**Virtualization:**

Virtualization is a technique how to separate a service from the underlying physical delivery of that service.It is the process of creating a virtual version of something like computer hardware. It involves using specialized software to create a virtual or software-created version of a computing resource rather than the actual version of the same resource. With the help of Virtualization multiple operating systems and applications can run on same Machine and its same hardware at the same time increasing the utilization and flexibility of hardware. Virtualization is a technique, which allows to share a single physical instance of a resource or an application among multiple customers and organizations at one time.

**Types of virtualization:**

* Native and full

The virtual machine simulates enough hardware to allow an unmodified guest OS to run in isolation

* Hardware assisted/ Hardware enabled

The virtual machine has its own hardware and allows a guest OS to run in isolation.

* Para - virtualization:

The virtual machine doesn’t necessarily simulate hardware but instead offers a special API that can only be used by modifying the guest OS

* OS level

Virtualizing a physical server at the operating system level, enabling multiple isolated and secure virtualized servers to run on a single physical server.

* Application Virtualization:

Application virtualization helps user to have a remote access of an application from a server. The server stores all personal information and other characteristics of the application, but can still run on a local workstation through internet.

* Network Virtualization:

The ability to run multiple virtual networks that each has a separate control and data plan.It co-exist together on top of one physical network.It can be managed by individual parties that potentially confidential to each other. Network virtualization, provides a facility to create and provision virtual networks—logical switches, routers, firewalls, load balancer, Virtual Private Network (VPN), and workload security within days or even in weeks.

* Storage Virtualization:

Storage virtualization is an array of servers that are managed by a virtual storage system. The servers aren’t aware of exactly where their data is stored, and instead function more like worker bees in a hive. It makes managing storage from multiple sources to be managed and utilized as a single repository. storage virtualization software maintains smooth operations, consistent performance and a continuous suite of advanced functions despite changes, break down and differences in the underlying equipment.

* Desktop Virtualization:

Desktop virtualization allows the users’ OS to be remotely stored on a server in the data center.It allows the user to access their desktop virtually, from any location by different machine. Users who wants specific operating systems other than Windows Server will need to have a virtual desktop.Main benefits of desktop virtualization are user mobility,portability, easy management of software installation, updates and patches.

**OS Based Virtualization:**

Virtualization of IS is like testing the built OS in different types of IS and platforms that are hosted in the cloud and the server instead of using different physical versions and physical devices.

**Solaris Zones:**

They provide separate virtualized operating systems environments that are derived from a global zone. Multiple zones can share file systems, processors and network interfaces. Scaling and sharing can be configured on a needed basis. Individual zones gain files and configurations from the global zone.

**Docker:**

Docker containers wrap up a piece of software in a complete file system that contains everything needed to run: code, runtime, system tools, system libraries anything you can install on a server. This guarantees that the software will always run the same, regardless of its environment it is running in. It automates the deployment of the applications inside software container. It is additional layer of abstraction and automation of operating system level virtualization on Linux.

**Kubernetes:**

Kubernetes provides a platform for automating deployment, scaling and operations of application containers across clusters of hosts. It is influenced by google’s borg system.

Pods - Unique IP addresses of colocated containers

Labels and selectors - Key-value pairs(labels) that resolves(selector) to a pod or container

Controllers - manage pods

Services - make the set of pods work together

**Java Virtual Machine:**

Abstract computing machine that enables a computer to run a java program. JRE is software package that contains what is required to run a java program. JVM is a sandboxed environment for remote execution. It supports elasticity, flexibility and more secure browsing. JVM languages are Java, Ruby, Python, Scala Compile. These use JVM to run the languages. It is secure and in sandbox environment. It is portable distributed applications and supports elasticity. Supports more secure browsing. Easier to software engineer because of typing and language. Easier to share it.

**IAAS Openstack:**

Openstack is a collection of open source software projects that enterprise/ service providers can use to setup and run their cloud compute and storage infrastructure.

Openstack core components are:

* Compute(“NOVA”)
* Object swift
* Image service

**Amazon Web Service:**

It is a collection of services for building cloud applications. There are 6 types of instances for web services. They are micro instances, general purpose, memory optimized, storage optimized, compute optimized, GPU instances.

**Microsoft:**

They are the biggest cloud providers. They want to provide cloud to mobiles first. Virtualization is provided by hyper - v to rival Vmware. Microsoft Azure is both IAAS and PAAS. Their biggest cloud is office 365 and office for ipad. Dynamics CRM. Azure is launched in 2010. It connects private cloud to microsoft cloud. It is a hybrid cloud provider. It can be used for anything since it provides IAAS services that can host virtual machines. It is good for .NET developers. Azure has its own operating system. It has a windows server support.

**Google:**

It leads in advertising. It is small and midsize business. It doesn't change to meet customer needs. Google rapidly innovate. It values data and includes real time data. Google cloud is not a hybrid cloud. Google is basically at the beginning is PAAS and later IAAS. Google has application services like maps, translate, sites and entertainment like youtube.

**Serverless Architecture:**

It is a new trend in cloud computing. A serverless architecture is a way to build and run applications and services without having to manage infrastructure. Your application still runs on servers, but all the server management is done by AWS. You no longer have to provision, scale, and maintain servers to run your applications, databases, and storage systems. Learn more about serverless computing here. By using a serverless architecture, your developers can focus on their core product instead of worrying about managing and operating servers or runtimes, either in the cloud or on-premises. This reduced overhead lets developers reclaim time and energy that can be spent on developing great products which scale and that are reliable