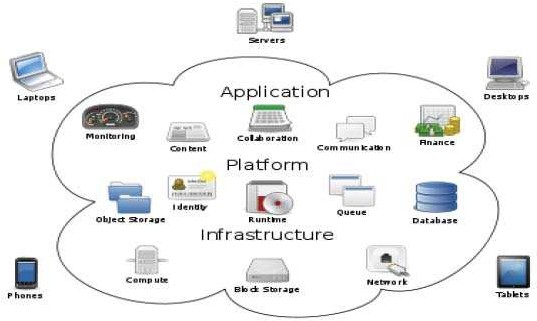
High Performance Computing (HPC) centers always available to deliver additional computing power to their clients .A cloud system created to manage resources for both hardware and software. , The term "cloud operating computing" is used to describe how multiple computers are used to share huge systems, applications, and processing capacity. Now, every business is embracing computerization. Every company cannot afford to invest a significant amount of money in buying servers and hiring IT personnel to manage such servers. Instead of doing this, a better choice is to utilize cloud computing, where organizations just need to use the services of cloud computing providers as needed. There are numerous options when selecting a cloud service provider. Microsoft Azure and Amazon EC2 are two examples of such cloud service providers.

**Introduction:**

*Cloud computing is having various key features like*.

* 1. Reduce capital expenditure.
  2. Device and location independence.
  3. Peak-load capacity increases.
  4. Reliability is improved.
  5. Scalability.
  6. Security.
  7. Ease of Maintenance.



**cloud Service Models.**

1. **Software as a Service (SaaS)**

Software as a service is a method of distributing software in which users can access programmes through a network, usually the Internet, that are hosted in the cloud by a vendor or service provider.

1. **Platform as a Service (PaaS)**

Renting hardware, operating systems, storage, and network bandwidth online is possible with platform as a service (PaaS). The user can rent virtualized servers and related services using the service delivery model to run their current apps or create

1. **Infrastructure as a service (IaaS).**

infrastructure as a Service is a delivery model where a business outsources the hardware, servers, storage, and networking components needed to support operations.

The equipment belongs to the service provider, who is also in charge of storing, running, and maintaining it. Usually, the customer pays per use.

**EC2:**

A web service called Amazon Elastic Computation Cloud (Amazon EC2) offers resizable compute power in the cloud. For developers, it is intended to make web-scale computing easy. The basic web service interface for Amazon EC2 makes it easy for you to get and set up capacity. It gives you complete control over your computing resources and enables you to utilise the dependable computing environment provided by Amazon. You can easily scale capacity up and down as your computing needs vary using Amazon EC2, which cuts the time needed to purchase and boot new server instances to minutes.

With Amazon EC2, you may alter the economics of computing by only paying for the capacity that you really utilise.

The tools provided by Amazon EC2 enable developers to create applications that are resistant to failure and to insulate themselves from common failure situations.

**all components of Amazon Elastic Compute Cloud**

**Elastic Compute Units:**

As an abstraction of computing resources, Amazon EC2 created the Elastic Compute Unit (ECU). One EC2 Compute Unit has the same CPU power as a 1.0-1.2 GHz processor.

**Amazon EC2 Instances Types:**

The six categories of Amazon EC2 instance types are listed below.

Standard

Micro

High-Memory

High CPU

Cluster Compute

Cluster GPU

**EC2 Storage Types:**

Elastic Block Store(EBS) is a type of network-based persistent storage that may be attached to active instances or used as a persistent boot medium.

Instance Storage: Data will be lost after an instance terminates because this local storage is not permanent.

**Amazon CloudWatch**

AWS cloud services and apps are monitored via Amazon CloudWatch, a web service, beginning with Amazon EC2.. It gives you insight into resource usage, operational efficiency, and general demand patterns, including measures like CPU utilisation, disc writes and read, and network traffic. For your metric data, you may receive statistics, see graphs, and create alarms. Simply choose the Amazon EC2 instances you want to watch to start using Amazon CloudWatch.

**Automated Scaling**

You may use Auto Scaling to automatically increase or decrease your Amazon EC2 capacity in accordance with the criteria you specify. You may make sure that the set of Amazon EC2 instances you're running grows up automatically during demand increases to maintain performance and scales down automatically during demand slow periods to decrease expenses using auto scaling.

**By transforming scalable software services into first-class objects, XOS(Extenable operating system) increases the level of abstraction in an IaaS cloud architecture.**

**an expandable cloud operating system that establishes consistent abstractions on top of a number of cloud-based services Because XOS performs a number of functions as an operating system would do on a normal computer, we refer to it simply as an operating system.**

**An operating system offers a variety of connected techniques to empower people.**

**If we use Unix as our leading model, then an OS provides isolated resource containers where programmes run (e.g., processes); mechanisms for programmes to communicate with each other (e.g., pipes); conventions about how programmes are named (e.g., /usr/bin), configured (e.g., /etc), and started (e.g., init); a mechanism to programme new functionality through the composition of existing programmes (e.g., shell); and a way to identify (e.g., device drivers)**

XOS provides counterparts to all these mechanism.

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High Performance Computing (HPC) is essential for increased competitiveness and stronger innovation.

There are two realistic scenarios today to access HPC capacities. One option consists in acquiring and operating an HPC system. However, for many companies and especially SMEs, this is seen as a non-viable solution since the Total Cost of Ownership (TCO) is perceived as too high and additional skills and manpower are needed to operate and maintain such a system

With the rapidly growing enthusiasm around the Cloud Computing (CC) paradigm, and more particularly of the Infrastructure-as-a-Service (IaaS) model which is best suited for HPC workload.. a second viable option is foreseen and attracts more and more attention due to the massive advertisement toward the cost-effectiveness of this approach

In this model, users rent from providers a resource that include computing, storage and network or higher level services. At present, many large actors of the Cloud Computing market propose an Infrastructure-as-a-Service (IaaS) service to their users, i.e., the possibility for users to rent virtual machines and other services such as network and storage to the provider. The cost model of IaaS is based on the actual resource usage of the user, who is thus billed depending on his activity. The computing resources are operated upon virtual machines and ran on a multi-tenant mode on the physical hardware. Characterized by their scalability and high-availability, IaaS platforms tend to be more and more efficient and are now sliding towards the territory of the traditional HPC facilities

Our approach to address this price comparison