



## IT602 Infrastructure Architecture MCQs

Which amount of new data is generated worldwide each day?

- A. 5 petabytes
- B. 10 petabytes
- C. 15 petabytes
- D. 50 petabytes

Answer: C

How often does the total amount of digital data approximately double?

- A. Every year
- B. Every two years
- C. Every five years
- D. Every ten years

Answer: B

Which storage medium was used in early computers?

- A. SSD
- B. Hard disk
- C. Punched cards
- D. Blu-ray disks

Answer: C

Paper tape stores data using:

- A. Magnetic fields
- B. Laser beams
- C. Electrical charges
- D. Holes in paper

Answer: D

Drum memory was widely used during which period?

- A. 1930s–1940s
- B. 1950s–1960s
- C. 1970s–1980s
- D. 1990s–2000s

Answer: B

Drum memory stores data using:

- A. Optical technology
- B. Magnetic coating

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- C. Flash memory
  - D. Semiconductor chips
- Answer: B

What was the storage capacity of drum memory?

- A. 5 MB
  - B. 2 MB
  - C. 62 KB
  - D. 300 GB
- Answer: C

Which was the first commercial digital disk storage system?

- A. IBM 726
  - B. DEC DLT
  - C. IBM RAMAC 350
  - D. LTO
- Answer: C

In which year was IBM RAMAC 350 introduced?

- A. 1952
  - B. 1956
  - C. 1964
  - D. 1970
- Answer: B

What was the storage capacity of IBM RAMAC 350?

- A. 62 KB
  - B. 2 MB
  - C. 5 MB
  - D. 10 MB
- Answer: C

How many disks were used in IBM RAMAC 350?

- A. 10
  - B. 20
  - C. 30
  - D. 50
- Answer: D

What was the approximate weight of IBM RAMAC 350?

- A. 100 kg
- B. 500 kg

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- C. 1 ton
  - D. 5 tons
- Answer: C

Over time, hard disk size has:

- A. Increased
- B. Remained same
- C. Shrunk
- D. Become unstable

Answer: C

Which improvement reduced seek times in hard disks?

- A. Stepper motors
- B. Servo-controlled heads
- C. Optical sensors
- D. Flash controllers

Answer: B

The IBM 726 is associated with which storage technology?

- A. Hard disk
- B. Magnetic tape
- C. SSD
- D. Optical disk

Answer: B

---

What was the storage capacity of IBM 726 per tape reel?

- A. 500 KB
- B. 1 MB
- C. 2 MB
- D. 5 MB

Answer: C

---

Magnetic reel tapes were mainly used until:

- A. 1960s
- B. 1970s
- C. Late 1980s
- D. 2000s

Answer: C

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Which company introduced Digital Linear Tape (DLT)?

- A. IBM
- B. HP
- C. DEC
- D. Intel

Answer: C

---

Super DLT cartridges can store up to:

- A. 100 GB
- B. 200 GB
- C. 300 GB
- D. 1 TB

Answer: C

---

Linear Tape Open (LTO) was developed in:

- A. 1980s
- B. Early 1990s
- C. Late 1990s
- D. 2000s

Answer: C

---

What is the capacity of LTO-7?

- A. 1 TB
- B. 3 TB
- C. 6 TB
- D. 10 TB

Answer: C

---

Most servers use which type of storage?

- A. Only internal
- B. Only external
- C. External with optional internal

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D. Optical  
Answer: C

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Disks mainly use which command sets to connect to controllers?

- A. USB and FireWire
- B. ATA and SCSI
- C. HDMI and VGA
- D. TCP and IP

Answer: B

---

ATA is also known as:

- A. SCSI
- B. IDE
- C. SATA
- D. SAS

Answer: B

---

Which command set uses simpler hardware and communication?

- A. SCSI
- B. ATA
- C. SAS
- D. Fibre Channel

Answer: B

---

Which command set is more complex?

- A. ATA
- B. IDE
- C. SCSI
- D. SATA

Answer: C

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Mechanical disks contain:

- A. Laser heads
- B. Flash chips
- C. Spinning platters
- D. Optical sensors

Answer: C

---

SATA disks are best suited for:

- A. High-speed databases
- B. Mission-critical systems
- C. Bulk storage
- D. Real-time analytics

Answer: C

---

Which disk type has the lowest cost per gigabyte?

