Cloud Computing

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Introduction to cloud computing

- **Cloud Computing** is a general term used to describe a new class of network based computing that takes place over the Internet, basically a step on from Utility Computing.
- A collection/group of integrated and networked hardware, software and Internet infrastructure (called a platform).
- Using the Internet for communication and transport provides hardware, software and networking services to clients
- These platforms hide the complexity and details of the underlying infrastructure from users and applications by providing very simple graphical interface or API (Applications Programming Interface).

Introduction to cloud computing

- In addition, the platform provides on demand services, that are always on, anywhere, anytime and any place.
- Pay for use and as needed, elastic scale up and down in capacity and functionalities
- The hardware and software services are available to general public, enterprises, corporations and businesses markets

Cloud Summary

- Cloud computing is an umbrella term used to refer to Internet based development and services

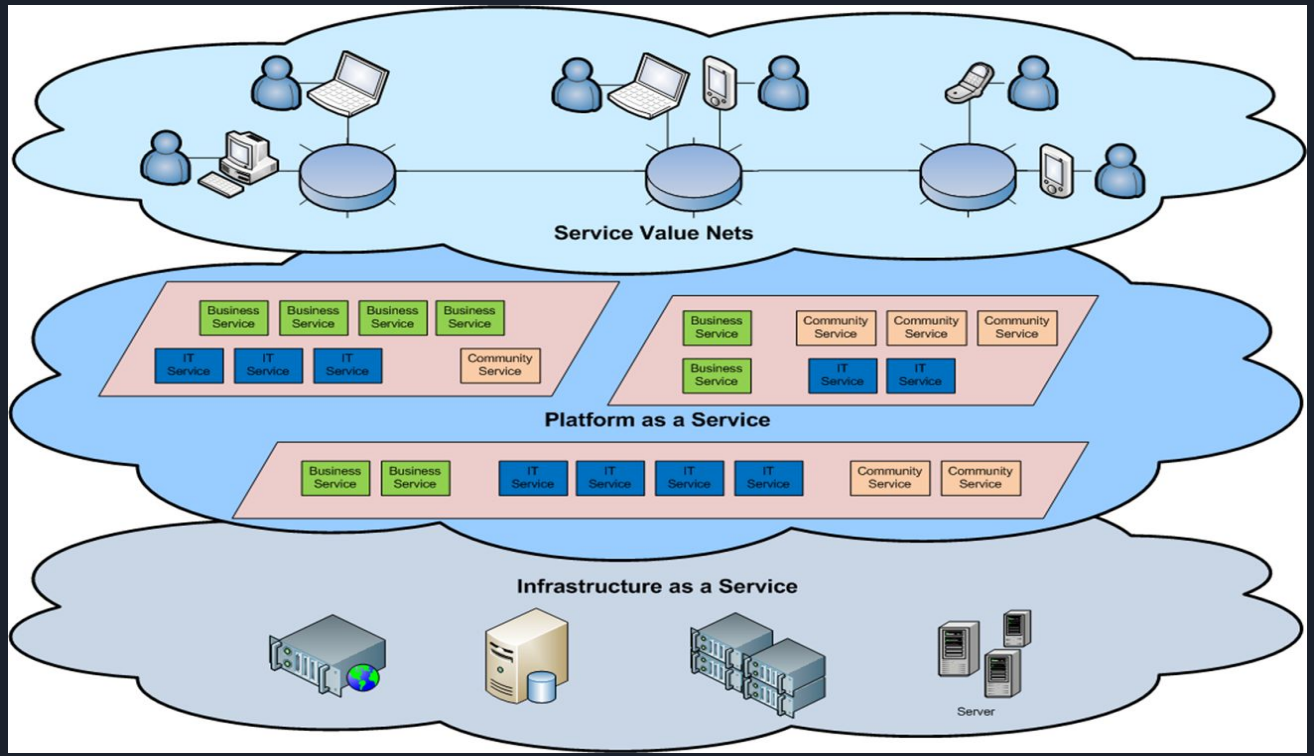
- A number of characteristics define cloud data, applications services and infrastructure:

  Remotely hosted: Services or data are hosted on remote infrastructure.

  Ubiquitous: Services or data are available from anywhere.

  Commodified: The result is a utility computing model similar to traditional that of traditional utilities, like gas and electricity - you pay for what you would want!

