

# Information Technology System Concepts Tutorial

Computer Science · Practice Test · 19 Questions

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**1. What is the primary mechanism through which operating systems abstract hardware resources for applications?**

- A) Providing a common interface via system calls
- B) Offering full hardware platform abstraction
- C) Enforcing strong isolation between entire system environments
- D) Allowing multiple OSs to run concurrently on a single physical machine

**2. Which technology is generally more efficient for deploying a scalable application, especially for microservices, due to its lightweight nature and faster startup times?**

- A) Virtualized environments
- B) Container-based setups
- C) Traditional physical servers
- D) Bare-metal cloud instances

**3. In overcommitted cloud environments, what can cause VM performance degradation?**

- A) Excessive paging leading to thrashing
- B) Memory deduplication
- C) Dynamic memory allocation by hypervisors
- D) Ballooning of memory

**4. How did virtualization influence the shift to cloud-native solutions by decoupling software from hardware?**

- A) It enabled server consolidation and reduced hardware costs, laying the foundation for IaaS.
- B) It increased the complexity of hardware management.
- C) It led to a decrease in the adoption of pay-per-use models.
- D) It made auto-scaling less feasible.

**5. What is a significant security risk associated with a compromised hypervisor in a cloud environment?**

- A) VM escape, allowing control of the host
- B) Reduced isolation between VMs
- C) Unrestricted access to other VMs' memory or storage
- D) Increased susceptibility to denial-of-service attacks

**6. For migrating a legacy application with strict configuration dependencies, which cloud service model is most suitable?**

- A) IaaS (Infrastructure as a Service)
- B) PaaS (Platform as a Service)
- C) SaaS (Software as a Service)
- D) FaaS (Function as a Service)

**7. When designing a high-level architecture for a legacy application migration using VMs, what component would typically be used for persistent storage attached to each VM?**

- A) Persistent block storage (e.g., AWS EBS)
- B) Object storage (e.g., AWS S3)
- C) Local instance storage
- D) Network Attached Storage (NAS)

**8. What is a potential technical challenge when migrating legacy applications to the cloud, and how can it be mitigated?**

- A) Challenge: Poor scalability; Mitigation: Use performance monitoring and VM resizing.
- B) Challenge: High network latency; Mitigation: Increase application code complexity.
- C) Challenge: Incompatible operating systems; Mitigation: Convert all applications to a single OS.
- D) Challenge: Increased hardware costs; Mitigation: Reduce the number of VMs used.

**9. Compared to operating systems, what does a virtual machine provide a stronger abstraction of?**

- A) An entire hardware platform
- B) Individual hardware resources
- C) Application-specific interfaces
- D) Network connectivity

**10. Which of the following is a characteristic of container-based setups that makes them efficient for scalability?**

- A) Sharing the host OS kernel
- B) Requiring a separate OS for each container
- C) Higher resource overhead compared to VMs
- D) Slower startup times

**11. Which operating system memory management policy can lead to VM performance degradation due to excessive page swapping?**

- A) Paging
- B) Memory deduplication
- C) Ballooning
- D) Smart allocation algorithms

**12. What is a key benefit of virtualization that contributed to the shift towards cloud-native solutions?**

- A) Decoupling software from physical hardware
- B) Increasing the reliance on physical hardware
- C) Limiting the ability to consolidate servers
- D) Reducing the adoption of DevOps practices

**13. Modern hypervisors mitigate security risks by implementing measures such as:**

- A) Secure boot and encryption
- B) Allowing direct access to host memory
- C) Disabling regular patching
- D) Reducing isolation between VMs

**14. Why might VMs be preferred over containers for certain legacy applications?**

- A) When application components require different OSs or strong isolation.
- B) When the application is designed for microservices.
- C) When fast startup times are critical.
- D) When resource efficiency is the top priority.

**15. What is a characteristic of virtual machines that makes them less resource-efficient than containers?**

- A) Higher resource overhead
- B) Sharing the host OS kernel
- C) Faster startup times
- D) Lightweight nature

**16. Which memory management technique can improve efficiency in virtualized setups by freeing up unused memory from VMs?**

- A) Ballooning
- B) Paging
- C) Thrashing
- D) Swapping

**17. The evolution of virtualization technologies has directly supported which aspect of cloud-native designs?**

- A) Auto-scaling
- B) Increased hardware dependency
- C) Reduced reliance on APIs
- D) Slower disaster recovery

**18. What is the primary function of the hypervisor in relation to virtual machines?**

- A) To enforce isolation between VMs
- B) To provide a user interface for applications
- C) To manage individual hardware components
- D) To directly run applications without an OS

**19. For a legacy application migration, why is IaaS a good recommendation over PaaS or SaaS?**

- A) It provides full control over the OS and application stack.
- B) It requires significant code changes.
- C) It offers less customization.
- D) It abstracts away the operating system entirely.