- A. SAS
- B. SSD
- C. SATA
- D. NVMe

Answer: C

---

Which command set is used by SATA disks?

- A. SCSI
- B. SMART
- C. Fibre Channel
- D. NVMe

Answer: B

---

SAS disks typically rotate at:

- A. 5,400 rpm
- B. 7,200 rpm
- C. 10,000–15,000 rpm
- D. 20,000 rpm

Answer: C

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Compared to SATA disks, SAS disks have:

- A. Higher capacity
- B. Lower speed
- C. Lower reliability
- D. Better error handling

Answer: D

---

NL-SAS disks combine:

- A. SATA interface with SAS mechanics
- B. SAS interface with SATA mechanics
- C. SSD interface with SATA mechanics
- D. NVMe interface with SAS mechanics

Answer: B

---

Flash storage has which advantage?

- A. Moving parts
- B. High vibration
- C. Faster access
- D. High heat generation

Answer: C

---

Flash-based storage consumes:

- A. More power
- B. Less power
- C. Equal power
- D. Unstable power

Answer: B

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Which law states that storage density doubles regularly?

- A. Moore's Law
- B. Kryder's Law
- C. Newton's Law

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D. Ohm's Law  
Answer: B

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According to Kryder's Law, hard drive density doubles every:

- A. 6 months
- B. 13 months
- C. 2 years
- D. 5 years

Answer: B

---

By 2025, a single disk drive is expected to store more than:

- A. 1 TB
- B. 1 PB
- C. 10 PB
- D. 20 PB

Answer: D

---

To fully benefit from Kryder's Law, storage infrastructure should support:

- A. Fixed expansion
- B. Manual upgrades
- C. Just-in-time expansion
- D. No expansion

Answer: C

---

Which storage medium is the cheapest for storing large amounts of data?

- A. SSD
- B. Hard disk
- C. Tape
- D. Optical disk

Answer: C

---

Tape storage is best suited for:

- A. Real-time processing
- B. Operating systems

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- C. Archiving
  - D. Virtual memory
- Answer: C
- 

Tape manufacturers guarantee readability of DLT, SDLT, and LTO cartridges for up to:

- A. 10 years
- B. 20 years
- C. 30 years
- D. 50 years

Answer: C

---

Which is a disadvantage of tape storage?

- A. High cost
- B. Fragility
- C. High power consumption
- D. Limited capacity

Answer: B

---

Manual handling of tapes can cause damage due to:

- A. Encryption
- B. Compression
- C. Dropping and bumping
- D. Network latency

Answer: C

---

Tape cartridges contain which type of components?

- A. Optical
- B. Electronic only
- C. Mechanical
- D. Solid-state

Answer: C

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Frequent rewinding of tapes causes:

- A. Increased speed
- B. Data compression
- C. Stress to tape substrate
- D. Better reliability

Answer: C

---

Tape storage is considered slow because it:

- A. Uses optical reading
- B. Uses random access
- C. Uses sequential access
- D. Uses flash memory

Answer: C

---

To find a specific file on tape, the system must:

- A. Use an index table
- B. Read data sequentially
- C. Use random access
- D. Use parity blocks

Answer: B

---

Handling tape operations is measured in:

- A. Nanoseconds
- B. Microseconds
- C. Milliseconds
- D. Minutes

Answer: D

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What is the purpose of a tape library?

- A. Increase tape speed
- B. Store SSDs
- C. Automate tape handling
- D. Replace RAID

Answer: C

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Which component is NOT part of a tape library?

- A. Tape drives
- B. Cartridge slots
- C. Barcode or RFID reader
- D. Flash memory controller

Answer: D

---

A Virtual Tape Library (VTL) stores backups using:

- A. Magnetic tapes
- B. Optical disks
- C. Hard disks
- D. Cloud storage

Answer: C

---

A VTL emulates:

- A. SSD devices
- B. Optical disks
- C. Traditional tape devices
- D. Network switches

Answer: C

---

Most VTL solutions use which type of disks?

