

Presentation layer

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In the seven-layer OSI model of computer networking, the **presentation layer** is **layer 6** and serves as the data translator for the network.^{[1][2]} It is sometimes called the syntax layer.^[3]

Contents

- 1 Description
- 2 Services
- 3 Sublayers
 - 3.1 CASE
 - 3.2 SASE
- 4 Protocols
- 5 References

Description

The presentation layer is responsible for the delivery and formatting of information to the application layer for further processing or display.^[4] It relieves the application layer of concern regarding syntactical differences in data representation within the end-user systems. An example of a presentation service would be the conversion of an EBCDIC-coded text computer file to an ASCII-coded file.

The presentation layer is the lowest layer at which application programmers consider data structure and presentation, instead of simply sending data in the form of datagrams or packets between hosts. This layer deals with issues of string representation - whether they use the Pascal method (an integer length field followed by the specified amount of bytes) or the C/C++ method (null-terminated strings, e.g. `"thisisastring\0"`). The idea is that the application layer should be able to point at the data to be moved, and the presentation layer will deal with the rest.

Serialization of complex data structures into flat byte-strings (using mechanisms such as TLV or XML) can be thought of as the key functionality of the presentation layer.

Encryption is typically done at this level too, although it can be done on the application, session, transport, or network layers, each having its own advantages and disadvantages.^[1] Decryption is also handled at the presentation layer. For example, when logging on to bank account sites the presentation layer will decrypt the data as it is received.^[1] Another example is representing structure, which is normally standardized at this level, often by using XML. As well as simple pieces of data, like strings, more complicated things are standardized in this layer. Two common examples are 'objects' in object-oriented programming, and the exact way that streaming video is transmitted.

In many widely used applications and protocols, no distinction is made between the presentation and application layers. For example, HyperText Transfer Protocol (HTTP), generally regarded as an application-layer protocol, has presentation-layer aspects such as the ability to identify character encoding for proper conversion, which is

then done in the application layer.

Within the service layering semantics of the OSI network architecture, the presentation layer responds to service requests from the application layer and issues service requests to the session layer.

In the OSI model: the presentation layer ensures the information that the application layer of one system sends out is readable by the application layer of another system. For example, a PC program communicates with another computer, one using extended binary coded decimal interchange code (EBCDIC) and the other using ASCII to represent the same characters. If necessary, the presentation layer might be able to translate between multiple data formats by using a common format.

Services

- Data conversion^[2]
- Character code translation^[2]
- Compression^[2]
- Encryption and Decryption^[2]

Sublayers

The presentation layer can be composed of two sublayers: common application service element (CASE) and specific application service element (SASE).^[5]

CASE

The common application service element sublayer provides services for the application layer and request services from the session layer. It provides support for common application services, such as:

- ACSE (Association Control Service Element)^[5]
- ROSE (Remote Operation Service Element)
- CCR (Commitment Concurrency and Recovery)
- RTSE (Reliable Transfer Service Element)

SASE

The specific application service element sublayer provides application specific services (protocols), such as

- FTAM (File Transfer, Access and Manager)
- VT (Virtual Terminal)
- MOTIS (Message Oriented Text Interchange Standard)
- CMIP (Common Management Information Protocol)
- JTM (Job Transfer and Manipulation) a former OSI standard (<http://www.furniss.co.uk/jtm/index.html>)
- MMS (Manufacturing Messaging Service)
- RDA (Remote Database Access)

- DTP (Distributed Transaction Processing)

Protocols

Other protocols sometimes considered at this level (though perhaps not strictly adhering to the OSI model) include:

- Apple Filing Protocol (AFP)
- Independent Computing Architecture (ICA), the Citrix system core protocol
- Lightweight Presentation Protocol (LPP)
- NetWare Core Protocol (NCP)
- Network Data Representation (NDR)
- Telnet (a remote terminal access protocol)
- Tox, The Tox protocol is sometimes regarded as part of both the presentation and application layer
- eXternal Data Representation (XDR)
- X.25 Packet Assembler/Disassembler Protocol (PAD)

References

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