1. **Explain the cloud network concept by incorporating the SAAS, PAAS, IAAS.**

Cloud computing is the way to access the files which are over the internet (cloud) in the way ‘Pay Per Use’. The data is differentiated in types as servers, storage, databases, software, etc. Users can access the data based on their demands. Companies offering cloud services are called cloud service providers.

**What is IaaS? (Infra as a service)**

IaaS provides the infrastructure such as virtual machines and other resources like virtual-machine disk image library, block and file-based storage, firewalls, load balancers, IP addresses, virtual local area networks etc. **Infrastructure as service** or **IaaS** is the basic layer in cloud computing model.

Common examples: DigitalOcean, Linode, Rackspace, Amazon Web Services (AWS), Cisco Metapod, Microsoft Azure, Google Compute Engine (GCE) are some popular examples of Iaas.

**What is PaaS (Platform as a service)**

**PaaS** or platform as a service model provides you computing platforms which typically includes operating system, programming language execution environment, database, web server. technically It is a layer on top of IaaS as the second thing you demand after Infrastructure is platform.

Common examples: AWS Elastic Beanstalk, Windows Azure, Heroku, salesforce, Google App Engine, Apache Stratos.

**What is SaaS (Software as a service)**

In a SaaS you are provided access to application services installed at a server. You don’t have to worry about installation, maintenance or coding of that software. You can access and operate the software with just your browser. You don’t have to download or install any kind of setup or OS, the software is just available for you to access and operate. The software maintenance or setup or help will be provided by SaaS provider company and you will only have to pay for your usage.

Common examples: Google Apps, Microsoft office365, Google docs, Gmail, WHMCS billing software.

Source: <https://www.quora.com/What-is-the-difference-between-IaaS-SaaS-and-Paas>

**2. Explain the OSI networking architecture with the related protocols involved.**

The **Open Systems Interconnection model** (**OSI model**) is a [conceptual model](https://en.m.wikipedia.org/wiki/Conceptual_model) that characterises and standardises the communication functions of a [telecommunication](https://en.m.wikipedia.org/wiki/Telecommunication) or computing system without regard to its underlying internal structure and technology. Its goal is the interoperability of diverse communication systems with standard [communication protocols](https://en.m.wikipedia.org/wiki/Communication_protocols).

**Layer 1: Physical Layer:** The [physical layer](https://en.m.wikipedia.org/wiki/Physical_layer) is responsible for the transmission and reception of unstructured raw data between a device and a physical [transmission medium](https://en.m.wikipedia.org/wiki/Transmission_medium). It converts the digital bits into electrical, radio, or optical signals.

**Layer 2: Data Link Layer:** The [data link layer](https://en.m.wikipedia.org/wiki/Data_link_layer) provides [node-to-node data transfer](https://en.m.wikipedia.org/wiki/Node-to-node_data_transfer)—a link between two directly connected nodes. It detects and possibly corrects errors that may occur in the physical layer. It defines the protocol to establish and terminate a connection between two physically connected devices. It also defines the protocol for [flow control](https://en.m.wikipedia.org/wiki/Flow_control_(data)) between them.

**Layer 3: Network Layer:** The [network layer](https://en.m.wikipedia.org/wiki/Network_layer) provides the functional and procedural means of transferring [packets](https://en.m.wikipedia.org/wiki/Network_packet) from one node to another connected in "different networks". A network is a medium to which many nodes can be connected, on which every node has an *address* and which permits nodes connected to it to transfer messages to other nodes connected to it by merely providing the content of a message

A number of layer-management protocols, a function defined in the *management annex*, ISO 7498/4, belong to the network layer. These include routing protocols, multicast group management, network-layer information and error, and network-layer address assignment. It is the function of the payload that makes these belong to the network layer, not the protocol that carries them.

**Layer 4: Transport Layer:** The [transport layer](https://en.m.wikipedia.org/wiki/Transport_layer) provides the functional and procedural means of transferring variable-length data sequences from a source to a destination host, while maintaining the quality of service functions.

An easy way to visualize the transport layer is to compare it with a post office, which deals with the dispatch and classification of mail and parcels sent.

**Layer 5: Session Layer:** The [session layer](https://en.m.wikipedia.org/wiki/Session_layer) controls the dialogues (connections) between computers. It establishes, manages and terminates the connections between the local and remote application. It provides for [full-duplex](https://en.m.wikipedia.org/wiki/Duplex_(telecommunications)), [half-duplex](https://en.m.wikipedia.org/wiki/Half-duplex), or [simplex](https://en.m.wikipedia.org/wiki/Simplex_communication) operation, and establishes procedures for checkpointing, suspending, restarting, and terminating a session. In the OSI model, this layer is responsible for gracefully closing a session, which is handled in the [Transmission Control Protocol](https://en.m.wikipedia.org/wiki/Transmission_Control_Protocol) at the transport layer in the Internet Protocol Suite. This layer is also responsible for session checkpointing and recovery, which is not usually used in the Internet Protocol Suite.

**Layer 6: Presentation Layer:** The [presentation layer](https://en.m.wikipedia.org/wiki/Presentation_layer) establishes context between application-layer entities, in which the application-layer entities may use different syntax and semantics if the presentation service provides a mapping between them. If a mapping is available, presentation protocol data units are encapsulated into session protocol data units and passed down the [protocol stack](https://en.m.wikipedia.org/wiki/Protocol_stack).

This layer provides independence from data representation by translating between application and network formats. The presentation layer transforms data into the form that the application accepts. This layer formats data to be sent across a network. It is sometimes called the syntax layer.

**Layer 7: Application Layer:**The [application layer](https://en.m.wikipedia.org/wiki/Application_layer) is the OSI layer closest to the end user, which means both the OSI application layer and the user interact directly with the software application. This layer interacts with software applications that implement a communicating component. Such application programs fall outside the scope of the OSI model.

Source: <https://en.m.wikipedia.org/wiki/OSI_model>