



Work Integrated Learning Programmes Division Machine Learning

S1 – 24 - CSIZG527/SEZG527

Cloud Computing (Merged)

First Semester, 2024 -25

Assignment

Objective:

To gain hands-on experience in setting up a QEMU/KVM hypervisor and performing basic virtualization tasks. The assignment will help you understand the fundamentals of virtualization, VM creation, and basic management operations using QEMU/KVM.

Task 1: Installation and Configuration

Hypervisor Installation:

- Install the QEMU/KVM hypervisor on your Linux machine.
- Verify the installation by checking the status of KVM modules.

Networking Setup:

- Configure a bridge network on the host to allow virtual machines to communicate with each other and with the external network.
- Document the steps and commands used.

Management Tools:

- Install and configure virt-manager or virsh for managing VMs on QEMU/KVM.
- Explore the interface and familiarize yourself with basic commands or GUI options for managing VMs.

Task 2: Virtual Machine Creation and Management

Create a Virtual Machine:

- Using virt-manager or virsh, create a new virtual machine running a Linux distribution (e.g., Ubuntu or CentOS).
- Allocate appropriate resources (CPU, memory, disk space) to the VM based on your system's capabilities.

Guest Operating System Installation:

- Install the chosen guest operating system on the newly created VM.
- Capture screenshots of key installation steps.

Basic VM Operations:

- Perform basic operations such as starting, stopping, pausing, and resuming the virtual machine using both the command line (virsh) and the graphical interface (virt-manager).
- Record the commands used or steps taken.

Task 3: Snapshot and Cloning

Snapshot Management:

- Create a snapshot of the running virtual machine.
- Modify the VM (e.g., install additional software) and then revert to the previous snapshot.
- Explain the process and the use cases for snapshots.

VM Cloning:

- Clone the existing virtual machine.
- Change the hostname and IP address of the cloned VM to avoid conflicts on the network.
- Verify the cloned VM's functionality.

Task 4: Resource Allocation and Monitoring

Resource Allocation:

- Modify the CPU and memory allocation for the virtual machine.
- Explain how resource allocation affects VM performance.

Performance Monitoring:

- Use tools like virt-top, htop, or vmstat to monitor the performance of the host and the virtual machine.
- Analyze and report on the resource usage (CPU, memory, disk I/O) of the VMs.

Task 5: Networking and Storage Management

Network Interface Management:

- Add a new virtual network interface to the VM.
- Configure the VM to use the new interface for internal communication only.

Storage Management:

- Attach an additional virtual disk to the VM.
- Format and mount the new disk inside the guest OS.
- Test the disk by storing and retrieving files.

Task 6: Automation with Scripts

Automating VM Creation:

- Write a bash script to automate the creation and configuration of a new VM with predefined resources and network settings.
- Execute the script and verify the VM creation.

Deliverables:

Documentation:

- Detailed documentation of each task with commands, screenshots, and explanations.
- Include a reflection on challenges faced and how they were overcome.

VM Images:

- Export the final state of your VMs as images for submission.

Submission:

- Submit document in PDF format.