Cloud Storage Models

By Prof. Tanmoy Biswas,
HOD, Department of Computer Science,
Syamaprasad College.

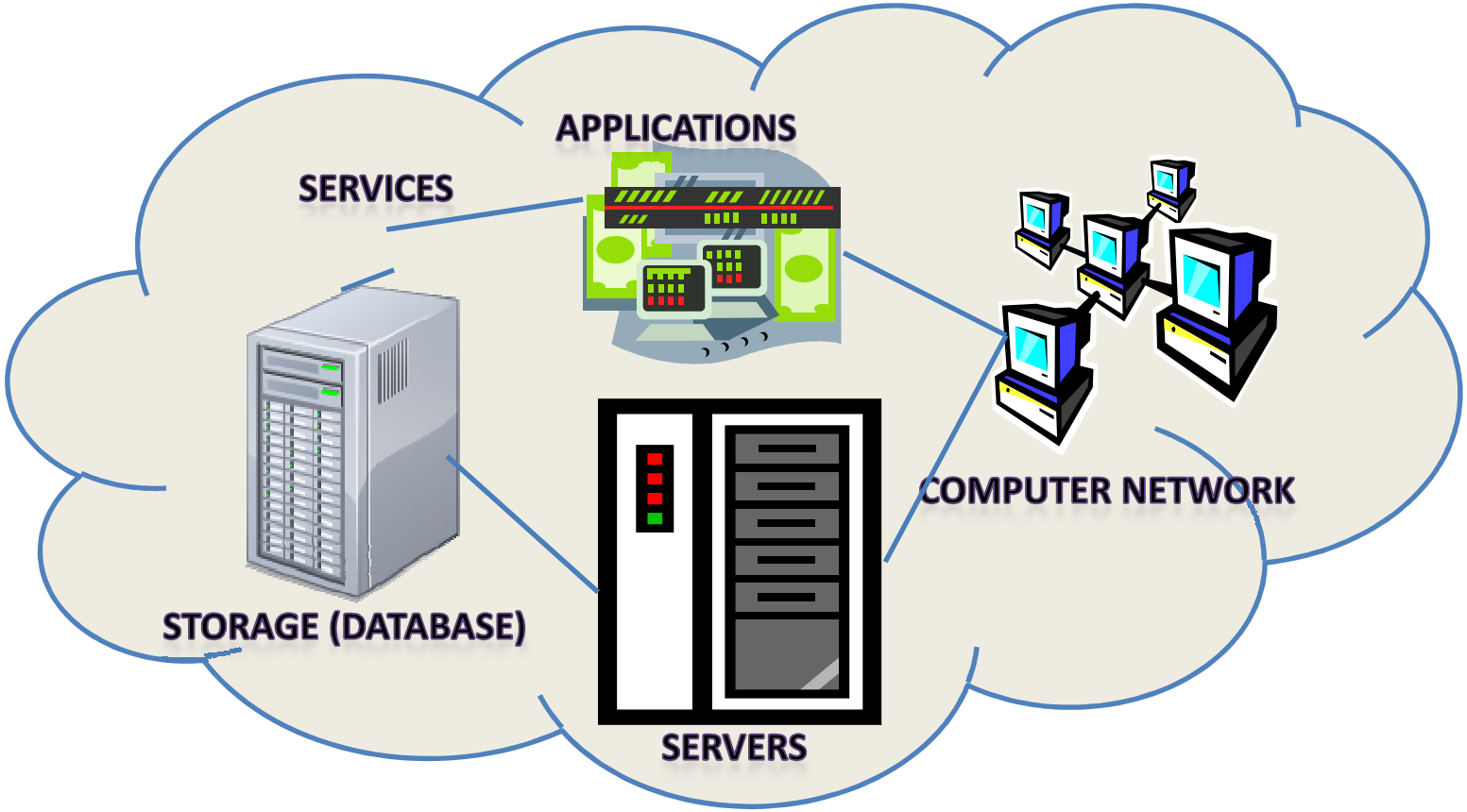
What is cloud storage?

