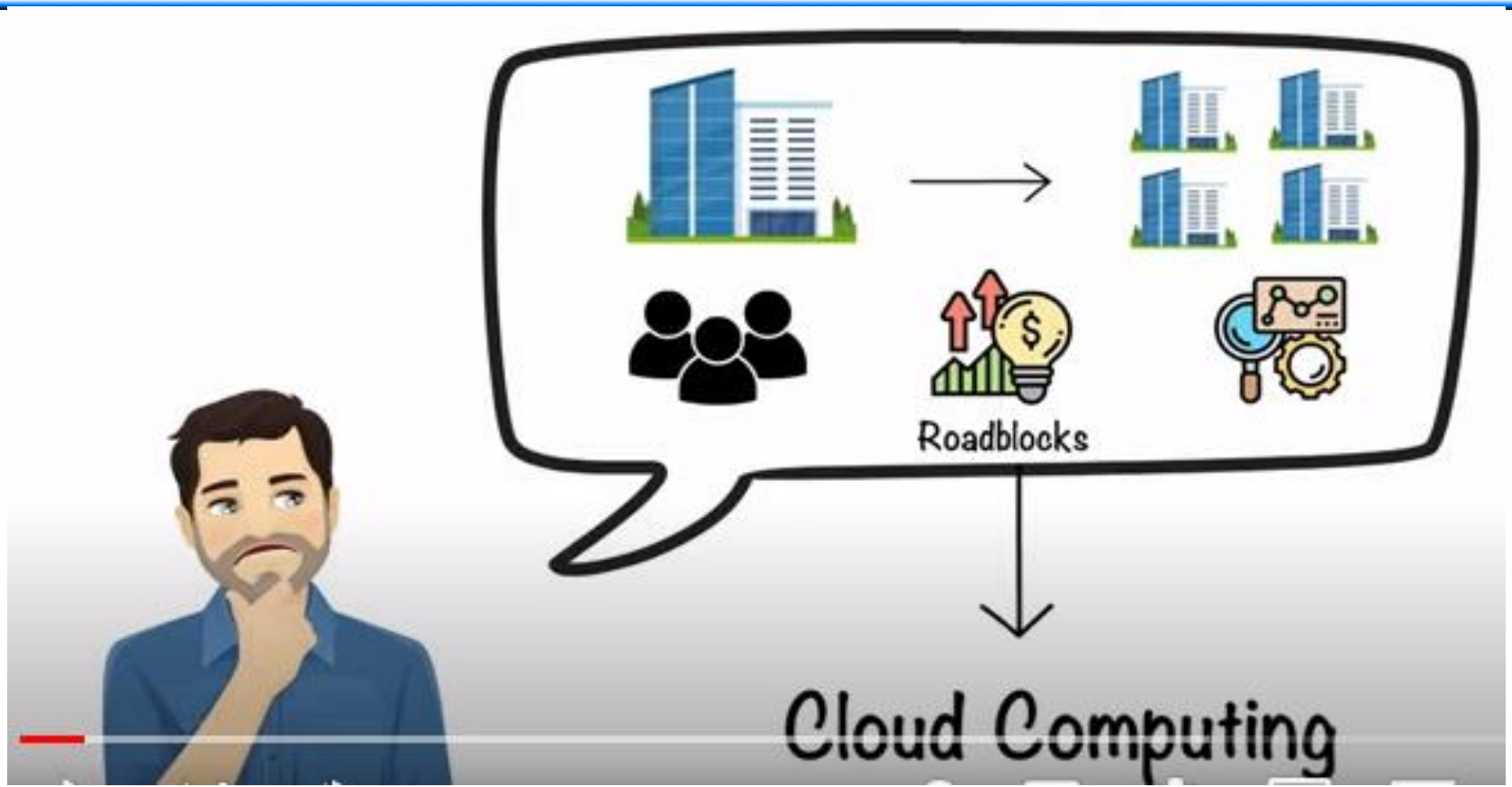
Cloud Architecture

Background

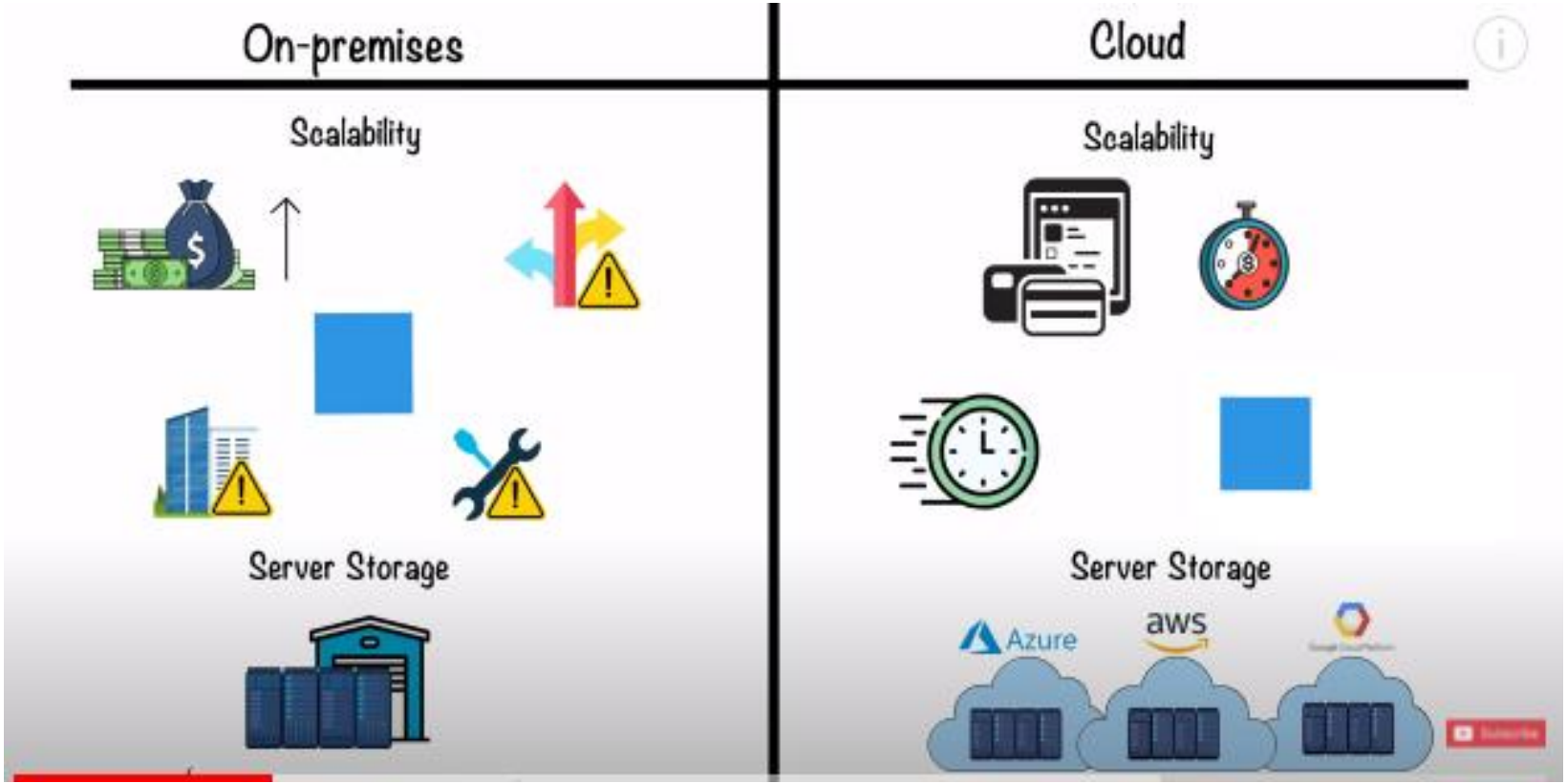
- 2010 WGITA approved the cloud computing project with SAI USA as lead and Canada & India as members
- 2011 A status report was presented and comments solicited
- 2012 Final project description and common cloud computing risks were presented.

  Members requested that this work be augmented with a cloud computing guide and audit handbook
- 2013 Guide & handbook completed for CC.
- 2013 Will be incorporated into the overall IT Audit Guide & Handbook in cooperation with IDI

