CMR COLLEGE OF ENGINEERING & TECHNOLOGY

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KANDLAKOYA, MEDCHAL ROAD, HYDERABAD - 501401.

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TECHNICAL SEMINAR

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Branch- Computer Science Engineering

Topic- Security in Cloud Computing

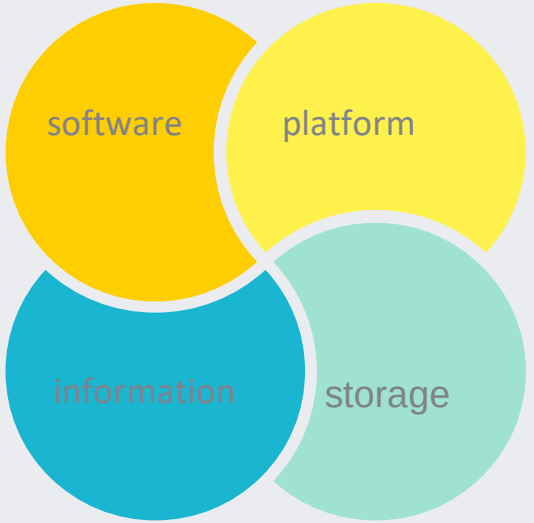
Security in Cloud Computing

What is the Cloud?

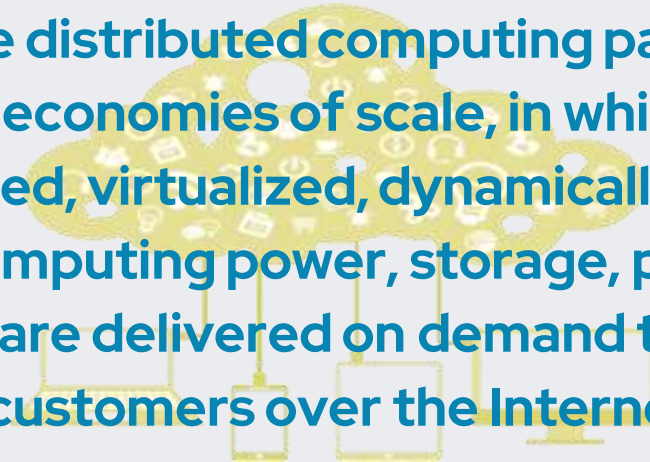
It refers to the servers that are accessed over the internet and the software and databases that run on those servers.

Key Points

- Internet-based computing technology
- Platform for sharing resources
- Virtual pool of computing resources
- Essential concerns are-
  - confidentiality
  - integrity
  - authenticity
  - availability
  - privacy



Introduction



A large-scale distributed computing paradigm that is driven by economies of scale, in which a pool of abstracted, virtualized, dynamically scalable, managed computing power, storage, platforms, and services are delivered on demand to external customers over the Internet.