- Cloud storage is a model of computer data storage in which the digital data is stored in logical pools.
- The physical storage spans multiple servers (sometimes in multiple locations), and the physical environment is typically owned and managed by a hosting company.
- These cloud storage providers are responsible for keeping the data available and accessible, and the physical environment protected and running.
- People and organizations buy or lease storage capacity from the providers to store user, organization, or application data.

Defining Cloud Computing

Cloud computing is a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction.

What is Cloud Computing ?



- Shared pool of configurable computing resources
- On-demand network access
- Provisioned by the Service Provider

Cloud Model

There are three Service models.

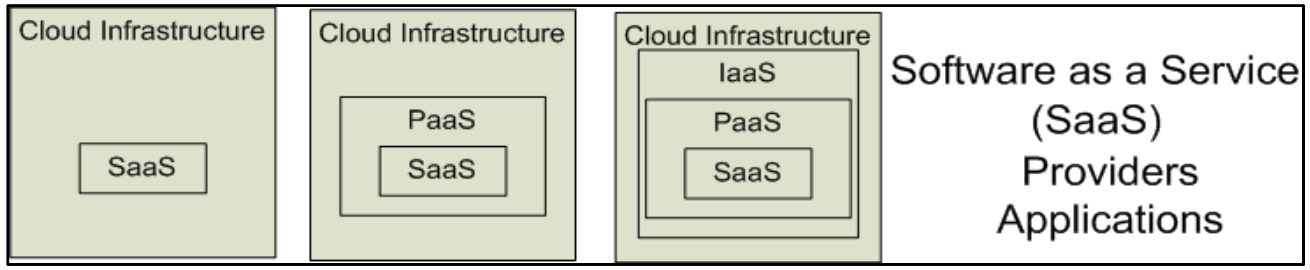
1. Cloud Software as a Service (SaaS)
2. Cloud Platform as a Service (PaaS)
3. Cloud Infrastructure as a Service (IaaS)

Cloud Service Models

Software as a Service (SaaS) | Platform as a Service (PaaS) | Infrastructure as a Service (IaaS)

