

UNIT 03: VIRTUALIZATION IN CLOUD COMPUTING.

(Piyusha Supe 23C0315)

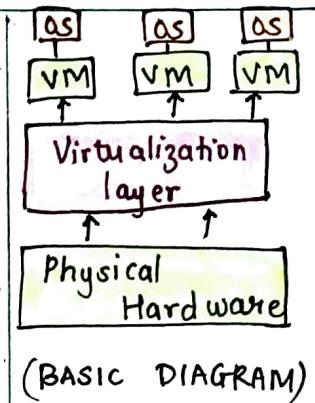
1) Definition - Virtualization is the creation of virtual versions of hardware, OS, storage or network.

• Why Adopt?

- Improves resource utilization, scalability, flexibility and cost efficiency.

TYPES OF VIRTUALIZATION -

1. **HARDWARE** - Abstract physical hardware.
2. **OS** - Multiple OS instances on one machine.
3. **STORAGE** - Pooling physical storage
4. **NETWORK** - Combine multiple N/W into one.
5. **DESKTOP, APPLICATION** - Access from anywhere.



(BASIC DIAGRAM)

VIRTUALIZATION SOFTWARE

- HYPERVISOR BASE -
- TYPE 1 (Bare Metal)
- TYPE 2 (Hosted)

TOOLS - HyperV, VirtualBox, KVM, VMWare

VIRTUAL CLUSTERING

- Linking virtual machines (VMs) to act as a cluster
- Benefits - load balancing, failover support, scalability.

APPLICATIONS -

- Server Consolidation
- Disaster recovery.
- Software Testing.
- Development requirements.
- Running Legacy apps.

PITFALLS -

- VM Sprawl
- Security vulnerability
- Performance overhead
- Licensing issues.
- Management complexities.
- Difficult to maintain.

GRID AND CLOUD VIRTUALIZATION.

• GRID COMPUTING -

- Allows grid nodes to run isolated environments.
- Enhances flexibility, compatibility in distributed tasks.

• CLOUD COMPUTING -

- Core enabler for IaaS, PaaS.
- On demand resource allocation.

• SECURITY IN VIRTUALIZATION -

- Risks - VM Escape, Misconfigured hypervisors, shared.
- Solutions - Strong isolation, access controls, tools vMM.

VIRTUALIZATION AND CLOUD COMPUTING.

Anatomy of Cloud Infrastructure:

- Core: Virtualized servers, networks, and storage
- Managed via APIs and orchestration tools.

Virtual Infrastructure:

- Pool of virtualized computing resources.
- Managed centrally via cloud platforms (e.g. openstack, AWS)

CPU Virtualization:

- Virtual CPU simulate physical CPU
- Managed by hypervisor for multitasking efficiency.

Storage Virtualization:

