1. Question

Check if your processor supports Intel/AMD virtualization technology. Enable Intel virtualization technology in BIOS if possible. (Note: For Intel processors, look for Intel VT-x; for AMD processors, look for AMD-V. For M series chips, they natively support hardware virtualization via Apple Virtualization Framework without manual BIOS activation.)

Answer

To check processor support for virtualization technology: On Windows, use Task Manager (navigate to the Performance tab and find the Virtualization section). On Linux, execute the `lscpu` command. If the virtualization feature is disabled (applicable for Intel/AMD processors), access the BIOS/UEFI settings and enable it under the Virtualization Technology option. For Apple M series chips, which are based on the ARM architecture, hardware virtualization is natively supported through the Apple Virtualization Framework. This feature is enabled at the system level, so no manual activation in the BIOS is required.

2. Question

What do you think are the fundamental reasons behind the success of the cloud? Name three pros and three cons of the cloud.

Answer

Fundamental Reasons for Cloud Success

1. On-demand resource access: Users can obtain computing resources (such as computing power, storage, and network) according to their actual needs without pre-purchasing and deploying a large number of physical devices.

2. High scalability: Cloud resources can be flexibly expanded or reduced based on changes in business volume and user demands, ensuring that resources are neither insufficient nor wasted.

3. Cost-effective pay-as-you-go model: Users only pay for the resources they actually use, avoiding the high upfront investment and subsequent maintenance costs associated with purchasing and managing physical hardware.

Three Pros of the Cloud

1. Cost savings: Enterprises and individuals do not need to invest heavily in purchasing physical servers, storage devices, and other hardware, nor do they need to bear the costs of hardware maintenance, updates, and room management.

2. Strong accessibility: As long as there is an internet connection, users can access cloud resources and their own data and applications from any location with compatible devices, facilitating remote work and collaboration.

3. Simplified management: Cloud service providers are responsible for the operation, maintenance, and updates of the underlying infrastructure, reducing the technical management burden on users and allowing them to focus more on core business.

Three Cons of the Cloud

1. Security and privacy risks: Data stored in the cloud may face threats such as data breaches, hacking attacks, and unauthorized access. At the same time, users need to entrust their data to cloud service providers, which may lead to privacy concerns.

2. Dependence on internet connectivity: The use of cloud services is highly dependent on a stable internet connection. If the network is interrupted, slow, or unstable, users may not be able to access cloud resources normally, affecting business continuity.

3. Potential downtime risks: Although cloud service providers usually have high availability

guarantees, they may still experience service outages due to natural disasters, technical failures, or human errors, which will have a direct impact on users relying on cloud services.

3. Question

What is the primary function of a hypervisor in virtualization?

Answer

The primary function of a hypervisor (also known as a virtual machine monitor) in virtualization is to abstract and virtualize the physical hardware resources of the host machine, including the CPU, memory, storage, and network. It allocates these virtualized resources to multiple virtual machines (VMs) running on the host in a reasonable manner according to predefined rules and configurations. Additionally, the hypervisor ensures strict isolation between different VMs, so that the operation of one VM (such as system crashes, software failures, or security vulnerabilities) will not affect the normal operation and data security of other VMs, creating an independent operating environment for each VM.

4. Question

What is a virtual machine (VM)?

Answer

A virtual machine (VM) is a software-based emulation of a physical computer system. It is created and managed by a hypervisor and runs on a physical host machine. Each VM has its own independent operating system (OS), as well as applications and configuration settings. It can simulate the functions and behaviors of a physical computer, including processing data, running software, and accessing network resources. Importantly, VMs are isolated from each other and from the host machine. The resources used by each VM are virtualized and allocated by the hypervisor, so they do not directly interfere with each other's operations.

5. Question

What are the benefits of using virtual machines?

Answer

1. Isolation and security: Different VMs run independently, and the operating environment, data, and applications between them are isolated. This prevents mutual interference between VMs. Even if one VM is attacked or malfunctions, it will not affect other VMs, enhancing the security and stability of the system.

2. Excellent portability: As long as the target host has a compatible hypervisor, VMs can be easily migrated between different physical host machines without being restricted by the underlying hardware. This facilitates scenarios such as load balancing, system maintenance, and business migration.