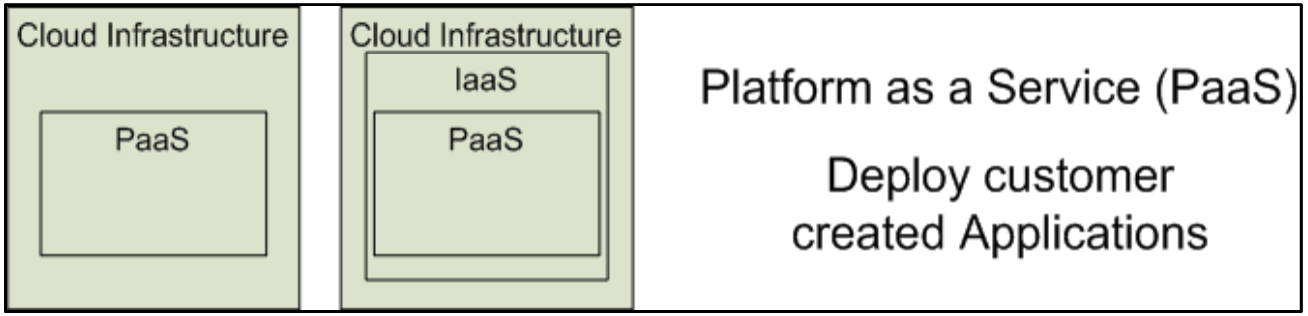
SalesForce CRM

LotusLive



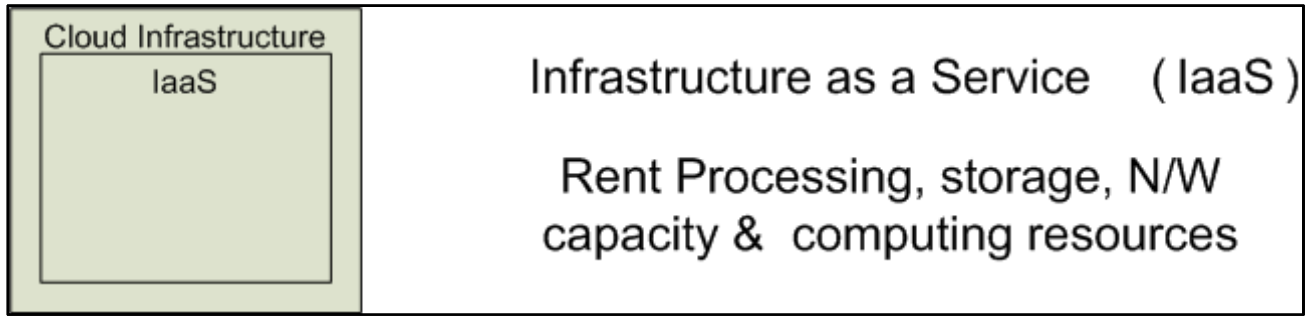
Google App Engine

Windows Azure
The Future Made Familiar



amazon web services™

rackspace HOSTING



Cloud Model

There are four **deployment models**.

