Presentation Layer in OSI model

Prerequisite: OSI Model

Introduction: Presentation Layer is the 6th layer in the Open System Interconnection (OSI) model. This layer is also known as Translation layer, as this layer serves as a data translator for the network. The data which this layer receives from the Application Layer is extracted and manipulated here as per the required format to transmit over the network. The main responsibility of this layer is to provide or define the data format and encryption. The presentation layer is also called as Syntax layer since it is responsible for maintaining the proper syntax of the data which it either receives or transmits to other layer(s).

Application Layer

Present Layer=> Presentation Layer

Session Layer

Transport Layer

Network Layer

Data Layer

Physical Layer

Functions of Presentation Layer:

Data from Application Layer <=> Presentation layer <=> Data from Session Layer

The presentation layer, being the 6th layer in the OSI model, performs several types of functions, which are described below-

- Presentation layer format and encrypts data to be sent across the network.
- This layer takes care that the data is sent in such a way that the receiver will understand the information (data) and will be able to use the data efficiently and effectively.
- This layer manages the abstract data structures and allows high-level data structures (example-banking records), which are to be defined or exchanged.
- This layer carries out the encryption at the transmitter and decryption at the receiver.
- This layer carries out data compression to reduce the bandwidth of the data to be transmitted (the primary goal of data compression is to reduce the number of bits which is to be transmitted).
- This layer is responsible for interoperability (ability of computers to exchange and make use of information) between encoding methods as different computers use different encoding methods.
- This layer basically deals with the presentation part of the data.

- Presentation layer, carries out the data compression (number of bits reduction while transmission), which in return improves the data throughput.
- This layer also deals with the issues of string representation.
- The presentation layer is also responsible for integrating all the formats into a standardized format for efficient and effective communication.
- This layer encodes the message from the user-dependent format to the common format and vice-versa for communication between dissimilar systems.
- This layer deals with the syntax and semantics of the messages.
- This layer also ensures that the messages which are to be presented to the upper as well as the lower layer should be standardized as well as in an accurate format too.
- Presentation layer is also responsible for translation, formatting, and delivery of information for processing or display.
- This layer also performs serialization (process of translating a data structure or an object into a format that can be stored or transmitted easily).

Features of Presentation Layer in the OSI model: Presentation layer, being the 6th layer in the OSI model, plays a vital role while communication is taking place between two devices in a network.

List of features which are provided by the presentation layer are:

- Presentation layer could apply certain sophisticated compression techniques, so fewer bytes of data are required to represent the information when it is sent over the network.
- If two or more devices are communicating over an encrypted connection, then this presentation layer is responsible for adding encryption on the sender's end as well as the decoding the encryption on the receiver's end so that it can represent the application layer with unencrypted, readable data.
- This layer formats and encrypts data to be sent over a network, providing freedom from compatibility problems.
- This presentation layer also negotiates the Transfer Syntax.
- This presentation layer is also responsible for compressing data it receives from the application layer before delivering it to the session layer (which is the 5th layer in the OSI model) and thus improves the speed as well as the efficiency of communication by minimizing the amount of the data to be transferred.

Working of Presentation Layer in the OSI model :
Presentation layer in the OSI model, as a translator, converts the data sent by the application layer of the transmitting node into an acceptable and compatible data format based on the applicable network protocol and architecture. Upon arrival at the receiving computer, the presentation layer translates data into an acceptable format usable by the application layer. Basically, in other words, this layer takes care of any issues occurring when transmitted data must be viewed in a format different from the

original format. Being the functional part of the OSI mode, the presentation layer performs a multitude (large number of) data conversion algorithms and character translation functions. Mainly, this layer is responsible for managing two network characteristics: protocol (set of rules) and architecture.

Presentation Layer Protocols :
Presentation layer being the 6th layer, but the most important layer in the OSI model performs several types of functionalities, which makes sure that data which is being transferred or received should be accurate or clear to all the devices which are there in a closed network.
Presentation Layer, for performing translations or other specified functions, needs to use certain protocols which are defined below –

- **Apple Filing Protocol (AFP):** Apple Filing Protocol is the proprietary network protocol (communications protocol) that offers services to macOS or the classic macOS. This is basically the network file control protocol specifically designed for Mac-based platforms.
- **Lightweight Presentation Protocol (LPP):** Lightweight Presentation Protocol is that protocol which is used to provide ISO presentation services on the top of TCP/IP based protocol stacks.
- **NetWare Core Protocol (NCP):** NetWare Core Protocol is the network protocol which is used to access file, print, directory, clock synchronization, messaging, remote command execution and other network service functions.
- **Network Data Representation (NDR):** Network Data Representation is basically the implementation of the presentation layer in the OSI model, which provides or defines various primitive data types, constructed data types and also several types of data representations.
- **External Data Representation (XDR):** External Data Representation (XDR) is the standard for the description and encoding of data. It is useful for transferring data between computer architectures and has been used to communicate data between very diverse machines. Converting from local representation to XDR is called encoding, whereas converting XDR into local representation is called decoding.
- **Secure Socket Layer (SSL):** The Secure Socket Layer protocol provides security to the data that is being transferred between the web browser and the server. SSL encrypts the link between a web server and a browser, which ensures that all data passed between them remains private and free from attacks.