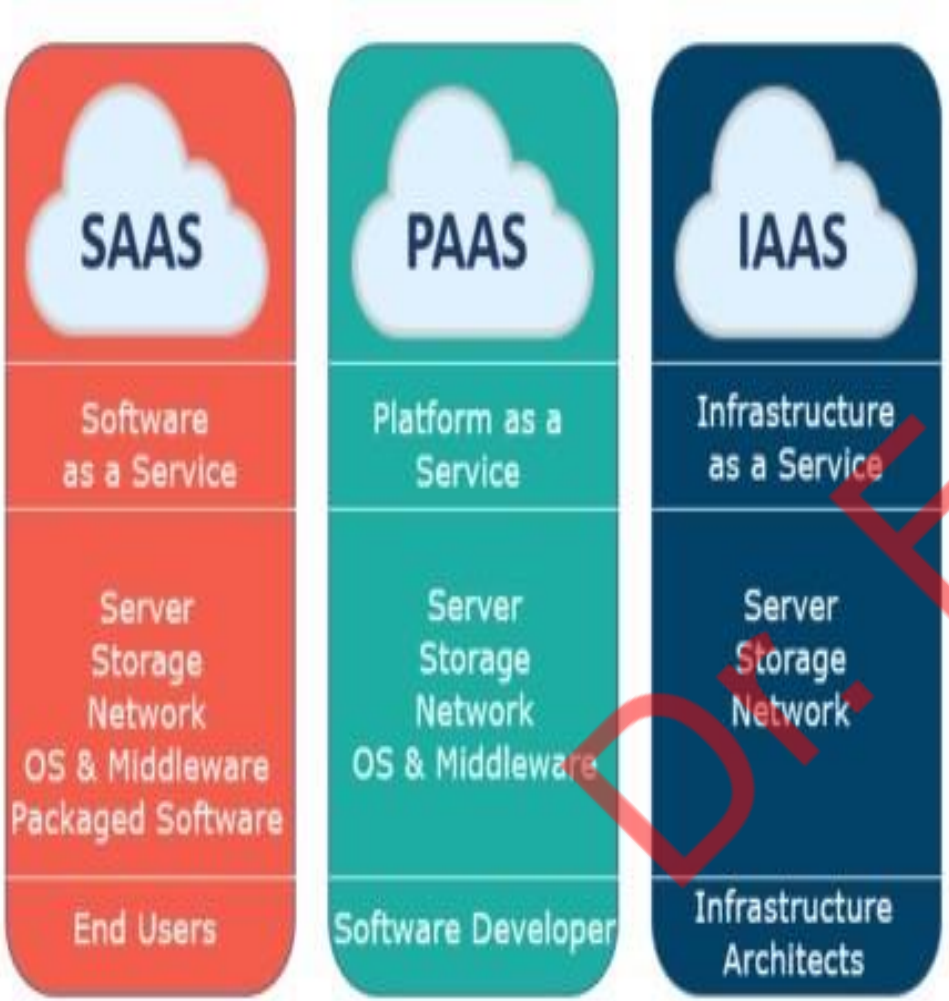
Lecture 2

Cloud Service Models

Introduction

Cloud computing enables access to apps as utilities over the internet. It enables the creation, configuration, and customization of programs online. Cloud computing enables users to access database resources over the internet from any location for an unlimited duration, reducing issues regarding resource upkeep or management. The primary advantages are scalability, cost-effectiveness, and accessibility.



Service Models

Service models are the reference models on which the cloud computing is based. These can be categorized into three basic service models,

1. **Infrastructure as a Service(IaaS)**
2. **Platform as a Service(Paas)**
3. **Software as a Service(Saas)**

IaaS, is the most basic level of service. Each of the service models make use of the underlying service model. i.e., each inherits the security and management mechanism from the underlying model. It is the delivery technology infrastructure as an on demand scalable service.