Cloud Architecture



Characteristics of cloud computing

Common characteristics include:

- Massive Scale
- Homogeneity
- Virtualization
- Low cost software
- Service Orientation
- Advance Security

Essential characteristics include:

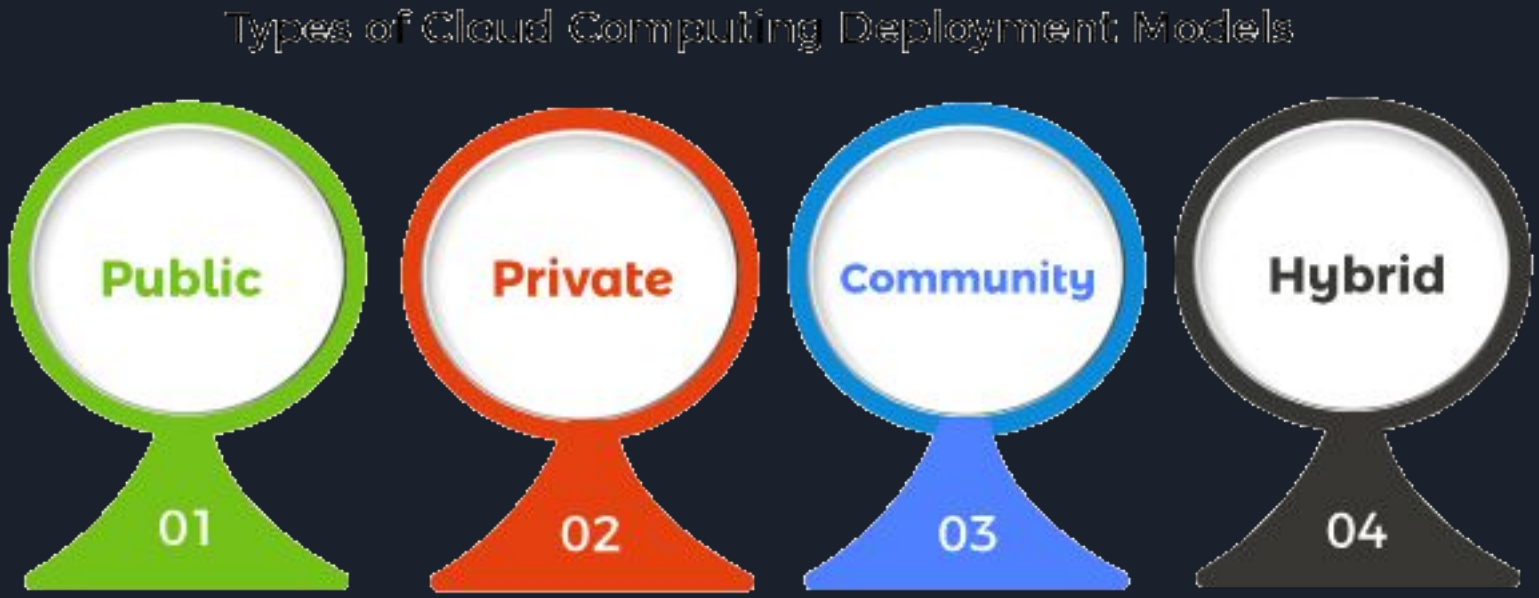
- On demand self service
- Broad Network Access
- Rapid Elasticity
- Resource Pooling
- Measured service

What is a cloud deployment model?

Today, organizations have many exciting opportunities to reimagine, repurpose and reinvent their businesses with the cloud. The last decade has seen even more businesses rely on it for quicker time to market, better efficiency, and scalability. It helps them achieve lo ng-term digital goals as part of their digital strategy.

It works as your virtual computing environment with a choice of deployment model depending on how much data you want to store and who has access to the Infrastructure.

