OSI Model

CITATIONS		READS
0		11,398

1 author, including:

Ahmed Hammoudi
Student Technical University NATIONAL AVIATION UNIVERSITY
2 PUBLICATIONS 0 CITATIONS

SEE PROFILE

OSI Model

Master of Science in Cybercrimes and Digital Evidences Analysis
(Network Forensics)

Submitted by
Ahmed G.I. Hammoudi

Supervisor

(Prof. Khalid Khanfar)

This case study was presented in response to the fulfilment
of the Network Forensics requirements

Faculty of Graduate Studies
Palestine Technical University–Kadoorie
2022

Abstract

The seven-layer OSI (Open System Interconnection) network model is an important milestone for Network Development (ISO) definition of the ISO. The OSI reference model is a logical definition, which is a specification, dividing the network logically into seven layers. The physical devices, such as routers, switches, etc., are associated to each layer. It not only serves as the basis for assessing and analyzing various network technology before and after, but also for designing and unifying network protocols. The data transmission mechanism of the OSI model is therefore of great importance to explore.

Contents

List of Figures

List of Tables

1 Introduction

In 1947, IBM introduced the world's first system network architecture, which is called system network architecture. Since then, various companies have come up with their own network architecture. Due to the complexity of the task involved in establishing and maintaining networks, the concept of the OSI reference model was proposed (Zhang et al., 2015).

The goal of this model (OSI) is to provide a uniform approach for addressing the compatibility problem of network interconnection. It eliminates the complexity of identifying the various components of the network interface, service, and protocol. The separation of the network's layers allows the providers of the same service to maintain their own protocols without affecting the operation of the adjacent layers. It simplifies the work of the network engineers by separating the various responsibilities of the network.

2 OSI Model

2.1 OSI Model Architecture

The model OSI or Open System Interconnection defines a networking environment for the protocols to be implemented in seven levels. Control is transferred from one layer to the next, from the application layer in one station to the lowest, from the channel to the next station, and back up the hierarchy.

ISO divides the whole communication function into seven levels according to the dividing and conquer principle, including physical layer, data link layer, network layer, transmission layer, conversation layer, presentation layer and application layer. The principal principles for the division of levels are: All nodes in a network have the same level, and each layer has the same function. There are no differences between the layers within the network. Each layer can communicate with the other layer through an interface see fig 2.1 (Help, 2014).

Figure 2.1: OSI Model (Open Systems Interconnection) Architecture

2.1.1   Application Layer – Layer 7

In this layer, an interface with the running application is provided. The network applications that work in this layer are email, FTP, web browsers. Furnish applications with services and protocols. An application layer is a window that lets users and processes access the network's services. It acts as a bridge between the end-user and the network's administrators.

2.1.1.1   Functions of Application layer:

1. An application layer permits a user to access and manage files stored in a remote computer. This allows a user to retrieve the files from a remote computer and transfer them to a local storage device see Fig 2.2 (Javatpoint, 2021)
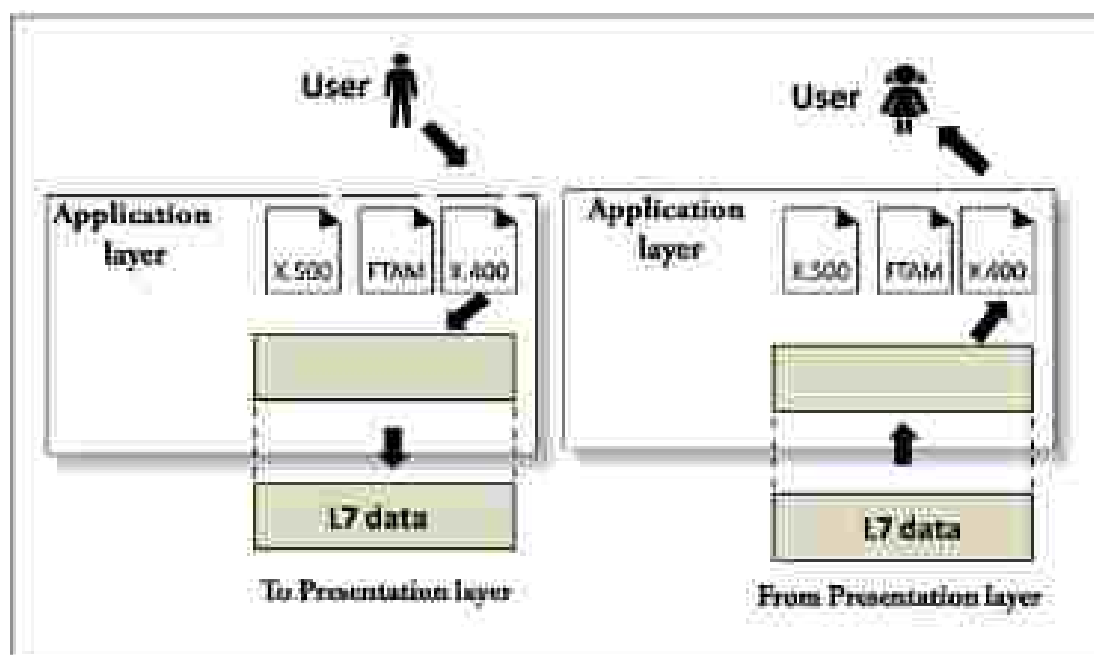

Figure 2.2: OSI Model (Application Layer)

2. **Services:** The e-mail forwarding and storage facility is provided by an application layer.
3. **Directory Services:** An application provides the distributed sources of the database and it provides global information about different objects.

