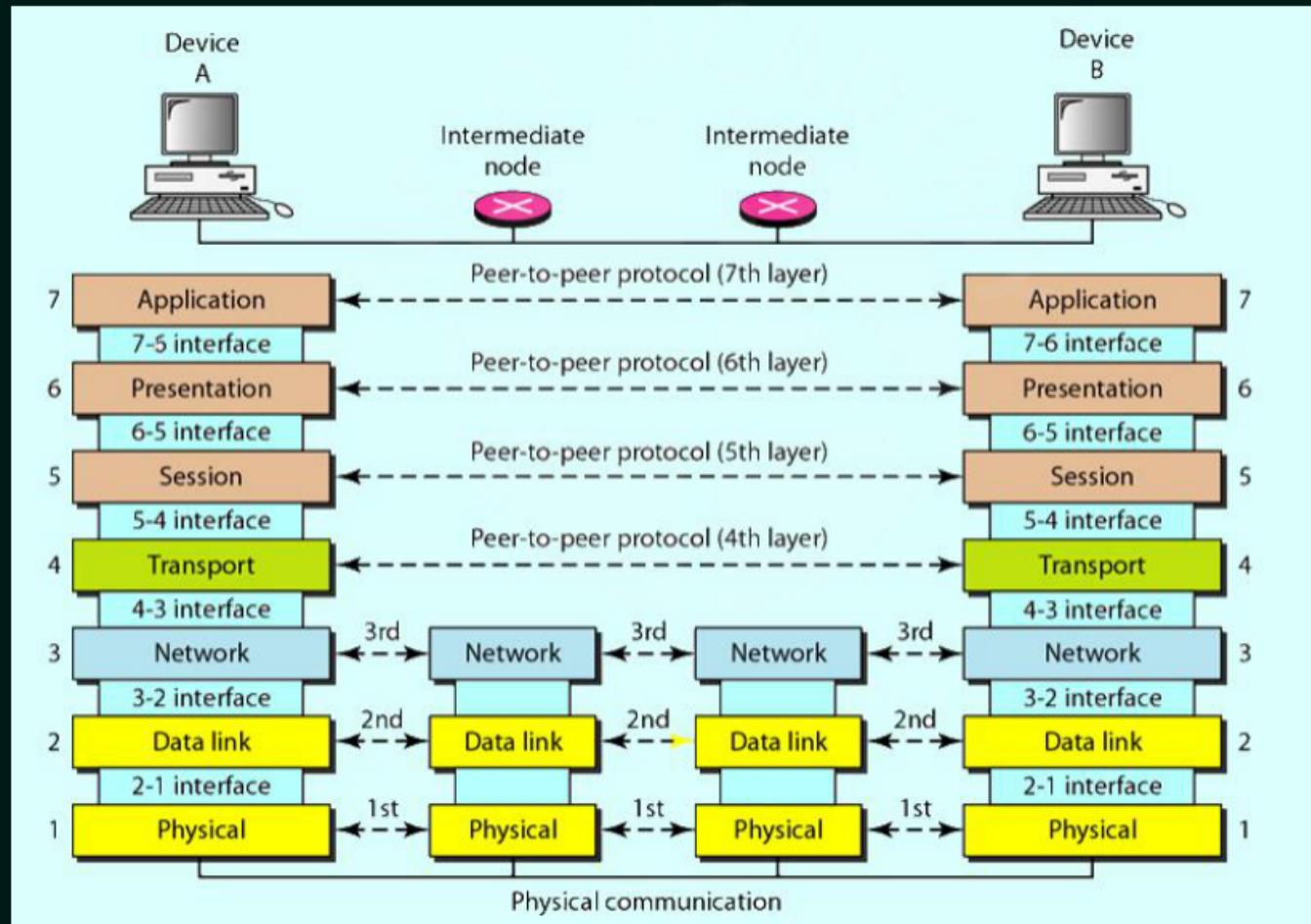
LAYERS IN THE OSI REFERENCE MODEL



HOW TO REMEMBER THE LAYERS?

Away	Application Layer
Pizza	Presentation Layer
Sausage	Session Layer
Throw	Transport Layer
Not	Network Layer
Do	Data Link Layer
Please	Physical Layer

LAYERS IN THE OSI REFERENCE MODEL



REVISITING THE SYLLABUS (BOTTOM UP APPROACH)

- ★ Chapter 1: Fundamentals
- ★ Chapter 2: Data Link Layer
- ★ Chapter 3: Network Layer
- ★ Chapter 4: Transport Layer
- ★ Chapter 5: Application Layer
- ★ Chapter 6: Network Security

Application Layer

Presentation Layer

Session Layer

Transport Layer

Network Layer

Data Link Layer

Physical Layer

ACTIVITY TIME

Identify the correct order of OSI layering in the following?

Application Layer	Application Layer	Application Layer	Application Layer
Session Layer	Presentation Layer	Presentation Layer	Presentation Layer
Presentation Layer	Session Layer	Session Layer	Transport Layer
Transport Layer	Network Layer	Transport Layer	Session Layer
Network Layer	Transport Layer	Network Layer	Network Layer
Data Link Layer	Data Link Layer	Data Link Layer	Data Link Layer
Physical Layer	Physical Layer	Physical Layer	Physical Layer

A

B

C

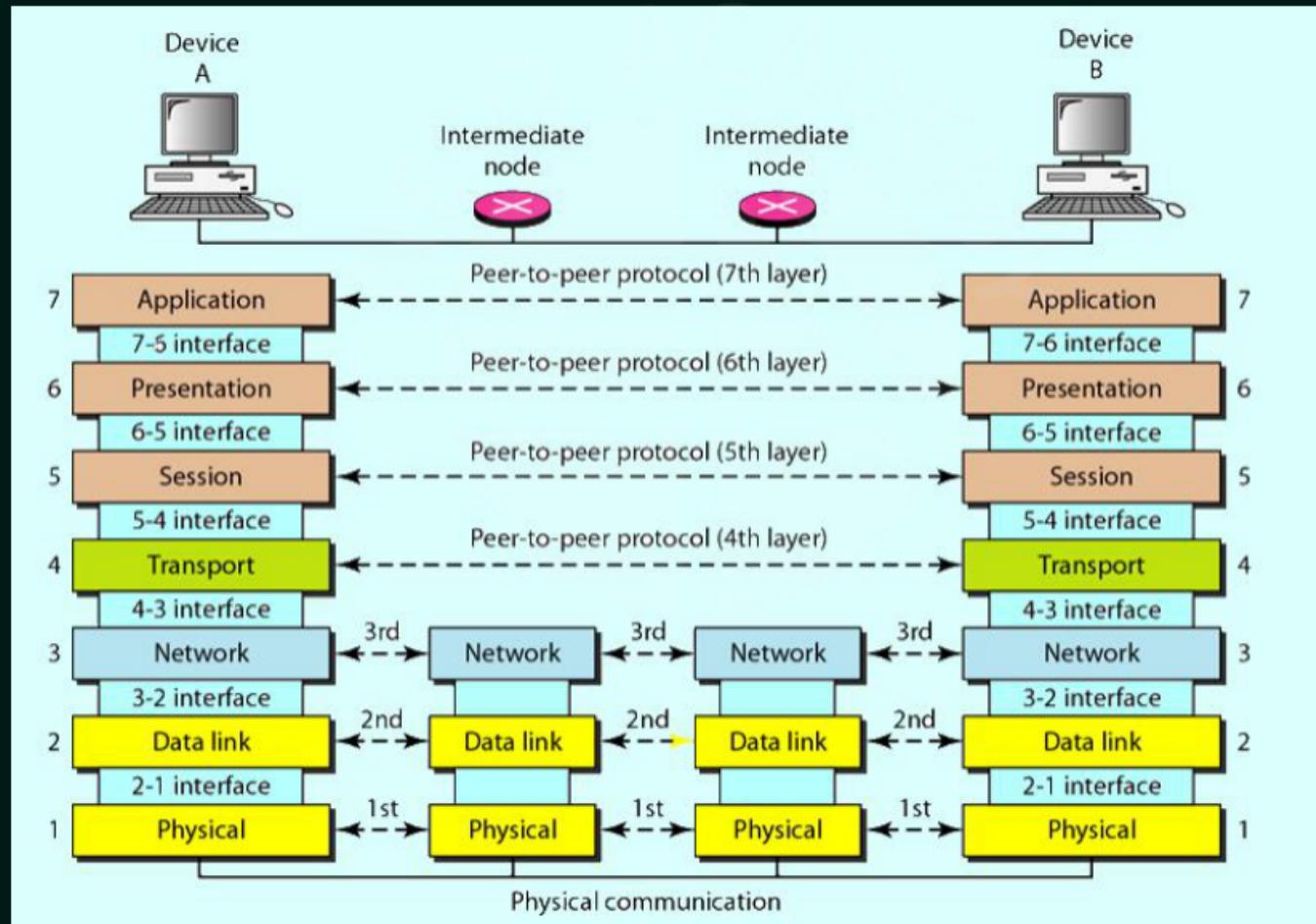
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OUTCOMES