- A. SSD
- B. SAS
- C. NL-SAS or SATA
- D. NVMe

Answer: C

---

VTLs allow handling multiple tapes by providing:

- A. One tape drive
- B. Multiple virtual tape drives
- C. Faster rewind speed

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D. Manual handling  
Answer: B

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Storage controllers can be implemented as:

- A. Only software
  - B. PCI expansion boards
  - C. Optical readers
  - D. USB flash devices
- Answer: B
- 

In NAS or SAN environments, controllers connect using:

- A. HDMI
  - B. VGA
  - C. Fibre Channel, iSCSI, or FCoE
  - D. Bluetooth
- Answer: C
- 

Physical disks are divided into small pieces called:

- A. Clusters
  - B. Sectors
  - C. Physical extents
  - D. Pages
- Answer: C
- 

Virtual disks presented to the OS are called:

- A. RAID sets
  - B. LUNs
  - C. Partitions
  - D. Snapshots
- Answer: B
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RAID stands for:

- A. Redundant Array of Internal Disks
- B. Random Access Independent Disks
- C. Redundant Array of Independent Disks
- D. Rapid Access Integrated Disks

Answer: C

---

RAID improves:

- A. Cost and size
- B. Availability and performance
- C. Security and encryption
- D. Compression and deduplication

Answer: B

---

RAID can be implemented in:

- A. Hardware only
- B. Software only
- C. Hardware and software
- D. Firmware only

Answer: C

---

Which RAID level provides striping only?

- A. RAID 1
- B. RAID 5
- C. RAID 6
- D. RAID 0

Answer: D

---

RAID 0 has which major drawback?

- A. Low performance
- B. High cost
- C. No redundancy
- D. Limited capacity

Answer: C

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RAID 0 is suitable when:

- A. Data must be protected
- B. Data loss is acceptable
- C. Long-term storage is needed
- D. High availability is required

Answer: B

---

RAID 1 is also known as:

- A. Striping
- B. Parity
- C. Mirroring
- D. Spanning

Answer: C

---

RAID 1 uses how many disks to store the same data?

- A. One
- B. Two
- C. Three
- D. Four

Answer: B

---

Which RAID level is the most reliable?

- A. RAID 0
- B. RAID 1
- C. RAID 5
- D. RAID 6

Answer: B

---

In RAID 1, what percentage of disk space is used for redundancy?

- A. 25%
- B. 33%
- C. 50%

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Answer: C

---

RAID 10 combines:

- A. Parity and mirroring
- B. Striping and mirroring
- C. Striping and parity
- D. Mirroring and spanning

Answer: B

---

RAID 10 provides:

- A. Low cost
- B. Only high performance
- C. High performance and availability
- D. Only high availability

Answer: C

---

RAID 5 uses:

- A. Disk mirroring
- B. No redundancy
- C. Single distributed parity
- D. Double distributed parity

Answer: C

---

RAID 5 can tolerate failure of:

- A. No disk
- B. One disk
- C. Two disks
- D. Three disks

Answer: B

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RAID 6 protects against:

- A. Single disk failure
- B. Controller failure
- C. Double disk failure
- D. Power failure

Answer: C

---

RAID 6 uses how many parity blocks?

- A. One
- B. Two
- C. Three
- D. Four

Answer: B

---

Data deduplication removes:

- A. Corrupted data
- B. Encrypted data
- C. Duplicate data
- D. Compressed data

Answer: C

---

Data deduplication is used in:

- A. Archived data only
- B. Production data only
- C. Archived and production data
- D. Temporary data only

Answer: C

---

Deduplication systems use what to identify duplicates?

