**What is Cloud Computing?**

Cloud Computing can be defined as delivering computing power ( CPU, RAM, Network Speeds, Storage OS software) a service over a network (usually on the internet) rather than physically having the computing resources at the customer location.

Cloud computing is the on-demand delivery of IT resource over the Internet with pay-as-you-go pricing. Instead of buying, owning and maintaining physical data centres and servers , you can access technology services, such as computing power, storage, and databases, on an as-needed basis from a cloud provider like Amazon Web Services(AWS)

**Why the Name Cloud?**

The term “Cloud” came from a network design that was used by network engineers to represent the location of various network devices and there inter-connection.  The shape of this network design was like a cloud.

**Why cloud computing?**

With increase in computer and Mobile user’s, data storage has become a priority in all fields. Large and small scale businesses today thrive on their data & they spent a huge amount of money to maintain this data. It requires a strong IT support and a storage hub. Not all businesses can afford high cost of in-house IT infrastructure and back up support services. For them Cloud Computing is a cheaper solution. Perhaps its efficiency in storing data, computation and less maintenance cost has succeeded to attract even bigger businesses as well.

Cloud computing decreases the hardware and software demand from the user’s side. The only thing that user must be able to run is the cloud computing systems interface software, which can be as simple as Web browser, and the Cloud network takes care of the rest. We all have experienced cloud computing at some instant of time, some of the popular cloud services we have used or we are still using are mail services like gmail, hotmail or yahoo etc.

While accessing e-mail service our data is stored on cloud server and not on our computer. The technology and infrastructure behind the cloud is invisible. It is less important whether cloud services are based on HTTP, XML, Ruby,[PHP](https://www.guru99.com/php-tutorials.html)or other specific technologies as far as it is user friendly and functional. An individual user can connect to cloud system from his/her own devices like desktop, laptop or mobile.

**Who is using cloud computing?**

Organizations of every type, size, and industry are using the cloud for a wide variety of use cases, such as data backup, disaster recovery, email, virtual desktops, software development and testing, big data analytics, and customer-facing web applications. For example, healthcare companies are using the cloud to develop more personalized treatments for patients. Financial services companies are using the cloud to power real-time fraud detection and prevention. And video game makers are using the cloud to power real-time fraud detection and prevention. And video game makers are using the cloud to deliver online games to millions of players around the world.

**Types of cloud computing?**

**The three main types of cloud computing**

Public Cloud

Some public cloud examples include those offered by Amazon, Microsoft, or Google. These companies provide both services and infrastructure, which are shared by all customers. Public clouds typically have [massive amounts of available space](https://www.vxchnge.com/blog/business-data-storage-methods), which translates into [easy scalability](https://www.vxchnge.com/blog/cloud-computing-scalability-benefits). A public cloud is often recommended for software development and collaborative projects. Companies can design their applications to be portable, so that a project that’s tested in the public cloud can be moved to the private cloud for production. Most cloud providers package their computing resources as part of a service. Public cloud examples range from access to a completely [virtualized infrastructure](https://www.vxchnge.com/blog/containerization-vs-virtualization) that provides little more than raw processing power and storage (Infrastructure as a Service, or IaaS) to specialized software programs that are easy to implement and use (Software as a Service, or SaaS).

Private Cloud

Private clouds usually reside behind a firewall and are utilized by a single organization. A completely [on-premises cloud](https://www.vxchnge.com/blog/on-premise-vs.-colocation) may be the preferred solution for businesses with very tight regulatory requirements, though private clouds implemented through a colocation provider are gaining in popularity. Authorized users can access, utilize, and store data in the private cloud from anywhere, just like they could with a public cloud. The difference is that no one else can access or utilize those computing resources. Private cloud solutions offer both [security and control](https://www.vxchnge.com/blog/secure-data-cloud-computing), but these benefits come at a cost. The company that owns the cloud is responsible for both software and infrastructure, making this a less economical model than the public cloud.

Hybrid Cloud

Hybrid clouds combine public clouds with private clouds. They are designed to [allow the two platforms to interact seamlessly](https://www.vxchnge.com/blog/benefits-hybrid-cloud), with data and applications moving seamlessly from one to the other.