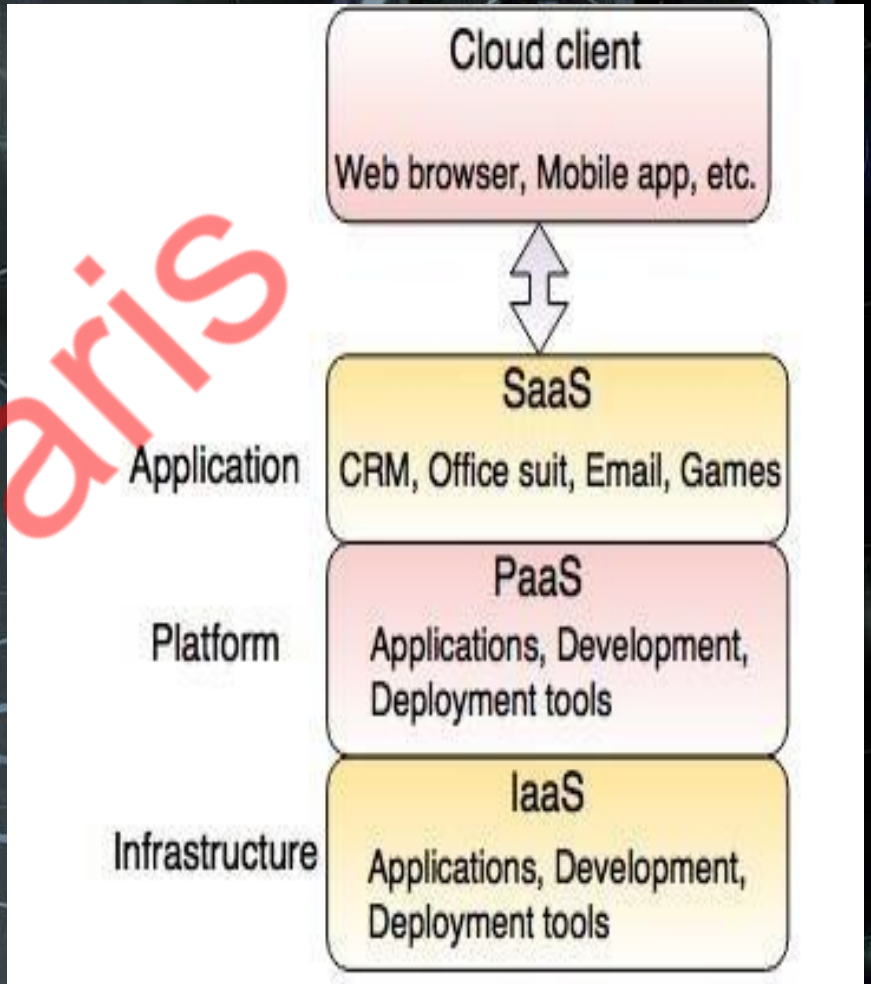
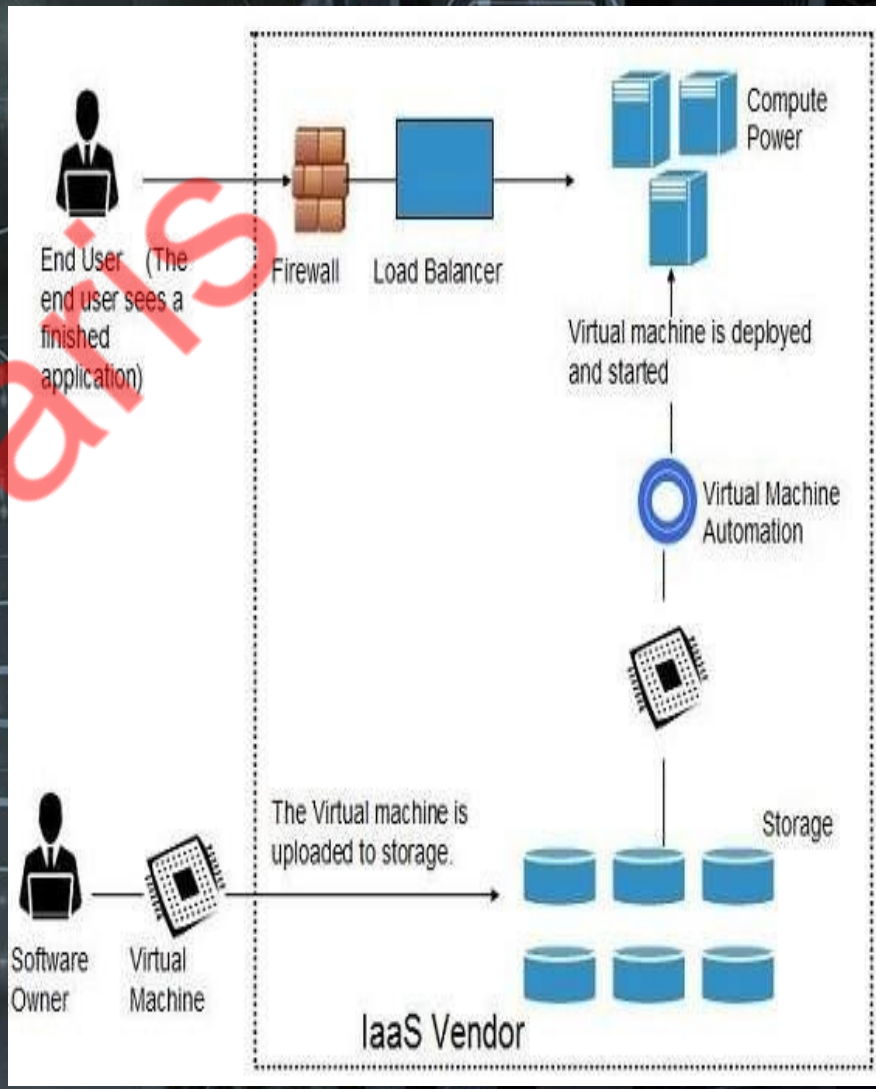


