

Cloud Computing Security

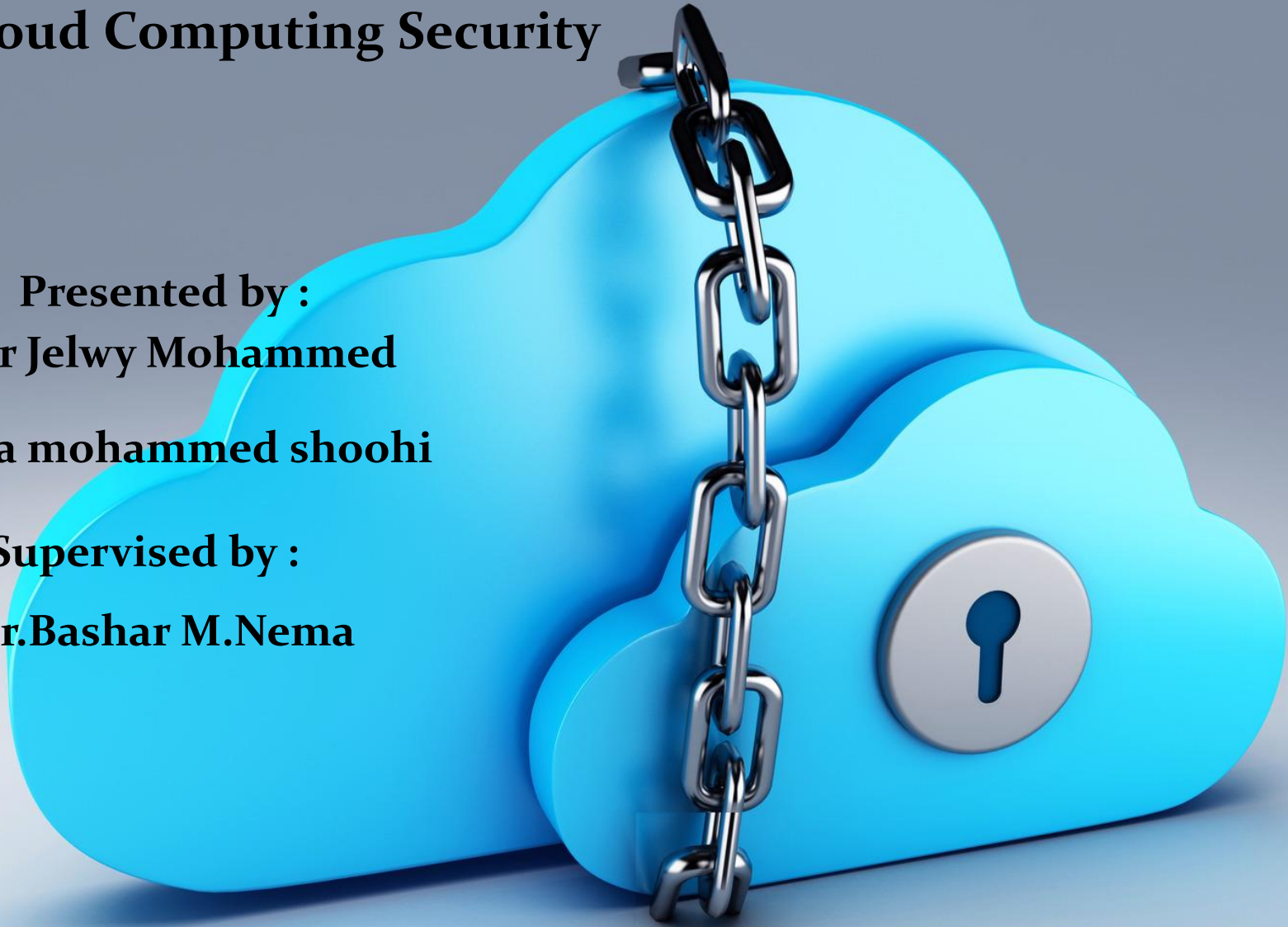
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Talk Objectives

- **Introduction.**
- **What is cloud computing?**
- **Cloud computing service categories**
- **Cloud computing deployment models**
- **Advantages and Disadvantages of Cloud Computing**
- **Cloud Computing Security.**
- **Possible Solutions.**
- **Summary**

Introduction

- **Cloud Computing** is a general term for the delivery of hosted services over the internet.



