

1. What is cloud computing? Explain services and models with advantages & disadvantages?

cloud computing

Cloud computing is the delivery of computing services such as servers, storage, databases, networking, software, analytics, intelligence and more, over the cloud (Internet).

cloud service models:

There are the following three types of cloud service models.

1. Infrastructure as a Service (IaaS)
2. Platform as a Service (PaaS)
3. Software as a Service (SaaS)

Infrastructure as a Service (IaaS):

IaaS is also known as Hardware as a Service (HaaS). It is a computing infrastructure managed over the Internet.

Platform as a service (PaaS):

PaaS cloud computing platform is created for the programmer to develop, test, run and manage the applications.



Software as a Service (SaaS):

SaaS is also known as "on-demand software"

It is a software in which the applications are hosted by a cloud service provider. Users can access these applications with the help of internet connection and web browser.

Advantages

Back up and restore data

Improved collaboration

Excellent accessibility

Low maintenance cost

Mobility

Disadvantages

Internet connectivity

Vendor lock-in

Limited control

Security

2 Explain about HPC and HTC

High performance computing (HPC)

HPC stressed upon the speed performance. The speed of HPC systems has increased from GFlops to PFlops these days, driven by the requirements from different fields like science engineering medicine and others. The systems that generally have high speed are super computers, main frames and other servers.

It should be noted here that the number of users is limited - less than 10% of all the users. The majority of the market now uses servers.

High throughput computing

The market-oriented computing is now going through a strategic change from HPC to HTC paradigm. HTC concentrates more on high-flux computing. The performance goal has shifted from speed of the device to the no. of tasks completed per unit of time.

HTC needs not only to improve the speed but also to solve other problems like availability cost, security and reliability.



3 Discuss about virtual machines and operations

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virtual machines (VM):

The VM is built with virtual resources managed by a guest OS to run a specific application. Between the VMs and the host platform we need a middleware called VM monitor. A hypervisor (VMM) is a program that allows different operating system to share a single hardware host.

VM Primitive operations

A VMM operation provides VM abstraction to the guest OS. The VMM can also export an abstraction of full virtualization so that a standard OS can run it as it would on physical hardware. Low level VMM operations are indicated.

- * The VMs can be multiplexed between machine
- * A VM can be suspended and stored in a stable storage.
- * A suspended VM can be resumed on a new hardware platform.
- * A VM can be migrated from one hardware platform to another.

4. Discuss Amdahl's law?

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Amdahl's law :

Consider the execution of a given program on a uniprocessor workstation with a total execution time of T minutes. Say the program is running in parallel with other servers on a cluster of many processing nodes. Assume that a fraction α of the code must be executed sequentially. Hence $(1 - \alpha)$ of the code can be compiled for parallel execution by n processors. The total execution time of the program is calculated by $\alpha T + (1 - \alpha)T/n$ where the first term is for sequential execution time on a single processor and the second term on n parallel nodes.

$$\text{Speedup } S = T / [\alpha T + (1 - \alpha)T/n] = 1 / [\alpha + (1 - \alpha)/n]. \quad (1)$$

The maximum speedup of n can be obtained only if α is reduced to zero or the code can be parallelized with $\alpha = 0$.

* As the cluster becomes large (that is $n \rightarrow \infty$), S approaches $1/\alpha$ which is the threshold on the speedup of S .

* The sequential bottleneck is the portion of the code that cannot be parallelized.