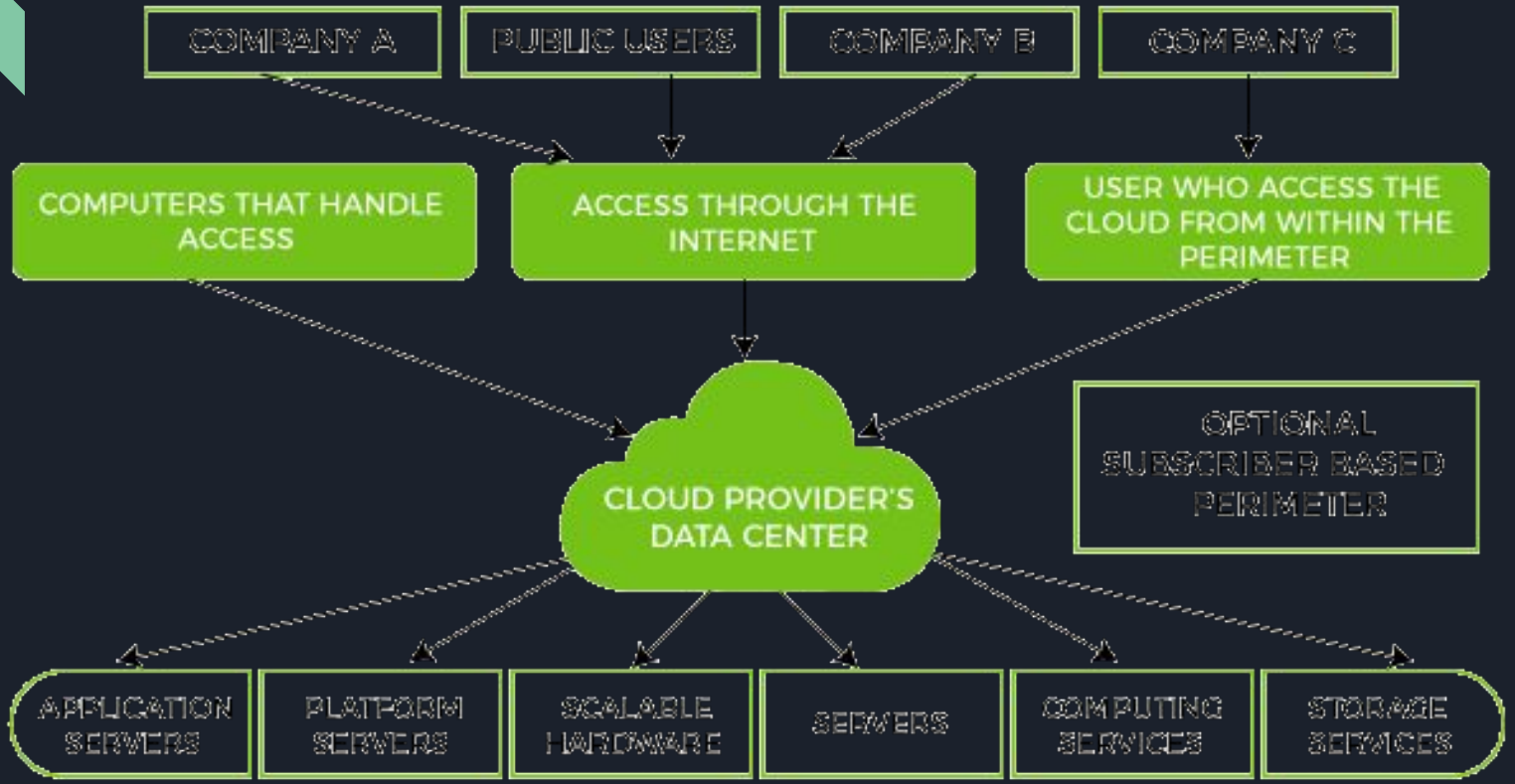
Types of cloud deployment



Public cloud

The name says it all. It is accessible to the public. Public deployment models in the cloud are perfect for organizations with growing and fluctuating demands. It also makes a great choice for companies with low-security concerns. Thus, you pay a cloud service provider for networking services, compute virtualization & storage available on the public internet. It is also a great delivery model for the teams with development and testing. Its configuration and deployment are quick and easy, making it an ideal choice for test environments.

Public Cloud



Benefits of Public cloud:

- Minimal Investment - As a pay-per-use service, there is no large upfront cost and is ideal for businesses who need quick access to resources
- No Hardware Setup - The cloud service providers fully fund the entire Infrastructure
- No Infrastructure Management - This does not require an in-house team to utilize the public cloud.

Drawbacks of Public cloud:

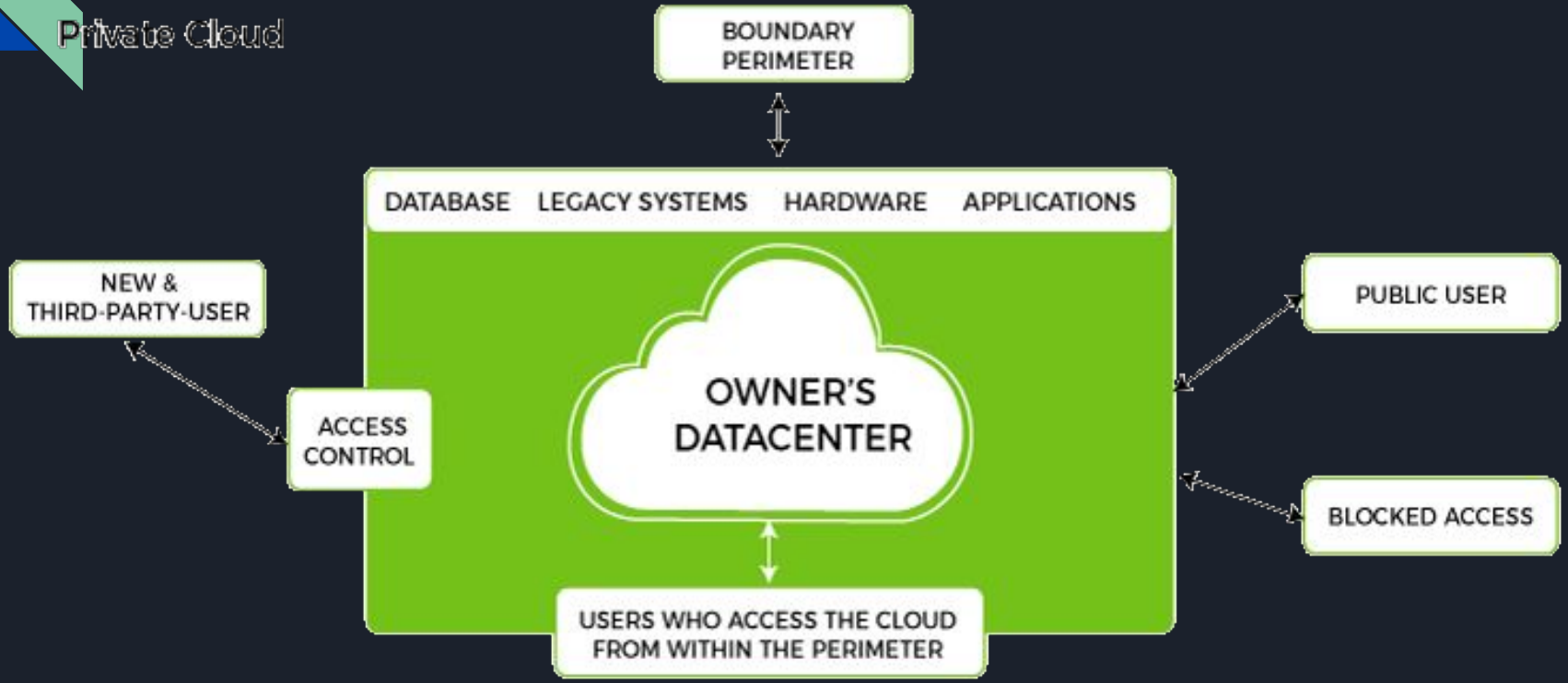
- Data Security and Privacy Concerns - Since it is accessible to all, it does not fully protect against cyber-attacks and could lead to vulnerabilities.
- Reliability Issues - Since the same server network is open to a wide range of users, it can lead to malfunction and outages
- Service/License Limitation - While there are many resources you can exchange with tenants, there is a usage cap.

Private cloud

Now that you understand what the public cloud could offer you, of course, you are keen to know what a private cloud can do. Companies that look for cost efficiency and greater control over data & resources will find the private cloud a more suitable choice.

It means that it will be integrated with your data center and managed by your IT team. Alternatively, you can also choose to host it externally. The private cloud offers bigger opportunities that help meet specific organizations' requirements when it comes to customization. It's also a wise choice for mission-critical processes that may have frequently changing requirements.

Private Cloud



Benefits of Private cloud:

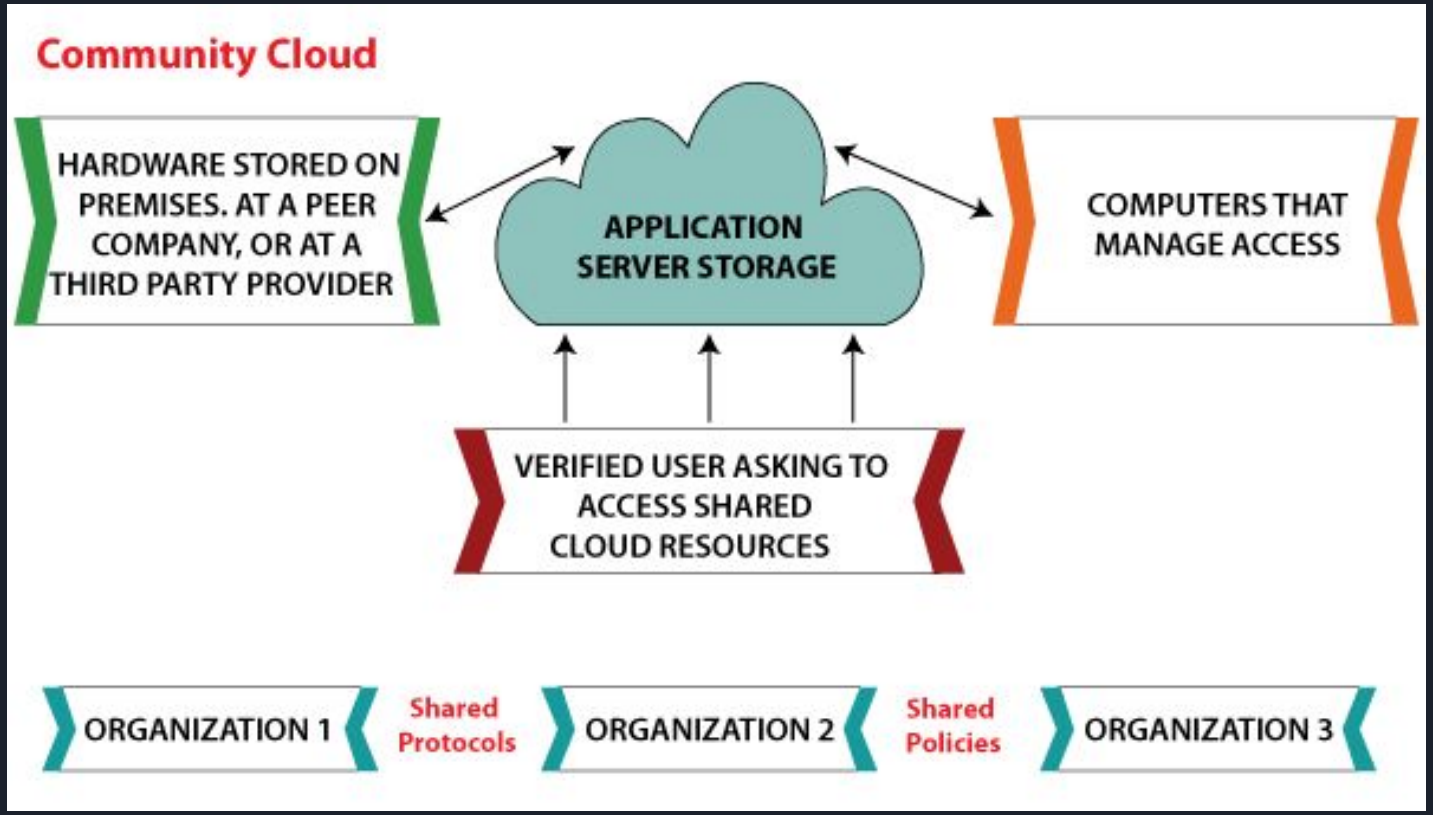
- Data Privacy - It is ideal for storing corporate data where only authorized personnel gets access
- Security - Segmentation of resources within the same Infrastructure can help with better access and higher levels of security.
- Supports Legacy Systems - This model supports legacy systems that cannot access the public cloud.