Key Points

- Emerging computing paradigm

- Posing serious limitation

- Significant momentum

- Internet based data storage

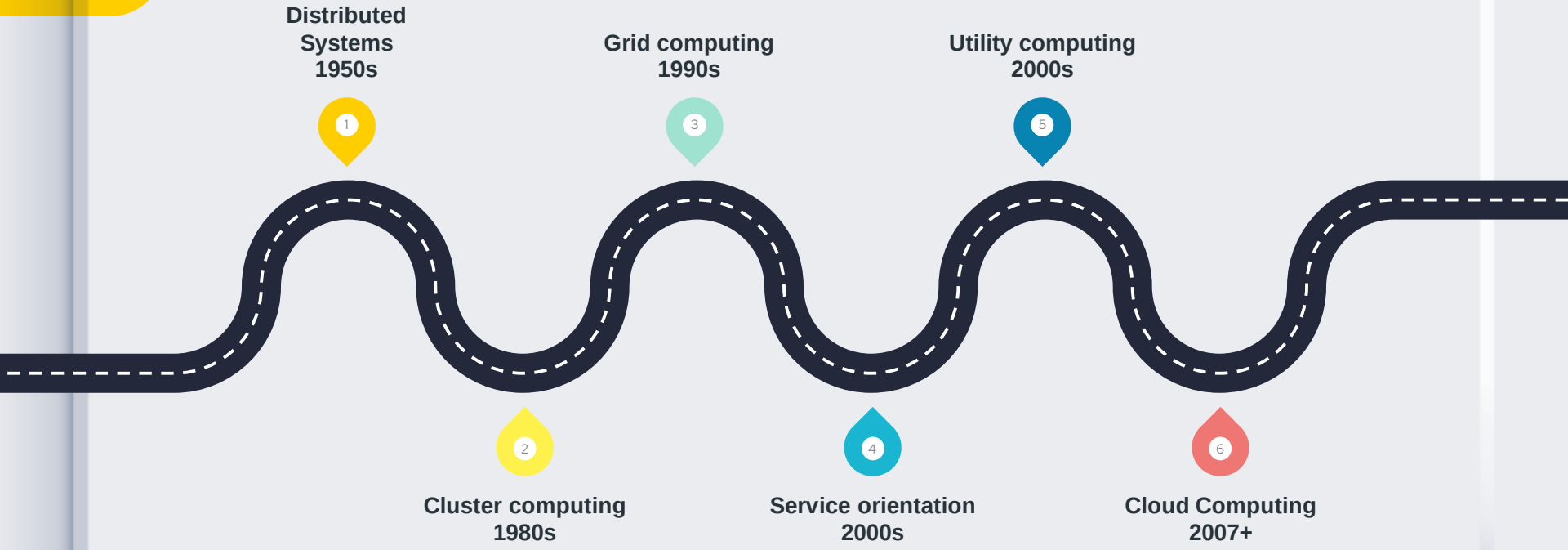
History

Joseph Carl Robnett Licklider

1915-1990

Evolution of Cloud Computing

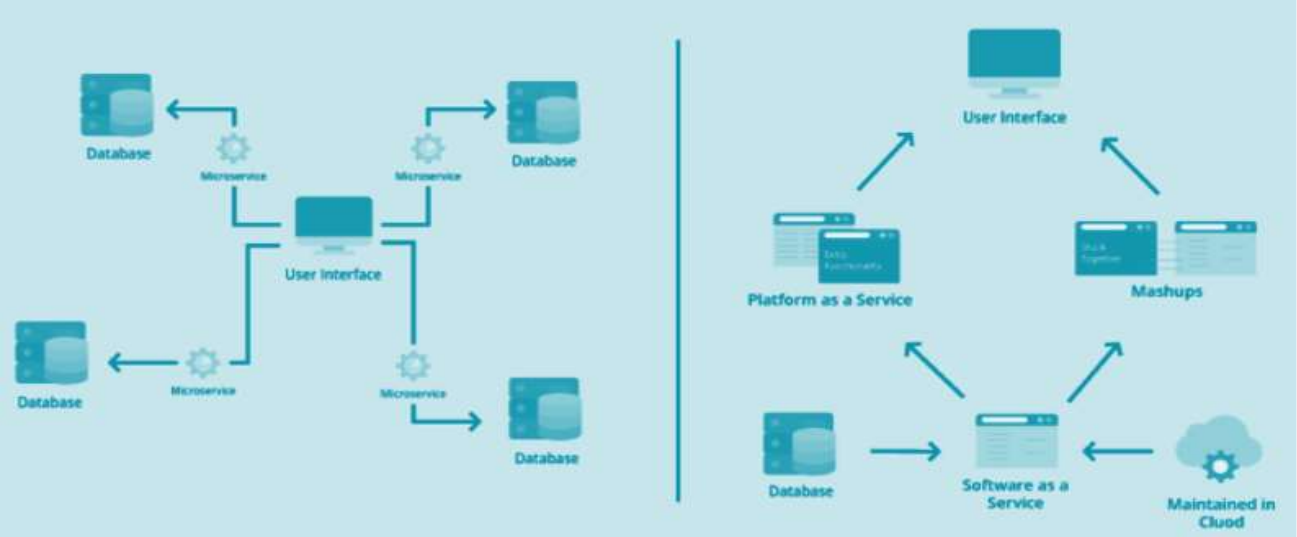
Roadmap


Distributed Systems 1950s
1
Cluster computing 1980s
2
Grid computing 1990s
3
Service orientation 2000s
4
Utility computing 2000s
5
Cloud Computing 2007+
6

