SWARNIM STARTUP & INNOVATION UNIVERSITY

Cloud Computing

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INTRODUCTION

"Cloud computing is a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction." (NIST Definition, National Institute of Standards and Technology)

continued…

Introduction cont…

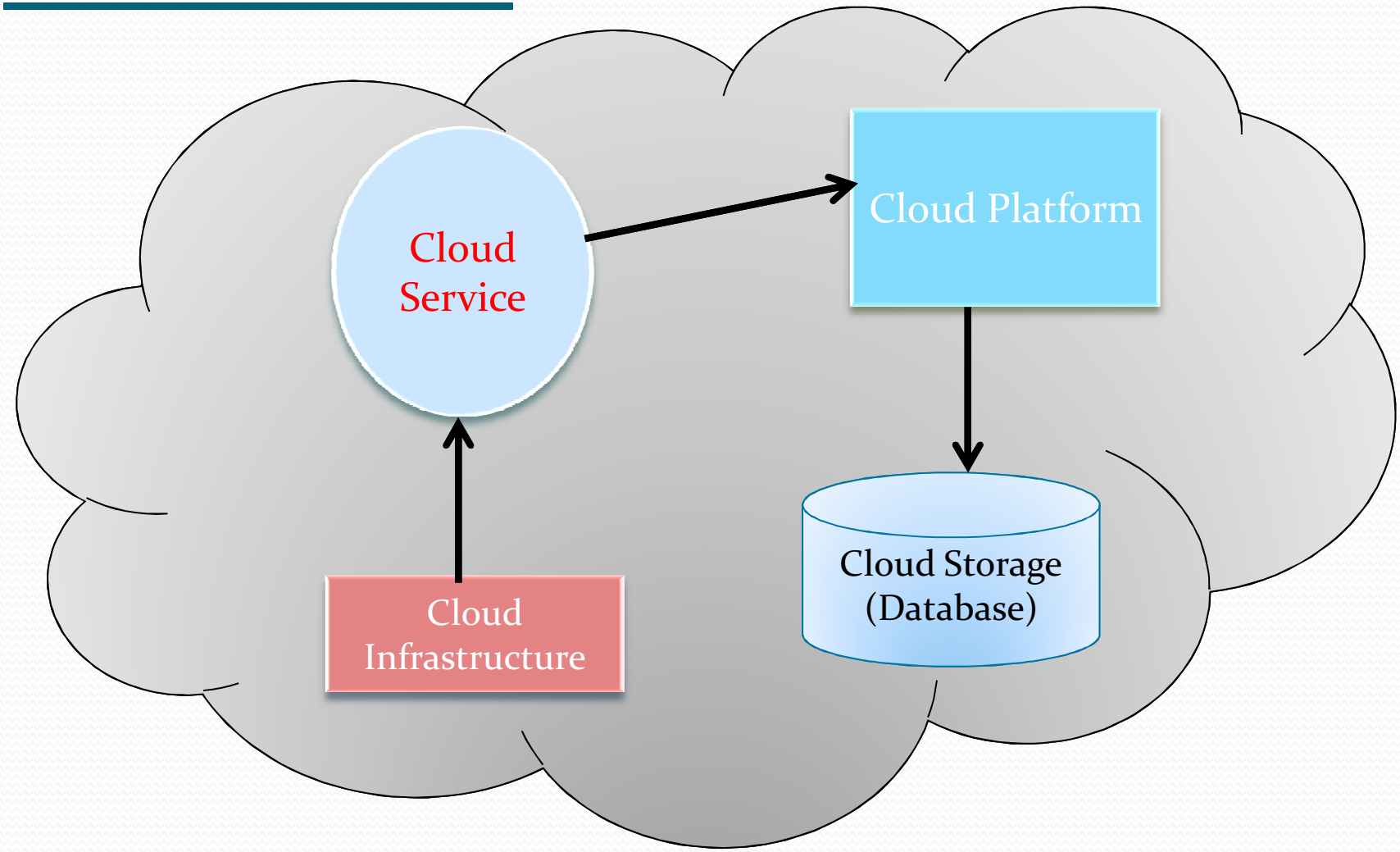
- Cloud computing is a computing paradigm shift where computing is moved away from personal computers or an individual application server to a “cloud” of computers.
- Users of the cloud only need to be concerned with the computing service being asked for, as the underlying details of how it is achieved are hidden. This method of distributed computing is done through pooling all computer resources together and being managed by software rather than a human.”