3. Efficient hardware utilization: A single physical host can run multiple VMs simultaneously, making full use of the computing power, memory, storage, and other resources of the physical hardware. This avoids the problem of low resource utilization of traditional single physical servers and reduces hardware investment costs.

4. Convenient testing and development: VMs can quickly create independent sandbox environments. Developers and testers can deploy different software versions, test various configurations, and verify new functions in these environments without affecting the production

environment. At the same time, VMs can be easily restored to a previous state, improving the efficiency of testing and development.

5. Reliable disaster recovery: Through VM snapshot and cloning functions, users can quickly create backups of VMs. In the event of a system failure, data loss, or other disasters, they can restore the VM to a normal operating state in a short time, minimizing business downtime and data loss.

6. Question

List five use cases of virtual machines.

Answer

1. Software development and testing: Developers can use VMs to build multiple independent development and testing environments, each configured with different operating systems, development tools, and dependency libraries. This allows for parallel development of multiple projects and testing of software compatibility across different environments without interfering with each other.

2. Running legacy applications: Some older legacy applications may only be compatible with specific older operating systems. Instead of maintaining outdated physical hardware, VMs can be used to run these older operating systems, enabling the continued use of legacy applications without affecting the normal operation of new systems.

3. Training and educational environments: In educational institutions or corporate training scenarios, VMs can quickly create a large number of identical training environments. Each trainee can operate independently in their own VM, practice various software operations and technical experiments, and the VM can be reset to the initial state after training, facilitating repeated use and reducing training costs.

4. Server consolidation: Enterprises often have multiple physical servers that are underutilized. By deploying multiple VMs on a small number of high-performance physical hosts, server consolidation can be achieved. This not only reduces the number of physical servers, saving space and energy consumption, but also simplifies the management and maintenance of the server infrastructure.

5. Disaster recovery and backup: Enterprises can create VM clones or snapshots as backups. When a disaster (such as hardware failure, data corruption, or natural disaster) occurs in the production environment, the backup VMs can be quickly activated on other physical hosts, enabling rapid business recovery and minimizing the impact of the disaster on the enterprise.

7-9. Questions

b, c, c

Answers

(Since the original questions for 7-9 are not specified, the following are example answers based on common virtualization and cloud-related questions corresponding to options b, c, c. If the actual questions are different, the answers should be adjusted accordingly.)

7. Example Question: Which of the following is a type of hypervisor that runs directly on the host's hardware? (Options: a. Hosted hypervisor b. Bare-metal hypervisor c. Application-level hypervisor d. Network hypervisor)

Answer: b. Bare-metal hypervisor

8. Example Question: Which of the following is a disadvantage of using virtual machines? (Options: a. Efficient resource utilization b. Easy portability c. Performance overhead d. Strong isolation)

Answer: c. Performance overhead

9. Example Question: What is the key advantage of the pay-as-you-go model in cloud computing? (Options: a. Fixed costs b. High upfront investment c. Cost optimization based on actual usage d. Limited resource scalability)

Answer: c. Cost optimization based on actual usage

10. Question

What is the purpose of cloning a virtual machine?

Answer

Cloning a virtual machine refers to creating an exact copy of an existing VM, which includes the VM's operating system, installed applications, configuration parameters, and stored data. The main purposes of VM cloning are as follows:

1. Rapid deployment: In scenarios where multiple identical VMs need to be deployed (such as enterprise server clusters, training environments, or large-scale application testing), cloning can avoid the tedious process of reinstalling the operating system, configuring software, and setting parameters for each VM individually, greatly shortening the deployment time and improving work efficiency.

2. Backup and disaster recovery: Cloned VMs can serve as backups of the original VMs. When the original VM encounters failures such as system crashes, data corruption, or virus attacks, the cloned VM can be quickly activated to replace the faulty VM, ensuring the continuity of business operations and reducing losses caused by downtime.

3. Safe testing environment: By cloning a production VM, a test environment that is identical to the production environment can be obtained. Testers can perform various tests (such as software upgrades, function verification, and vulnerability scanning) in this cloned VM without modifying or affecting the data and operation of the production VM, ensuring the stability and security of the production environment.