Atharva Pawar : BE Comps - A
(9427)

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DC : Assignment 1.

Q1. a) Grid Computing:

In grid computing, multiple computers & data centers are interconnected to form a distributed infrastructure. This infrastructure enables the sharing of computational resources, such as processing power, storage & specialized power, storage & specialized s/w applications, across different organizations or geographical locations. Grid computing finds applications in scientific research, weather forecasting, drug discovery & simulations that require massive computational power.

b) Cluster Computing:

Cluster computing involves the creation of clusters, which are interconnected groups of computers or servers that work together to perform complex tasks. Each cluster consists of multiple nodes & tasks are distributed among these nodes to achieve high performance & fault tolerance. Cluster computing is commonly used in data centers, web servers, financial modelling & scientific simulations.

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c) Cloud Computing

Cloud computing provides on-demand access to a shared pool of computing resources, including servers, storage, n/w, & services over the internet. Cloud computing offers scalability, flexibility & cost effectiveness making it suitable for various applications such as S/w as a services (SaaS), Infrastructure as a services (IaaS), & platform as a services (PaaS). Organizations can leverage cloud computing to deploy applications, store data & scale resources dynamically based on demand.

d) Distributed Computing:

Distributed computing involves the use of multiple interconnected computers or nodes to solve complex problems collaboratively. Tasks are divided into smaller subtasks & distributed among these nodes, which work concurrently to process data & produce results. Distributed computing is used in parallel processing, & data analytics, content delivery n/w (CDNs) & decentralized systems like blockchain.

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4) Ubiquitous Cloud Computing

Ubiquitous cloud computing represents a paradigm shift in how computing resources are accessed, managed & utilized. It involves the delivery of on demand computing services, including storage, processing power & applications, over the Internet. Instead of relying on local servers or individual devices, users tap into a shared pool of resources hosted on remote servers. This approach offers unparalleled flexibility, scalability & accessibility allowing users to access their data & applications from virtually anywhere with an Internet connection.

5) Parallel Computing:

Parallel Computing is a computational paradigm that involves the simultaneous execution of multiple tasks or subtasks, utilizing multiple processors or cores. This approach is pivotal for tackling complex problems by dividing them into smaller, manageable portions that can be processed concurrently. By harnessing the power of parallelism, tasks that would traditionally take a substantial amount of time can be completed much faster, leading to significant improvements in computational efficiency.

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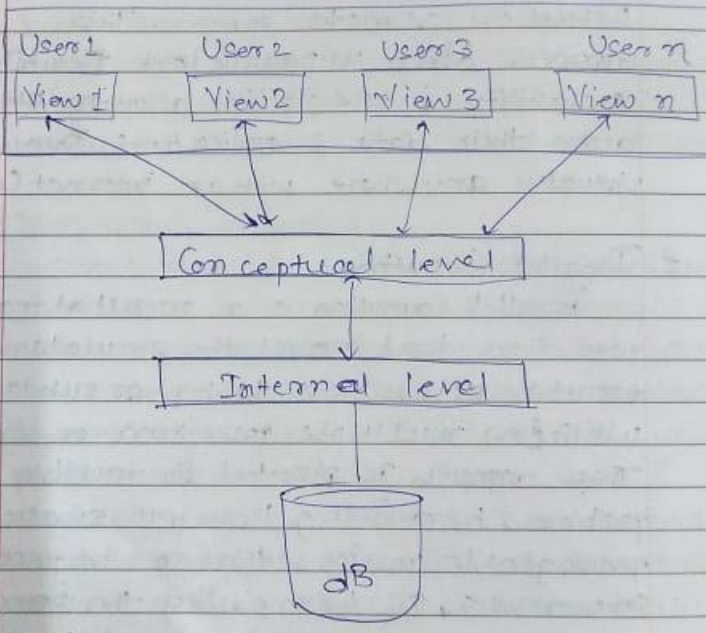
Q2) Multi-tiered architectures are commonly used in distributed computing environments to organize & structure the components of a sys. into multiple layers or tiers. Each tier handles specific functions & interacts with other tiers to process & deliver services to users.

A) Three-Tier Architecture.



