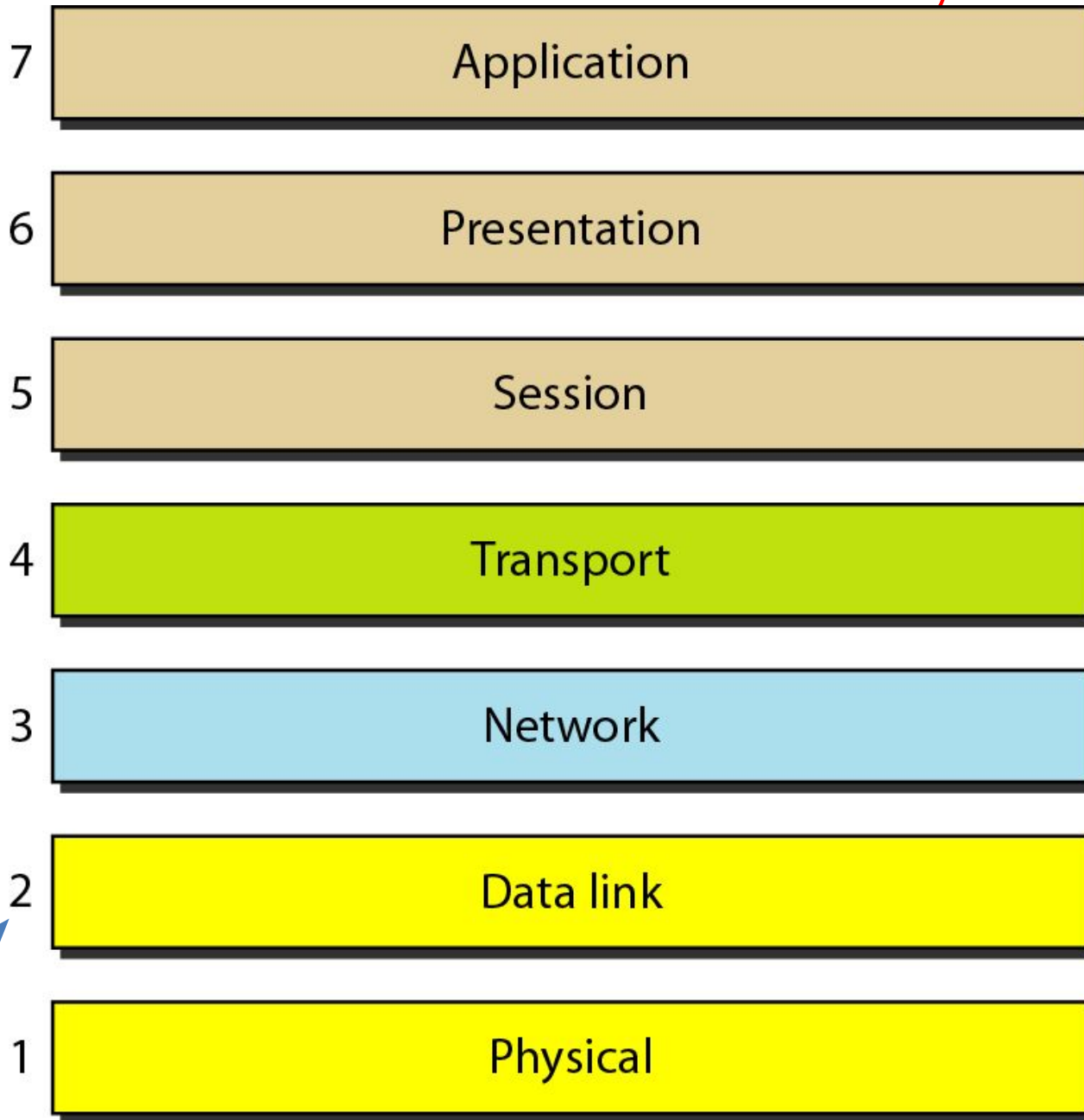# Network Models: OSI Model

- An International Standards Organization (ISO) standard, that covers all aspects of computer network communications is the Open Systems Interconnection (OSI) Reference Model.

- An open system is a set of protocols that allows any two different systems to communicate regardless of their underlying architecture. (i.e. without requiring changes to the logic of the underlying hardware and software.)

- The OSI model is not a protocol; it is a model for understanding and designing a network architecture that is flexible, robust, and interoperable.

❑ OSI stands for **Open System Interconnection** is a reference model that describes how information from a software application in one computer moves through a physical medium to the software application in another computer.