Drawbacks of Private cloud:

- Higher Cost - With the benefits you get, the investment will also be larger than the public cloud. Here, you will pay for software, hardware, and resources for staff and training.
- Fixed Scalability - The hardware you choose will accordingly help you scale in a certain direction
- High Maintenance - Since it is managed in-house, the maintenance costs also increase.

Community Cloud

The community cloud operates in a way that is similar to the public cloud. There's just one difference - it allows access to only a specific set of users who share common objectives and use cases. This type of deployment model of cloud computing is managed and hosted internally or by a third-party vendor. However, you can also choose a combination of all three.


Community Cloud
HARDWARE STORED ON PREMISES. AT A PEER COMPANY, OR AT A THIRD PARTY PROVIDER
APPLICATION SERVER STORAGE
COMPUTERS THAT MANAGE ACCESS
VERIFIED USER ASKING TO ACCESS SHARED CLOUD RESOURCES
ORGANIZATION 1
Shared Protocols
ORGANIZATION 2
Shared Policies
ORGANIZATION 3

Benefits of Community cloud:

- Smaller Investment - A community cloud is much cheaper than the private & public cloud and provides great performance
- Setup Benefits - The protocols and configuration of a community cloud must align with industry standards, allowing customers to work much more efficiently.

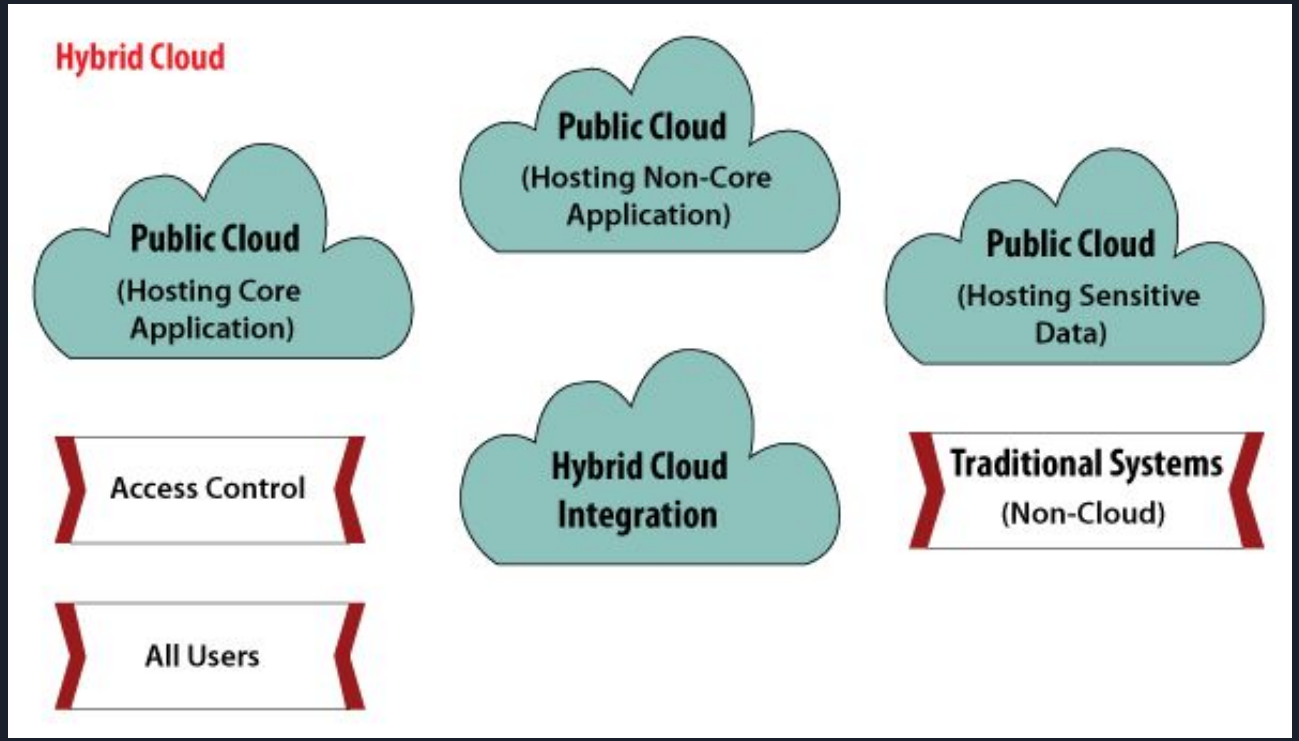
Drawbacks of Community cloud:

- Shared Resources - Due to restricted bandwidth and storage capacity, community resources often pose challenges.
- Not as Popular - Since this is a recently introduced model, it is not that popular or available across industries

Hybrid Cloud:

As the name suggests, a hybrid cloud is a combination of two or more cloud architectures. While each model in the hybrid cloud functions differently, it is all part of the same architecture. Further, as part of this deployment of the cloud computing model, the internal or external providers can offer resources.

Let's understand the hybrid model better. A company with critical data will prefer storing on a private cloud, while less sensitive data can be stored on a public cloud. The hybrid cloud is also frequently used for 'cloud bursting'. It means, supposes an organization runs an application on-premises, but due to heavy load, it can burst into the public cloud.


Hybrid Cloud
Public Cloud
(Hosting Core Application)
Public Cloud
(Hosting Non-Core Application)
Public Cloud
(Hosting Sensitive Data)
Access Control
Hybrid Cloud Integration
Traditional Systems
(Non-Cloud)
All Users

Benefits of Hybrid cloud:

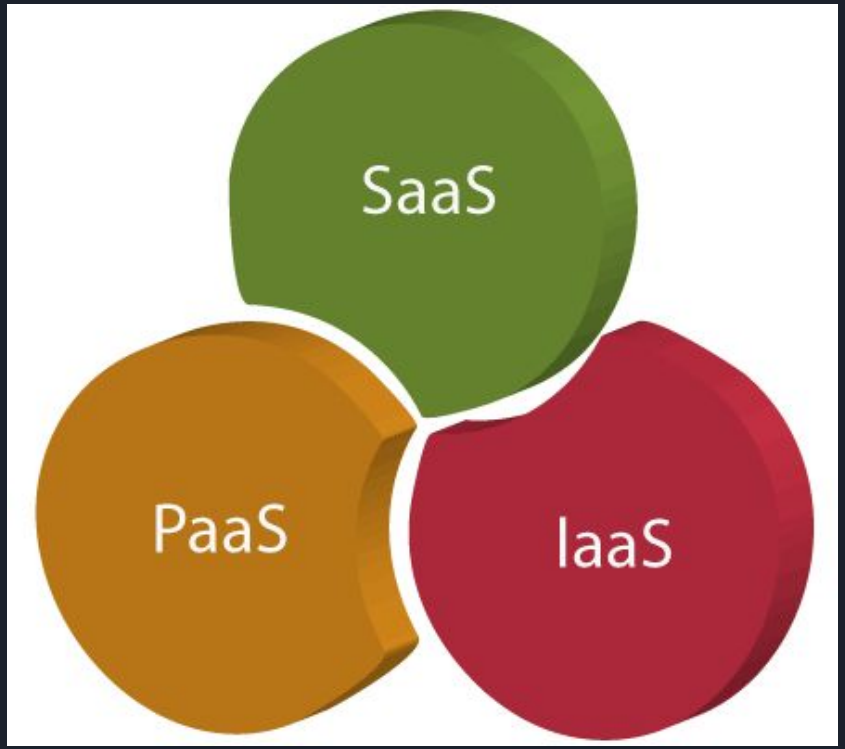
- Cost-Effectiveness - The overall cost of a hybrid solution decreases since it majorly uses the public cloud to store data.
- Security - Since data is properly segmented, the chances of data theft from attackers are significantly reduced.
- Flexibility - With higher levels of flexibility, businesses can create custom solutions that fit their exact requirements

Drawbacks of Hybrid cloud:

