Hello everyone! In this video you will understand the network reference models and will also learn about the OSI model, one of the most popular network reference models.

Reference models are theoretical frameworks that systematize the communication between different type of networks or machines.
They represent the blueprints for designing the networks.
Most popular reference models are OSI and TCP/IP protocol suite.

Network reference models work based on layered architecture, in which the complete functionality is divided among layers to reduce the complexity and orderly execution. This model can be understood using the example of a postal system where the tasks are always executed in a order to get the letter delivered.

Here you have understood, what is a network reference model. Before knowing about a popular network reference model, let's understand some more terms related to communication of data through a communication system like network. In any communication system, there are five

components. Sender, receiver, Message, Transmission medium and the protocols.
The protocols represent the set of rules to be followed by sender and receiver both for making communication, possible, correct and secure.
Functions represented by layers in a reference model are implemented with the help of these protocols.

Let's understand one of the most popular network reference models, OSI model. OSI stands for open systems interconnection model, allowing heterogeneous computers like windows, Linux or MAC based machines of any hardware architecture, talking to each other. There are seven layers within the model depicting different set of related functions required for communication in a network. These layers are Application, Presentation, Session, Transport, Network, Data Link and Physical layer.

These layers are implemented by a combination of network card drivers, operating systems, applications and networking hardware that facilitate the transmission of signal over various types of cables or wireless mediums.

This slide represents the conceptual communication between the peer layers of OSI model. In layered architecture, the sender and receiver both have same set of layers executing the related functions. For example, the presentation layer on sender side, receives the data from application layer and encrypts it while the presentation layer on receiver side decrypts the data and gives it to application layer.

Let's understand, the layers from the top to bottom. The topmost layer of OSI model is application layer. Users interact with this layer, using various applications such as browsers, skype, outlook etc. These applications use various protocols defined on this layer such as http, dns, telnet, ftp etc.

All of the applications provide a set of services to be performed by application layer, which are executed with the help of Presentation layer, the layer below it. On receiver side, the reverse operations are performed by application layer.

The presentation layer, or layer 6, performs conversion of data, you provide to the computer in natural languages, into computer understandable form using encoding techniques such as ASCII or Unicode.
After conversion, the data may also be encrypted by the presentation layer for security purpose. For example, while ordering something from an online store, the data is first converted into binary and then encrypted using some encryption algorithm.
On receiver side the data will then be decrypted and decoded to user understandable form by the presentation layer.

After processing done by presentation layer, the data is passed to the session layer or the application layer, depending on whether the data is transmitted or received.

At the session layer, or layer 5, the sessions are established and released. This layer is also responsible for synchronization of sent and received data.

After the session is established, the data is then passed to the transport layer on sender side. On receiver side, the reverse operation is performed, and data is handed over to presentation layer for further processing.

The Transport layer, or layer 4, is responsible for the transmission of data across network connections between processes. This layer is also responsible for error recovery, data flow, and retransmission.

Once the transport layer has completed its function, the data is then passed to the Network layer on sender side and to the session layer on receiver side.

More precisely, Transport layer manages the process-to-process communication.

The Network layer, or layer 3, handles the routing of the data. From source machine to destination machine.

Machines are identified by a network address which is a global identifier of the machine.
The layer sends data to correct destination flowing through a set of routers in a path such as the Internet.

After processing the data by network layer, it is handed over to the data link layer on sender side. On receiver side the network layer receives the correct data from data link layer and hands it over to transport layer.

The Data Link layer, or layer 2, is considered the most complex of the layers.
This layer sets up links across the physical network. This layer receives data from network layer and prepare in for the error handling by creating the frames.
On the receiver side, it accepts the data from the physical layer and checks for the transmission errors. Apart from this, it also handles flow control for dealing with data loss between a slow receiver and fast sender.

Data link layer from sender side after processing the network layer data, transfers the data to the bottommost

layer. The physical layer and on receiver side, after checking for errors, it passes the data to the network layer.

The physical layer, or layer 1, deals with the physical transmission medium which may be wired or wireless. This layer deals with network cables, power plugs, cable pinouts, wireless radio frequencies, connectors, transceivers, receivers, etc.

This layer converts the digital data into electromagnetic signal on sender side and electromagnetic signal into digital data on receiver side.

Thank You…