CSA1526

Cloud Computing

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TEST - 1

1. Focus on the Concept of Service - oriented Computing (SOC) its significance in Modern Computing. How does SOC facilitate the development and deployment of flexible, scalle and Interperable Softwlare?

2. Discuss the differences between Parallel Processing and vector Processing in terms of their Architecture, operational principles and Applications. Provide the Examples of tasks or Problems that are well-suited to each Approach and Explain.

3. Write the Concept of Service virtulization in Cloud Computing including its benefits, challanges and Applications. How does Service virtulization Contribute to the flexibility, Efficiency of cloud based-systems?

Answers

1. Service oriented Computing and its significance:

* SOC is a Computing Paradigm that Leverages services as fundamental building blocks to develop flexible, Scalable and Interperable software systems. SOC is primarily implemented in Service-oriented Architecture (SOA) and micro Services Architecture in Modern Computing environments.

key Principles of SOC:

* SOC is build on the following Principles:

① Loose Coupling: services are independent and Interact through well-defined interfaces, Minimizing dependencies.

② Interoperability: Services Communicate using standard Protocols, enabling cross-Platform.

(3) Reusability: Services can be Reused across different platforms many times.

(4) Autonomy: Services function independently without being affected by changes in other services.

(5) Discoverability: services are published in directories and can be dynamically discovered and used.

SOC FACILTIES IN SOFTWARE DEVELOPMENT:

1. flexibility
2. scalability
3. Interoperability

SOC IN MODERN COMPUTING:

1. Enterprise Application: Large scale businesses use SOC to Integrate various departments via Web services.
2. Cloud Computing: SOC Enables cloud-native applications with Microservices and Serverless.

3. E-commerce platforms

4. IoT systems

5. Finincial services: Bank uses soc for Real-time transactions, fraud detection, and API-based services.

Conclusion:

SOC is a crucial Paradigm in Modern software development. It Enables modular, scalable, and interoperable systems that can adapt to dynamic business Requirments. Wheather in cloud Computing, Enterprise applications, or IOT, SOC Continues to drive Innovation by making software development More efficient, flemible and Resilient.

2. Parallel Processing and Vector Processing are two high- Performance Computing technique used to enhance Computational Speed and Efficiency.

* while both aim to process large amount of data quickly, they differ in Architecture, Operational Principles, Application domains.

OPERATIONAL PRINCIPLES:

Parallel Processing:

* It uses multiple Processing units to Execute multiple Instructions or data in Parallel.

* Implements different levels of Parallelism:

  * Task Parallelism
  * Data Parallelism.

* Used in multi-core Processors, cluster Computing & Distributed systems.

Example:

A supercomputer with thousands of processors solving different parts of simulation at same time.

VECTOR PROCESSING:

* It used vector Registers to process multiple data elements using one Instruction.
* Works well for highly structured data.
* used in scientific computing, graphics processing, AI workloads.

Example:

A GPU applying the same transformation to Millions of pixels in image at same time.

WHY THESE TWO?

* Parallel processing is effective for tasks that can be broken into independent subtasks.
* vector processing is better suited for structured. Repetive operations on large datasets.

Key Trade-offs:

* Parallel Processing scales well, but Synchronization and data sharing overhead can impact Performance.

* vector processing is highly efficient, but only when dealing with structured, SIMD friendly data.

Conclusion:

* Parallel Processing is suited for large, independent workloads like scientific simulations, cloud computing and distributed AI training.

* vector processing is ideal for mathematical computations, graphics Rendering & AI Interface.

* choosing between them depends on the nature of the workload, with some applications benefiting from combination of both.

3.

Service virtualization in Cloud Computing:

* Service virtulization is a technique used in cloud Computing to simulate the behaviour of services, API's and Applications without Requiring their full deployment.

* It Allows developers and testers to work with virtullazed services that mimic Real world system behaviour, enabling Continuous development, tasting and Integration even when the actual service are unavaliable.

* It is Particularly useful in Microservices, distributed systems, and cloud based Architectures, where different Components often depend on External API's, databases; or third Party Sericees.

Benefits of service Virtualization:

1. Increased flexibility

→ supports agile and DevOps methods.

2. Enhanced Efficiency

→ Allows early detection of issue before Production deployment.

3. Cost savings

→ Reduces Infrastructure cost by Complex Environments.

4. Scalability & Performance testing.

→ Helps in identifying performance bottlenecks.

5. Improved Realiability System.

→ Detects issue Related to service dependencies before Production.

Challanges:

1. Complexity in setup
2. Maintenance overhead
3. Limited Realism
4. Security concerns

Applications:

1. Software Development & testing
2. Microservices and API driven
3. Cloud based performance testing
4. Training and simulations.

Conclusion:

* It improves flexibility, efficiency, Reability in cloud Computing by allowing teams to develop, test and deploy software.