1. Private cloud
2. Public Cloud
3. Community Cloud
4. Hybrid Cloud.

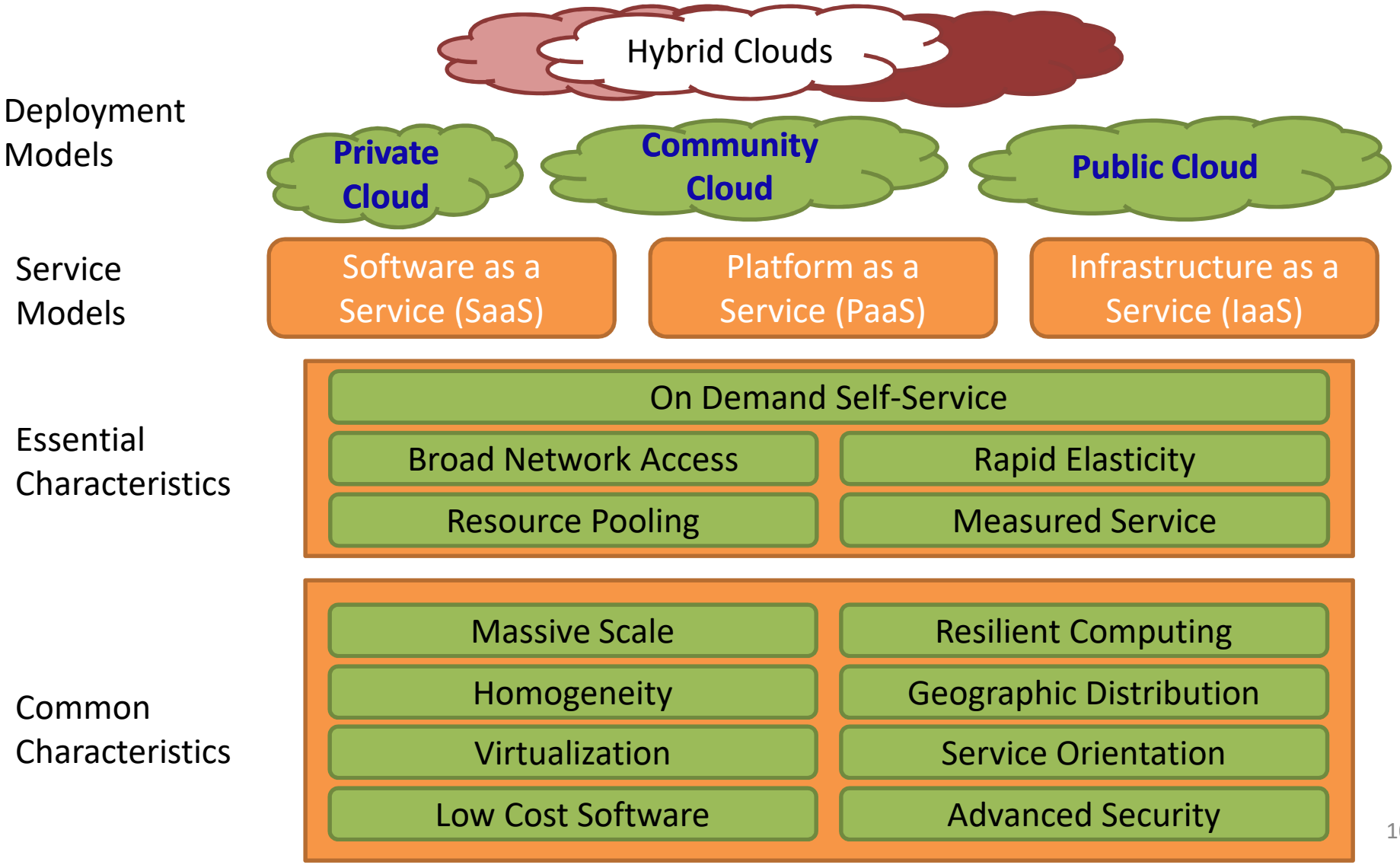
Essential Cloud Characteristics

1. On-demand self-service
2. Broad network access
3. Resource pooling
4. Rapid elasticity
5. Measured service

Common Cloud Characteristics

- Cloud computing often leverages:
  - Massive scale
  - Homogeneity
  - Virtualization
  - Resilient computing
  - Low cost software
  - Geographic distribution
  - Service orientation
  - Advanced security technologies

Cloud Definition Framework



Cloud Model

Software as a Service (SaaS)

1. SaaS is closely related to the application service provider (ASP) and on demand computing software delivery models.
2. The provider hosts the customer's software and delivers it to approved end users over the internet.
3. In the software on demand SaaS model, the provider gives customers network-based access to a single copy of an application that the provider created specifically for SaaS distribution.
4. The application's source code is the same for all customers and when new features or functionalities are rolled out, they are rolled out to all customers.

Cloud Model

Software as a Service (SaaS)

4. Organizations can integrate SaaS applications with other software using application programming interfaces (APIs).

5. There are SaaS applications for fundamental business technologies, such as email, sales management, customer relationship management (CRM), financial management, human resource management (HRM), billing and collaboration. Leading SaaS providers include Oracle, SAP, Intuit and Microsoft.

Advantages of SaaS

1. **SaaS r**emoves the need for organizations to install and run applications on their own computers or in their own data centers.

2. Eliminates the expense of hardware acquisition, provisioning and maintenance, as well as software licensing, installation and support.

3. **Flexible payments**: Rather than purchasing software to install, or additional hardware to support it, customers ***subscribe to a SaaS offering.*** Generally, they pay for this service on a monthly basis using a ***pay-as-you-go model.***

Advantages of SaaS

4. **Scalable usage:** Cloud services like SaaS offer high vertical scalability, which gives customers the option to access more, or fewer, services or features on-demand.

5. **Automatic updates:** Rather than purchasing new software, customers can rely on a SaaS provider to automatically perform updates and patch management. This further reduces the burden on in-house IT staff.

6. **Accessibility and persistence:** Since SaaS applications are delivered over the Internet, users can access them from any Internet-enabled device and location.

Disadvantages of SaaS

1. Businesses must rely on outside vendors to provide the software, keep that software up and running, track and report accurate billing and facilitate a secure environment for the business' data.
2. Providers that experience service disruptions, impose unwanted changes to service offerings, experience a security breach or any other issue can have a profound effect on the customers' ability to use those SaaS offerings.
3. Users should understand their SaaS provider's service-level agreement, and make sure it is enforced.

Cloud Platform as a Service (PaaS)

Platform as a Service (**PaaS**) or **Application Platform as a Service** (**aPaaS**) or platform-based service is a category of cloud computing services that provides a platform allowing customers to develop, run, and manage applications without the complexity of building and maintaining the infrastructure typically associated with developing and launching an app.

PaaS examples: AWS Elastic Beanstalk, Heroku, Windows Azure (mostly used as PaaS), Force.com, OpenShift, Apache Stratos, Magento Commerce Cloud.

Cloud Platform as a Service (PaaS)

PaaS examples: AWS Elastic Beanstalk:

- AWS Elastic Beanstalk is an easy-to-use service for deploying and scaling web applications and services developed with Java, .NET, PHP, Node.js, Python, Ruby, Go, and Docker on familiar servers such as Apache, Nginx, Passenger, and IIS.
- You can simply upload your code and Elastic Beanstalk automatically handles the deployment, from capacity provisioning, load balancing, auto-scaling to application health monitoring. At the same time, you retain full control over the AWS resources powering your application and can access the underlying resources at any time.
- There is no additional charge for Elastic Beanstalk - you pay only for the AWS resources needed to store and run your applications.