- Complexity - It is complex setting up a hybrid cloud since it needs to integrate two or more cloud architectures

- Specific Use Case - This model makes more sense for organizations that have multiple use cases or need to separate critical and sensitive data

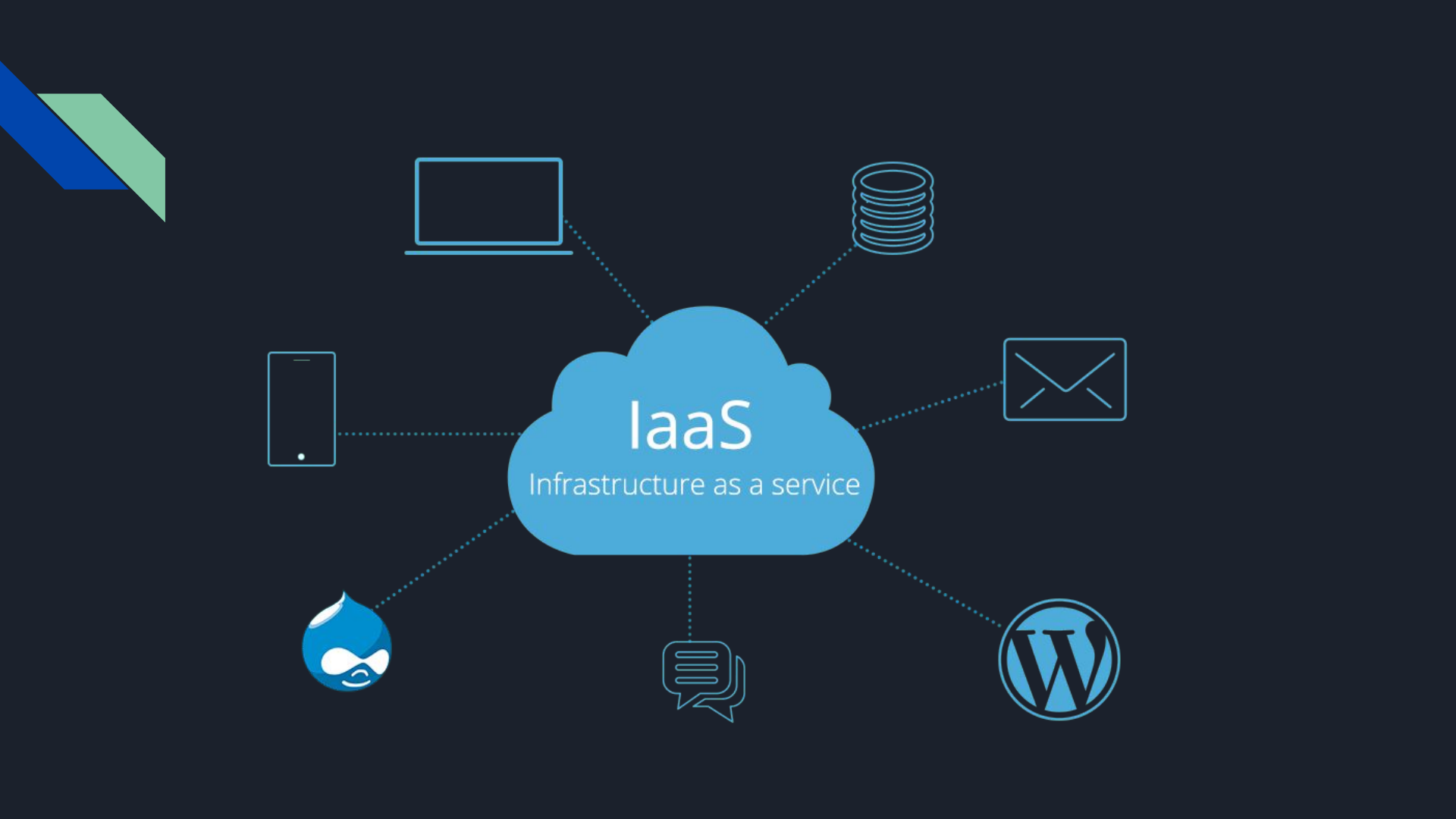
Cloud service models



Infrastructure as a Service [IaaS]

IaaS is also known as **Hardware as a Service (HaaS)**. It is a computing infrastructure managed over the internet. The main advantage of using IaaS is that it helps users to avoid the cost and complexity of purchasing and managing the physical servers.

Example: DigitalOcean, Linode, Amazon Web Services (AWS), Microsoft Azure, Google Compute Engine (GCE), Rackspace, and Cisco Metacloud.