- A. Encryption keys
- B. Hash tables
- C. Parity blocks
- D. Index files

Answer: B

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Inline deduplication occurs:

- A. After data is written
- B. Before data is written
- C. During backup restore
- D. During snapshot creation

Answer: B

---

Inline deduplication causes:

- A. High storage usage
- B. Large performance penalty
- C. Data corruption
- D. Increased redundancy

Answer: B

---

Periodic deduplication is performed:

- A. In real time
- B. During high workload
- C. When performance demand is low
- D. Only during backups

Answer: C

---

In periodic deduplication, duplicate data is replaced with:

- A. Encrypted blocks
- B. Parity data
- C. Pointers to existing data
- D. New disk blocks

Answer: C

---

Cloning and snapshotting are used to:

- A. Increase disk speed
- B. Compress data
- C. Create point-in-time copies

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D. Encrypt data  
Answer: C

---

Cloning creates:

- A. A reference pointer
  - B. A full copy of a disk
  - C. A parity block
  - D. A snapshot index
- Answer: B
- 

A snapshot represents:

- A. A full backup
  - B. A mirrored disk
  - C. A point-in-time view of data
  - D. A compressed archive
- Answer: C
- 

When a snapshot is active:

- A. Data can be overwritten
  - B. Original disk becomes read-only
  - C. Disk is deleted
  - D. Parity is removed
- Answer: B
- 

New writes during a snapshot are stored on:

- A. The same disk
  - B. Tape media
  - C. Separate disk volume
  - D. Backup server
- Answer: C

Thin provisioning allows storage allocation that is:

- A. Less than physical capacity
- B. Equal to physical capacity

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- C. Greater than physical capacity
  - D. Fixed permanently
- Answer: C
- 

Approximately how much allocated storage is typically never used?

- A. 20%
- B. 30%
- C. 40%
- D. 50%

Answer: D

---

Thin provisioning ensures that applications:

- A. Fail when storage is full
- B. Always see required storage
- C. Use only physical disks
- D. Store data temporarily

Answer: B

---

Thin provisioning uses which technique to manage storage?

- A. Manual monitoring
- B. Fixed allocation
- C. Automated capacity management
- D. Disk mirroring

Answer: C

---

Physical disk space in thin provisioning is added:

- A. At installation time
- B. At fixed intervals
- C. When needed
- D. Never

Answer: C

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A typical use of thin provisioning is:

- A. CPU allocation
- B. Network routing
- C. Large home directories
- D. Encryption

Answer: C

---

A Storage Area Network (SAN) is best described as:

- A. A general-purpose LAN
- B. A wireless network
- C. A specialized storage network
- D. A cloud platform

Answer: C

---

A SAN connects:

- A. One server to one disk
- B. Storage to a single PC
- C. Central storage to multiple servers
- D. Backup servers only

Answer: C

---

SANs commonly use which technologies to connect servers to storage?

- A. USB and HDMI
- B. Fibre Channel and iSCSI
- C. Wi-Fi and Bluetooth
- D. HTTP and FTP

Answer: B

---

Virtual disks offered by SAN controllers are known as:

- A. Volumes
- B. Partitions
- C. LUNs
- D. Snapshots

Answer: C

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A LUN is accessible to:

- A. All servers in the SAN
- B. Any server with access rights
- C. Only the server that mounts it
- D. Only storage controllers

Answer: C

---

The core of a SAN consisting of switches is called the:

- A. Backbone
- B. Core switch
- C. Fabric
- D. Gateway

Answer: C

---

Host Bus Adapters (HBAs) are:

- A. Storage devices
- B. Network switches
- C. Interface cards in servers
- D. Disk controllers

Answer: C

---

SAN disk arrays typically contain:

- A. One or two disks
- B. Up to ten disks
- C. Dozens to hundreds of disks
- D. Only SSDs

Answer: C

---

A disk array in a SAN can store:

- A. A few gigabytes
- B. Tens of gigabytes
- C. Hundreds of terabytes or more

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D. Only temporary data  
Answer: C

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Which of the following is NOT a SAN connectivity protocol?

- A. Fibre Channel
- B. FCoE
- C. iSCSI
- D. HTTP

Answer: D

---

Fibre Channel operates primarily at which OSI layer?

- A. Layer 1
- B. Layer 2
- C. Layer 3
- D. Layer 7

Answer: B

---

Fibre Channel is designed mainly for:

- A. Web traffic
- B. Email services
- C. Storage data transport
- D. Multimedia streaming

Answer: C

---

Which is a supported Fibre Channel speed?

