1. Instance

- **What**: An instance is a single, running copy of an operating system or an application on a physical or virtual machine.
- **Why**: It's the basic unit of computation in cloud computing or virtualization.
- **How**: Cloud providers like AWS, Azure, or GCP allow users to create virtual machine instances to run workloads.

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2. Heap

- **What**: A heap is a memory area used for dynamic memory allocation, typically in programming or application execution.
- **Why**: It allows programs to request and free memory during runtime.
- **How**: For example, in Java, objects are stored in the heap, while references are in the stack.

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3. Persist

- **What**: To persist means to store data so it remains available even after the application stops running.
- **Why**: Essential for saving data for future use, such as in databases or files.
- **How**: Persistence can be achieved using databases (e.g., MySQL) or file systems.

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4. Linux Distribution

- **What**: A Linux distribution is a packaged version of Linux, containing the kernel and additional tools.
- **Why**: Distributions make it easier to use Linux for various purposes (e.g., Ubuntu for desktop, CentOS for servers).
- **How**: Popular distributions include Ubuntu, Fedora, Red Hat, and Debian.

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5. Data Center

- **What**: A facility used for storing, managing, and processing data.
- **Why**: Critical for hosting applications, websites, and business operations.
- **How**: Types include:
    - **On-premise**: Owned and operated by an organization.
    - **Colocation**: Space rented in a third-party data center.
    - **Cloud**: Services hosted by cloud providers (e.g., AWS, Azure).

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6. IaaS, PaaS, SaaS

- **What**: Cloud service models:
  - **IaaS** (Infrastructure as a Service): Provides virtualized computing resources (e.g., AWS EC2).
  - **PaaS** (Platform as a Service): Provides a platform for application development (e.g., Google App Engine).
  - **SaaS** (Software as a Service): Provides software over the internet (e.g., Google Workspace, Salesforce).

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7. Reliability, Scalability, Availability

- **What**: Key factors for system performance:
  - **Reliability**: Consistent functioning without failures.
  - **Scalability**: Ability to handle increased load by adding resources.
  - **Availability**: The uptime of a system or service.

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8. Disaster Recovery

- **What**: Strategies and processes to restore systems after a disaster.
- **Why**: Ensures minimal downtime and data loss.
- **How**: Includes backup, replication, and failover plans.

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9. Redundancy

- **What**: Duplicate components to ensure system reliability.
- **Why**: Reduces the risk of failures.
- **How**: For example, using RAID for disk redundancy or multiple network paths.

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10. High Availability

- **What**: Ensures a system or service is operational almost all the time (e.g., 99.99% uptime).
- **Why**: Critical for mission-critical systems.
- **How**: Achieved through redundancy, failover, and load balancing.

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11. Chaos App / Chaos Monkey

- **What**: Tools used to simulate failures in systems to test fault tolerance.

- **Why**: Helps ensure systems are resilient to unexpected failures.
- **How**: Chaos Monkey randomly shuts down instances to test recovery mechanisms.

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12. BIOS

- **What**: Basic Input/Output System, firmware for hardware initialization during boot.
- **Why**: Configures hardware settings and prepares the system to load the OS.
- **How**: Important for setting up virtual environments like Docker.

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13. HDD and SSD

- **What**:
  - **HDD**: Uses magnetic storage to read/write data.
  - **SSD**: Uses flash memory for faster electronic storage.
- **Why**: SSDs are faster but more expensive, while HDDs offer larger storage at lower costs.
- **How**: SSDs are common in laptops; HDDs are often used in archival systems.

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14. Data Lakes and Warehouses

- **What**:
  - **Data Lake**: Stores raw data for analytics.
  - **Data Warehouse**: Stores processed, structured data for business intelligence.
- **Why**: Both are used for data storage but serve different purposes.

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15. DAS, NAS, SAN

- **What**:
  - **DAS** (Direct-Attached Storage): Connected directly to a computer (e.g., external HDD).
  - **NAS** (Network-Attached Storage): Accessible over a network.
  - **SAN** (Storage Area Network): High-speed network connecting storage devices.

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16. Device-Level, Block-Level, File-Level Storage

- **What**:
  - **Device-Level**: Accesses the entire device.
  - **Block-Level**: Divides memory into blocks (e.g., for databases).

- **File-Level**: Stores and accesses data as files.

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17. RTO, RPO

- **What**:
  - **RTO** (Recovery Time Objective): Time needed to recover a system.
  - **RPO** (Recovery Point Objective): Data loss tolerance during a disaster.

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18. Incremental & Differential Backup

- **What**:
  - **Incremental**: Backs up only changes since the last backup.
  - **Differential**: Backs up changes since the last full backup.

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19. Backup and Recovery Strategies

- **What**: Plans to ensure data is backed up and recoverable.
- **Why**: Protects against data loss.
- **How**: Strategies include full, incremental, and differential backups.

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20. Version Control and Testing

- **What**:
  - **Version Control**: Tracks changes in code (e.g., Git).
  - **Regular Testing**: Ensures reliability of systems and backups.

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21. Types of Servers

- **What**:
  - Web Server, File Server, Database Server, Game Server, Application Server, Mail Server.

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22. Types of Firewalls

- **What**: Devices/software to filter traffic:
  - Stateful: Tracks connections and allows subsequent requests automatically.
  - Stateless: Does not track connections.

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23. Security Groups

- **What**: Rules to control inbound and outbound traffic in cloud environments.

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24. CloudWatch and CloudTrail

- **What**:
  - **CloudWatch**: Monitors AWS resources.
  - **CloudTrail**: Logs API activity in AWS.

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25. CIA Triad

- **What**: Security principles:
  - **Confidentiality**: Protecting data from unauthorized access.
  - **Integrity**: Ensuring data accuracy.
  - **Availability**: Ensuring data is accessible.

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26. Malware, Ransomware

- **What**:
  - **Malware**: Malicious software.
  - **Ransomware**: Encrypts data and demands payment.

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27. SQL Injection

- **What**: A type of attack injecting malicious SQL code to manipulate databases.

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28. Session Stickiness

- **What**: Ensures a user’s requests are directed to the same server.

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29. Load Balancing Algorithms

- **What**:
  - **Round Robin**: Distributes requests sequentially.

- **Weighted Round Robin**: Prioritizes servers based on weight.

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30. Hardware vs. Software Load Balancer

- **What**:
  - Hardware: Operates at the network layer.
  - Software: Operates at the application layer.