Cloud Platform as a Service (PaaS)

PaaS Characteristics:

PaaS platforms are;

- Accessible by multiple users.
- Scalable – you can choose from various tiers of resources to suit the size of your business.
- Built on virtualization technology.
- Easy to run without extensive system administration knowledge.

Cloud Platform as a Service (PaaS)

When to Use PaaS:

- PaaS is often the most cost-effective and time-effective way for a developer to create a unique application.
- PaaS allows the developer to focus on the creative side of app development, as opposed to menial tasks such as managing software updates or security patches. All of their time and brainpower will go into creating, testing, and deploying the app.

Cloud Platform as a Service (PaaS)

Examples;

PaaS Non-Ecommerce Example:

- A good example of PaaS is AWS Elastic Beanstalk.
- Amazon Web Services (AWS) offers over 100 cloud computing services such as EC2, RDS, and S3.

PaaS Ecommerce Example:

- Magento Commerce Cloud (also known as Magento Enterprise Cloud Edition) is the most common example of PaaS for ecommerce.
- This enables the merchant to bundle their hosting as part of their package with Magento.

Cloud Infrastructure as a Service (IaaS)

Infrastructure as a Service (IaaS):
IaaS businesses offer services such as pay-as-you-go storage, networking and virtualization.
IaaS gives users cloud-based alternatives to on-premise infrastructure, so businesses can avoid investing in expensive on-site resources.

IaaS delivery:
Over the internet.

IaaS Advantages:
Maintaining on-premise IT infrastructure is costly and labor-intensive. It often requires a significant initial investment in physical hardware, and then you will probably need to engage external IT contractors to maintain the hardware and keep everything working and up-to-date.

Cloud Infrastructure as a Service (IaaS)

IaaS solutions are highly flexible and highly scalable, and you can replace it whenever you need without losing money on your initial investment.

Another advantage of IaaS is it puts control over the infrastructure back in your hands.

You no longer need to place faith in an external IT contractor; you can access and oversee IaaS platforms yourself if you wish (without being an IT whizz).

IaaS Characteristics:

1. IaaS platforms are:
2. Highly flexible and highly scalable.
3. Accessible by multiple users.
4. Cost-effective.

Cloud Infrastructure as a Service (IaaS)

When to Use IaaS?

