TASK ONE

THE TCP/IP MODEL

TCP/IP stands for Transmission Control Protocol/ Internet Protocol. TCP/IP Stack is specifically designed as a model to offer highly reliable and end-to-end byte stream over an unreliable internet work.

The functionality of the TCP IP model is divided into four layers, and each includes specific protocols.

TCP/IP is a layered server architecture system in which each layer is defined according to a specific function to perform. All these four TCP IP layers work collaboratively to transmit the data from one layer to another.

- Application Layer
- Transport Layer
- Internet Layer
- Network Interface

Application Layer

This layer is same as that of the OSI model and performs the following functions:

- It provides different services such as manipulation of information in several ways, retransferring the files of information, distributing the results etc.
- The functions such as LOGIN or password checking are also performed by the application layer.

Transport Layer

It does the same functions as that of transport layer in OSI model. Here are the key points regarding transport layer:

- It uses TCP and UDP protocol for end to end transmission.
- TCP is reliable and connection oriented protocol.
- TCP also handles flow control.
- The UDP is not reliable and a connection less protocol also does not perform flow control.

Internet Layer

The internet layer has the task of exchanging datagrams across network boundaries. It is therefore also referred to as the layer that establishes internetworking, indeed, it defines and establishes the Internet. This layer defines the addressing and routing structures used for the TCP/IP protocol suite. The primary protocol in this scope is the Internet Protocol, which defines IP addresses. Its function in routing is to transport datagrams to the next IP router that has the connectivity to a network closer to the final data destination

The function of this layer is to allow the host to insert packets into network and then make them travel independently to the destination. However, the order of receiving the packet can be different from the sequence they were sent.

The Network Access Layer / Host-to-Network Layer

The Network Access layer of the TCP/IP model corresponds with the Data Link and Physical layers of the OSI reference model. It defines the protocols and hardware required to connect a host to a physical network and to deliver data across it. This

protocol varies from host to host and network to network. Packets from the Internet layer are sent down the Network Access layer for delivery within the physical network.

FEATURES OF THE TCP/IP MODEL

Here, are the essential characteristics of TCP IP protocol:

1. Support for a flexible TCP/IP architecture
2. Adding more system to a network is easy.
3. In TCP IP protocols suite, the network remains intact until the source, and destination machines were functioning properly.
4. TCP is a connection-oriented protocol.
5. TCP offers reliability and ensures that data which arrives out of sequence should put back into order.
6. TCP allows you to implement flow control, so sender never overpowers a receiver with data.

DIFFRENCES AND SIMILARITIES BETWEEN THE OSI AND TCP/IP MODELS

The TCP/IP and OSI are network reference models. The process of developing both models began in the early 1970s and ended in the late 1970s. Both models were published in the early 1980s. Manufacturers manufactured devices to support one model or both models in the 1990s. By the late 1990s, the TCP/IP model became a common option and the OSI model was rejected due to a slower formal standardization process than the TCP/IP model. Leading manufacturers abandoned their proprietary networking model in favor of the TCP/IP model in the 2000s. Nowadays, only the TCP/IP model is used. Almost all modern computer networks are built using the TCP/IP model. All modern networking devices support the TCP/IP model.

Similarities between the TCP/IP model and the OSI model

- Both are logical models.
- Both define standards for networking.
- Both provide a framework for creating and implementing networking standards and devices.
- Both divide the network communication process into layers.
- In both models, a single layer defines a particular functionality and sets standards for that functionality only.
- Both models allow a manufacturer to make devices and network components that can coexist and work with the devices and components made by other manufacturers.
- Both models simplify the troubleshooting process by dividing complex functions into simpler components.
- Instead of defining the already defined standards and protocols, both models referenced them. For example, the Ethernet standards were already defined by IEEE before the

creation of these models. So instead of defining them again both models used them as IEEE Ethernet standards.

Differences between the OSI model and the TCP/IP model

- The OSI Layer model has seven layers while the TCP/IP model has four layers.
- The OSI Layer model is no longer used while the TCP/IP is still used in computer networking.
- To define the functionalities of upper layers, the OSI model uses three separate layers (Application, Presentation, and Session) while the TCP/IP model uses a single layer (Application).
- Just like the upper layers, the OSI model uses two separate layers (Physical and Data-link) to define the functionalities of the bottom layers while the TCP/IP uses a single layer (Link layer) for the same.
- To define the routing protocols and standards, the OSI model uses the Network layer while the TCP/IP model uses the Internet layer.
- The OSI model is well documented than the TCP/IP model.

- The OSI model explains every standard and protocol in detail while the TCP/IP model provides a summarized version of the same.

TASK TWO

Original network id :10.10.10.0

Network ID	Subnet mask	Host ID range	No of usable host	Broadcast ID
10.10.10.0	/26	10.10.10.1-10.10.10.62	62	10.10.10.63
10.10.10.64	/26	10.10.10.65-10.10.10.126	62	10.10.10.127
10.10.10.128	/26	10.10.10.65-10.10.10.126	62	10.10.10.191
10.10.10.192	/26	10.10.10.193-10.10.10.254	62	10.10.10.255

Original network id : 192.168.0.0

Network ID	Subnet mask	Host ID range	No of usable host	Broadcast ID
192.168.0.0	/26	192.168.0.1-192.168.0.62	62	192.168.0.63
192.168.0.64	/26	192.168.0.1-192.168.0.62	62	192.168.0.63
192.168.0.128	/26	192.168.0.129-192.168.0.190	62	192.168.0.191
192.168.0.192	/26	192.168.0.193-192.168.0.254	62	192.168.0.255

Original network id : 172.168.1.0

Network ID	Subnet mask	Host ID range	No of usable host	Broadcast ID
172.168.1.0	/26	172.168.0.1-172.168.0.62	62	172.168.1.63
172.168.1.64	/26	172.168.0.65-172.168.0.126	62	172.168.1.127
172.168.1.128	/26	172.168.0.129-172.168.0.190	62	172.168.1.191
172.168.1.192	/26	172.168.0.193-172.168.0.254	62	172.168.1.255

Q. What are the NS IP addresses for Google, Facebook and Tesla?

Breakdown the following RFC 1918 IPv4 address range into exactly 4 subnets with no address left over.

The ns IP address for Facebook is 102.132.101.35

The ns IP address for Google is 142.250.184.174

The ns IP address for Tesla is 23.201.26.71

10.10.10.0 subnets:

10.10.10.0 /26 subnet mask: 255.255.255.192

10.10.10.64 /26 subnet mask: 255.255.255.192

10.10.10.128 /26 subnet mask: 255.255.255.192

10.10.10.192 /26 subnet mask: 255.255.255.192

192.168.0.0 subnets:

192.168.0.0 /18 subnet mask: 255.255.192.0

192.168.0.64 /18 subnet mask: 255.255.192.0

192.168.0.128 /18 subnet mask: 255.255.192.0

192.168.0.192 /18 subnet mask: 255.255.192.0

172.168.1.0 subnets:

172.168.1.0 /26 subnet mask: 255.255.255.192

172.168.1.64 /26 subnet mask: 255.255.255.192

172.168.1.128 /26 subnet mask: 255.255.255.192

172.168.1.192 /26 subnet mask: 255.255.255.192

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