- A. 1 Gbit/s
- B. 5 Gbit/s
- C. 16 Gbit/s
- D. 100 Gbit/s

Answer: C

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Fibre Channel can run over:

- A. Wireless links only
- B. Copper and fiber cables
- C. Coaxial cables only
- D. Satellite links

Answer: B

---

Fibre Channel is considered reliable because it provides:

- A. Packet retransmission
- B. Encryption
- C. Zero data loss
- D. Compression

Answer: C

---

Which Fibre Channel topology connects devices in a loop?

- A. Point-to-Point
- B. Switched Fabric
- C. Arbitrated Loop
- D. Star topology

Answer: C

---

The most commonly used Fibre Channel topology today is:

- A. Arbitrated Loop
- B. Point-to-Point
- C. Switched Fabric
- D. Ring

Answer: C

---

Fibre Channel over Ethernet (FCoE) allows:

- A. Ethernet over Fibre Channel
- B. Fibre Channel over Ethernet
- C. TCP/IP over Fibre Channel
- D. SAN over Wi-Fi

Answer: B

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FCoE requires Ethernet speeds of at least:

- A. 1 Gbit/s
- B. 5 Gbit/s
- C. 10 Gbit/s
- D. 100 Mbit/s

Answer: C

---

FCoE eliminates the need for:

- A. Disk controllers
- B. Storage arrays
- C. Separate FC and Ethernet networks
- D. SAN switches

Answer: C

---

Which Ethernet feature ensures no packet loss for FCoE?

- A. NAT
- B. VLAN
- C. Lossless Ethernet
- D. DHCP

Answer: C

---

Quality of Service (QoS) in FCoE is used to:

- A. Encrypt packets
- B. Increase MTU size
- C. Prioritize storage traffic
- D. Compress data

Answer: C

---

Jumbo frames allow Ethernet packet sizes up to:

- A. 1500 bytes
- B. 2000 bytes
- C. 2500 bytes

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D. 9000 bytes  
Answer: C

---

Which adapter is required for FCoE?

- A. NIC
  - B. HBA
  - C. CNA
  - D. Modem
- Answer: C
- 

A Converged Network Adapter presents itself as:

- A. Two NICs
  - B. Two HBAs
  - C. NIC and HBA
  - D. Router and switch
- Answer: C
- 

iSCSI allows which protocol to run over Ethernet?

- A. FTP
  - B. HTTP
  - C. SCSI
  - D. SMB
- Answer: C
- 

iSCSI uses which network protocol stack?

- A. UDP only
  - B. Fibre Channel
  - C. TCP/IP
  - D. Bluetooth
- Answer: C
- 

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Compared to Fibre Channel, iSCSI performance is usually:

- A. Higher
- B. Equal
- C. Lower
- D. Unstable

Answer: C

---

iSCSI adoption has increased due to:

- A. Wireless networks
- B. Slower CPUs
- C. High-speed Ethernet and jumbo frames
- D. Optical storage

Answer: C

**What does the term "compute" generally refer to?**

- A) Storing files on a hard drive
- B) Performing calculations or executing instructions
- C) Displaying graphics on a screen
- D) Sending emails

Answer: B

**Which of the following is NOT a type of physical computer group?**

- A) Mainframes
- B) Midrange systems
- C) x86 servers
- D) Smartphones

Answer: D

**Which component is responsible for executing instructions in a computer?**

- A) Memory
- B) CPU
- C) BIOS
- D) Network card

Answer: B

**Which was the first publicly recognized general-purpose computer?**

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- A) Colossus
- B) ENIAC
- C) IBM 1401
- D) UNIVAC

Answer: B

**ENIAC could perform approximately how many operations per second?**

- A) 500
- B) 5,000
- C) 50,000
- D) 500,000

Answer: B

**What replaced vacuum tubes in computers during the 1960s?**

- A) Microprocessors
- B) Transistors
- C) Integrated circuits
- D) ARM chips

Answer: B

**What are the main advantages of transistors over vacuum tubes?**

- A) Smaller, faster, cheaper, reliable
- B) Larger, slower, expensive
- C) Only used in servers
- D) Required more power