Cloud Architecture

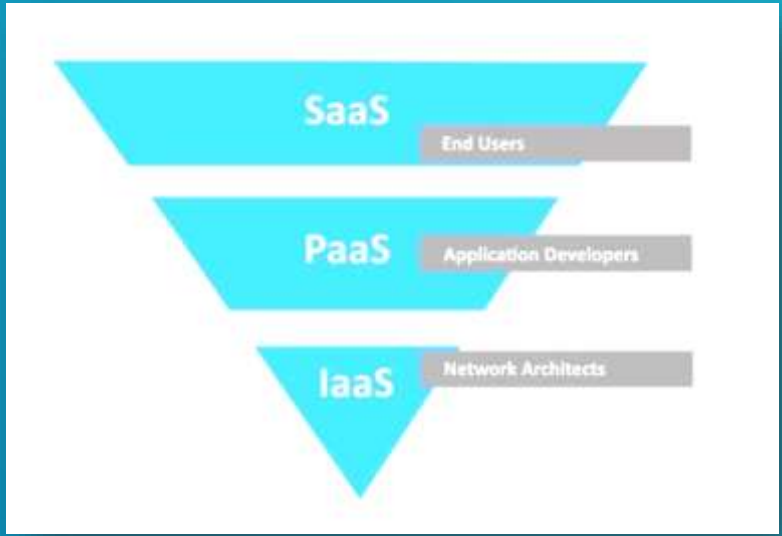
Key Points

Event-driven architecture **Service-oriented architecture**



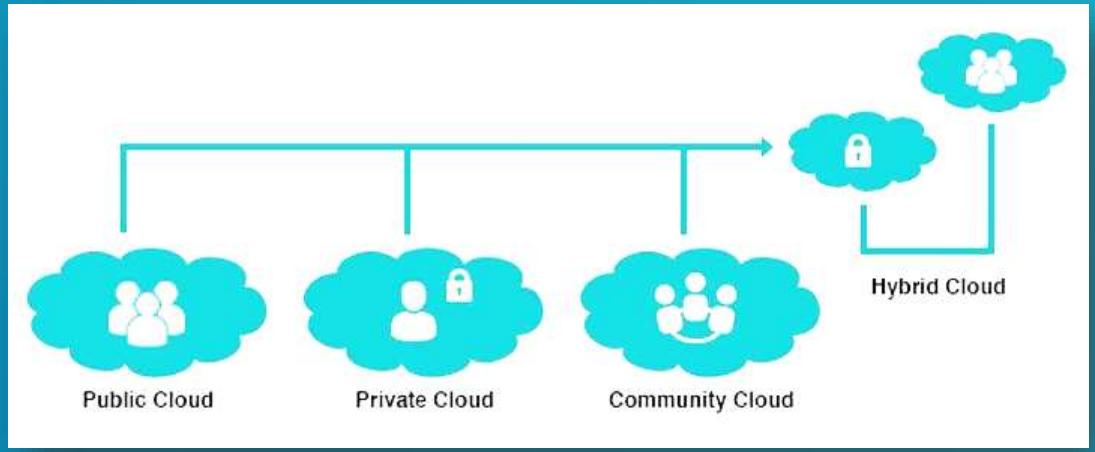
Service Model

The general architecture of cloud platform is also known as cloud stack.