Upon the completion of this session, the learner will be able to

- ★ Understand the services offered by Application Layer.
- ★ Understand the services offered by Presentation Layer.
- ★ Understand the services offered by Session Layer.

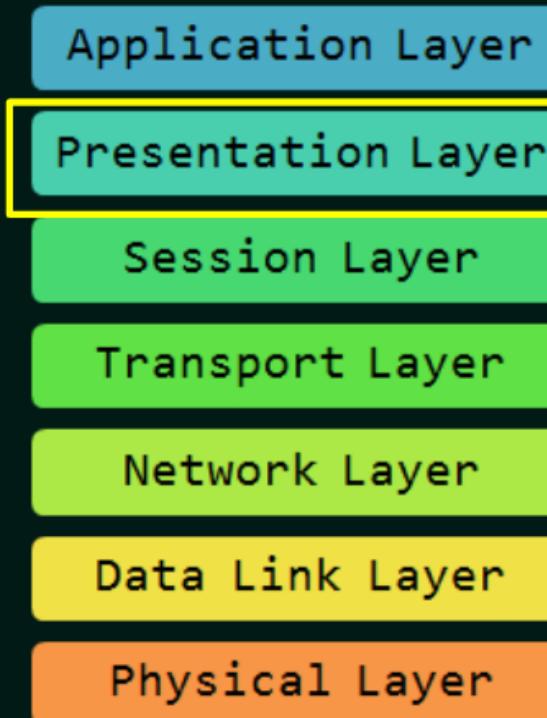
LAYERS IN THE OSI REFERENCE MODEL – A RECAP