Introduction cont…

- Cloud computing is a concept where applications and files are hosted on a “cloud” consisting of thousands of computers and servers, all linked together and accessible via the Internet.

- With cloud computing, everything you do is now web based instead of being desktop based. You can access all your programs and documents from any computer that’s connected to the Internet.

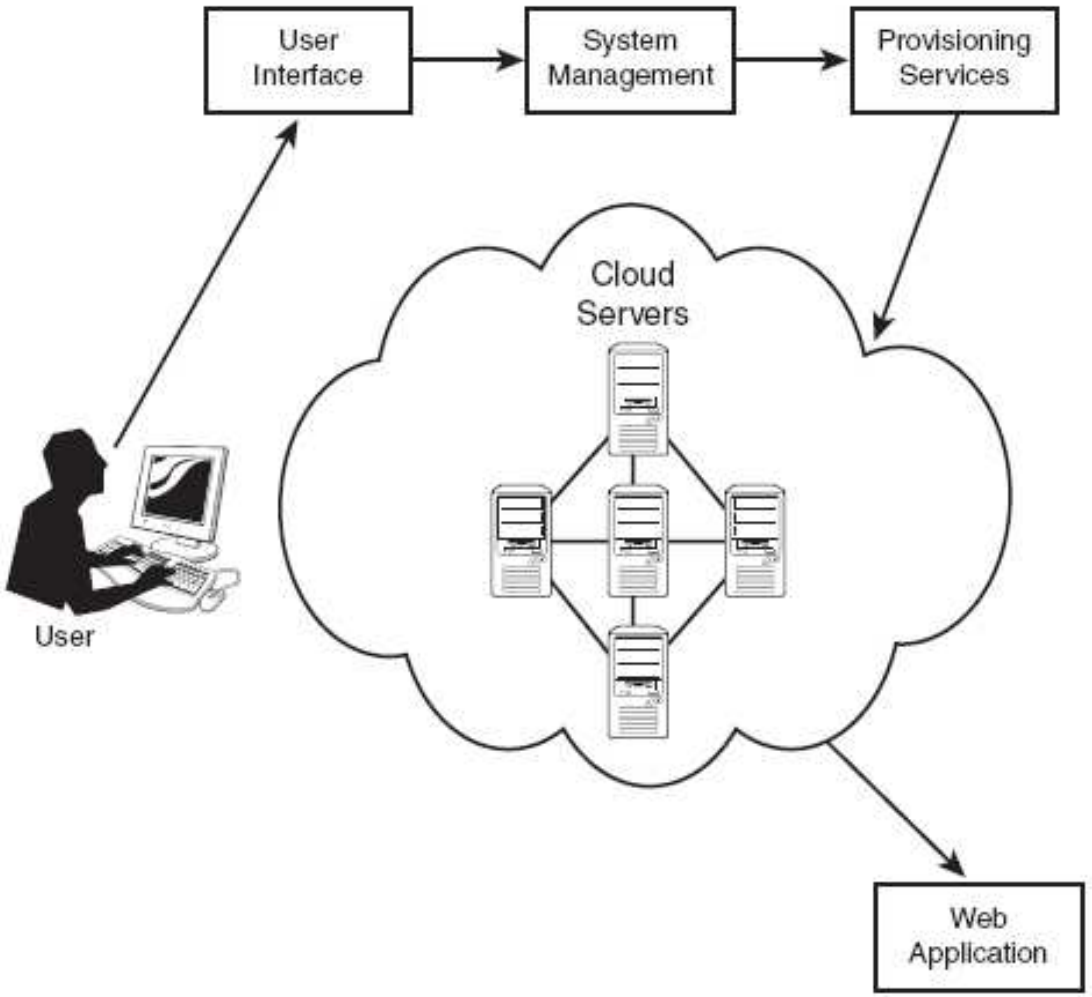
Cloud computing sample architecture



- *Cloud architecture*, the **systems architecture** of the **software systems** involved in the delivery of cloud computing, typically involves multiple *cloud components* communicating with each other over **application programming interfaces**, usually **web services** and **3-tier architecture**. This resembles the **Unix philosophy** of having multiple programs each doing one thing well and working together over universal interfaces. Complexity is controlled and the resulting systems are more manageable than their **monolithic** counterparts.

- The two most significant components of cloud computing architecture are known as the front end and the back end. The front end is the part seen by the client, i.e. the computer user. This includes the client's network (or computer) and the applications used to access the cloud via a user interface such as a web browser. The back end of the cloud computing architecture is the 'cloud' itself, comprising various computers, servers and data storage devices.