Deployment Model

Based on the deployment model, the cloud can be divided into the following subcategories, which are as follows:-



Cloud Security Challenges

Virtual centralization

Third-party data control

Traditional security issues

Internet-communication media

Characteristics of Cloud Computing

Broad network access

- Heterogeneous thin or thick client platforms

Resource pooling

- Served using multi-tenant model

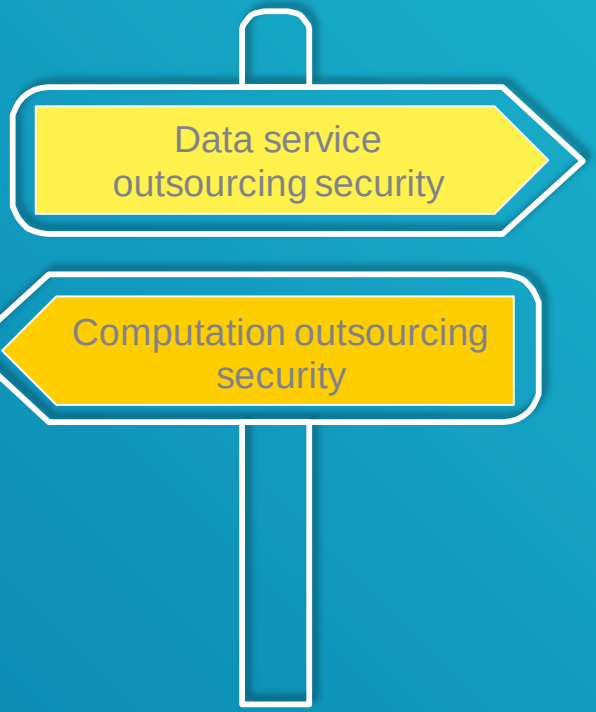
Rapid elasticity

- Capabilities can be rapidly and elastically provisioned

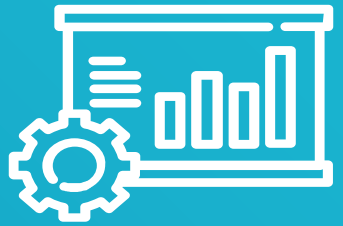
Measured service

- Automatically optimizing the usage of resources

01 Outsourcing



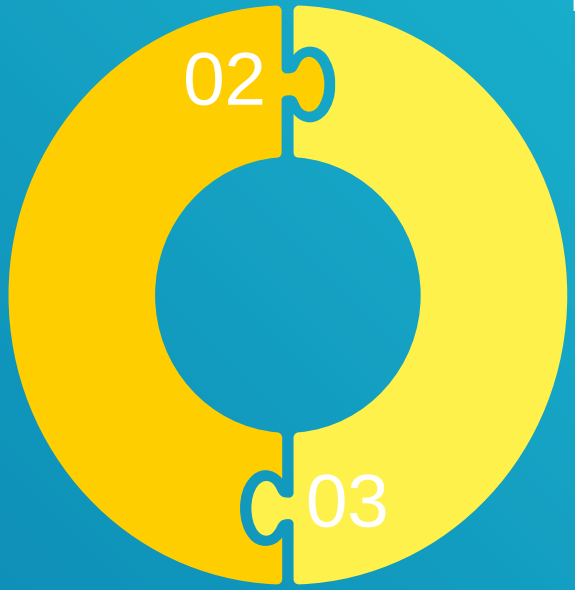
Users computational power is no longer limited by their resource-constrained devices.



Cloud computing provides access to data, but the challenge is to ensure that only authorized entities can gain access to it.

Multi-tenancy

Multi-tenancy means that the cloud platform is shared and utilized by multiple customers.



Massive data and intense computation

Cloud computing is capable of handling mass data storage and intense computing tasks.