What is cloud computing?

- In other words it is regarded as a “method of running application, software and storing the related data in provided computer systems and providing customer or other users the access to them through the internet”



Cloud computing service categories

- Software As A Service ([SaaS](#)).
- Platform As A Service ([PaaS](#))
- Infrastructure As A Service ([IaaS](#)),



Cloud computing service categories

- Software as a Service (SaaS):

SaaS is a distribution model that delivers software applications over the internet; these applications are often called web services.

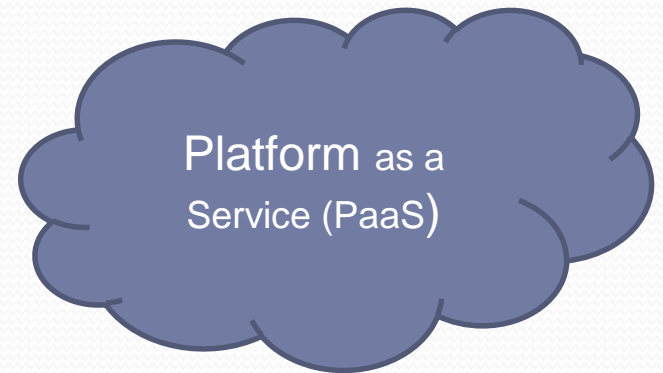
Microsoft Office 365 is a SaaS offering for productivity software and email services. Users can access SaaS applications and services from any location using a computer or mobile device that has internet access.



Cloud computing service categories

- Platform as a Service (PaaS)

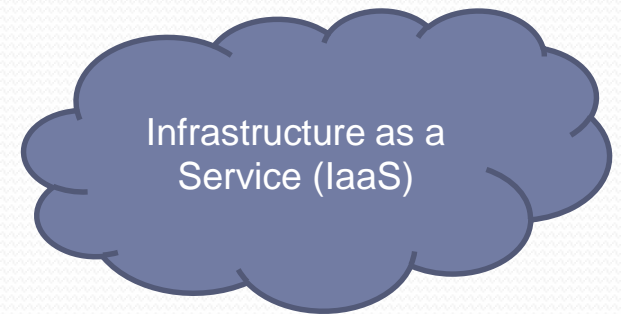
In the PaaS model, providers host development tools on their infrastructures. Users access these tools over the internet, web portals or gateway software. PaaS is used for general software development, and many PaaS providers will host the software after it's developed. Common PaaS providers include Google App Engine.



Cloud computing service categories

- Infrastructure as a Service (IaaS)

IaaS providers, such as supply a virtual server instance and storage, as well as application program interfaces (APIs) that let users migrate workloads to a virtual machine. Users have an allocated storage capacity and can start, stop, access and configure the VM and storage as desired. IaaS providers offer small, medium, large, extra-large and memory- or compute-optimized instances, in addition to customized instances, for various workload needs.



Cloud computing deployment models:

