Cloud Data Centres Lab 1

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1. Check if your processor supports Intel/AMD virtualization technology. Enable Intel virtualization technology in BIOS if possible.
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:

   - **Scalability**: Cloud computing allows for customising your software based on needs and usage. Changes and updates can be done immediately.
   - **Accessibility**: When your data is in the cloud, it can be accessed from anywhere in the world at any time.
   - **Recovery:** If you store your data locally on a physical device and that device were to fail, that data will be lost forever. However, by storing your data in the cloud it will typically always be available, even in the cases of a disaster.

   Cons:

   - **Security/Privacy:** By storing your data within the cloud you are increasing security concerns as typically your data is now in control of your provider. This could be an issue with storing sensitive information in the cloud as it would be as secure as the provider is.
   - **Dependence on internet:** In order to be able to use cloud technology, a internet connection is necessary. Also, depending on the use case certain tasks would require a fast internet connection is necessary and this could significantly impact the time it can take to complete the task.
   - **Service Reliance:** By storing your data in the cloud you are entirely reliant on the provider. In the event of a service outage, you may not be able to access any of your data which can cost a business significant amounts of money.

3. What is the primary function of a hypervisor in virtualization?

   Hypervisors are used to create and run virtual machines. It's primary function is to distribute and manage the physical resources of a machine so multiple virtual machines can operate simultaneously on the same hardware.

4. What is a virtual machine (VM)?

   A virtual machine (VM) is a virtual emulation of a physical computer that runs an operating system. It uses software rather than a physical machine in order to run the operating system and its applications.

5. What are the benefits of using virtual machines?

   - You can manage multiple different operating systems on the one physical machine.
   - You can utilise the full capabilities of your hardware and run multiple virtual machines on the one physical machine.
   - Being able to run operating systems or software that would not be compatible on the host machine.

6. List five use cases of virtual machines.

   - **Disaster Recovery:** Create backup copies of virtual machines for quick recovery in case of system failures.
   - **Server Consolidation:** To run multiple instances of a virtual server on the one physical server machine.
   - **Development Environments:** Create virtual environments that can be used for specific purposes such as for development or testing of software.
   - **Legacy Support:** To be able to run legacy applications on modern hardware that would be incompatible.
   - **Resource Isolation:** To be able to isolate applications or services within a virtual machine to be able to improve security.

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 a virtual machine is to create an exact copy of an existing virtual machine. The are multiple reasons as to why you would do this:

    - **Testing:** By cloning a VM to create a test environment, you can create a safe and isolated environment to test new features of your software without it affecting other software or code.
    - **Development:** Developers can create identical and consistent copies of development environment to ensure uniformity across development teams
    - **Backing up/Disaster Recovery:** By cloning a virtual machine you are creating a snapshot of its state which can be used as a backup in the case of disaster recovery.
    - **Deployment:** Quickly deploy multiple instances of a virtual machine that all have the exact same configuration.