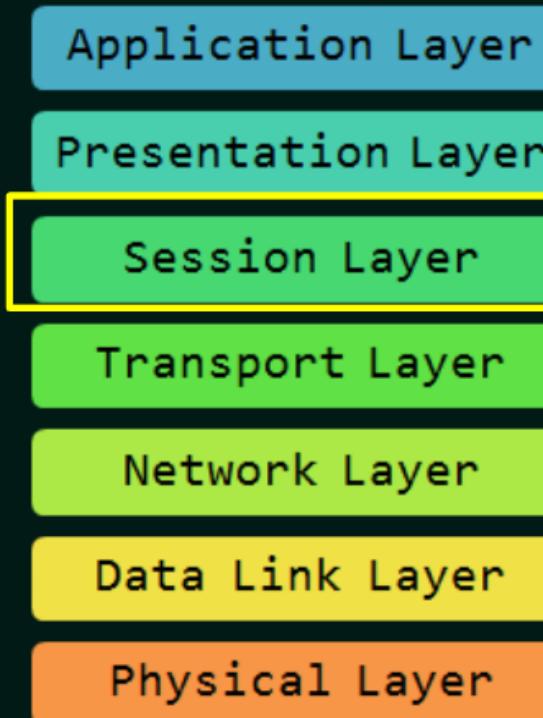
LAYERS IN THE OSI REFERENCE MODEL



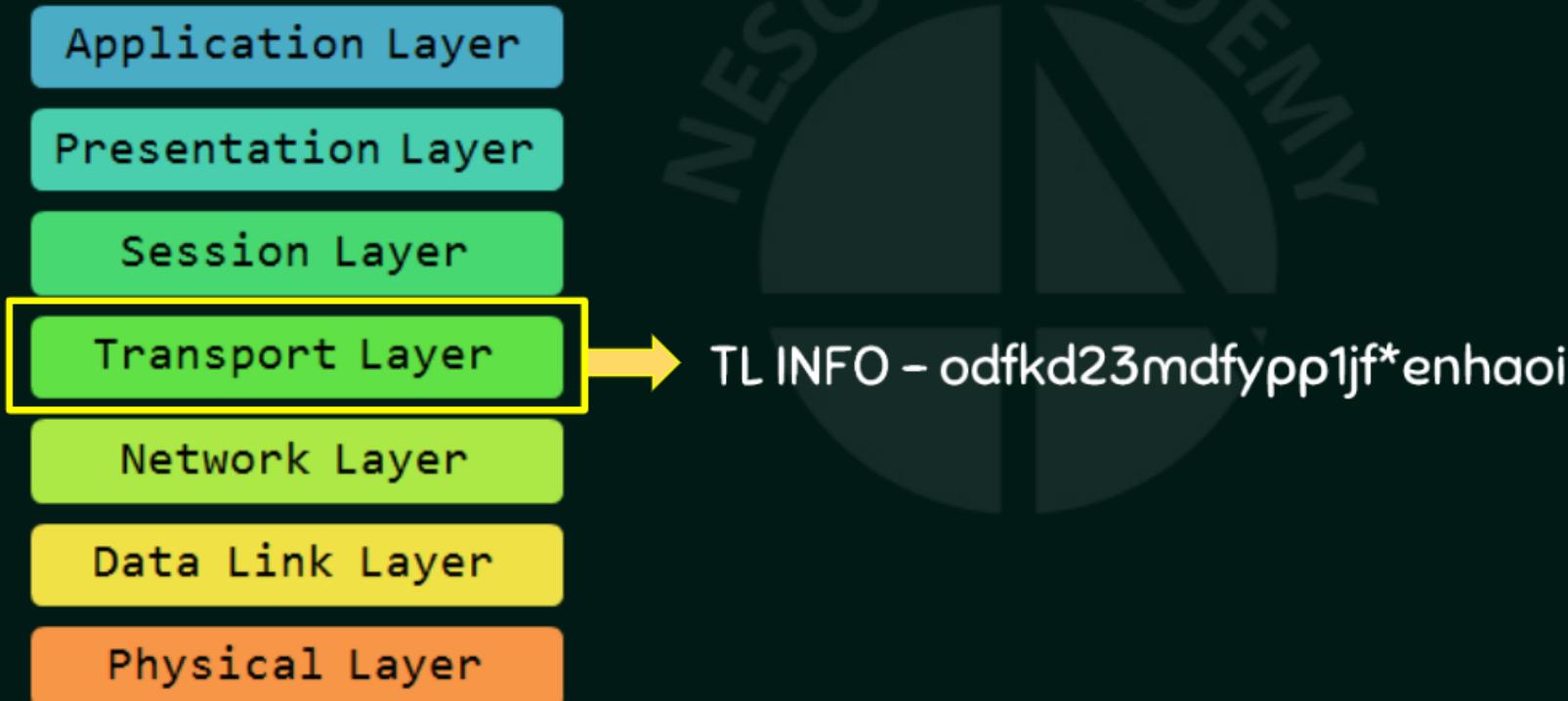
LAYERS IN THE OSI REFERENCE MODEL



LAYERS IN THE OSI REFERENCE MODEL



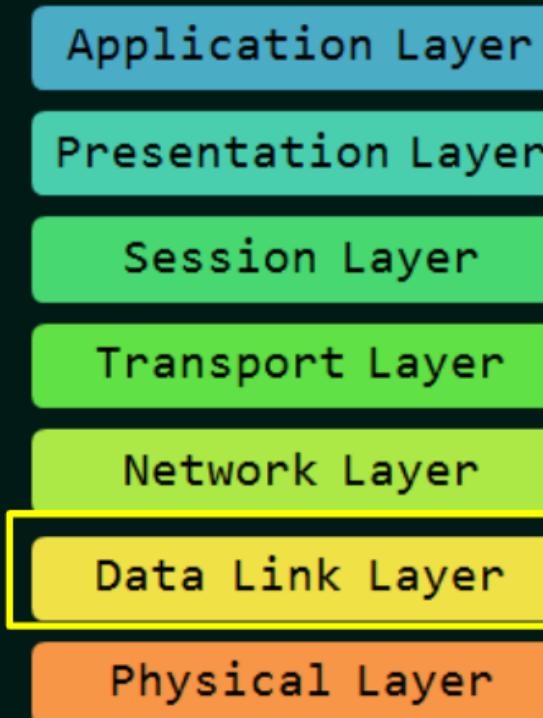
LAYERS IN THE OSI REFERENCE MODEL



LAYERS IN THE OSI REFERENCE MODEL

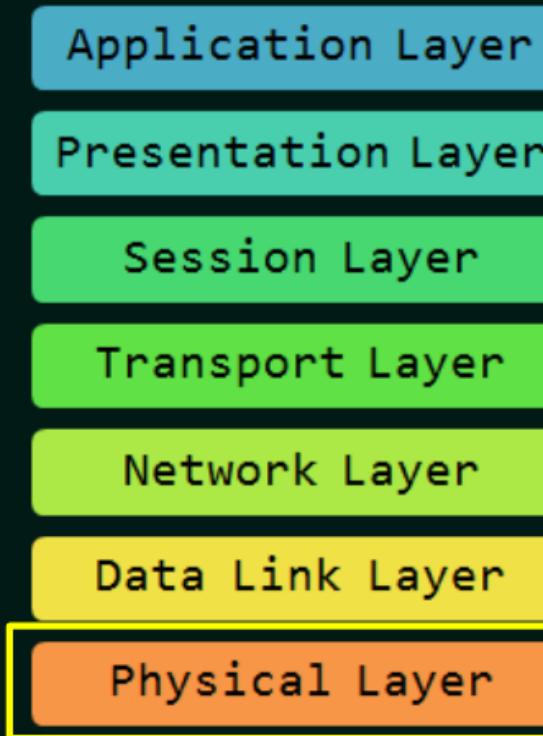


LAYERS IN THE OSI REFERENCE MODEL



DL INFO - NL INFO - TL INFO - odfkd23mdfyp1jf*enhaoi

LAYERS IN THE OSI REFERENCE MODEL



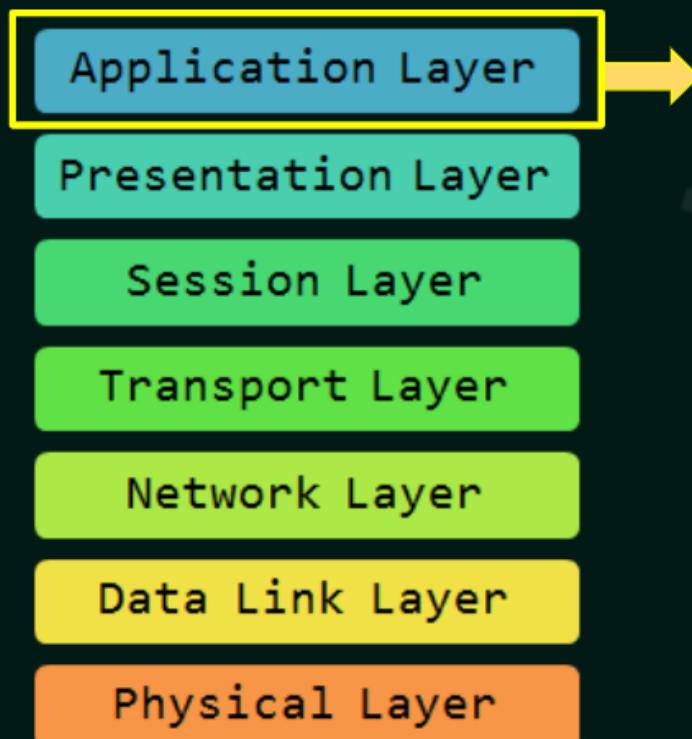
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LAYERS IN THE OSI REFERENCE MODEL

- Application Layer
- Presentation Layer
- Session Layer
- Transport Layer
- Network Layer
- Data Link Layer
- Physical Layer

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LAYERS IN THE OSI REFERENCE MODEL



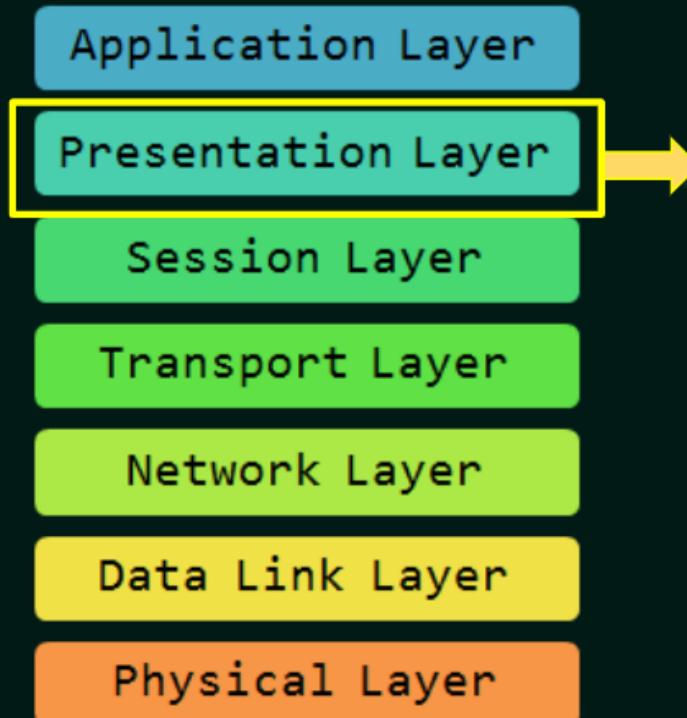
It enables the user to access the network resources.

SERVICES PROVIDED BY APPLICATION LAYER

- ★ File Transfer and Access Management (FTAM).
- ★ Mail Services.
- ★ Directory services.



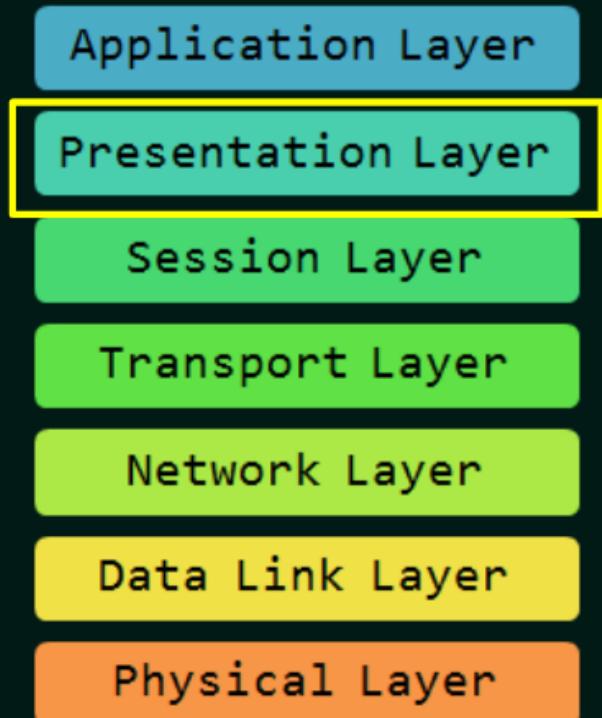
LAYERS IN THE OSI REFERENCE MODEL



It is concerned with the syntax and semantics of the information exchanged between two systems.