❑ OSI consists of seven layers, and each layer performs a particular network function.

OSI Reference Model: 7 Layers

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

Layer Number

Layer 7 -Application Layer : Serves as window for users & application processes to access the network services

Layer 6 - Presentation Layer: Translates data to binary, Compression/Decompression, Encryption/Decryption

Layer 5- Session Layer : Establishes, Maintains & terminations communications between connected devices

Layer 4 –Transport Layer : Segments data from L5
Data Transfer Rate

Layer 3-Network Layer:
Assigns source and destination IP addresses to the data packets
Transmits packets between networks
Determines best path

Layer 2- data Link Layer :
performs physical addressing
adds sender and receiver MAC addresses to the data packet
Error Control
Flow Control on physical link

Layer 1- Physical layer :converts the binary into electrical signals and transmits them over transmission media

Layer 7. The application layer

The application layer enables the user -- human or software -- to interact with the application or network whenever the user elects to read messages, transfer files or perform other network-related tasks. Web browsers and other internet-connected apps, such as Outlook and Skype, use Layer 7 application protocols.

Layer 6. The presentation layer

The presentation layer translates or formats data for the application layer based on the semantics or syntax the application accepts. This layer also handles the encryption and decryption that the application layer requires.

Layer 5. The session layer

The session layer sets up, coordinates and terminates conversations between applications. Its services include authentication and reconnection after an interruption. This layer determines how long a system will wait for another application to respond. Examples of session layer protocols include X.225 and Zone Information Protocol (ZIP).

Layer 4. The transport layer

The [transport layer](#) is responsible for transferring data across a network and provides error-checking mechanisms and data flow controls. It determines how much data to send, where it gets sent and at what rate..

Layer 3. The network layer

The primary function of the [network layer](#) is to move data into and through other networks. Network layer protocols accomplish this by packaging data with correct network address information, selecting the appropriate network routes and forwarding the packaged data up the stack to the transport layer. From a TCP/IP perspective, this is where IP addresses are applied for routing purposes.
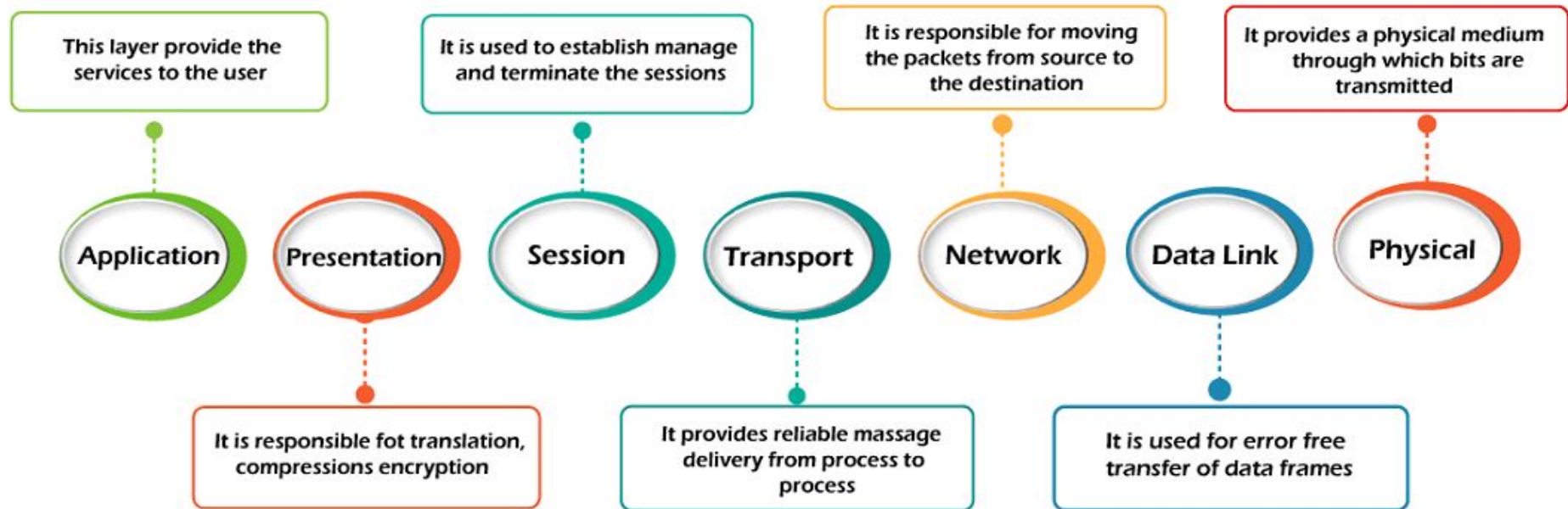
Layer 2. The data-link layer

The [data-link](#), or protocol layer, in a program handles moving data into and out of a physical link in a network. This layer handles problems that occur as a result of bit transmission errors. It ensures that the pace of the data flow doesn't overwhelm the sending and receiving devices. This layer also permits the transmission of data to Layer 3, the network layer, where it's addressed and routed.

