



Department of Computing
Bachelor of Science (Hons) in Software
Development

Cloud Data Centres - Y4
Lab 1

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1. Check if your processor supports Intel/AMD virtualization technology. Enable Intel virtualization technology in BIOS if possible.
 - Processor: Intel(R) Core(TM) i7-8650U CPU @ 1.90GHz, 2112 Mhz, 4 Core(s), 8 Logical Processor(s) ---- supports Intel Virtualization Technology
2. The cloud is almost everywhere in our lives now. What do you think are the fundamental reasons behind its success? Name three pros and three cons of cloud.
 - Pros of Cloud computing:
 - Cloud services offer scalability, allowing users to easily scale their computing resources up or down based on demand. This flexibility is crucial for businesses that experience varying workloads, as they can adapt their IT infrastructure accordingly
 - By outsourcing infrastructure management to cloud providers, organizations can reduce the burden on their IT staff and allocate resources more efficiently.
 - Cloud services enable users to access their data and applications from virtually anywhere with an internet connection. This enhances collaboration among teams, as members can work on shared documents and projects in real-time.
 - Cons of Cloud computing
 - Security remains a significant concern for some organizations, especially those dealing with sensitive or regulated data. There's always a risk of unauthorized access, data breaches, or other security incidents, although cloud providers invest heavily in security measures.
 - Cloud services rely on internet connectivity. If there are issues with the internet connection, it may disrupt access to cloud-based resources. This can be a concern for businesses that require continuous access to their applications and data.
 - The data centers that power cloud services require significant energy consumption. While cloud providers are working to improve energy efficiency, the overall environmental impact of large-scale data centers remains a concern for some organizations with sustainability goals.
3. What is the primary function of a hypervisor in virtualization?
 - A hypervisor, serves as a critical component in virtualization by managing and allocating physical resources to multiple virtual machines. Positioned between

the hardware and VMs, it abstracts and virtualizes CPU, memory, storage, and network interfaces, presenting them as independent resources to each VM. This abstraction enables VMs to run different operating systems and operate in isolation, preventing interference between them. The hypervisor also handles resource allocation, scheduling, and live migration, facilitating efficient use of hardware and minimizing downtime during VM movements.

4. What is a virtual machine (VM)?

- A virtual machine is a software emulation of a physical computer that runs an operating system and applications as if it were a distinct physical machine. Created by a hypervisor, a VM operates in an isolated environment on a host system. The hypervisor abstracts and allocates the host's physical resources—such as CPU, memory, storage, and network—allowing multiple VMs to coexist on the same physical hardware. Each VM is independent of others, with its own OS, applications, and user space.

5. What are the benefits of using virtual machines?

- virtual machines offer several benefits, VMs enable multiple virtualized instances to run on a single physical server, consolidating resources. This improves resource utilization and efficiency by avoiding underutilization of hardware.
- VMs abstract the underlying hardware, allowing for the creation of a standardized virtual environment. This promotes flexibility, as VMs can be easily moved or replicated across different physical hosts or cloud platforms.
- VMs facilitate scalability by allowing organizations to dynamically allocate or deallocate resources based on demand. This flexibility supports efficient handling of varying workloads.
- VMs can be snapshot or cloned, enabling efficient backup and disaster recovery procedures. Snapshots capture the VM's state at a specific point in time, facilitating quick restoration in case of failures. Virtualization platforms often provide centralized management tools that allow administrators to monitor, configure, and manage multiple VMs from a single interface, streamlining operations.

6. List five use cases of virtual machines.

- Virtual machines allow you to run different operating systems on the same computer. This is useful for trying out new software, testing compatibility, or using applications that may only work on specific operating systems.
- Virtual machines help save energy and space by allowing multiple virtual servers to share the same physical server. This is like having several computers in one, reducing the need for a separate physical server for each task.
- With virtual machines, you can experiment with new software or configurations without worrying about messing up your main computer. If

something goes wrong, you can simply start over or discard the virtual machine.

- Virtual machines make it easy to create backups of your entire computer setup. If your computer has a problem or crashes, you can quickly restore it to a previous state, ensuring you don't lose important files or settings.
- VMs play a crucial role in disaster recovery planning. Organizations can create snapshots or replicas of VMs, allowing for quick backup and recovery in the event of hardware failures, data corruption, or other disasters. Virtualization simplifies the restoration process, reducing downtime and ensuring business continuity.

7. In virtualization, what is the guest operating system?

- (b The operating system installed on a virtual machine

8. What does virtual machine isolation mean?

- (c Virtual machines run independently and are isolated from each other and the host system.

9. What is the benefit of virtual machine portability?

- (c It allows virtual machines to be moved between different physical machines with compatible hypervisors.

10. What is the purpose of cloning a virtual machine?

- Cloning virtual machines serves various purposes, including facilitating testing and development by providing a safe and isolated environment for experimentation. Cloning enables rapid deployment of standardized configurations, aiding in scenarios requiring scalable resources or consistent setups across different servers. It also serves as a form of backup, allowing for quick recovery in case of system failures or data corruption. Additionally, cloning is used to create templates for replicating predefined configurations, ensuring consistency and streamlining the setup of standardized environments. Overall, cloning enhances efficiency, accelerates deployment, and contributes to the flexibility and agility of virtualized infrastructures.