The primary advantage of a hybrid cloud model is its ability to provide the scalable computing power of a public cloud with the security and control of a private cloud. Data can be stored safely behind the firewalls and encryption protocols of the private cloud, then moved securely into a public cloud environment when needed. This is especially helpful in the age of big data analytics, when [industries like healthcare](https://www.vxchnge.com/blog/big-data-healthcare) must adhere to strict data privacy regulations while also using sophisticated algorithms powered by artificial intelligence (AI) to derive actionable insights from [huge masses of unstructured data](https://www.vxchnge.com/blog/improve-unstructured-data-management)

**Cloud Services?**

The three main types of cloud include Infrastructure as a Service, Platform as a Service, and Software as a Service. Each type of cloud computing provides different levels of control, flexibility, and management so that you can select the right set of services for your needs.

Infrastructure as a Service (IaaS) :-

IaaS contains the basic building blocks for cloud IT. It typically provides access to networking features, computers (virtual or on dedicated hardware), and data storage space. IaaS gives you the highest level of flexibility and management control over your IT resources. It is most similar to the existing IT resources with which many IT departments and developers are familiar.

Platform as a Service (PaaS) :-

PaaS removes the need for you to manage underlying infrastructure (usually hardware and operating systems), and allows you to focus on the deployment and management of your applications. This helps you be more efficient as you don’t need to worry about resource procurement, capacity planning, software maintenance, patching, or any of the other undifferentiated heavy lifting involved in running your application.

Software as a Service (SaaS) :-

SaaS provides you with a complete product that is run and managed by the service provider. In most cases, people referring to SaaS are referring to end-user applications (such as web-based email). With a SaaS offering, you don’t have to think about how the service is maintained or how the underlying infrastructure is managed. You only need to think about how you will use that particular software.

**Advantages of Cloud Computing?**

**Cost Savings**

Cost saving is the biggest benefit of cloud computing. It helps you to save substantial capital cost as it does not need any physical hardware investments. Also, you do not need trained personnel to maintain the hardware. The buying and managing of equipment is done by the cloud service provider.

**High Speed**

Cloud computing allows you to deploy your service quickly in fewer clicks. This faster deployment allows you to get the resources required for your system within fewer minutes.

**Back-up and restore data**

Once the data is stored in a Cloud, it is easier to get the back-up and recovery of that, which is otherwise very time taking process on-premise.

**Automatic Software Integration**

In the cloud, software integration is something that occurs automatically. Therefore, you don't need to take additional efforts to customize and integrate your applications as per your preferences.

**Reliability**

Reliability is one of the biggest pluses of cloud computing. You can always get instantly updated about the changes.

**Unlimited storage capacity**

The cloud offers almost limitless storage capacity. At any time you can quickly expand your storage capacity with very nominal monthly fees.

**Collaboration**

The cloud computing platform helps employees who are located in different geographies to collaborate in a highly convenient and secure manner.

**Quick Deployment**

Last but not least, cloud computing gives you the advantage of rapid deployment. So, when you decide to use the cloud, your entire system can be fully functional in very few minutes. Although, the amount of time taken depends on what kind of technologies are used in your business.

**Elasticity**

You can scale these resources up or down to instantly to grow and shrink capacity as your business needs change.

**Disadvantages of Cloud Computing?**

**Internet Connectivity**

Good Internet connectivity is a must in cloud computing. You can't access cloud without an internet connection. Moreover, you don't have any other way to gather data from the cloud.

**Lower Bandwidth**

Many cloud storage service providers limit bandwidth usage of their users. So, in case if your organization surpasses the given allowance, the additional charges could be significantly costly

**Loss of Control**

You are, essentially, trusting another party to take care of your data. You are trusting that they will maintain their data centers and servers with the same care as you would, if not more. You have to trust that your provider’s data centers are compliant and secured both physically and online. Some find the lack of in-house control of the server unnerving.

**Technical Issues**

If you experience any technical issues, you have no choice but to call your [hosted provider’s technical support](https://centretechnologies.com/it-support/) for help. You cannot fix your cloud computing problems in-house, and some providers do not offer around-the-clock technical support.

**What is EC2?**

Amazon Elastic Compute Cloud (Amazon EC2) is a web service that provides secure, resizable compute capacity in the cloud. It is designed to make web-scale cloud computing easier for developers. Amazon EC2’s simple web service interface allows you to obtain and configure capacity with minimal friction. It provides you with complete control of your computing resources and lets you run on Amazon’s proven computing environment.