Need for Security in Cloud

Security and Privacy Attributes

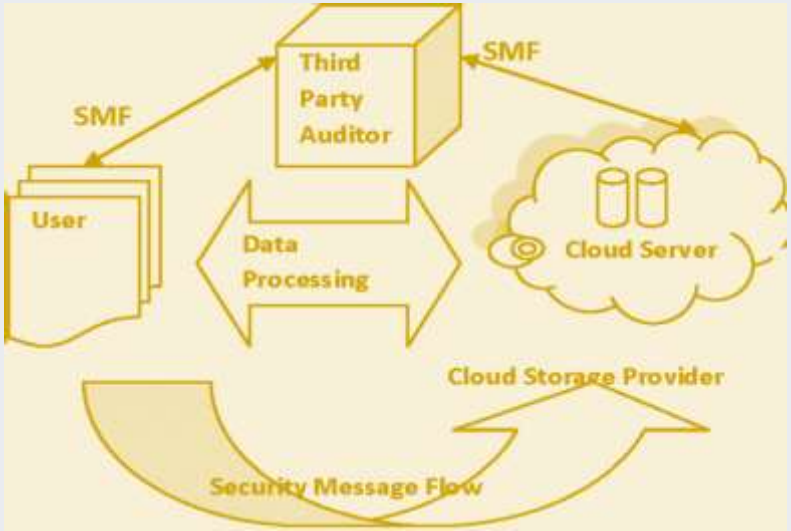
Cloud Integrity

Threats to cloud integrity:

- Data loss/manipulation
- Dishonest computation in remote servers

Dishonest computation in remote servers:

- Provable data possession (PDP)
- Third party auditor (TPA)
- Combating dishonest computing
  - Re-computation
  - Replication
  - Auditing
  - Trusted computing



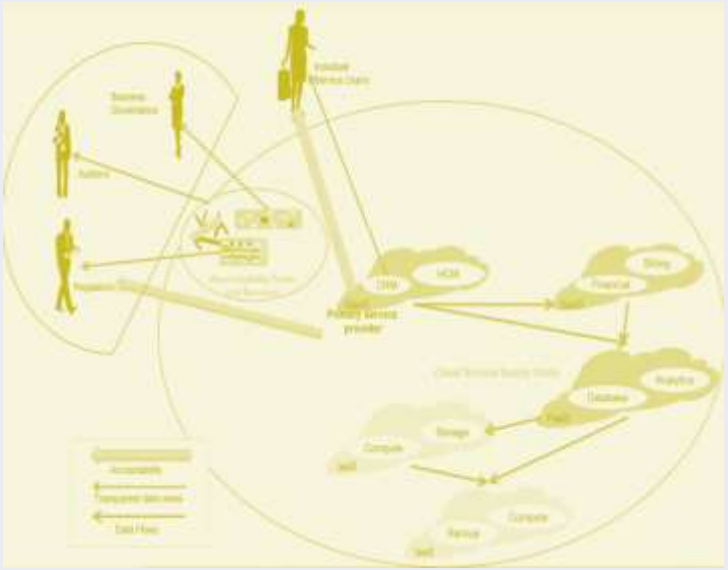
Cloud Accountability

Threats to cloud accountability:

- SLA violation
- Dishonest MapReduce
- Hidden identity of adversaries:
- Inaccurate billing of resource consumption

Defensive strategies:

- Accountability on Service Level Agreement(SLA)
- Accountable virtual machine (AVM)
- Collaborative monitoring
- Accountable MapReduce(AMR)
- Secure provenance
- Verifiable Resource Accounting