Layer 1. The physical layer
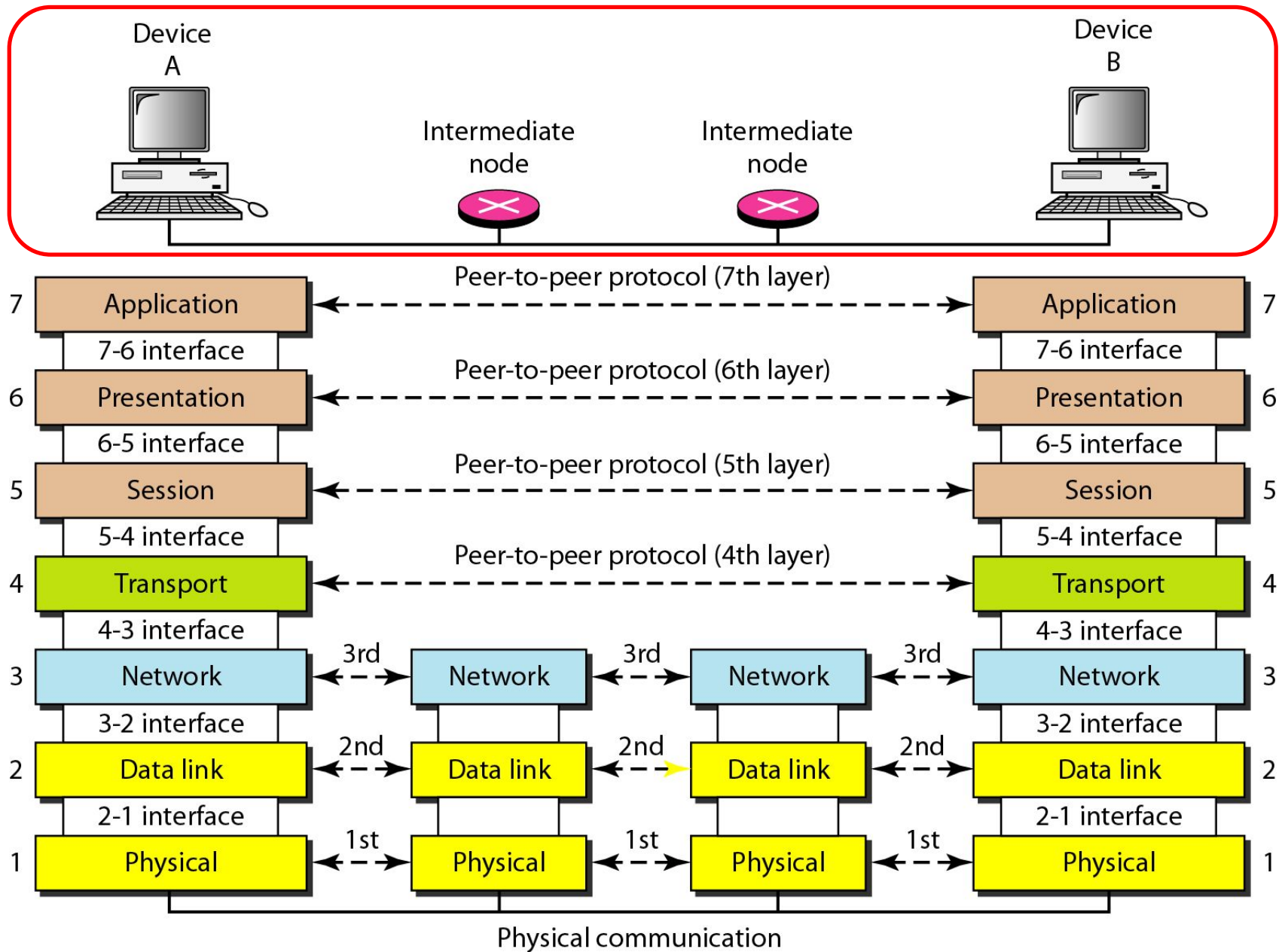
The [physical layer](#) transports data using electrical, mechanical or procedural interfaces.

