**Virtualization**

Virtualization describes a technology in which an application, guest operating system(guest OS) or data storage is abstracted away from the true underlying hardware or software.

Virtualization, or a virtual machine monitor(hypervisor),is a software, firmware, or hardware that creates and runs virtual machines (VMs).It is what sits between the hardware and the virtual machine to virtualize the server.

Virtualization uses software that simulates hardware functionality in order to create a virtual system , every single Virtual machine has its own binaries, libraries,and applications .With each virtual machine runs a unique operating system ,virtual machines with different operating systems can run on the same physical server -Unix Virtual machine can sit alongside a linux virtual machine.

The advantages of utilizing a virtualized environment are :

* **lower costs,** it reduces the amount of hardware servers necessary within a company and data centre.This lowers the overall cost of buying and maintaining large amounts of hardware.
* **Easier disaster recovery**.it is very simple in a virtualized environment .regular snapshots provide up-date data,allowing virtual machines to be feasibly backed up and recovered
* **Easier testing**.less complicated
* **Quicker backups**.both the virtual server and the machine.
* **Improved productivity**.focus on more productive tasks.

The disadvantages of a virtualized environment it is important to consider the various upfront costs.

* Converting to virtualization takes time and may come with a learning curve .Implementing and controlling the virtualized environment demands each IT staff to be trained and possess expertise in virtualization.
* Data is crucial to the success of a buisness

**Containerization**

Containerization involves bundling an application together with all of its configuration files, libraries and dependencies required for it to run in an efficient and bug -free way across different computing environments.

Containers are an abstraction of the application layer where each virtual machine simulates a physical machine to run the software, multiple containers share the same operating system but each container runs isolated processes.

Thus many or multiple virtual machines run on one physical machine occupying its specific copy of an operating system, dependencies, libraries ,applications and other related files.

Containers sit on top of a physical server and its host operating system foe example linux or windows .Each container shares the host kernel and usually the binaries and libraries too.

Disadvantages of containerization presents two security challenges.

* Since containerized applications share a common operating system security threats to the operating system can affect the whole system.
* Security scanners in a containerized environment generally protect the operating system but not the application.