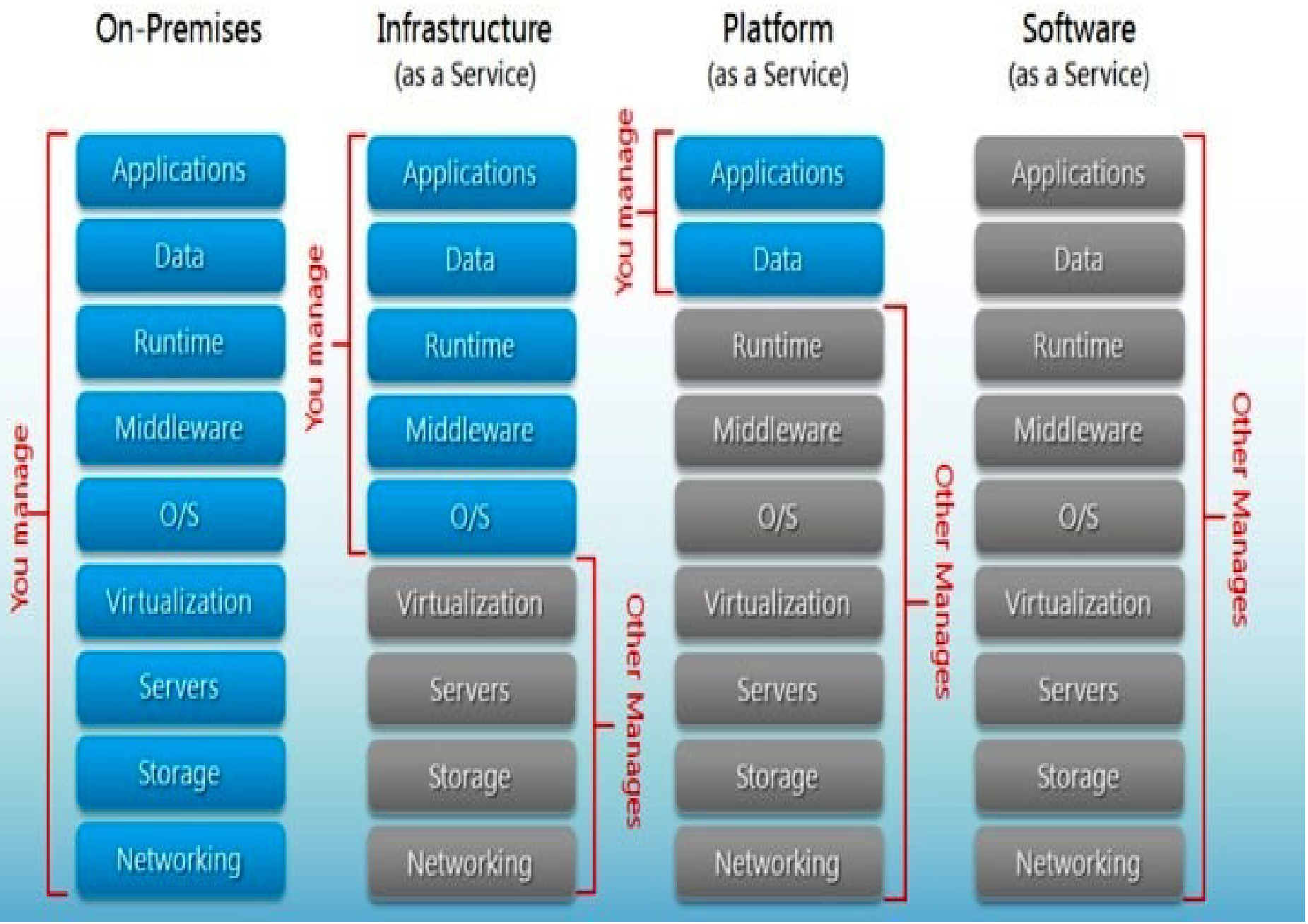
1. IaaS is beneficial to businesses of all shapes and sizes, as it allows complete control ***over your infrastructure***, and operates on a pay-as-you-use model, so it fits into most budgets.
2. With most IaaS platforms, you get access to ongoing support and have the option of scaling up your requirements at any time.
3. A good example of IaaS is ***AWS EC2***.

Cloud Infrastructure as a Service (IaaS)