Cloud Computing



Differences



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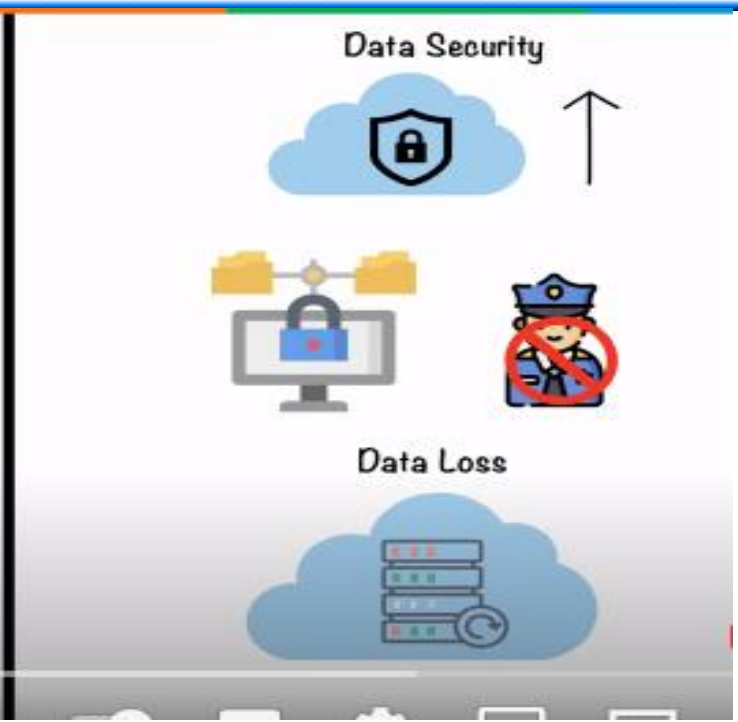
Data Security
Data Loss


Data Security
Data Loss


Maintenance


Maintenance
Azure
aws

Summary

- On-Premise is expensive
- Less scalability
- Allot huge space for servers
- Less chance of data recovery
- Long deployment times
- Lack of flexibility
- Poor data security
- Less collaboration
- Data cannot be accessed remotely

Solutions

- No server space required
- No experts required for hardware and software maintenance
- Better data security
- Disaster recovery
- Ease of deployment
- Cost effective
- Management of services is easy
- Collaboration efficiency

What is cloud computing?

- Cloud Computing is the delivery of On-Demand resources (such as server, database, software , etc.) over the internet.
- It also gives the ability to build, design and manage applications on the cloud platform
- Cloud Computing service providers are the vendors to manage applications through a global network
- Ex. Amazon Web Services, Microsoft Azure, GCP etc.

Benefits of Cloud Computing

Highly Available

Flexibility

Better Security

Customisation

Characteristics

Characteristics include-

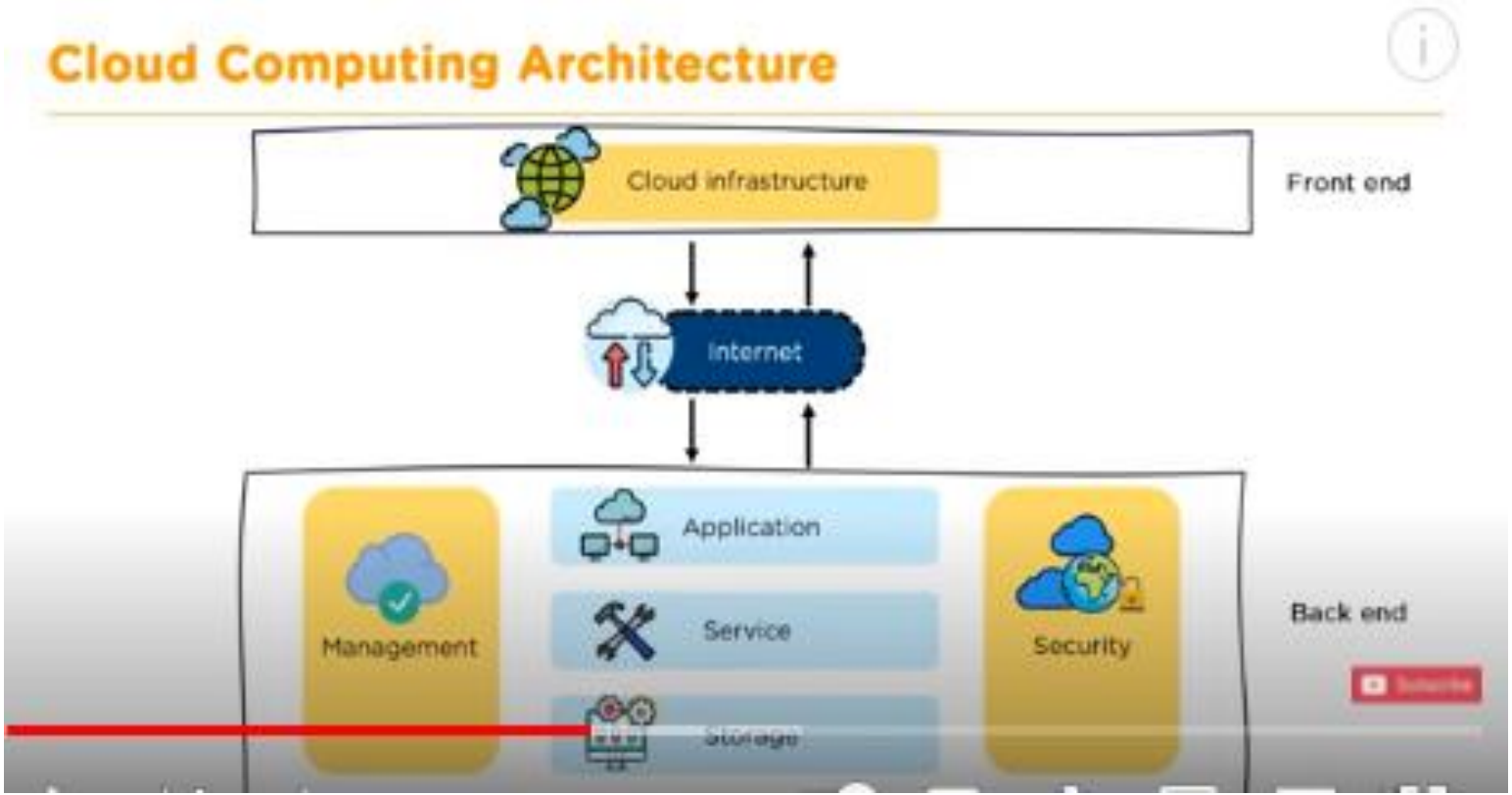
On-Demand service- You use it when you need it