Answer: A

**Integrated Circuits (ICs) are used to create:**

- A) Microprocessors and memory circuits
- B) Hard drives
- C) Keyboards
- D) Network cables

Answer: A

**Microprocessors became cheap enough for personal computers in which decade?**

- A) 1960s
- B) 1970s

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- C) 1980s
  - D) 1990s
- Answer: C**

**Which type of server is cheaper and shares power, fans, and network?**

- A) Tower server
  - B) Rack-mounted server
  - C) Blade server
  - D) Mainframe
- Answer: C**

**A blade enclosure typically hosts how many blade servers?**

- A) 2–4
  - B) 4–8
  - C) 8–16
  - D) 16–32
- Answer: C**

**What is the instruction set of a CPU?**

- A) The hardware components of the CPU
  - B) The set of operations a CPU can perform
  - C) The memory size of a computer
  - D) The network interface
- Answer: B**

**Which is the lowest level programming language?**

- A) C#
  - B) Python
  - C) Assembly language
  - D) Java
- Answer: C**

**What does a CPU require to operate?**

- A) A hard disk
- B) A high-frequency clock
- C) A keyboard

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- D) A GPU
- Answer: B

**CPU speed is measured in:**

- A) MHz
  - B) GHz
  - C) Mbps
  - D) Bytes
- Answer: B

**What is the typical word size of modern CPUs?**

- A) 4 bits
  - B) 16 bits
  - C) 32 bits
  - D) 64 bits
- Answer: D

**Which company created the x86 CPU architecture?**

- A) AMD
  - B) Intel
  - C) ARM
  - D) HP
- Answer: B

**Which CPU architecture is most used worldwide?**

- A) x86
  - B) Itanium
  - C) ARM
  - D) PowerPC
- Answer: C

**The ENIAC used which type of input/output?**

- A) Keyboard & monitor
  - B) Magnetic tape
  - C) IBM punched cards
  - D) USB drives
- Answer: C

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**The first Intel CPU in the original PC was:**

- A) 8086
- B) 8088
- C) 80386
- D) 80486

**Answer: B**

**Which company is the second-largest supplier of x86 CPUs?**

- A) Intel
- B) AMD
- C) ARM
- D) HP

**Answer: B**

**x86-64 architecture is:**

- A) Only for Intel CPUs
- B) 64-bit extension of x86 for Intel and AMD
- C) Only for AMD CPUs
- D) ARM-based

**Answer: B**

**Which CPU architecture powers most smartphones and set-top boxes?**

- A) Intel x86
- B) AMD Opteron
- C) ARM
- D) Itanium

**Answer: C**

**Blade enclosures reduce wiring and points of failure because:**

- A) They use more cables
- B) Components are shared across multiple servers
- C) They require separate power for each server
- D) They need more fans

**Answer: B**

**Which decade saw the shift from vacuum tubes to transistors?**

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- A) 1940s
  - B) 1950s
  - C) 1960s
  - D) 1970s
- Answer: C**

**The assembler programming language translates to:**

- A) Machine code
  - B) High-level code
  - C) Python code
  - D) SQL queries
- Answer: A**

**The CPU's largest single data transfer unit is called a:**

- A) Register
  - B) Word
  - C) Byte
  - D) Cluster
- Answer: B**

**Who started producing the SPARC processor series in 1986?**

- A) IBM
  - B) Sun Microsystems
  - C) Oracle
  - D) Intel
- Answer: B**

**What type of architecture is SPARC?**

- A) Proprietary
  - B) Open and non-proprietary
  - C) ARM-based
  - D) x86 only
- Answer: B**

**Which company bought Sun Microsystems in 2010?**

- A) IBM
- B) AMD

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- C) Oracle
  - D) Intel
- Answer: C

The latest SPARC model (2017) is:

- A) 24-core POWER9
  - B) 32-core SPARC M7, 4.1 GHz
  - C) 16-core Opteron
  - D) 22-core Xeon
- Answer: B

POWER / PowerPC CPUs were created by:

- A) Intel
  - B) Sun Microsystems
  - C) IBM
  - D) AMD
- Answer: C

Which supercomputer used 3,000 POWER7 cores?