This layer is responsible for sending computer bits from one device to another along the network.

It determines how physical connections to the network are set up and how bits are represented into predictable signals as they're transmitted either electrically, optically or via radio waves.

This layer provide the services to the user

It is used to establish manage and terminate the sessions

It is responsible for moving the packets from source to the destination

It provides a physical medium through which bits are transmitted

Application

Presentation

Session

Transport

Network

Data Link

Physical

It is responsible fot translation, compressions encryption

It provides reliable massage delivery from process to process

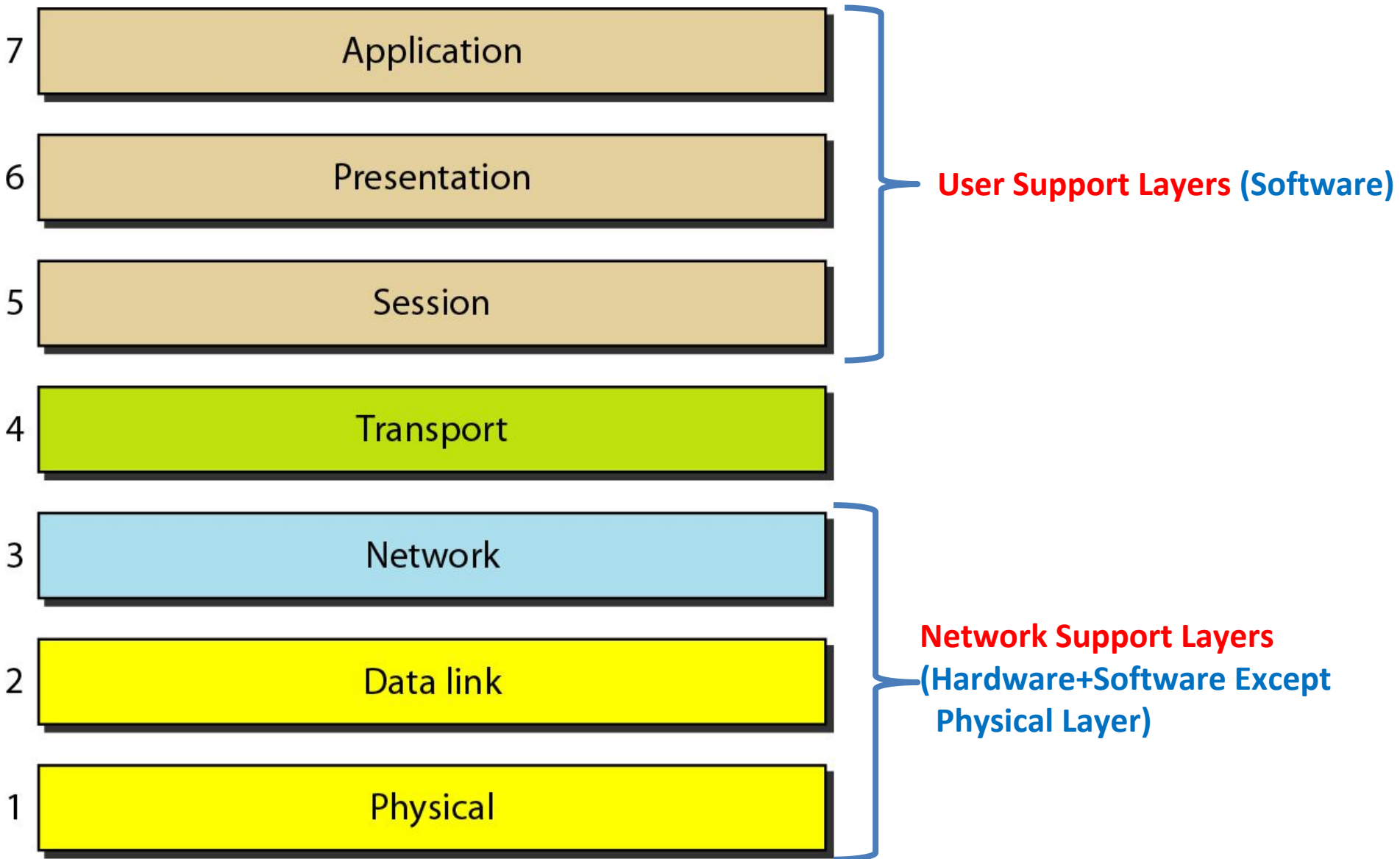It is used for error free transfer of data frames