Private Cloud :-

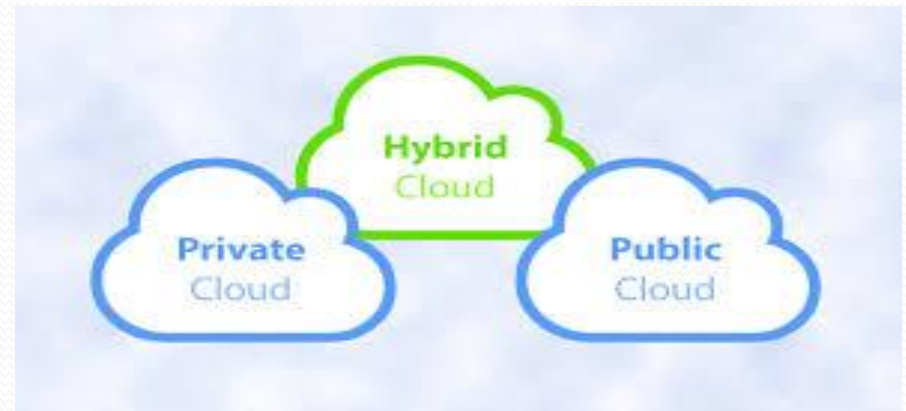
The cloud infrastructure is owned or leased by a single organization and is operated solely for that organization.

Public Cloud :-

A large organization owns the cloud infrastructure and sells cloud services to industries or public.

Hybrid Cloud :-

It is combination of two or more cloud. It enables data and application portability.



Advantages of Cloud Computing

- Lower computer costs
- Improved performance
- Reduced software costs
- Instant software updates
- Improved document format compatibility
- Unlimited storage capacity
- Universal document access
- Latest version availability
- Easier group collaboration
- Device independence

Disadvantages of Cloud Computing

- Requires a constant Internet connection
- Does not work well with low-speed connections
- Features might be limited
- Can be slow
- Stored data might not be secure
- Stored data can be lost

Cloud Computing Security Issues

Security Is the Major Challenge

- **Security** issues in cloud computing has played a major role in slowing down its acceptance, in fact security ranked first as the greatest challenge issue of cloud computing

Cloud computing challenges

Q: Rate the challenges/issues ascribed to the "cloud"/on-demand model
(1=not significant, 6=very significant)



Why Cloud Computing brings new threats?

- Loss of control
- Lack of trust (mechanisms)
- Multi-tenancy



Why Cloud Computing brings new threats?

Consumer's loss of control

- Data, applications, resources are located with provider
- User identity management is handled by the cloud
- User access control rules, security policies and enforcement are managed by the cloud provider
- Consumer relies on provider to ensure
 - Data security and privacy
 - Resource availability
 - Monitoring and repairing of services/resources

Why Cloud Computing brings new threats?

Multi-tenancy :

Multiple independent users share the same physical infrastructure

So, an attacker can legitimately be in the same physical machine as the target



Who is the attacker?

Insider?

- Malicious employees at client
- Malicious employees at Cloud provider
- Cloud provider itself

Outsider?

- Intruders
- Network attackers?

Attacker Capability: Malicious Insiders

- At client
 - Learn passwords/authentication information
 - Gain control of the VMs
- At cloud provider
 - Log client communication

Attacker Capability: Cloud Provider

- What?
 - Can read unencrypted data
 - Can possibly peek into VMs, or make copies of VMs
 - Can monitor network communication, application patterns

Attacker Capability: Outside attacker

- What?
 - Listen to network traffic (passive)
 - Insert malicious traffic (active)
 - Probe cloud structure (active)

Possible Solutions

- Loss of Control
 - Take back control
 - Data and apps may still need to be on the cloud
 - But can they be managed in some way by the consumer?
- Lack of trust
 - Increase trust (mechanisms)
 - Technology
 - Policy, regulation
 - Contracts (incentives)
- Multi-tenancy
 - Private cloud
 - Strong separation

Summary

- What is cloud computing?
- describe a new class of network based computing that takes place over the Internet .
- Cloud computing service categories
 - SaaS
 - PaaS
 - IaaS
- Advantages and Disadvantages of Cloud Computing
- Cloud computing deployment models
 - Private Cloud
 - Public Cloud
 - Hybrid Cloud
- Why Cloud Computing brings new threats?
 - Loss of control
 - Lack of trust (mechanisms)
 - Multi-tenancy
- Who is the attacker?
 - Insider?
 - Outsider?

Thank You



References

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