1.
Explain Working mechanism of Virtual Machines.

Answer:

In general, a virtual machine (VM) is a virtual environment that works like a computer within a computer. It is a virtual representation or emulation of a physical computer. It runs on an isolated partition of its host computer with its own resources of CPU power, memory, an operating system (e.g. Windows, Linux, Unix), and other resources.

Virtual Machines(VMs) are made possible through virtualization technology. Virtualization uses software to simulate virtual hardware that allows multiple VMs to run on a single machine. The physical machine is known as the host while the VMs running on it are called guests. A VM cannot interact directly with a physical computer. The software to manage this process is known as a hypervisor. The hypervisor is responsible for managing and provisioning resources like processors, memory and storage from the host to guests. It keeps each VM separate from others so they don’t interfere with each other. VMs only work if there is a hypervisor to virtualize and distribute host resources.

There are two types of hypervisors used in virtualization. They are;

- Type 1 hypervisors also known as Bare-metal hypervisors
- Type 2 hypervisors also known as Hosted hypervisors

2.
Explain Working mechanism of Containers.

Answer:

Containerization is the packaging of software code with just the operating system libraries and dependencies required to run the code to create a single lightweight executable called a container that runs constantly on any infrastructure. It does OS level virtualization.
Containers are an abstraction at the app layer that packages code and dependencies together. Multiple containers can run on the same machine and share the OS kernel with other containers, each running as isolated processes in user space.

At the bottom, there is the hardware of the infrastructure which includes arm chips, intel chips, network interface, disk storage, etc. Above that, there is the host OS and its kernel which serves as a bridge between the software of the OS and the hardware of the underlying system. The container engine and its minimal guest OS, which are particular to the containerization technology being used, sit atop the host OS. At the top most part are the binaries and libraries for each application and the apps, running in their isolated user spaces called containers.

So, this is how the container works.

3.
What problem does Virtualization solve and what is its drawback in context to modern application deployments?

Answer:

The problem that Virtualization solve in context to modern application deployments are as follows;

- Reduced capital and operating costs.
- Simplified data center management.
- Faster provisioning of applications and resources.
- It offers a better uptime.

The drawbacks of virtualization are as follows;

- It creates an scalability issue
- It creates an availability issue
- It can have a high cost of implementation.

4.
What are the problems Container solves in regard to app deployment and how it solves?

Answer:

There are many problems that the container solves in regard to app deployment. They solve the problem of environment separation and dependency resolution. Contained application gets exactly the environment and dependencies it needs, regardless of what sort of OS (and libraries) installed on the host. Also, the deployment (installation) is very easy: we just need to pull the image. It may be rather large ,but with modern hardwares and disk sizes, that typically doesn't possess much of a problem. It has made it a lot easier to run multiple containers in a host than creating multiple virtual machines on the same host since containers are isolated and self-contained and containers are easier to spin up and destroy than traditional VMs. It provides better support to microservices architectures as it can be easily isolated, deployed and scaled. And in terms of size also, a container may be tens megabytes in size whereas a VM has several gigabytes in size due to its operating system and this helps the server to host more containers than VMs.

Thank You