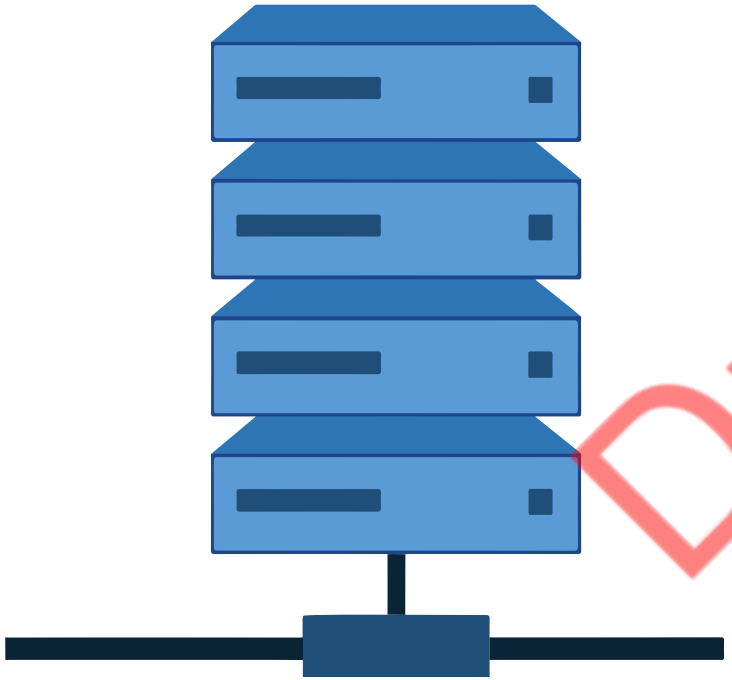
Fig. - Categories of Cloud Computing

Infrastructure as a Service(IaaS)

IaaS gives access to important resources like actual servers and virtual storage. In addition to these resources, IaaS provides virtual disk storage, virtual local area networks (VLANs), load balancers, IP addresses, and software packages. All of these resources are provided to end users through server virtualization by the customers look like they owner of them.



Characteristics



- Limited capital investment
- web access
- Elastic resources
- Green IT
- Infrastructure on demand
- Centralized management • Metered services(pay-as you-go)

Benefits

- Full control of the computing resources through administrative access to VMs.
- Flexible and efficient routing of computer hardware.
- Portability, Interoperability with legacy applications.