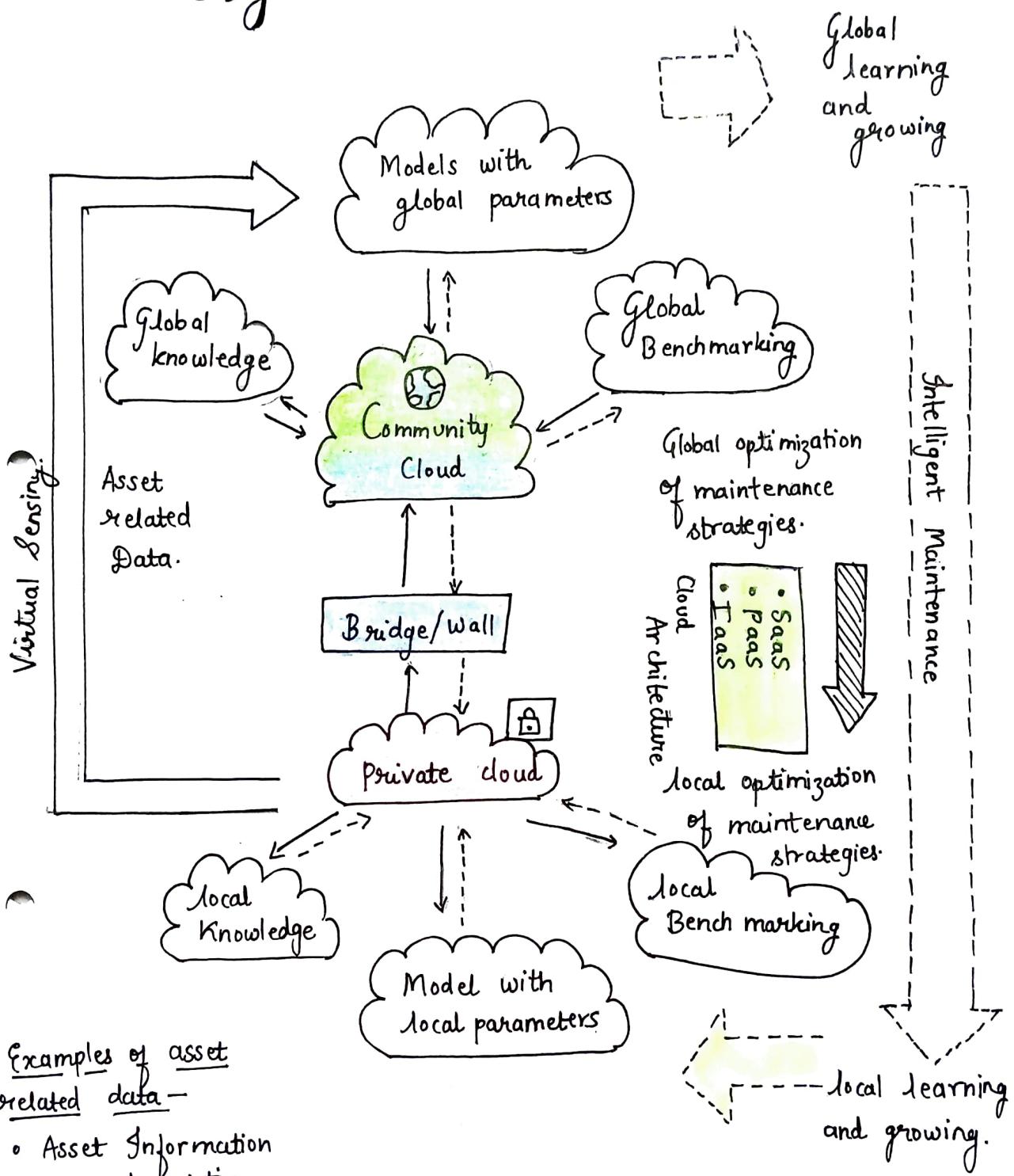
- Combines many storage devices in single logical units.
- Eg: SAN, NAS, cloud storage (e.g. S3)

Network Virtualization:

- Abstracts physical Network to software network.
- Enables s/w defined networking (SDN)

Rishabh

Hybrid Cloud Model.



Examples of asset related data -

- Asset Information
 - description
 - Criticality
- Work Order feedback
 - Order execution (CM)
 - Inspection (PM)
 - CBM (PdM)
- Fault Management and analysis.
- Maintenance strategies

UNIT - 01 Introduction
to cloud Computing.

- Hybrid deployment model.

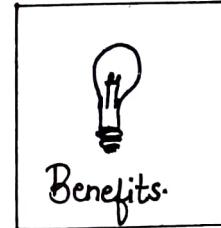
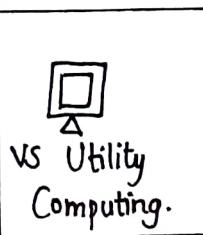
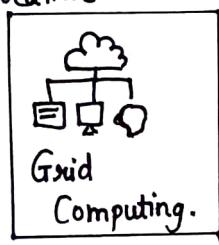
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UNIT - 01 - INTRODUCTION TO CLOUD COMPUTING.

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— MIND - MAP —

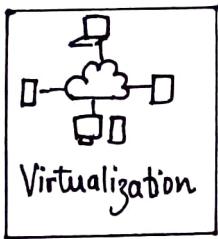
- Ability to change
- Control of location
- Less demanding
- Business model.
- More favorable
- Uses available resource
- Owned by a multiple parties at multiple locations.
- Decentralized model.
- Provide limited services.
- Federates resources in different organizations.



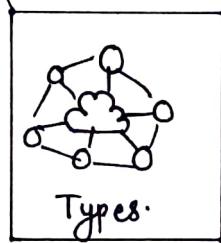
Services.

- Software as a service (SaaS)
- Platform as a service (PaaS)
- Infrastructure as a service (IaaS)

- Network.
- Server
- Storage

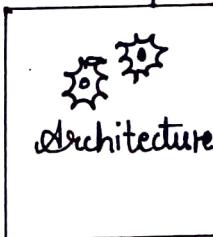


Virtualization



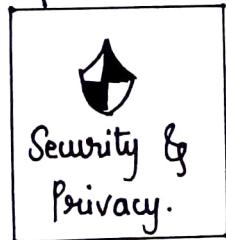
Types.

- Private
- Public
- Hybrid
- Community



Architecture

- Backend
- Frontend.



Security & Privacy.

- Confidentiality of data
- Keep data encrypted at the cloud.