- A) Deep Blue
  - B) Watson
  - C) Cray-1
  - D) ENIAC
- Answer: B

The latest POWER CPU (2017) is:

- A) POWER7
  - B) POWER8
  - C) POWER9, 24-core, 4 GHz
  - D) POWER10
- Answer: C

Which early memory technology used vacuum tubes?

- A) RAM
- B) Magnetic core memory
- C) Relays

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- D) Williams tube
- Answer: D**

**Relays as memory were:**

- A) Fast and cheap
  - B) Slow, noisy, heavy, expensive
  - C) Small and low power
  - D) Non-mechanical
- Answer: B**

**Magnetic core memory stores data using:**

- A) Capacitors
  - B) Small magnetic rings (cores)
  - C) Flip-flops
  - D) Vacuum tubes
- Answer: B**

**RAM is:**

- A) Non-volatile
  - B) Volatile
  - C) Mechanical
  - D) Obsolete
- Answer: B**

**SRAM uses:**

- A) Capacitor + transistor
  - B) Flip-flop circuits, 6 transistors per bit
  - C) Magnetic cores
  - D) Vacuum tubes
- Answer: B**

**DRAM requires:**

- A) No refresh
  - B) Regular refresh (~16 times/sec)
  - C) Flip-flops
  - D) Mechanical switches
- Answer: B**

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**BIOS is stored on:**

- A) Hard disk
- B) Flash memory chip on motherboard
- C) RAM
- D) External USB drive

**Answer: B**

**BIOS flashing refers to:**

- A) Installing a new CPU
- B) Updating BIOS software
- C) Installing RAM
- D) Installing OS

**Answer: B**

**RS-232 interface is used for:**

- A) USB devices only
- B) Older peripherals, industrial equipment, console ports
- C) PCIe expansion cards
- D) Thunderbolt devices

**Answer: B**

**USB 3.1 (2013) provides:**

- A) 1 Gbit/s
- B) 5 Gbit/s
- C) 10 Gbit/s
- D) 40 Gbit/s

**Answer: C**

**USB Type-C (2014) is:**

- A) Larger than USB-A
- B) Smaller, more power, reversible
- C) Only for keyboards
- D) Obsolete

**Answer: B**

**Thunderbolt 3 (2015) provides:**

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- A) 10 Gbit/s
- B) 20 Gbit/s
- C) 40 Gbit/s and 100 W power
- D) Only video signals

Answer: C

**Internal PCI interfaces are:**

- A) Serial links, point-to-point
- B) Parallel bus, shared communication path
- C) Wireless
- D) USB-based

Answer: B

**PCI Express (PCIe) uses:**

- A) Shared parallel bus
- B) Point-to-point serial links, crossbar hub
- C) RS-232 bus
- D) USB protocol

Answer: B

**Server virtualization is also called:**

- A) Hyper-threading
- B) Software Defined Compute (SDC)
- C) BIOS flashing
- D) PCI Express

Answer: B

**Virtual machines allow:**

- A) Only one OS per physical machine
- B) Multiple OS on a single physical machine
- C) Faster RAM
- D) Mechanical relays as memory

Answer: B

**VM sprawl occurs when:**

- A) Too many virtual machines are created
- B) Only one VM exists

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- C) RAM is upgraded
- D) BIOS is flashed

Answer: A

**Benefits of VM migration include:**

- A) No power saving
- B) Automatic failover and load balancing
- C) Requires manual reboot of all VMs
- D) Reduces BIOS updates

Answer: B

**Virtual machines must be:**

- A) Ignored after creation
- B) Managed, backed up, patched, powered
- C) Only created once
- D) Non-updatable

Answer: B

**Which platform is positioned between mainframe and x86 systems?**

- Midrange platform
- Mainframe
- Minicomputer
- PC

**What is a key feature of midrange platforms built by a single vendor?**

- High cost only
- Stability, high availability, and security
- Limited memory
- Requires multiple vendors