IaaS
Infrastructure as a service

Characteristics of IaaS:

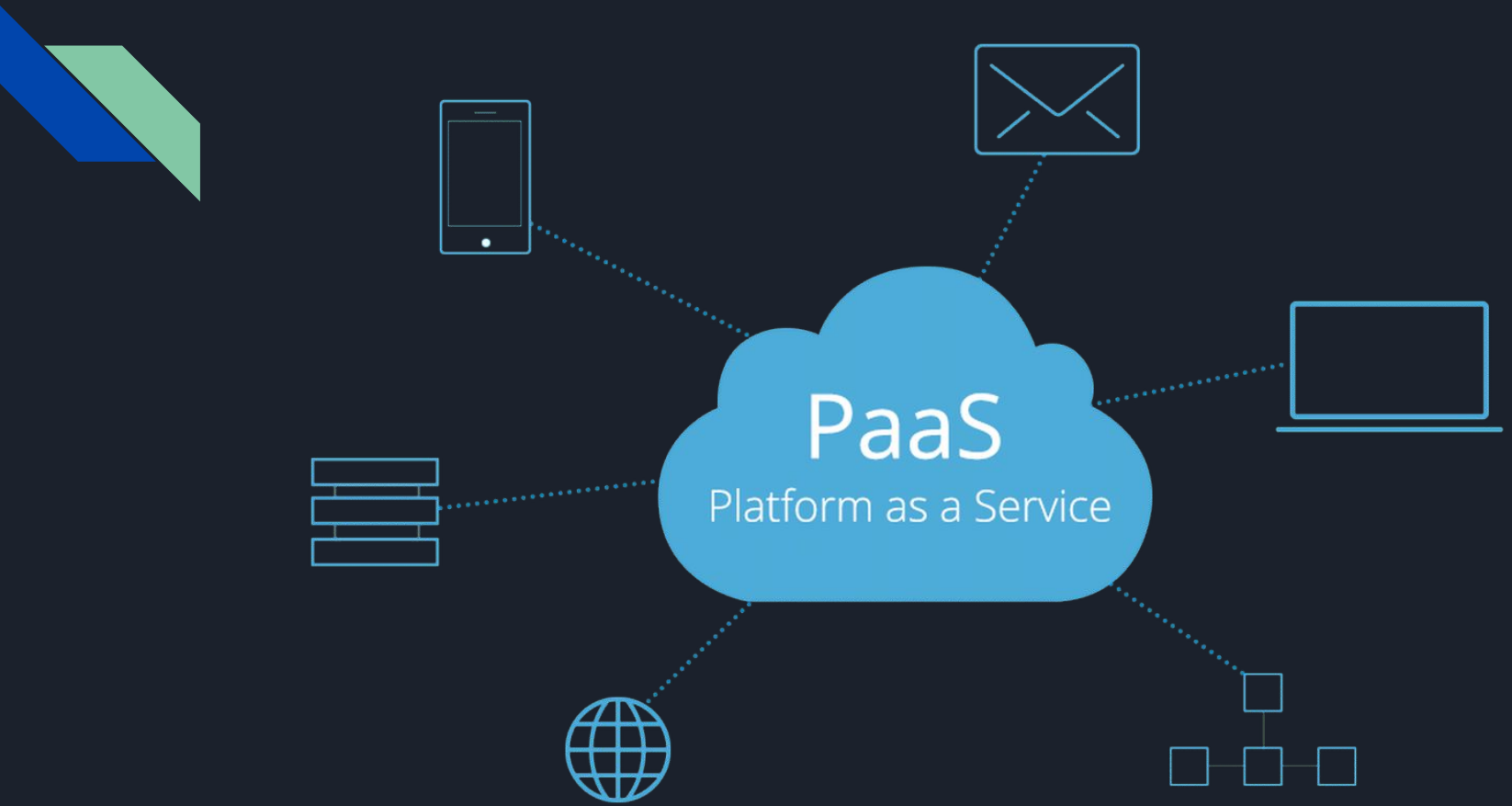
There are the following characteristics of IaaS -

- Resources are available as a service
- Services are highly scalable
- Dynamic and flexible
- GUI and API-based access
- Automated administrative tasks

Platform as a Service [PaaS]

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

Example: AWS Elastic Beanstalk, Windows Azure, Heroku, Force.com, Google App Engine, Apache Stratos, Magento Commerce Cloud, and OpenShift.


PaaS
Platform as a Service

Characteristics of PaaS:

There are the following characteristics of PaaS -

- Accessible to various users via the same development application.
- Integrates with web services and databases.
- Builds on virtualization technology, so resources can easily be scaled up or down as per the organization's need.
- Support multiple languages and frameworks.
- Provides an ability to "**Auto-scale**".

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.

Example: BigCommerce, Google Apps, Salesforce, Dropbox, ZenDesk, Cisco WebEx, ZenDesk, Slack, and GoToMeeting.


SaaS
Software as a Service

Characteristics of SaaS:

There are the following characteristics of SaaS -

- Managed from a central location
- Hosted on a remote server
- Accessible over the internet
- Users are not responsible for hardware and software updates. Updates are applied automatically.
- The services are purchased on the pay-as-per-use basis