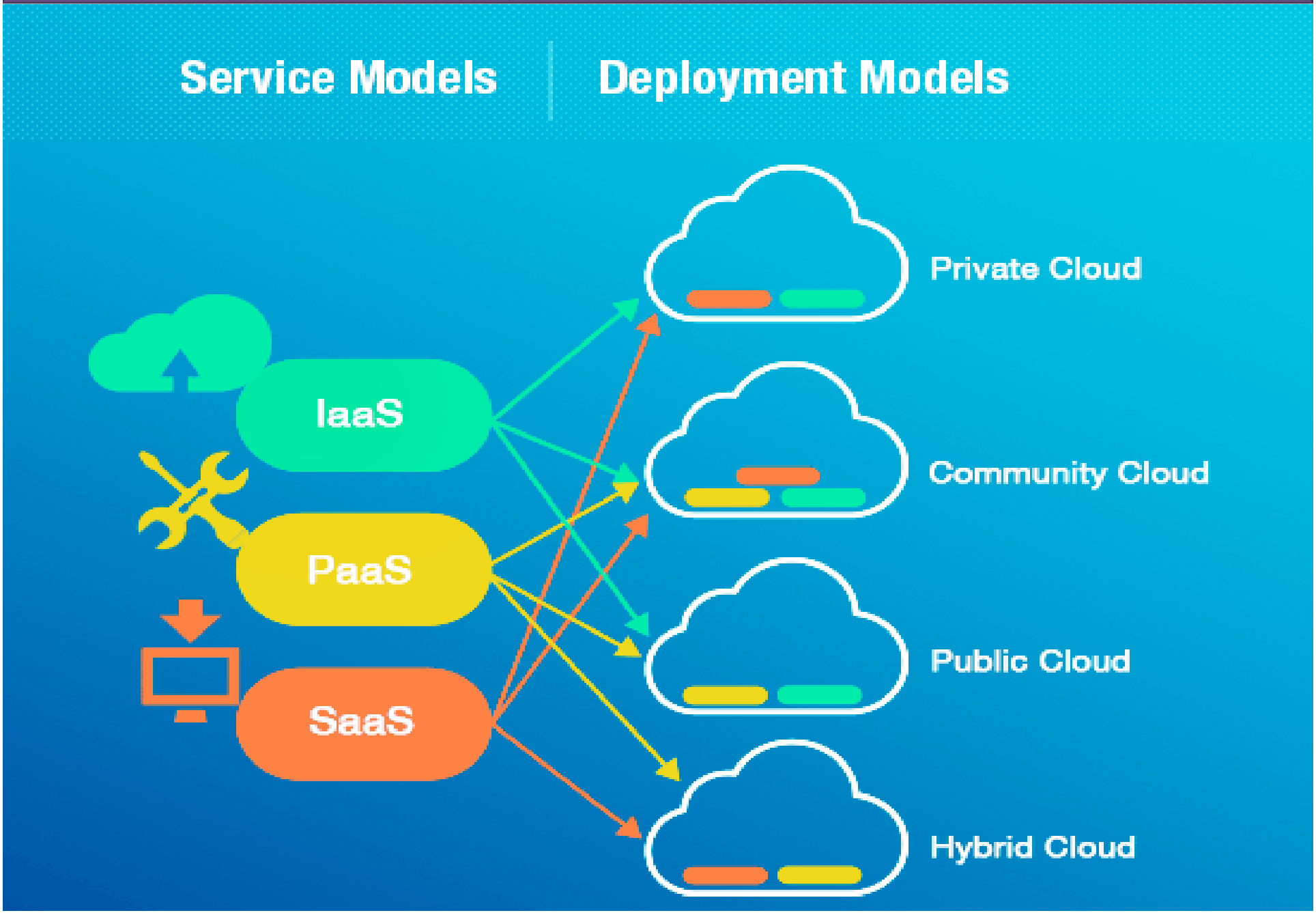
AWS EC2.

- 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 reduces the time required to obtain and boot new server instances to minutes, allowing you to quickly scale capacity, both up and down, as your computing requirements change. Amazon EC2 changes the economics of computing by allowing you to pay only for capacity that you actually use. Amazon
- EC2 provides developers the tools to build failure resilient applications and isolate them from common failure scenarios.

Cloud Models comparison



Cloud Models Deployment



Cloud Models Deployment

Deployment models of cloud computing are categorized based on their location.

Private Cloud

- It is a cloud-based infrastructure used by stand-alone organizations.
- It offers greater control over security. The data is backed up by a firewall and internally, and can be hosted internally or externally.
- Private clouds are perfect for organizations that have high-security requirements, high management demands, and availability requirements.

Cloud Models Deployment

Public Cloud

- This type of cloud services is provided on a network for public use.
- Customers have no control over the location of the infrastructure. It is based on a shared cost model for all the users, or in the form of a licensing policy such as pay per user.
- Public deployment models in the cloud are perfect for organizations with growing and fluctuating demands. It is also popular among businesses of all sizes for their web applications, webmail, and storage of non-sensitive data.

Cloud Models Deployment

Community Cloud

- It is a mutually shared model between organizations that belong to a particular community such as banks, government organizations, or commercial enterprises.
- Community members generally share similar issues of privacy, performance, and security. This type of deployment model of cloud computing is managed and ***hosted internally or by a third-party vendor.***

Cloud Models Deployment

Hybrid Cloud

- This model incorporates the best of both private and public clouds, but each can remain as separate entities.
- As part of this deployment of cloud computing model, the internal, or external providers can provide resources.
- A hybrid cloud is ideal for scalability, flexibility, and security. ***A perfect example of this scenario would be that of an organization who uses the private cloud to secure their data and interacts with its customers using the public cloud.***

THE END