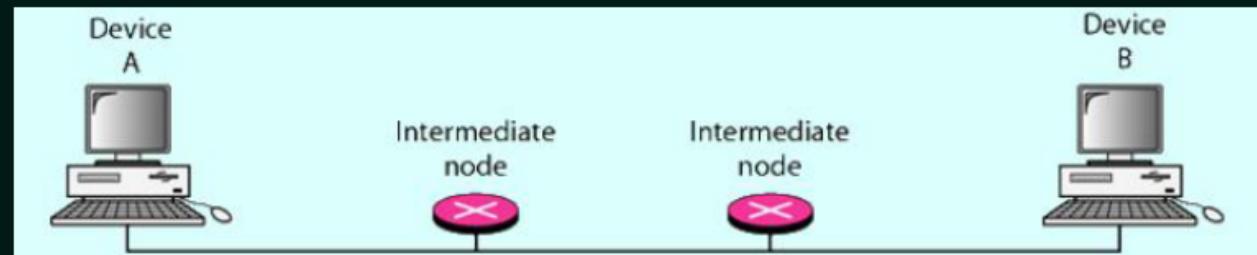
LAYERS IN THE OSI REFERENCE MODEL



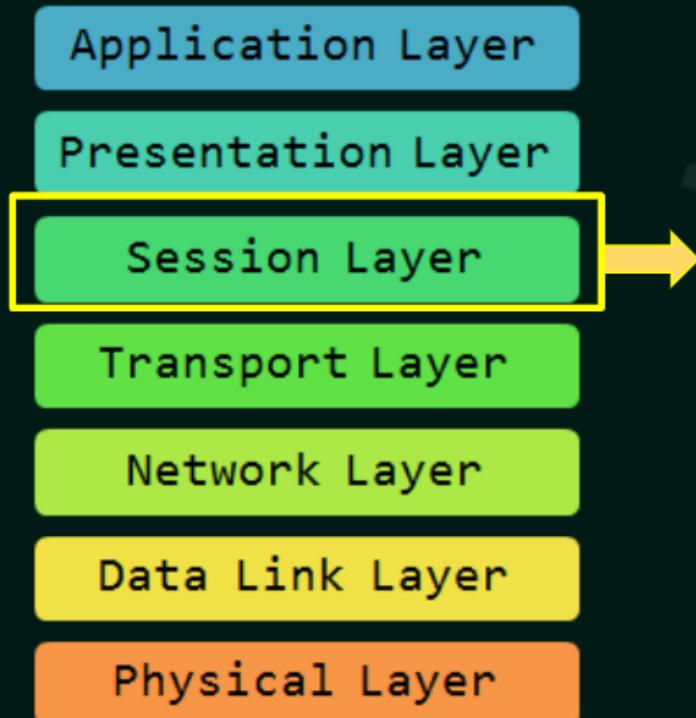
It is concerned with the syntax and semantics of the information exchanged between two systems.

SERVICES PROVIDED BY PRESENTATION LAYER

- ★ Translation.
- ★ Encryption.
- ★ Compression



LAYERS IN THE OSI REFERENCE MODEL

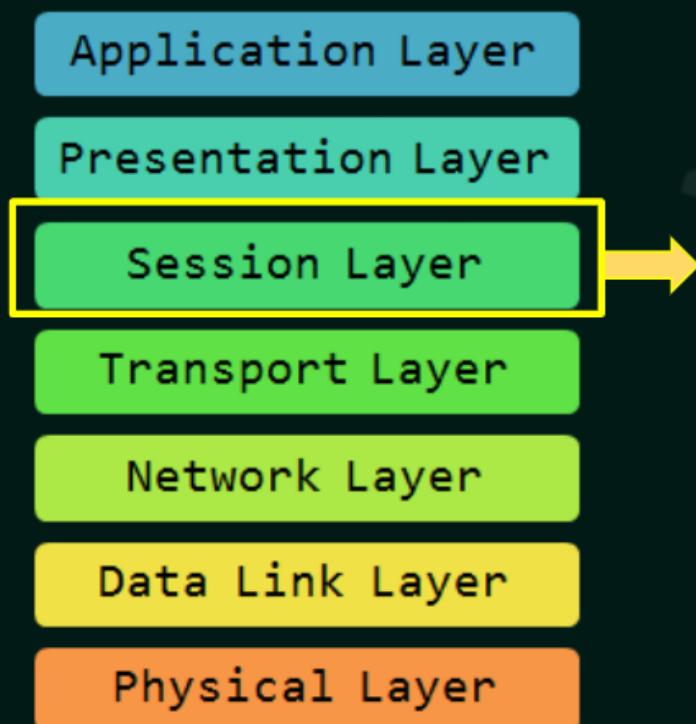


It establishes, maintains, and synchronizes the interaction among communicating devices

SERVICES PROVIDED BY SESSION LAYER

- ★ Dialog control.
- ★ Synchronization.

LAYERS IN THE OSI REFERENCE MODEL



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SERVICES PROVIDED BY SESSION LAYER

- ★ Dialog control.
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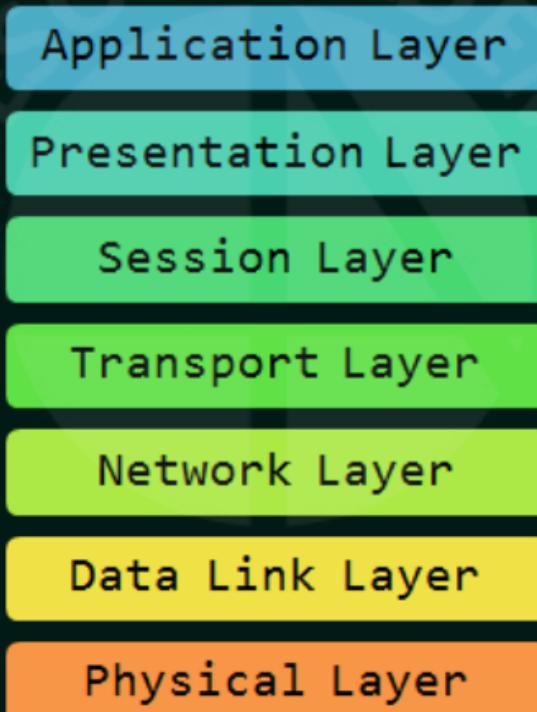