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1. Presentation Tier:
The presentation tier, also known as the client tier, is responsible for interacting with users & presenting info. in a user-friendly format. It includes user interfaces, such as web browsers, mobile apps or desktop app.

2. Application Tier:
The application tier also known as the logic tier or middle tier, contains the business logic & application processing logic. It handles user requests, executes application-specific logic & accesses data from the data tier. This tier may consist of application servers, middleware or microservices.

3. Data tier:
The data tier, also known as the backend or storage tier, manages data storage & access. It stores & retrieves data from databases, file sys. or other data sources. This tier ensures data integrity, consistency, & security.

4. Application.
- Ecommerce platforms
- Online banking sy.
- ERP: Enterprise resource planning.

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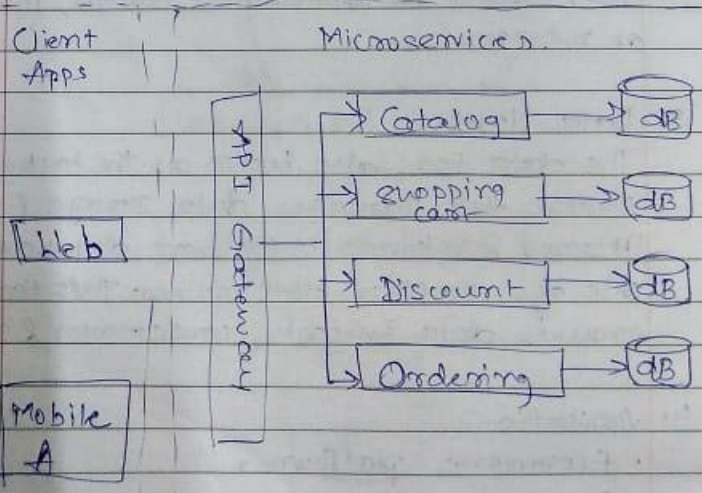
5. Advantages:
- Modular & Scalable arch.
- Separation of concerns b/w presentation, application & data layers.
- Improved maintainability & flexibility.

6. Disadvantages
- Increased complexity & overhead due to multiple tiers.
- Potential performance bottlenecks, especially in communication b/w tiers.

B) Microservices Architecture:



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1. Microservices:
In a microservices arch., applications are decomposed into smaller independent services that are developed, deployed & scaled independently. Each microservices represents a specific business function or capability & communications with other services via lightweight protocols, such as HTTP or message queues.

2. Applications:
- Cloud native app
- Scalable web app
- IoT platforms.

3. Advantages:
- Increased agility & scalability
- Improved fault isolation & resilience.
- Technology diversity & polyglot programming.

4. Disadvantages:
- Operational complexity, including service discovery, orchestration & monitoring.
- Distributed sys challenges, such as n/w latency & eventual consistency.

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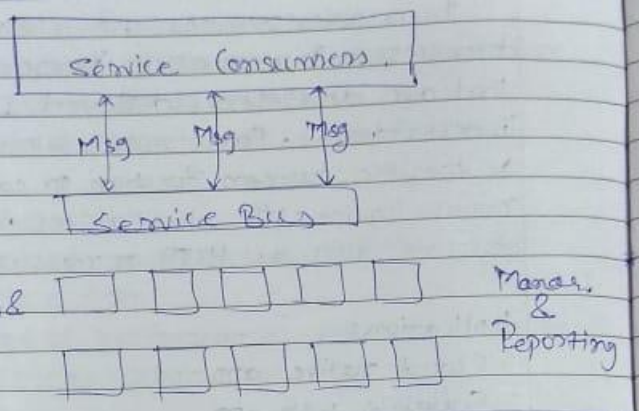
c) SOA: Service - Oriented Arch.



1. Services:
In a service-oriented arch. sys. functionality is encapsulated as reusable services that can be accessed & composed to fulfill business requirements. Services are loosely coupled & communicate through standardized protocols, such as SOAP or REST.

2. Application.
- Enterprise application integration (EAI)
- Composite applica.
- Cloud based servite.

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3. Advs:
- Reusability & interoperability of services.
- Flexibility to adapt to changing business needs.
- Promotes service autonomy & encapsulation.

4. Disadvantages:
- Complexity in service discovery, composition & orchestration.
- Governance & management challenges such as versioning & service lifecycle management.