28%

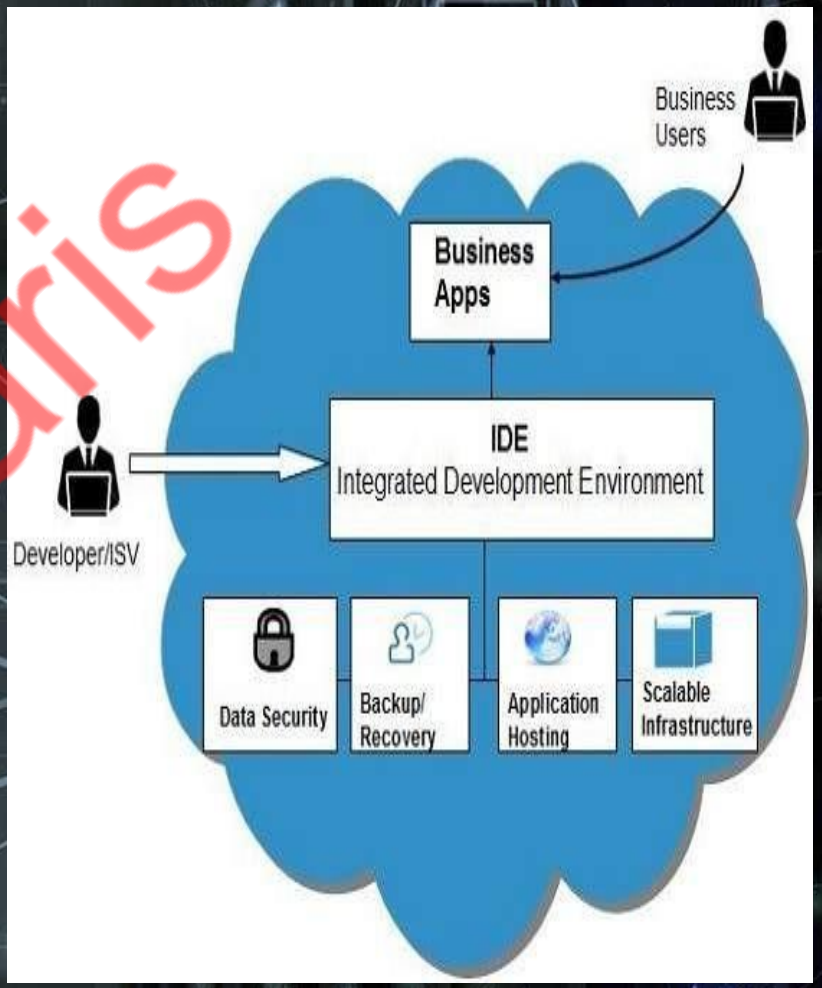
32%

Issues

- Data erase practices.
- Interoperability issues.
- Virtual machine sprawl.
- Performance issue in network connectivity.
- Security issues.

Platform as a Service(PaaS)

PaaS is a service model that provides a platform for developers to design, deploy, and maintain applications without concern about the underlying infrastructure. It offers a runtime environment for applications, as well as development and deployment tools and so on. Google's App Engine and Force.com showcase PaaS services from vendors.



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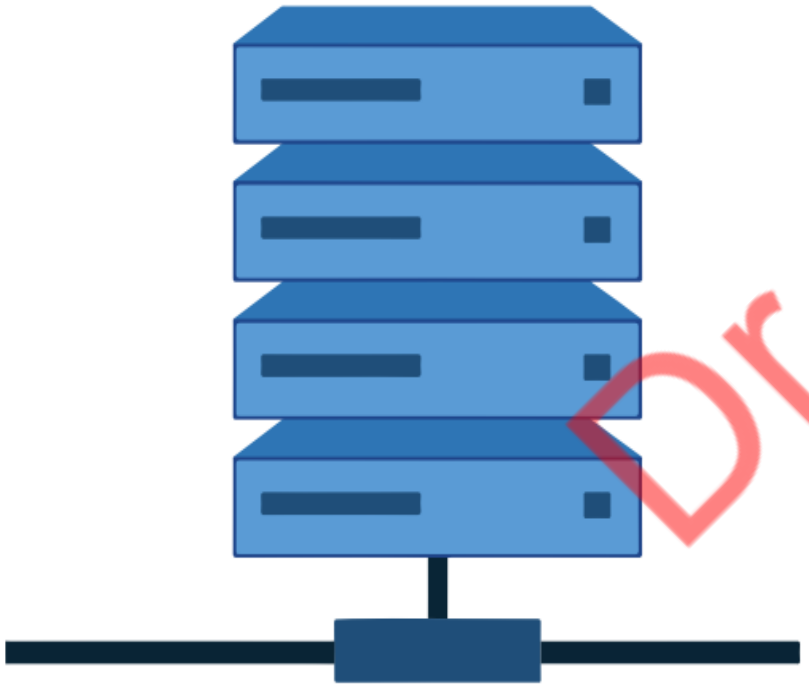


- All in one
- web access
- scalability and elasticity
- collaborative access
- offline access
- Centralized management

Benefits

- Reduced TCO.
- Lower total cost of ownership.
- Scalable solutions.
- Quick development and deployment.
- Less maintainance.
- Ease of use.