OUTCOMES

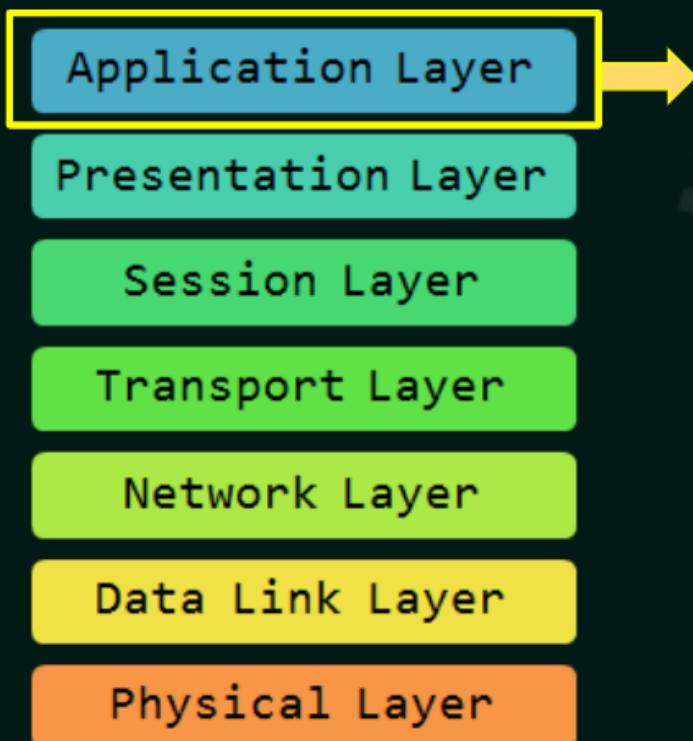
Upon the completion of this session, the learner will be able to

- ★ Understand the services offered by Transport Layer.
- ★ Understand the services offered by Network Layer.
- ★ Understand the services offered by Data Link Layer.
- ★ Understand the services offered by Physical Layer.

LAYERS IN THE OSI REFERENCE MODEL – A RECAP



APPLICATION LAYER – A RECAP



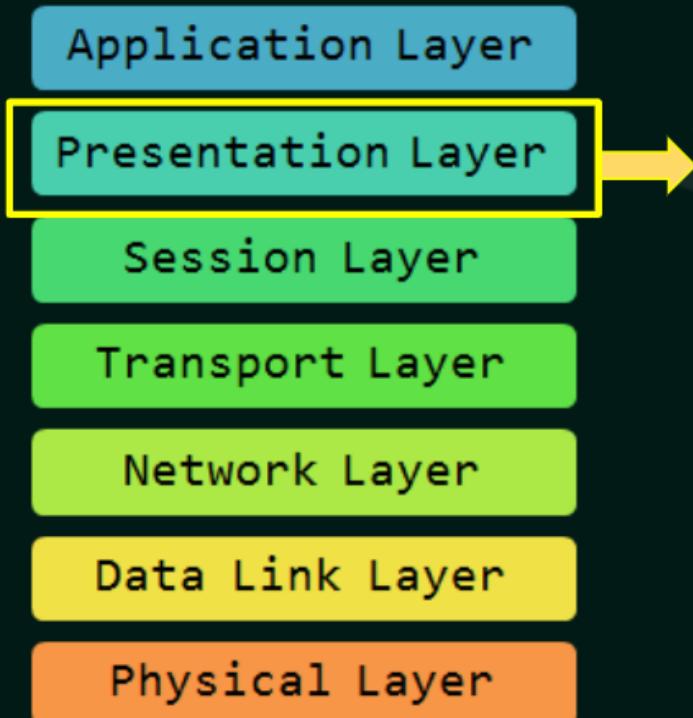
It enables the user to access the network resources.

SERVICES PROVIDED BY APPLICATION LAYER

- ★ File Transfer and Access Management (FTAM).
- ★ Mail Services.
- ★ Directory services.



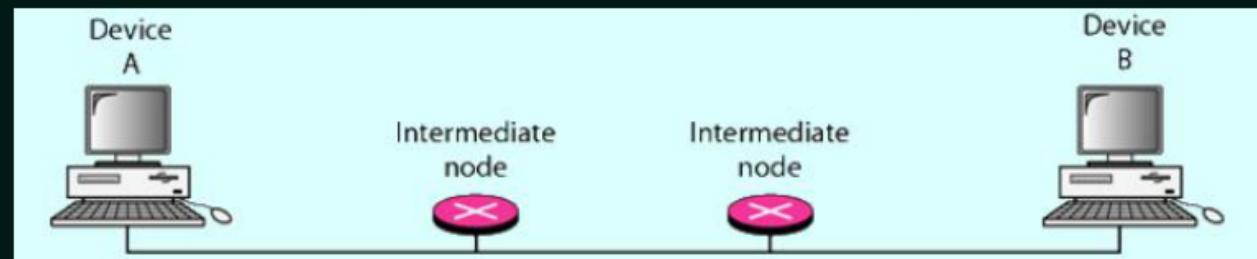
PRESENTATION LAYER – A RECAP



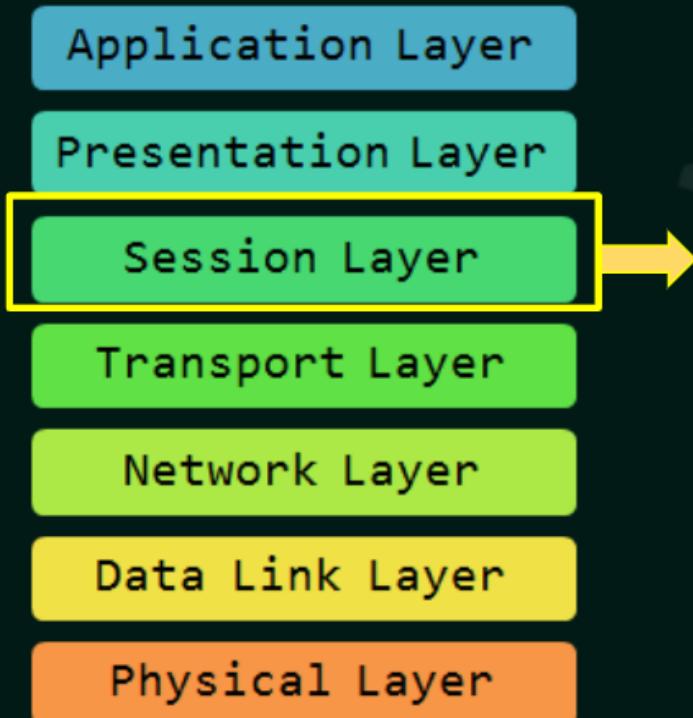
It is concerned with the syntax and semantics of the information exchanged between two systems.

SERVICES PROVIDED BY PRESENTATION LAYER

- ★ Translation.
- ★ Encryption.
- ★ Compression



SESSION LAYER – A RECAP



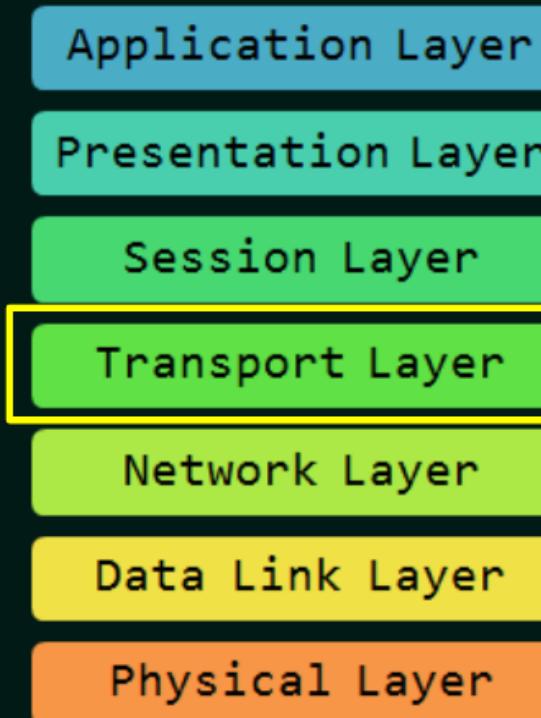
It establishes, maintains, and synchronizes the interaction among communicating devices.

SERVICES PROVIDED BY SESSION LAYER

- ★ Dialog control.
- ★ Synchronization.