**Which of these is an IBM midrange system?**

- Power Systems
- HP Integrity
- SPARC Servers
- PDP-8

**Which OS runs on HP Integrity systems?**

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- HP-UX UNIX and OpenVMS
- AIX UNIX
- Solaris UNIX
- Linux only

**When did minicomputers first appear?**

- 1960s
- 1950s
- 1980s
- 1990s

**What was the first commercially successful minicomputer?**

- DEC PDP-8
- IBM 360
- Sun SPARC
- HP Integrity

**Why did minicomputers decline in the 1980s?**

- PCs became cheaper and LANs emerged
- They were too small
- Lack of multi-user OS
- Poor performance

**In shared memory architecture, memory changes by one CPU are:**

- Immediately visible to all other CPUs
- Invisible to other CPUs
- Only visible after reboot
- Visible to half of the CPUs

**UMA architecture is also called:**

- SMP (Symmetric Multi-Processor)
- NUMA
- LPAR
- WPAR

**NUMA architecture means:**

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- Memory access time is not uniform
- All CPUs share memory equally
- Only one CPU can access memory
- CPUs are not connected

**What ensures cache coherence in multi-CPU systems?**

- All CPUs update caches when one writes
- CPUs use separate memory
- Only main memory is updated
- Cache is disabled

**LPAR virtualization on IBM AIX is called:**

- WPAR (Workload Partition)
- nPAR
- Zone
- Container

**Which Oracle Solaris virtualization is used?**

- Zones and Containers
- WPAR
- nPAR
- SMP

**What is a major reason midrange systems are still used today?**

- High availability, performance, and security
- Low cost only
- Small size only
- Simple user interface

**When did x86 servers first appear?**

- 1990s
- 1980s
- 2000s
- 1970s

**x86 servers are basically:**

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- Big PCs in 19" racks without keyboard/monitor
- Mainframes
- Midrange systems
- Supercomputers

#### Common vendors of x86 servers include:

- HP, Dell, Lenovo, HDS, Huawei
- IBM, HP, Oracle
- Cray Research only
- Sun Microsystems

#### Most used operating systems on x86 servers are:

- Windows and Linux
- AIX UNIX and HP-UX
- Solaris UNIX only
- OpenVMS

#### Why did x86 servers become popular?

- Low cost, many vendors, familiar OS
- Extremely high reliability
- Only one application per server
- Requires specialized chips

#### Modern x86 systems use which architecture?

- PCH / SoC → RAM & PCIe directly connected to CPU
- Northbridge/Southbridge only
- UMA/SMP
- NUMA

#### A typical x86 server runs:

- One main application per server
- Multiple heavy applications natively
- Only Windows applications
- Only Linux applications

#### Virtualization products for x86 include:

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- VMware vSphere, Hyper-V, Citrix XenServer, VirtualBox, Red Hat RHEV
- WPAR, nPAR, Zones
- ECC Memory
- Lockstepping systems

### Supercomputers are designed for:

- Maximum calculation speed (floating point)
- High I/O throughput
- Running one application per server
- Low cost and energy efficiency

### Early supercomputers were produced by:

- Cray Research
- IBM only
- HP
- Oracle

### Modern high-performance computing uses:

- Large arrays of x86 servers and GPUs
- Only mainframes
- Only midrange systems
- Single PC

### GPU in supercomputers is used for:

- Accelerating parallel calculations
- Managing memory only
- Replacing CPU completely
- Running Windows applications

### Hot-swappable components allow:

- Replacement while server is running
- Reboot required for every change
- Only software updates
- Only one CPU per server

### ECC memory does what?

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- Detects and corrects memory errors
- Only detects errors
- Speeds up processing
- Replaces GPUs

**Lockstepping is used for:**

- Extreme reliability by comparing results of multiple systems
- Increasing virtualization efficiency
- Reducing cost
- GPU acceleration

**Failover clustering protects against:**

- Physical machine failure and virtual OS crashes
- Network congestion only
- Memory errors only
- CPU overheating

**Methods for handling physical machine failure in virtualization include:**

- Spare server takes over automatically
- All machines shut down
- Manual restart only
- Disabling virtual machines

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