28%

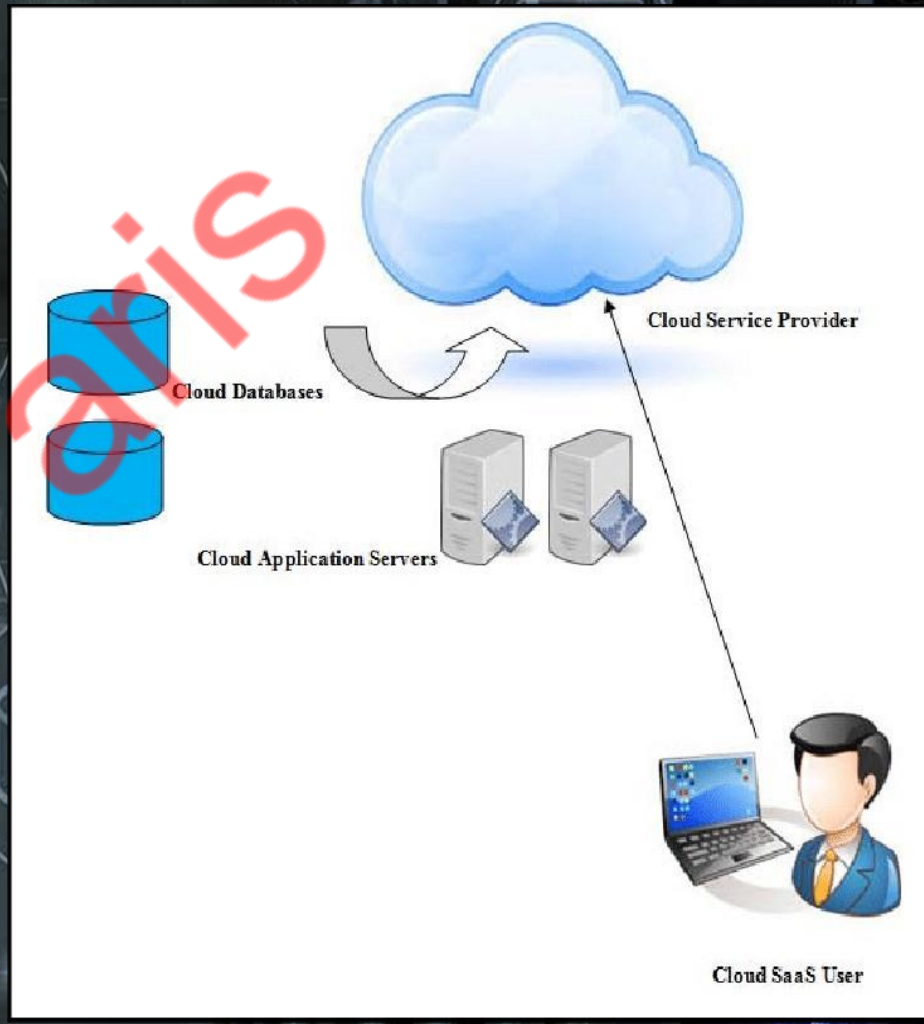
32%

Issues

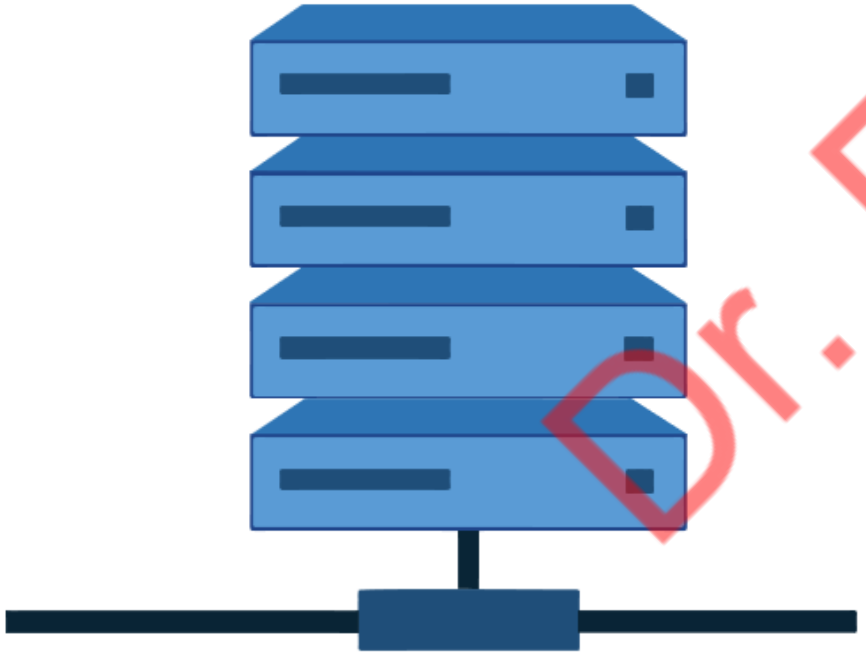
- Lack of portability between PaaS clouds.
- Events based processor scheduling.
- Security engineering of PaaS applications.
- Vendor lock-in.

