What is Storage Virtualization in Cloud Computing?

The technology of abstracting physical data storage resources is storage virtualization to make them look as if they were a centralized resource. In memory, networks, servers, and storage, virtualization masks the complexity of managing resources.

Virtualization of storage runs on several storage devices, making them appear as if they were a single pool of storage. Pooled storage devices may come from various suppliers and networks. The virtualization storage engine defines aggregates and handles the available storage space from various arrays and storage media and introduces it to applications.

Types of Storage Virtualization

1. Hypervisor Virtualization

A hypervisor is a layer between the hardware and the operating system. Multiple operating systems can operate with the aid of hypervisors. It also provides functionality and essential services that help OS function properly.

2. Hardware-Assisted Virtualization

This form of virtualization needs help from the hardware. This is equivalent to absolute Para-virtualization. Here, the unmodified OS can be used as virtualization hardware support and we can also use it to manage requests for access to hardware and protect operations.

3. Para-Virtualization

It's based on a hypervisor that manages software emulation and trapping. Here, before running it on any additional computer, the guest operating system is updated. The updated framework interacts with the hypervisor directly and enhances output.

4. Kernel Level Virtualization

It runs a separate Linux Kernel version. The Kernel level allows multiple servers to be run on a single host. To communicate between the main Linux Kernel and the virtual machine, it uses a system driver. A special type of Server Virtualization is this virtualization.

5. Full Virtualization

This virtualization is equivalent to Para-Virtualization. In this, the hypervisor traps the function of the computer that the operating system is using to perform the operations. It emulates, in particular, software and the returned status codes after trapping the operations.

Advantages of Storage Virtualization

The following are the advantages of storage virtualization:

- Storage Systems are capable of performing advanced functions such as disaster recovery, duplication, data replication & data re-duplication.
- Avoids downtime during the migration of data. Virtualization functions in the background to retain the logical address of the data to maintain access.
- Enables dynamic use of storage and virtual scalability, both block and file, of attached storage resources.
- Data in a very convenient place is processed. This is because the data on the host failure is not inherently affected.
- It allows storage to be added and removed quickly without affecting any programme.

Importance of Storage virtualization

- **WAN Environment**: WAN accelerator is used to locally cache the data and display it in a LAN velocity instead of sending several copies of the same data over WAN and does not affect the performance of the WAN.
- **File Server**: To keep it isolated and protected from local users, the OS writes the data to a remote server site.
- **Storage Tiering**: This methodology analyses and extracts the most widely used data using the storage system as a bridge or as a stepping stone and positions it on the best performing storage pool and the least used data in the lowest performance storage pool.
- **SAN Storage**: The storage is presented by SAN technology as block-level storage & the storage is displayed over the OS Ethernet network.