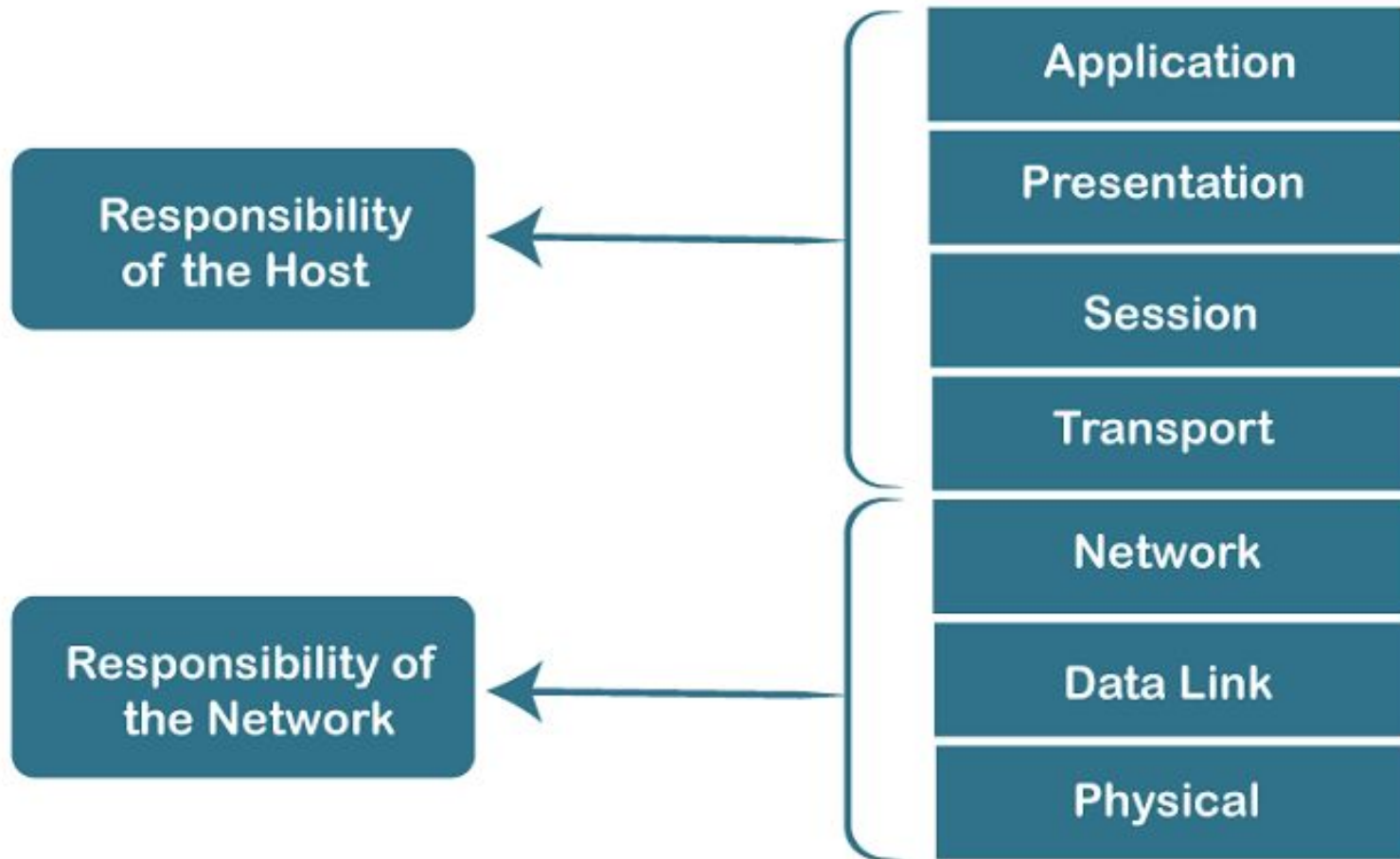# The interaction between layers in the OSI model

OSI Reference Model

- Layered Architecture

- Peer-to-Peer Processes

- Interfaces between Layers: the process by which data is passed between layer N of the model and layer N-1 or layer N+1

- Organization of Layers

OSI Reference Model : Organization of Layers

7	Application
6	Presentation
5	Session

User Support Layers (Software)

4	Transport

3	Network
2	Data link
1	Physical

Network Support Layers (Hardware+Software Except Physical Layer)

OSI Reference Model :

Characteristics of OSI Model

Responsibility of the Host ←	Application
	Presentation
	Session
	Transport
Responsibility of the Network ←	Network
	Data Link
	Physical

An Exchange using OSI Model