Software as a Service(SaaS)

The SaaS model enables the provision of software applications as a service to end users. Software that is deployed on hosted service and is accessible through the internet. There are a number of SaaS applications. Some of them are: billing and invoicing system, help-desk applications, Customer Relationship Management(CRM) application, Human Resource (HR) solutions.



Characteristics



- Multi-tenancy model
- Automated provisioning
- Single Sign On
- Subscription based billing
- High availability
- Data Security

Benefits

- Cost efficiency
- Accessible from anywhere
- Easily Scalable
- It is collaborative and can easily integrate with other software and services.

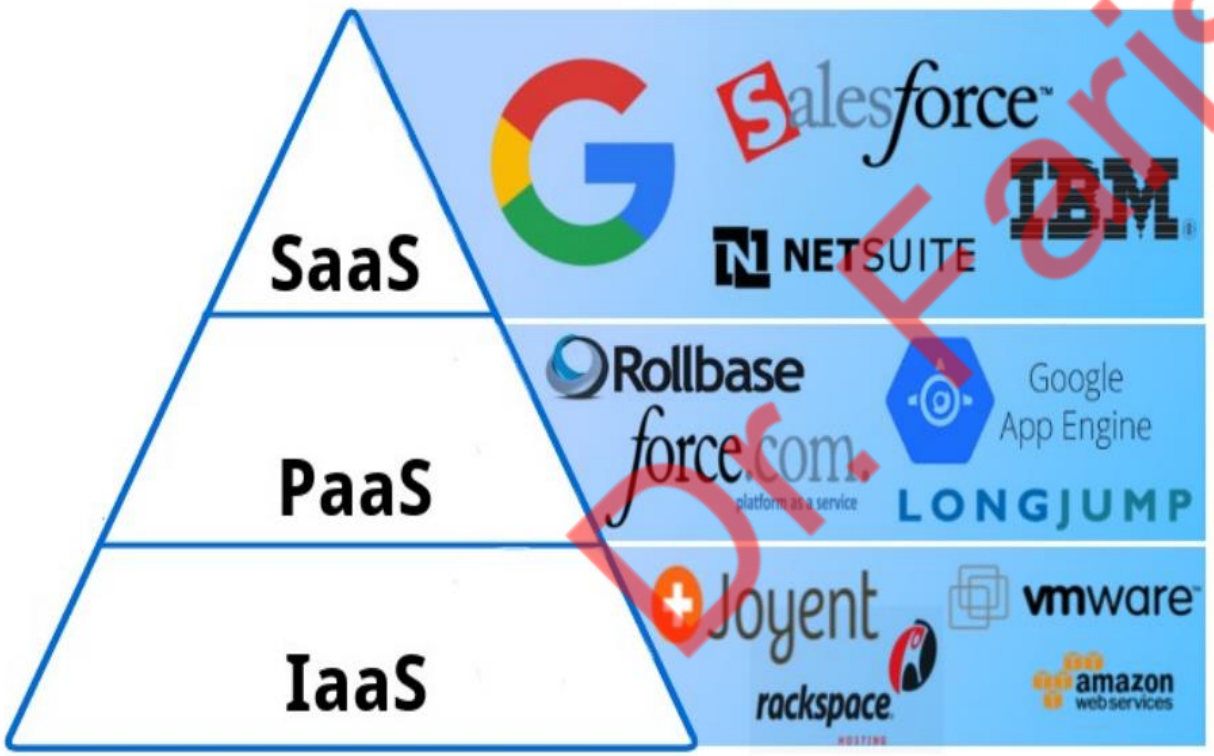
28%

32%

Issues

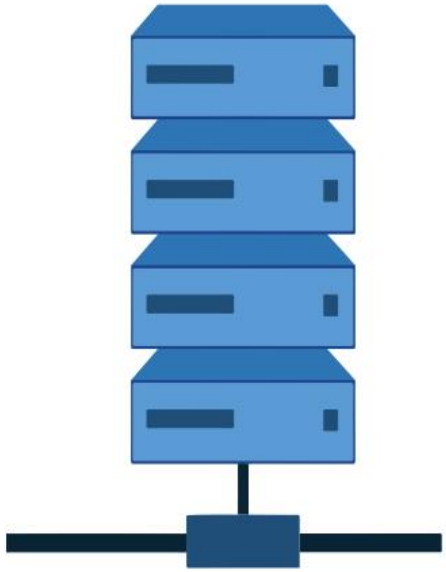
- Lack of control
- Cost over time
- Internet dependency
- Limited customization

Example

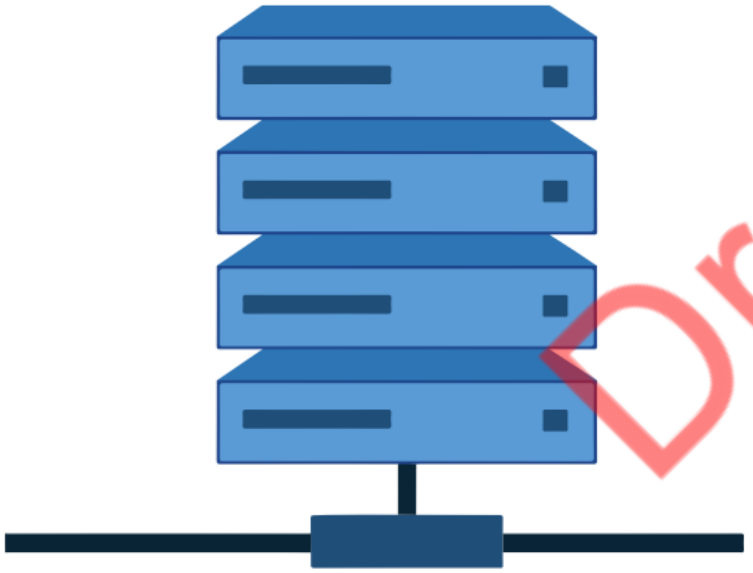


CLOUD

Computing Technology



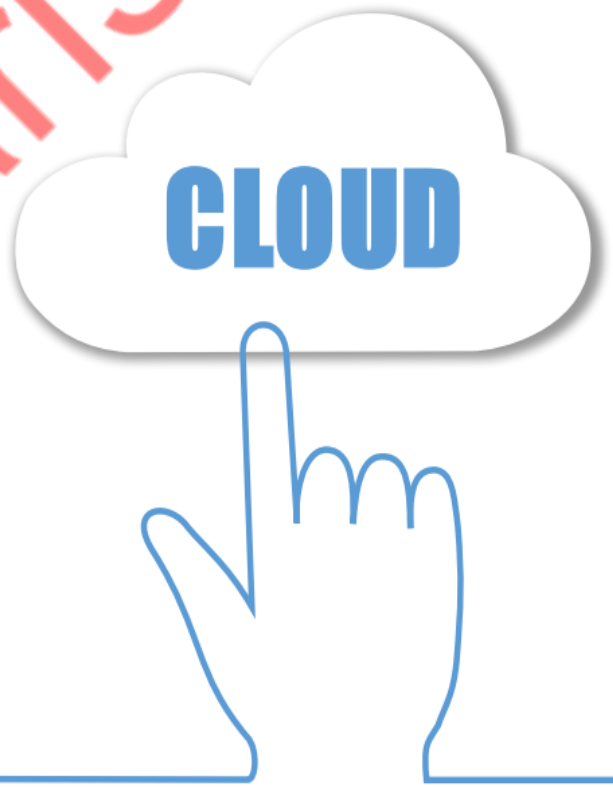
Key Considerations



- Security and Compliance
- Cost Considerations
- Data Management
- Performance and Availability
- Vendor lock-in
- Integration Capabilities
- Support and maintainance