Understanding Cloud Architecture



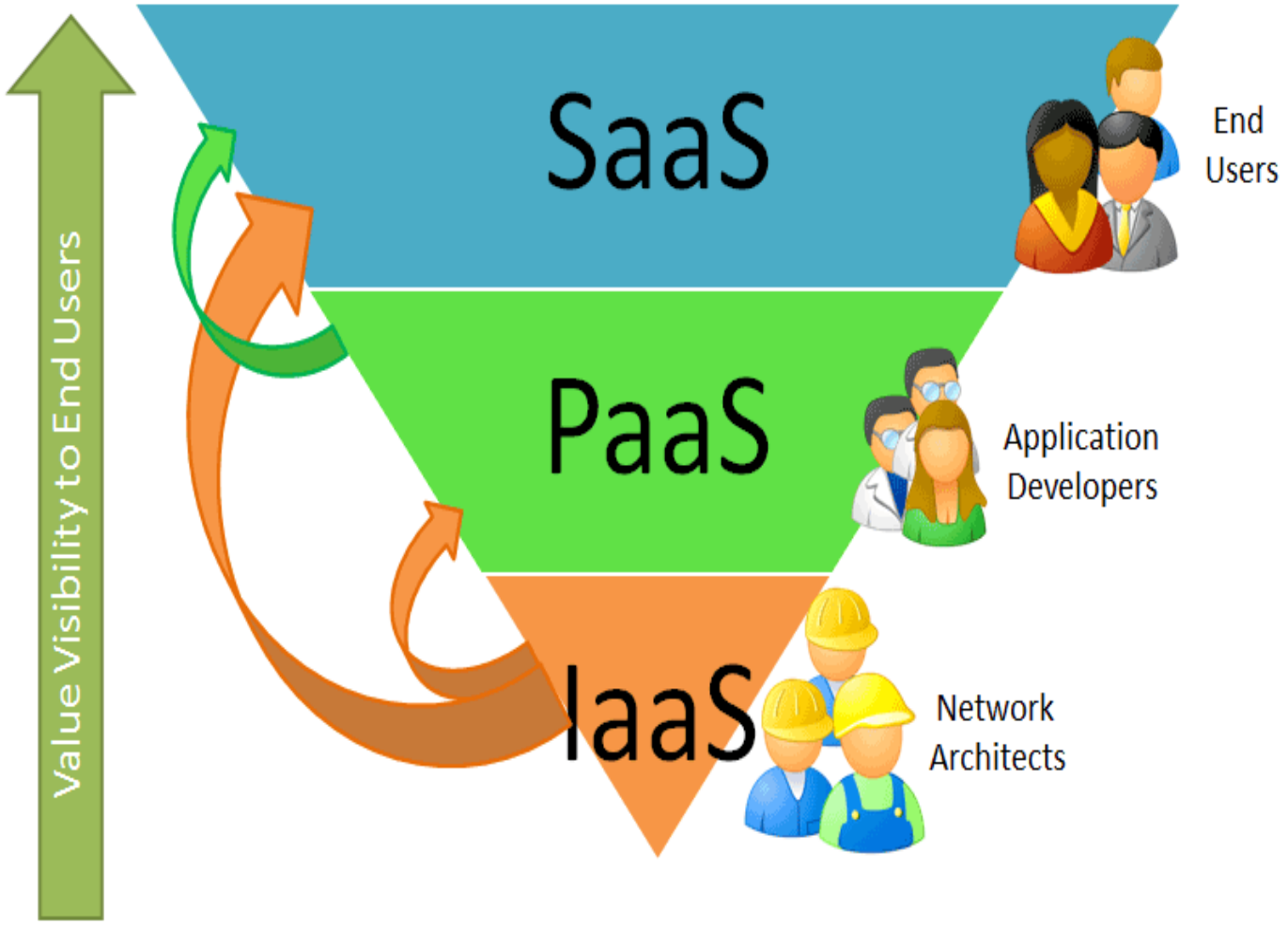
Understanding Cloud Architecture

- Users select a task or service (either starting an application or opening a document).
- User's request goes to the system management, which finds the correct resources and then calls the system's appropriate provisioning services.
- These services
  - > Carve out the necessary resources in the cloud
  - > Launch the appropriate web application
  - > Opens the requested document.
- Web application is launched
- System's monitoring functions track the usage of the cloud so that resources are apportioned and attributed to the proper user(s).
- User is charged according to the amount of utilities and resources used.

key Characteristics of Cloud computing