Network Access- Uses internet as a medium

Shared resources-Resources are pooled together, used by multiple clients

Scalability- Allows elasticity of resources

Cloud Computing Architecture



Architecture

- It is divided in two parts- Front end and Back end

Front End-

- It provides applications and the interfaces that are required for the cloud based services
- These applications are web browsers such as google chrome and internet explorer
- It includes clients and mobile devices

Front End- Cloud infrastructure

- Cloud infrastructure consist of hardware and software components such as data storage, server, virtualization software etc.
- It also provides graphical user interface to end users in order to perform respective tasks

Back End

- It manages all the programs that run the application on the front end
- It has a large number of data storage systems and servers
- **Application**
- It can also be a software or a platform
- Based on the requirement the application provides output to the end-user(with resources) in the back end
- **Service**
- It is the most important component in the cloud
- Its task is to provide utility in the architecture
- Few services that are widely used among the end users are storage, application development environments and web services

Back End

- **Storage**
- It maintains and manages any amount of data over the internet
- Some of the examples of storage services are Amazon S3, Oracle Cloud Storage and Microsoft Azure storage
- The storage capacity varies depending upon the service providers available in the market

Management

- It allocates specific resources to a specific task. Also it handles functions of cloud environment
- It helps in the management of components like application , task, service, security, data storage and cloud infrastructure
- In simple terms ,it establishes coordination among the resources

Security

- Security is an integral part of cloud infrastructure
- It helps in protecting cloud resources, systems, files and infrastructure
- Also, it provides security to the cloud server with virtual firewalls which results in preventing data loss

Components of cloud computing Architecture

Hypervisor

- It is a virtual Operating platform for every user
- It runs a separate virtual machine on the back-end which consists of software and hardware
- Its main objective is to divide and allocate resources

Management software

- Its responsibility is to manage and monitor cloud operations
- It helps in improving the performance of the cloud
- For Ex. High security, flexibility, full-time access etc.