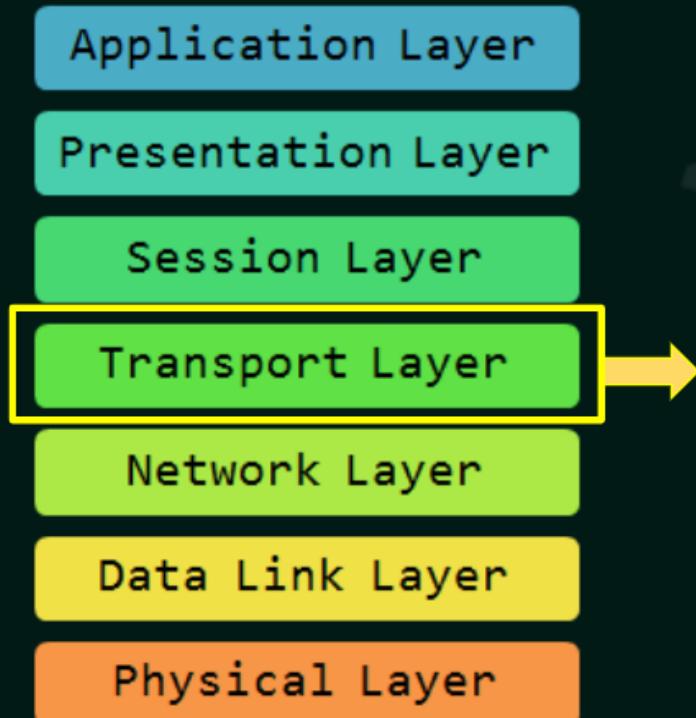


LAYERS IN THE OSI REFERENCE MODEL



It is responsible for process to process delivery of the entire message.

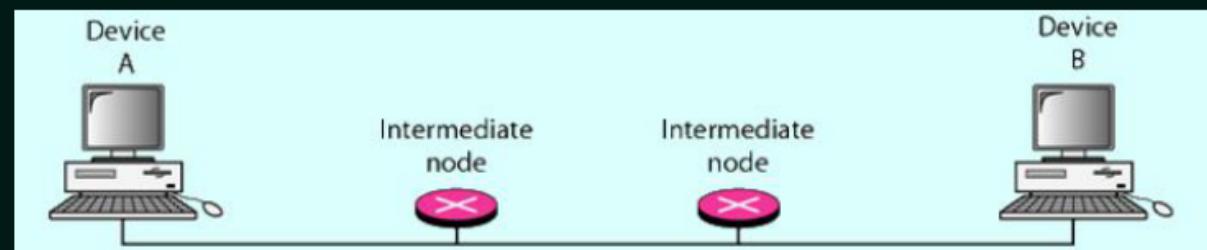
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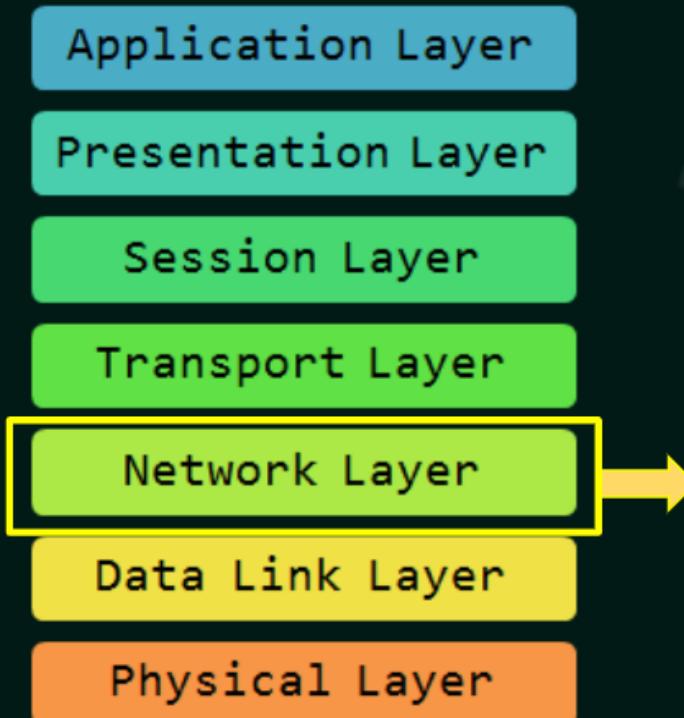
It is responsible for process to process delivery of the entire message.

SERVICES PROVIDED BY TRANSPORT LAYER

- ★ Port addressing.
- ★ Segmentation and Reassembly.
- ★ Connection control.
- ★ End-to-End Flow Control.
- ★ Error Control



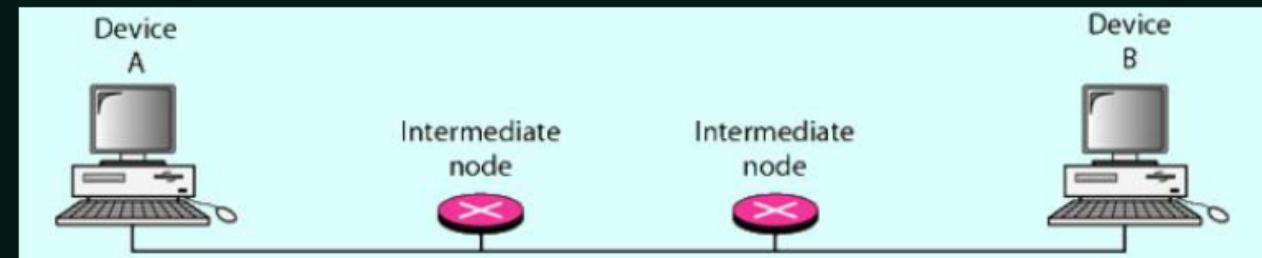
LAYERS IN THE OSI REFERENCE MODEL



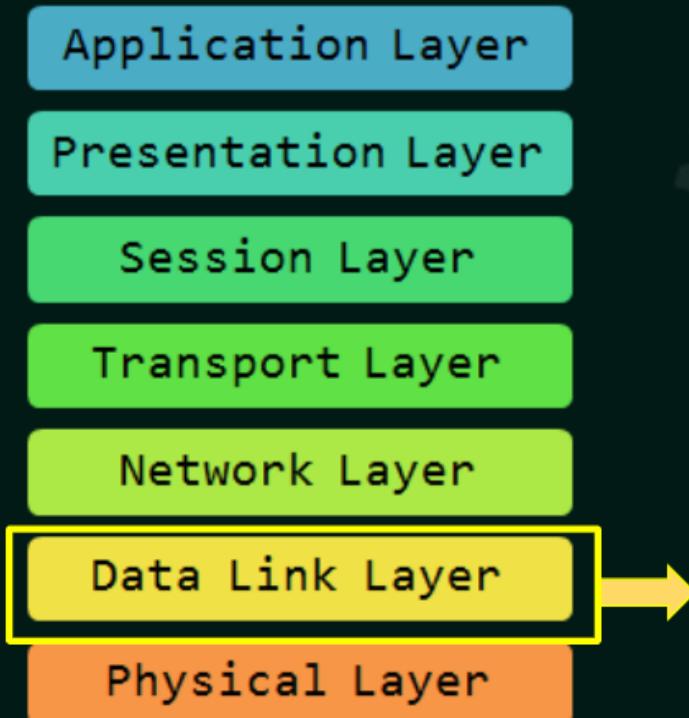
It is responsible for delivery of data from the original source to the destination network.

SERVICES PROVIDED BY NETWORK LAYER

- ★ Logical addressing.
- ★ Routing.