- Agility
- Application Programming Interface
- Cost
- Device and location independence
- Multi-tenancy
- Reliability
- Scalability
- Security
- Maintenance
- Metering

Cloud Computing Layers



Client

Application

Platform

Infrastructure

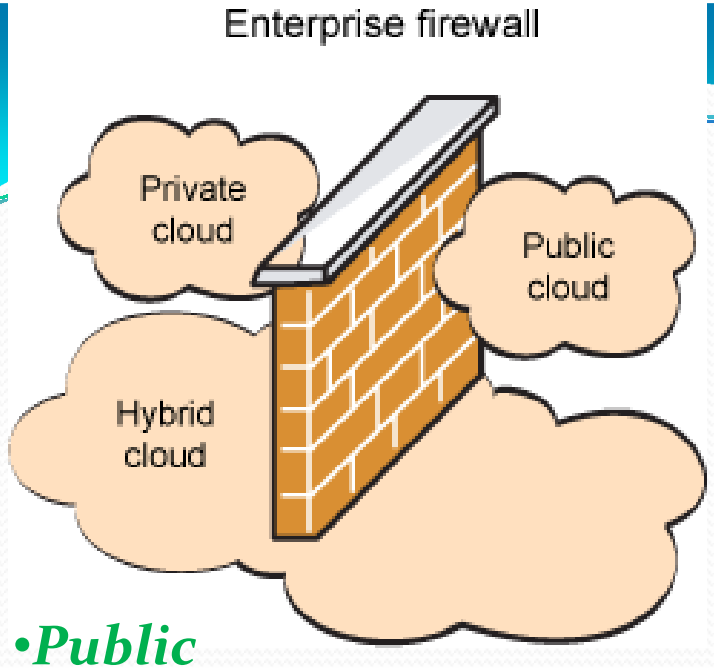
Server

SaaS vs. IaaS vs. PaaS

- **Software as a Service (SaaS):** Complete application systems delivered over the Internet on some form of "on-demand" billing system: **Salesforce.com, Google Apps…**

- **Platform as a Service (PaaS):** Development platforms and middleware systems hosted by the vendor, allowing developers to simply code and deploy without directly interacting with underlying infrastructure: **Google AppEngine, Microsoft Azure, Force.com…**

