Class work - 6th Semester - Cloud computing

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Assignment - 1

Q.1 → Discuss briefly about grid Computing and distributed Computing. (4 marks).

Q.2 → Specify the process of virtualization. Discuss the potential benefits and risk associated with this in.

Q3- Identify any four characteristics of virtualization mention any two types of virtualization essentially required in any cloud setup.

Solution →

1. Grid computing and distributed computing are paradigms for utilizing multiple computing resource to solve complex problems, but they differ in structure and application.

Architecture - loosely coupled, heterogeneous systems.

Control → Decentralized Control; resources are often shared across multiple organizations.

Purpose → Resources sharing and solving large complex problems.

Domain - Typically spans multiple administrative domains.

Communication - Minimal; nodes operate independently with occasional interaction.

eg → Scientific research (eg. CERN's data processing).

Distributed computing → A system of interconnected computers working together as a cohesive unit.

Architecture - Can be tightly or loosely coupled, often homogeneous systems.

Control - may have centralized or decentralized control, typically within one organisation.

purpose → Co-ordinate execution of tasks, often, to improve reliability or performance.

Domain → Often within a single administrative domain

Communication → frequent and tightly integrated communication between nodes.

eg → Cloud computing, real time application
eg- Google search, netflix.

2→ Virtualization is the process of creating virtual instances of computing resources, such as servers, storage, devices or network, to optimize their utilization. This is done by using a hypervisor, which is a software layer that enables multiple virtual machines to run on a single physical machine.

Steps in the Virtualization process:

1. Hardware Abstraction: A hypervisor abstracts physical hardware, allowing multiple operating systems to run on one machine.

2. Resource Allocation: The hypervisor abstracts physical hardware, allowing multiple operating system allocates CPU, memory and storage VMs.

3. Management: Administrator manage VMs using virtualization tools for monitoring, scaling and maintainence.

4. Virtual machine creation: Each VM operates as an independent system.

5. Execution: Applications run within VMs isolated and independent from others

Benefits → cost efficiency, improved utilization, flexibility and scalability.

Risks → security vulnerabilities, single point of failure, performance overhead, complexity and data loss risks.

Ans 3 → The characteristics of virtualization :-

1. Isolation : virtual machines (VMs) operate independently, ensuring failures or issues in one VM don't impact others.

2. Hardware Independence: applications and operating systems run on virtual hardware, enabling compatibility across different physical devices.

3. flexibility & Scalability — Easily scale resources up or down as needed and deploy new VMs easily.

- types of Virtualization in cloud setup are

1. Server Virtualization.

2. Storage Virtualization.

1. Server virtualization : Enables multiple virtual servers to run on a single physical server, improving resource utilization.

2. Storage virtualization - Combines physical storage resources into unified virtual storage pool, providing scalability & flexibility.