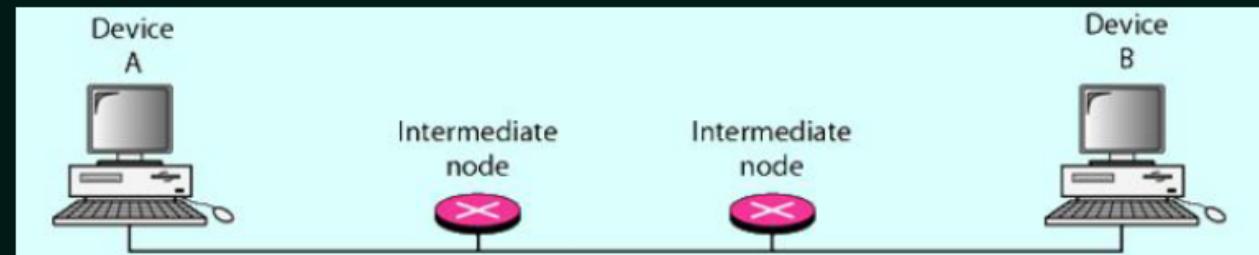
LAYERS IN THE OSI REFERENCE MODEL



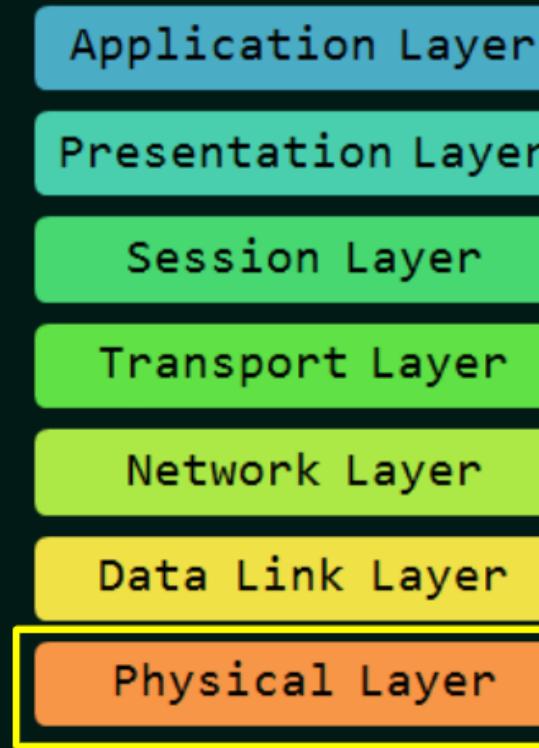
It is responsible for moving data(frames) from one node to another node.

SERVICES PROVIDED BY DATA LINK LAYER

- ★ Framing.
- ★ Physical Addressing.
- ★ Flow Control.
- ★ Error Control.
- ★ Access Control.



LAYERS IN THE OSI REFERENCE MODEL

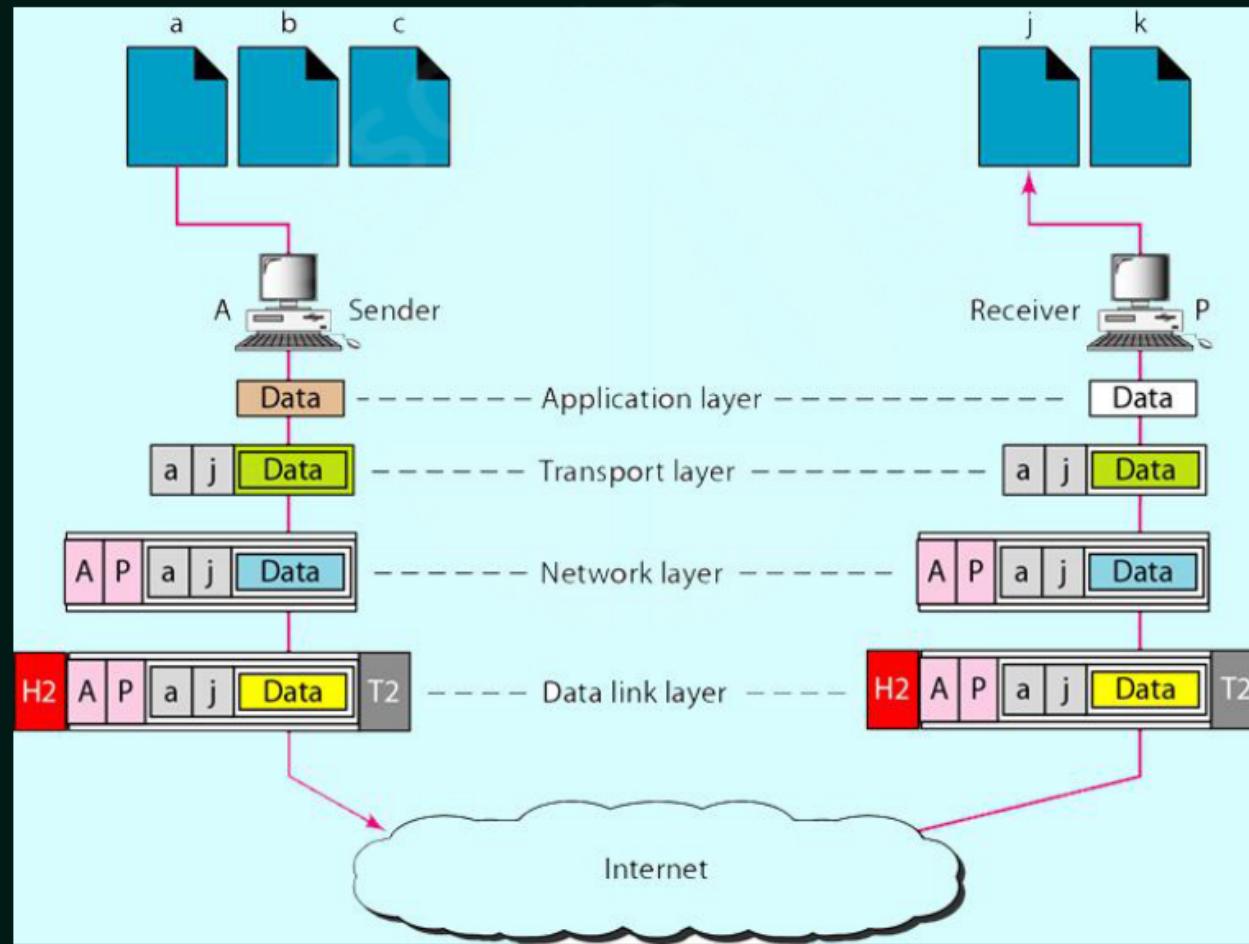


It is responsible for transmitting bits over a medium. It also provides electrical and mechanical specifications.

SERVICES PROVIDED BY PHYSICAL LAYER

- ★ Physical characteristics of the media.
- ★ Representation of bits.
- ★ Data rate.
- ★ Synchronization of bits.
- ★ Line configuration.
- ★ Physical topology.