2.1.1.2   List of network protocols for Application Layer

1. SOAP, Simple Object Access Protocol.
2. Simple Service Discovery Protocol, A discovery protocol employed by UPnP.
3. ATCAP, Transaction Capabilities Application Part.
4. Universal Plug and Play
5. DHCP.
6. DNS Domain Name System.
7. HTTP.
8. HTTPS.

9. NFS
10. POP3
11. SMTP
12. SNMP
13. FTP
14. NTP
15. IRC
16. Telnet
17. SSH
18. TFTP
19. IMAP
20. Gemini

2.1.2 Presentation Layer – Layer 6

The presentation layer translates the data collected by the application layer into formats that the system accepts. It can also handle encryption and decryption see Fig 2.3.
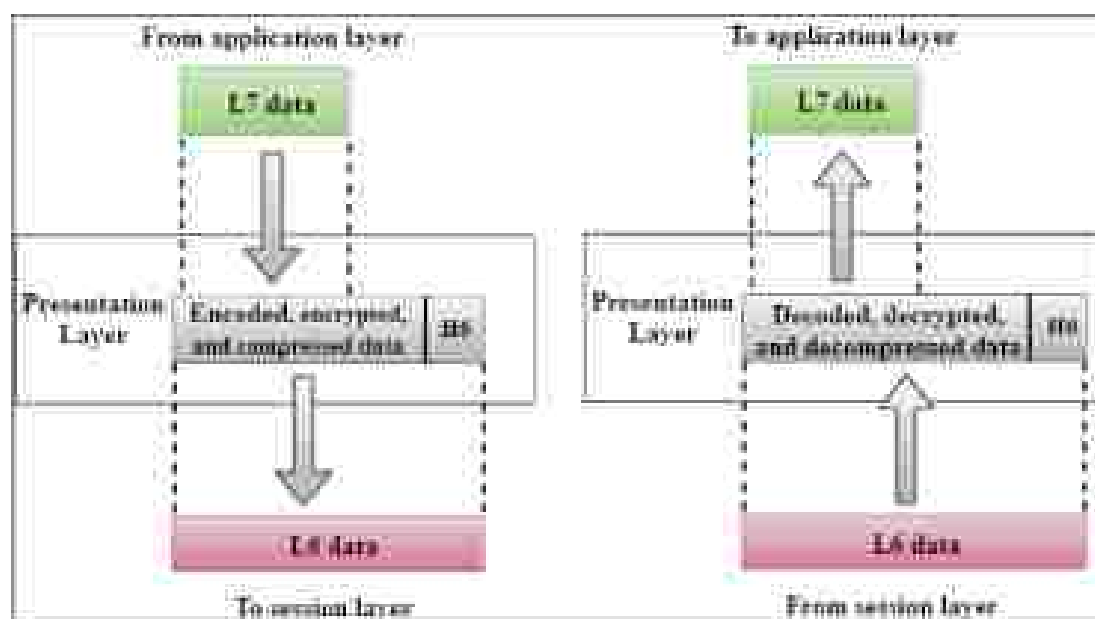

Figure 2.3: OSI Model (Presentation Layer)

2.1.2.1 Functions of Presentation Layer:

1. **Translation:** the processes exchange data in two systems in the form of strings, numbers. The presentation layer deals with the interoperability of the various encoding methods in various computers. It translates sender-dependent data in a standard format and at the receiving end it changes the standard format into recipient-dependent format.

2. **Encryption:** Encryption to maintain confidentiality is needed. Encryption is a process of transferring the information transmitted to the sender and sending the resulting informa-

tion over the Internet

3. **Compression:** Data compression is a compression process, which reduces the amount of bits to be transmitted. Compression: In multimedia like text, audio, and video, data compression is very important.

2.1.2.2   List of network protocols for Presentation Layer

1. TLS Transport Layer Security
2. AFP Apple Filing Protocol
3. SSL Secure Sockets Layer
4. FTP
5. SSH

2.1.3   Session Layer – Layer 5

2.1.4   Transport Layer – Layer 4

2.1.5   Network Layer – Layer 3

2.1.6   Data Link Layer – Layer 2

2.1.7   Physical Layer – Layer 1

References

Help, P. (2014). *ISO OSI and TCP/IP Model Comparison.* Available from: http://programmerhelp404.blogspot.com/2014/01/iso-osi-layer-model-tcpip-model.html

Javatpoint (2021). *OSI Model.* Available from: https://www.javatpoint.com/osi-model.

Zhang, W., Yuan, Y., Hu, Y., Huang, S., Cao, S., Chopra, A., and Huang, S. (2018). A Privacy-Preserving Voting Protocol on Blockchain. *IEEE International Conference on Cloud Computing, CLOUD* [online]. 2018-July-April, pp. 401–408. ISSN: 21596190. DOI: 10.1109/CLOUD.2018.00057.