Advantages

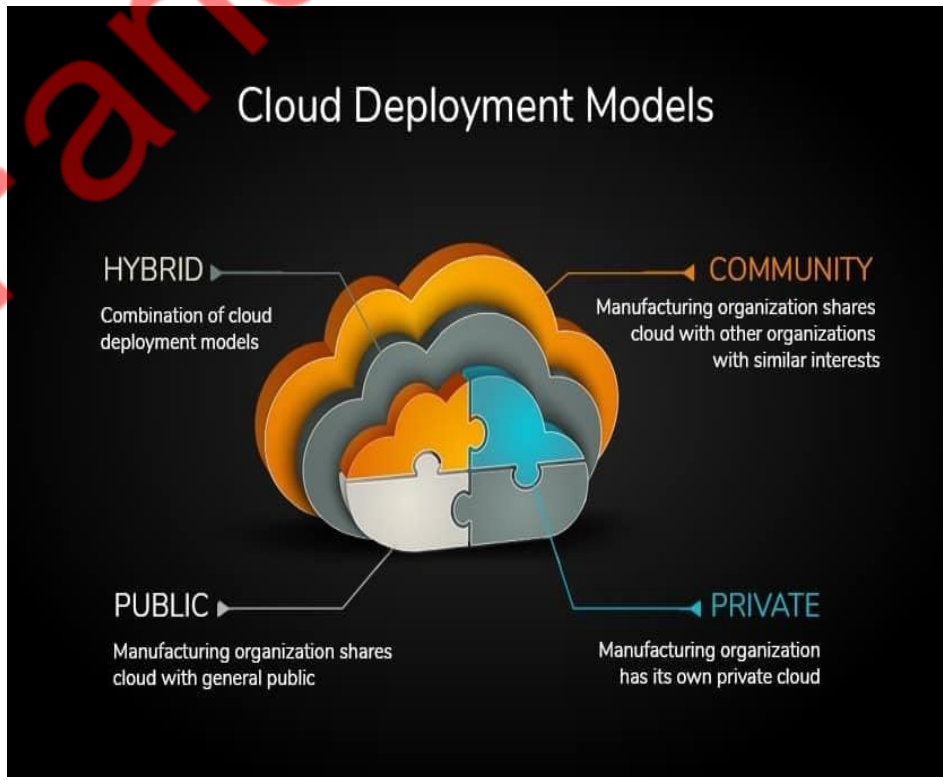
1. Lower computer costs
2. Improved Performance
3. Reduced software costs
4. Improved document format compatibility
5. Unlimited storage capability
6. Increased data reliability
7. Universal document access
8. Latest version availability
9. Device independence



Disadvantages

1. Requires a constant internet connection
2. Doesn't work well with low-speed connection
3. Features might be limited
4. Can be slow
5. Stored data can be lost
6. Stored data might not be secured

Deployment Models



Public Cloud

- A public cloud is controlled and operated by a third-party cloud service provider, with the infrastructure available to everyone over the internet.
- They provide cost per month and are suitable for businesses who prefer not to put funds in their own infrastructure.
- Examples of public cloud providers include Amazon Web Services (AWS), Microsoft Azure, and Google Cloud.

Advantages

- Minimal Investment
- No setup cost
- Infrastructure Management is not required
- No maintenance
- Dynamic Scalability

Disadvantages

- Less secure
- Low customization

Private Cloud

- Private clouds are completely controlled and operated by a single company and are not shared with any other organization.
- They provide the advantages of cloud computing, like scalability and cost efficiency, while keeping the security and management of a private infrastructure.
- Private clouds may be deployed either on-premises or off-premises.

Advantages

- Better Control
- Data Security and Privacy
- Supports Legacy Systems
- Customization

Disadvantages

- Less scalable
- Costly

Hybrid Cloud

- Hybrid clouds combine the benefits of both public and private clouds, allowing organizations to use a combination of on-premises, private, and public cloud resources to meet their specific needs.

- This technique provides flexibility and enables organizations to use the best solution for each workload.

Advantages

- Flexibility and control
- Cost
- Security

Disadvantages

- Difficult to manage
- Slow data transmission

Hybrid Cloud

- Community clouds are shared by multiple organizatios with similar needs and goals.
- They are typically owned and operated by a third-party provider and are used by a specific community, such as educational institutions or government agencies.
- Community clouds provide the benefits of the cloud, such as scalability and cost savings, while maintaining the security and control of private infrastructure.

Advantages

- Cost Effective
- Security
- Shared resources
- Collaboration and data sharing

Disadvantages

- Limited Scalability
- Rigid in customization