LAYERS IN THE OSI REFERENCE MODEL

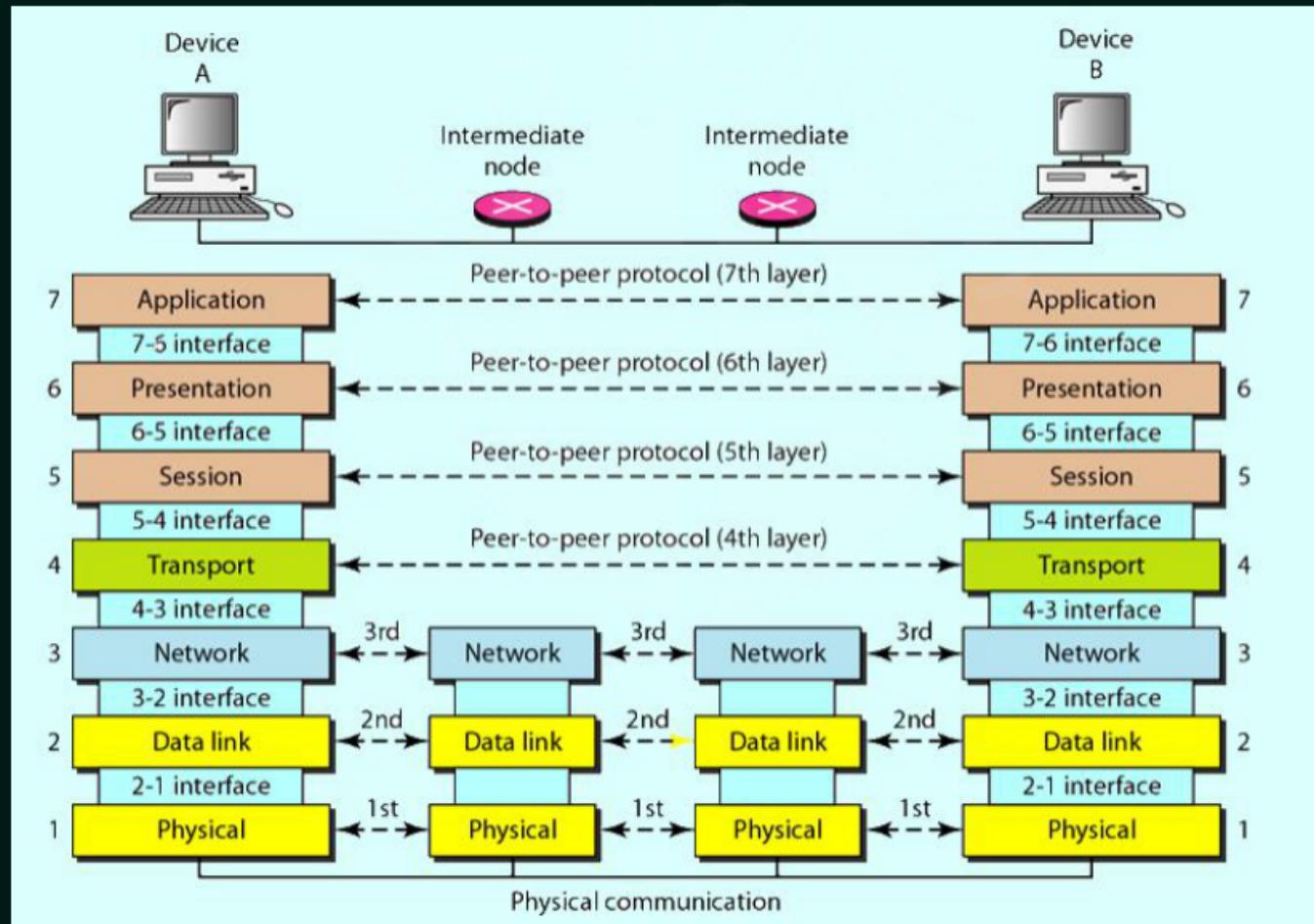


OUTCOMES

Upon the completion of this session, the learner will be able to

- ★ Recall the services offered by each layer of the OSI model.
- ★ Understand the working of OSI reference model with an example.

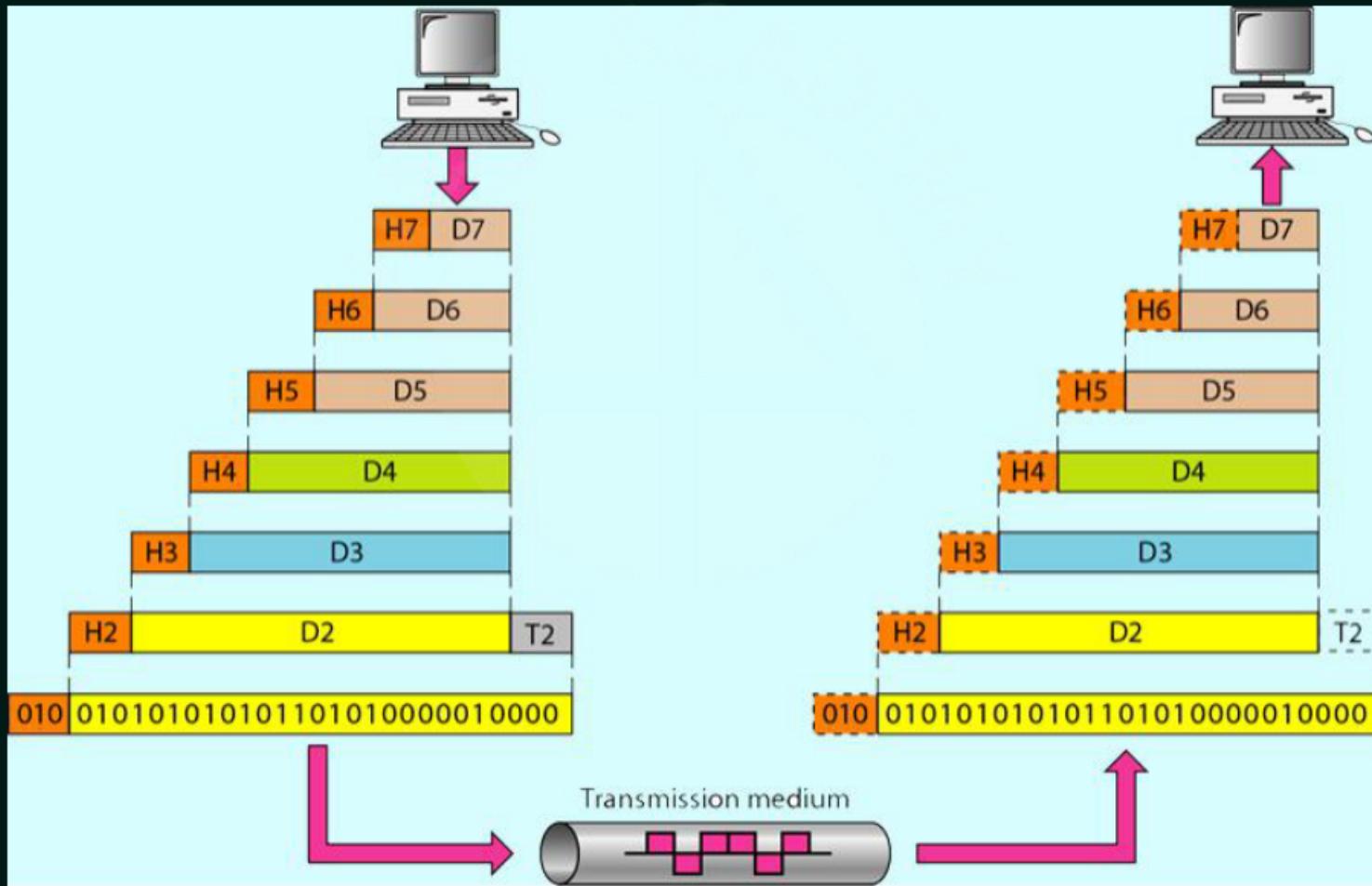
LAYERS IN THE OSI REFERENCE MODEL – A RECAP



SERVICES OFFERED BY EACH LAYER

- Application Layer → FTAM, Mail Services and Directory Services.
- Presentation Layer → Translation, Encryption and Compression.
- Session Layer → Dialog control and Synchronization.
- Transport Layer → Port Addressing, Segmentation and Reassembly, Connection Control, Flow control and Error Control
- Network Layer → Logical Addressing and Routing.
- Data Link Layer → Framing, Physical Addressing, Flow Control, Error Control, and Access Control.
- Physical Layer → Physical characteristics of the media, Representation of bits, Data rate, Synchronization of bits, Line configuration, Physical topology and Transmission mode.

WORKING OF THE OSI REFERENCE MODEL



WORKING OF THE OSI REFERENCE MODEL

