OSI Layer Model describes how information is transmitted between networking devices. In this tutorial I will provide a brief introduction of OSI Layer model including its advantage and services. OSI model was developed in 1984. It divides data transmission process in seven layers. Each layer has its own functions and protocols.

This tutorial is the first part of our article “OSI Layers Model”. You can read second part of this article here.

**OSI Seven Layers Model Explained with Examples**


*This tutorial is the second part of this article. In this part I will explain each layer of OSI model in detail with examples including its functions and protocols.*

When we talk about OSI Layers model, first thing which comes in our mind is that why it was developed? To find out the answer of this question we need to understand the protocol.

Protocols are the standard terms which computers use to understand each other. Just like two people must speak a common language in order to communicate, two computers must have one or more protocols common in order to exchange the data. No matter what software the computers are running and what kind of computers the network uses, they must have a common protocol in order to understand each other.

Before 1980, developing these protocols was the responsibility of hardware manufactures. They developed proprietary protocols to support their own products. With proprietary protocols we were not able use mix equipment from different manufactures on same network. To run a network we had to buy all devices from the same company. This entire method makes collaboration between different types of computers nightmare.

To sort out this issue, open standard protocols were developed. Open standards are industry-wide protocol definitions that are not tied with a specific manufacturer company. With open standard protocols, we can use equipment from any vendor to build our network. As long as the equipment implements the standard protocols, it should be able to coexist on the same network. With open standard protocols, networks can consist of many different computing platforms running entirely different software.

Protocols are implemented on a network in several ways. Some are integrated into the operating system. Others are device drivers, such as the driver for a particular network interface adapter supplied by its manufacturer.

Protocols can be relatively simple or highly complex. Many organizations are involved in developing protocols for networking. From those following five are the most important organizations.

2. Institute of Electrical and Electronics Engineers (IEEE).
Whenever we connect two or more computers to share information, we create a data network. This data network uses several protocols during the data exchange process. OSI Layer model explains this process and used protocols in simple way by dividing it in seven layers.

**Purpose of OSI model**

OSI model presents a structured set of seven layers interconnecting as a stack. Each layer in this model was developed to maintain the ability of connecting the devices, computers and network segments.

OSI model was created with following purposes:-

- To create a common platform for software developers and hardware manufactures that encourage the creation of networking products that can communicate with each other over the network.

- To help network administrators by dividing large data exchange process in smaller segments. Smaller segments are easier to understand, manage and troubleshoot. With layer approach they only have to troubleshoot the devices which are working in faulty layer.

**Seven Layers of OSI model**

<table>
<thead>
<tr>
<th>Layer Number</th>
<th>Layer Name</th>
<th>Layer task</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>Application</td>
<td>Provide platform to access network</td>
</tr>
<tr>
<td>6</td>
<td>Presentation</td>
<td>Format data</td>
</tr>
<tr>
<td>5</td>
<td>Session</td>
<td>Configure and open network connection</td>
</tr>
<tr>
<td>4</td>
<td>Transport</td>
<td>Break large data file in small segments</td>
</tr>
<tr>
<td>3</td>
<td>Network</td>
<td>Find route for IP address</td>
</tr>
<tr>
<td>2</td>
<td>Data Link</td>
<td>Pack data for transmission</td>
</tr>
<tr>
<td>1</td>
<td>Physical</td>
<td>Transmit or receive data</td>
</tr>
</tbody>
</table>
Advantage of OSI layer model

Dividing the network into the seven layers provides following advantage:
- It prevents changes in one layer from affecting other layers.
- It describes what functions occur at each layer of the model that encourages industry standardization.
- Dividing network communication process in smaller component makes software development, design, and troubleshooting easier.
- Standardization of network components allows multiple-vendor development.
- It allows different types of network hardware and software to communicate.
- Dividing network in layers make network administrators life easier. They can troubleshoot issue more quickly and effectually by looking in layer that is causing issue rather than finding it entire network. It also makes learning easier.

Services provided by OSI model

To insure the data transmission over the network, OSI model provides several services including following:

**Data Segmentation:** - In this process a large data file is divided into smaller segments sufficient enough to transmit over the network.
**Packet acknowledgment**: - Every transferred segment is acknowledged with a return message from recipient which insures that segment is delivered successfully.

**Flow control**: - This mechanism instructs sender computer to match its transmissions speed with receiver computer.

**Error detection and correction**: - In this process receiving computer verify the content of data. If any segment is corrupted, it will inform the sender that specific piece of data was damaged and must be retransmitted

**Data compression**: - To eliminate redundant, segments are compressed before transmission.

**Data encryption**: - To increase the data safety, segments are encrypted with a key already known by receiving system.

That’s all for this introductory part. In next part I will explain OSI layers in detail with examples.

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