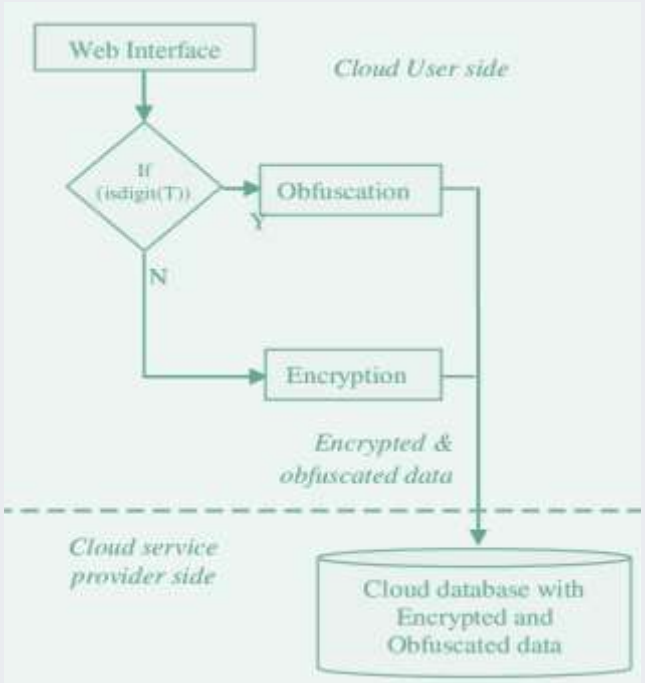
Cloud Confidentiality

Threats to cloud confidentiality:

- Cross-Virtual Machine(VM) attack via Side Channels
- Malicious sysAdmin

Defensive strategies:

- Placement prevention
- Co-residency detection
- NoHype
- Trusted cloud computing platform(TCCP)
- Retaining data control back to customer



Cloud Availability

Threats to cloud availability:

- Flooding attack via bandwidth starvation
- Direct DOS
- Indirect DOS
- Fraudulent Resource Consumption (FRC) attack

Defensive strategies:

- Defending the new DOS attack
- FRC attack detection

Cloud privacy-preservability

Approaches of privacy enforcement:

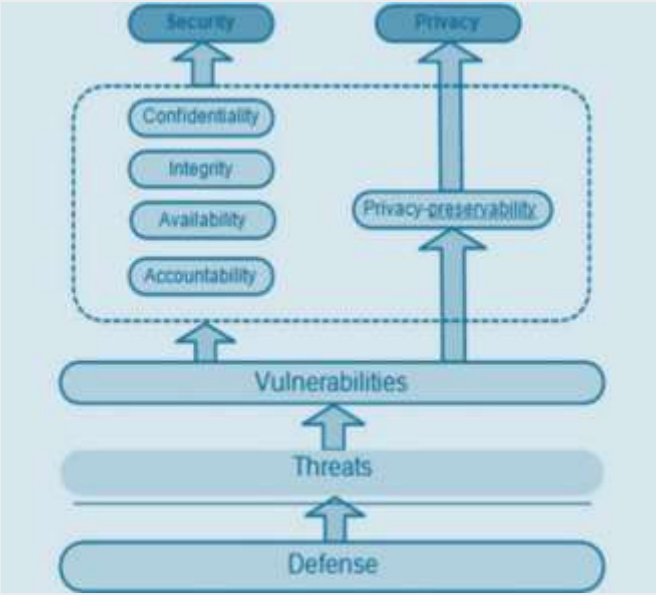
- Information centric security
- Trusted computing
- Cryptographic protocols

Threats to cloud privacy-preservability:

- Data privacy
- Computation privacy

Defensive strategies:

- Fully Homomorphic Encryption (FHE)



Predictions

..We think everyone on the planet deserves to have their own virtual data center in the cloud..

-Lew Tucker

..Cloud Computing Will Be As Influential As E-business ..

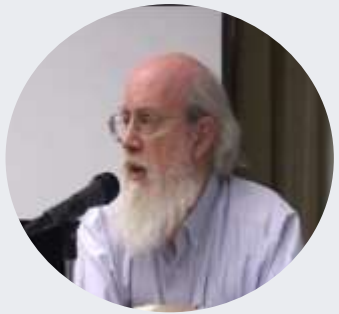
-Gartner

..Public clouds will grow even more dominant and the worldwide spending on infrastructure will double..

-IDC

..Who knew that the concept of security in cloud computing was even possible to imagine?..

-Scott Bradner



Conclusion

Cloud computing provides easy data storage and access.

Integrity of cloud is compromised due to data loss and dishonest computation in remote servers.

Denial of Service attack is the most common attack which is also possible in cloud computing network.

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Thanks!