Difference between TCP\IP model and OSI model

TCP\IP model	OSI model
1. TCP/IP Stands for Transmission Control Protocol/Internet Protocol model.	1. The OSI Stands for Open Systems Interconnection model.
2. Designed by Vint Cerf and Bob Kahn in the 1970s.	2. Developed in 1984 by the International Organization for Standardization (ISO).
3. It has four layers. This combines the functions of the physical, data link, and network layers into a single layer called the Internet layer.	3. It has seven layers. Each with its own set of protocols and services.
4. TCP/IP model is practical and widely used, especially on the Internet	4. the OSI model is more theoretical and has more layers
5. It specifies protocols and services that are necessary to establish communication between different systems.	5. It defines protocols and standards at each layer.
6. It is designed specifically for the Internet.	6. It is a generic model that can be used to develop protocols for any type of network.
7. These layers are responsible for managing data exchange between applications and ensuring that the data is in the correct format.	7. These include layers for session and presentation, which are not present in the TCP/IP model.
8. This model is simpler and easier to manage.	8. It is more complex than the TCP/IP model, making it more difficult to implement and maintain.
9. This is used as a standard for Internet communication.	9. It is widely used as a reference model for network protocol development.

Difference between peer to peer network and client/server network

Client-Server Network	Peer-to-Peer Network
➢ In a Client-Server Network, clients and servers are differentiated due to the existence of distinct servers and clients.	➢ In a Client-Server Network, clients and servers are differentiated due to the existence of distinct servers and clients.
➢ It primarily focuses on the dissemination of information.	➢ It chiefly emphasizes on connectivity.
➢ Data is typically stored in a centralized server.	➢ Every peer holds its own data
➢ A Client-Server network is more expensive than a Peer-to-Peer network.	➢ A Peer-to-Peer network is more cost-effective than a Client-Server network.
➢ They provide a more stable network configuration.	➢ They offer less stability in comparison.
➢ They can be employed in both small and large networks.	➢ They are mainly used for smaller networks.

What are Seven layers of OSI model and write functions of each layers?

- **Physical Layer**: Handles the physical connection between devices and the transmission of raw binary data over a medium. Involves cables, switches, and physical standards.
- **Datalink Layer**: Packages raw bits into frames for error detection/correction and controls access to the physical medium. Includes Ethernet and switches.
- **Network Layer** : Determines the best path for data to travel and handles logical addressing (IP addresses). Manages packet forwarding and routing.
- **Transport Layer**: Ensures reliable data transfer between end systems, handles segmentation, reassembly, and flow control. Examples are TCP and UDP.
- **Session Layer** : Manages sessions between applications, including establishing, maintaining, and terminating connections. Controls dialog and synchronization.
- **Presentation Layer:** Translates data between the network and application formats, handles data encryption/decryption and compression. Ensures data is readable.
- **Application Layer:** Provides network services to end-users and applications, including protocols like HTTP, FTP, and SMTP. Supports resource sharing and user interfaces.

What are the principles behind the OSI model?

- **Layered Archietecture**: Divides network functions into seven distinct layers, each with specific responsibilities. This modular approach simplifies network design and troubleshooting.
- **Layer Independence** : Each layer operates independently, performing its designated function. Changes in one layer do not affect other layers, promoting flexibility and ease of updates.
- **Encapsulation** : Data is encapsulated with protocol-specific headers as it moves down the layers, and headers are removed as it moves up the layers. This process ensures proper data handling and integrity.
- **Standardization:** Provides a universal set of protocols and standards that ensure different systems and technologies can communicate and interoperate effectively.
- **Modularity:** Allows for modular network design, where individual layers can be updated or replaced without affecting the overall system. This supports technological advancements and system scalability.
- **Interoperability:** Ensures that various hardware and software from different vendors can work together within a network, promoting compatibility and reducing vendor lock-in.
- **Transparency** : Provides network transparency to the end user, masking the complexity of underlying network operations and protocols. Users can access and use network services without needing to understand the underlying details.
- **Error Handling and Recovery**: Includes mechanisms for detecting and correcting errors that occur during data transmission, ensuring reliable communication.
- **Flow Control and Congestion Management**: Implements flow control to manage the rate of data transmission between sender and receiver, and congestion management to prevent network overloads.