Amazon [EC2](https://aws.amazon.com/ec2/) (Elastic Compute Cloud), one of Amazon Web Services’ most well-known services, offers businesses the ability to run applications on the public cloud. Developers can create instances of virtual machines and easily configure the capacity scaling of instances using the EC2 web interface.

EC2 also allows users to build apps to automate scaling according to changing needs and peak periods, and makes it simple to deploy virtual servers and manage storage, lessening the need to invest in hardware and helping streamline development processes.

**Scale-up and Scale-down?**

When ram and hard-disk are increase dynamically by AWS its called as scale-up.

When ram and hard-disk are decrease dynamically by AWS its called as scale-down.

**What is SSH**

The SSH protocol (also referred to as Secure Shell) is a method for secure remote login from one computer to another. It provides several alternative options for strong authentication, and it protects the communications security and integrity with strong encryption. It is a secure alternative to the non-protected login protocols (such as [telnet](https://www.ssh.com/ssh/telnet), rlogin) and insecure file transfer methods (such as [FTP](https://www.ssh.com/ssh/ftp/)).

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***Security group?***

A *security group* acts as a virtual firewall for your EC2 instances to control incoming and outgoing traffic. Inbound rules control the incoming traffic to your instance, and outbound rules control the outgoing traffic from your instance. When you launch an instance, you can specify one or more security groups. If you don't specify a security group, Amazon EC2 uses the default security group. You can add rules to each security group that allow traffic to or from its associated instances. You can modify the rules for a security group at any time. New and modified rules are automatically applied to all instances that are associated with the security group. When Amazon EC2 decides whether to allow traffic to reach an instance, it evaluates all of the rules from all of the security groups that are associated with the instance.

**Data Center?**

A data center traditionally refers to server hardware on your premises to store and access data through your local network. It is typically maintained by an in-house IT department on your company's payroll.

**Availability zones?**

Availability zones (AZs) are isolated locations within data center regions from which public cloud services originate and operate. Regions are geographic locations in which public cloud service providers' data centers reside.

Example :- Maharshtra is Data Center and Mumbai,Aurangabad,Nashik are availability Zone Under This Data Center.

**Amazon S3?**

Amazon Simple Storage Service (Amazon S3) is an object storage service that offers industry-leading scalability, data availability, security, and performance. This means customers of all sizes and industries can use it to store and protect any amount of data for a range of use cases, such as websites, mobile applications, backup and restore, archive, enterprise applications, IOT devices, and big data analytics.

The data store in the form of immutable object.

We have to create a root directory it is also called as bucket, name of bucket should be unique across the AWS.

**Amazon RDS?**

Amazon Relational Database Service (Amazon RDS) makes it easy to set up, operate, and scale a relational database in the cloud. It provides cost-efficient and resizable capacity while automating time-consuming administration tasks such as hardware provisioning, database setup, patching and backups. It frees you to focus on your applications so you can give them the fast performance, high availability, security and compatibility they need.

Amazon RDS is available on several [database instance types](https://aws.amazon.com/rds/instance-types/) - optimized for memory, performance or I/O - and provides you with six familiar database engines to choose from, including [Amazon Aurora](https://aws.amazon.com/rds/aurora/), [PostgreSQL](https://aws.amazon.com/rds/postgresql/), [MySQL](https://aws.amazon.com/rds/mysql/), [MariaDB](https://aws.amazon.com/rds/mariadb/), [Oracle Database](https://aws.amazon.com/rds/oracle/), and [SQL Server](https://aws.amazon.com/rds/sqlserver/). You can use the [AWS Database Migration Service](https://aws.amazon.com/dms/) to easily migrate or replicate your existing databases to Amazon RDS.

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| **RDS** | **SQL in EC2** |
| We need only OS | We will need OS + extra resource |
| Manage and maintain by you | Manage and maintain by AWS |
| Security risk to your side | Security risk to AWS side |
| RDS is a Database as a Service that automatically configures and maintains your databases in the AWS cloud | The user has limited power over specific configurations in comparison to running MySQL directly on Elastic Compute Cloud (EC2). |
| Amazon RDS is easier to set up, manage, and maintain than running Oracle Database | It is not easier to set up, manage, and maintain than running Oracle Database |