Unit-2: Virtualization and Resource Management

Virtual Machine (VM) Provisioning

Definition: Virtual Machine (VM) provisioning is the **process of creating, configuring, and deploying virtual machines** in a computing environment. It is essential for:

- Efficient resource utilization
- Rapid scalability
- Streamlined IT operations

Types of VM Provisioning

1. **Static Provisioning: Pre-allocates resources (CPU, memory, storage)** to a VM. Ensures predictable performance but may lead to resource underutilization.

2. **Dynamic Provisioning: Allocates resources on-demand based** on workload requirements. Optimizes resource utilization and enhances flexibility.

3. **Instant Provisioning: Uses pre-configured VM templates** to create VMs rapidly. Significantly reduces deployment time.

Steps in VM Provisioning Process

Requirement Analysis- Identify the purpose and required specifications for the VM (e.g., CPU, memory, storage).

Selection of Hypervisor- Choose between Type 1 (Bare-metal) or Type 2 (Hosted)

Creation of Virtual Machines- Define hardware configurations (e.g., processors, RAM, storage).

Operating System Installation- Install and configure the desired operating system within the VM.

Customization- Set up applications, network settings, and security configurations.

Testing- Verify the VM's performance and stability.

Deployment- Deploy the VM for production, development, or testing purposes.

VM Provisioning Life Cycle

The VM provisioning life cycle consists of four main stages. Each stage is crucial for ensuring the smooth deployment and operation of virtual machines.

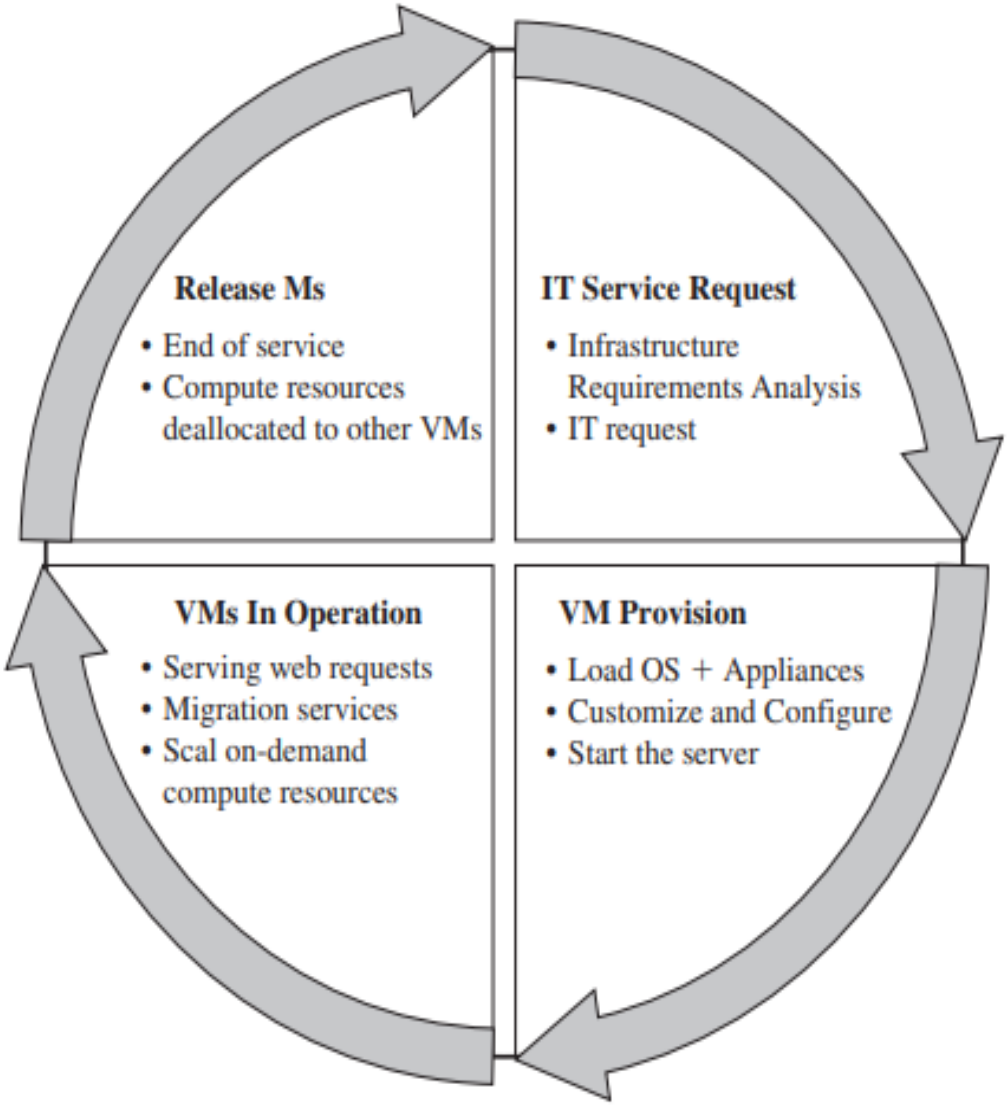

FIGURE Virtual machine life cycle.

1. IT Service Request

The life cycle begins with a service request for a virtual machine.

- Defining the business or technical requirements for the VM.
- Specifying the necessary resources (e.g., CPU, memory, storage, network bandwidth).
- Example: A development team requests a VM with 8 CPUs, 32 GB RAM, and 1 TB storage for running a simulation application.

2. VM Provision

This stage involves the creation and configuration of the requested VM.

- Allocating physical resources from the underlying infrastructure.
- Deploying templates or cloning existing VM images.
- Setting up network configurations, security policies, and user permissions.
- Example: A systems administrator uses a pre-configured Windows Server template to quickly deploy a new VM for a file-sharing service.

3. VM in Operation

The VM is deployed and running its intended workload.

- The VM is monitored for performance and resource utilization.
- Maintenance tasks, such as software updates, patching, and backups, are performed.
- Alerts and logs are generated to track usage and detect anomalies.
- Example: A VM hosting a company's e-commerce platform handles live customer transactions and generates daily usage reports.

4. Release VM

When the VM is no longer required, it is decommissioned.

- Shutting down the VM and releasing its resources back to the pool.
- Archiving important data and deleting unnecessary files.
- Ensuring compliance with data retention policies.
- Example: A temporary testing VM is terminated after project completion, and its storage space is reallocated to a new project.