Deployment Software

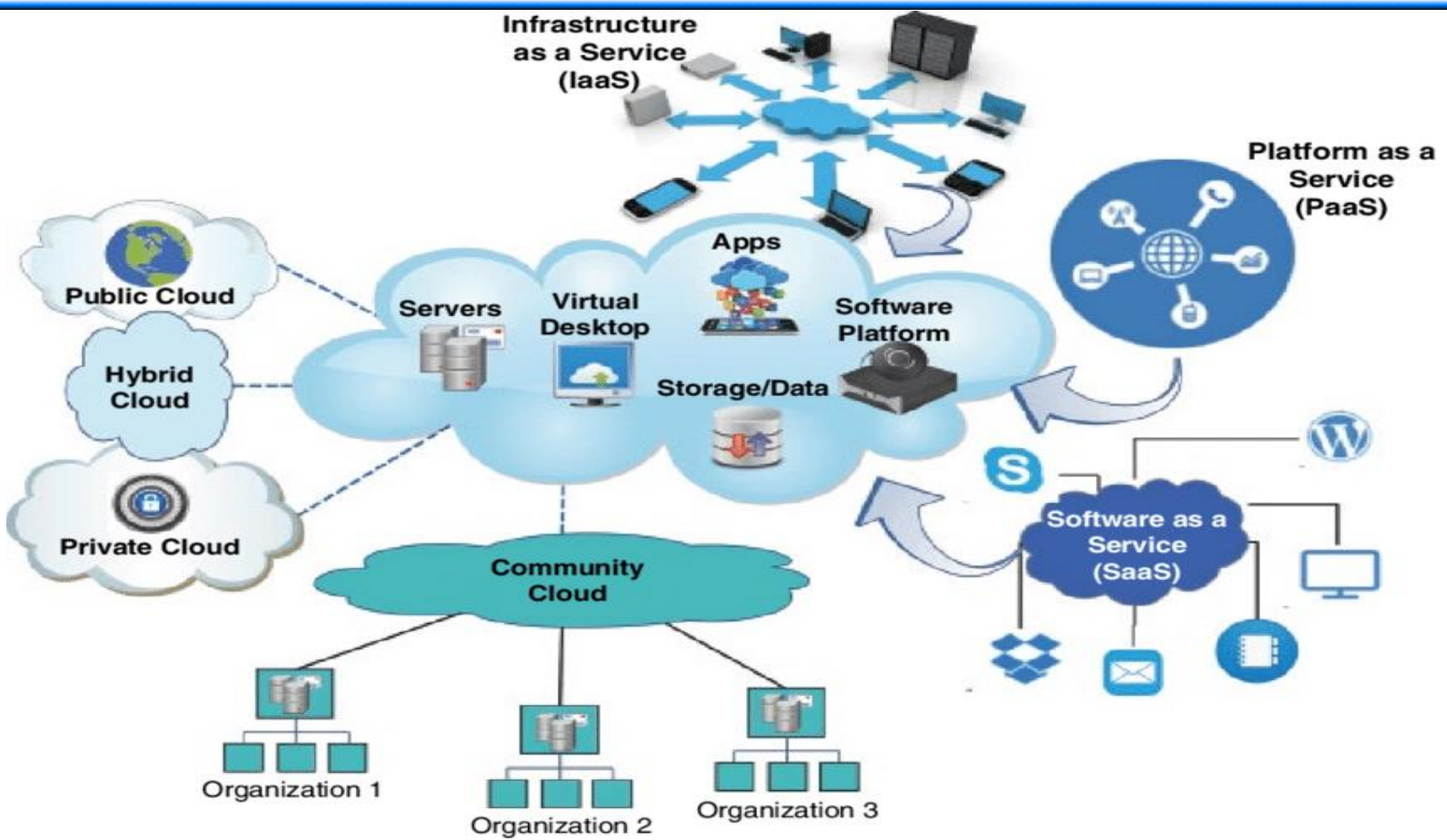
- It consists of all the mandatory installations and configurations required to run a cloud service
- Every deployment of cloud services is performed using a deployment software
- Three different models which can be deployed are-
- SAAS-software as a service hosts and manages applications of the end-user. Ex. Gmail
- PAAS-Platform as a service. It helps developers to build,create and manage applications. Ex Microsoft Azure
- IAAS- Infrastructure as a service, provides services on a pay-as-you-go pricing model

Network

- It connects the front end and back end. Also, allows every user to access cloud resources
- It helps users to connect and customize the route and protocol
- It is a virtual server which is hosted on the cloud computing platform
- It is highly secure, flexible and cost effective

Cloud Storage

- Here every data is stored and accessed by a user from anywhere over the internet
- It is scalable at run-time and is automatically accessed
- Data can be modified and retrieved from cloud storage over the web


Infrastructure as a Service (IaaS)
Platform as a Service (PaaS)
Public Cloud
Hybrid Cloud
Private Cloud
Servers
Virtual Desktop
Apps
Software Platform
Storage/Data
Community Cloud
Software as a Service (SaaS)
Organization 1
Organization 2
Organization 3