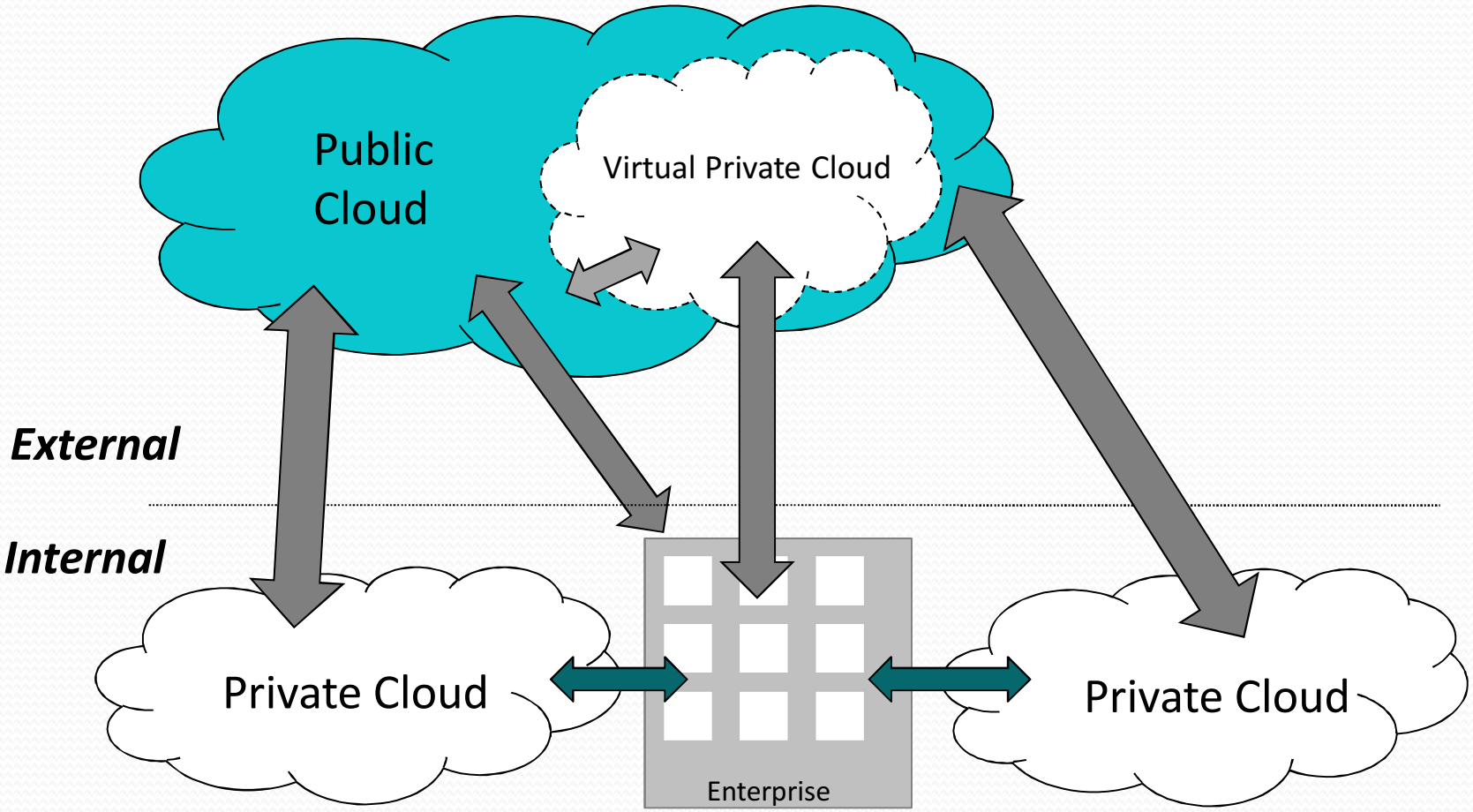
- **Infrastructure as a Service (IaaS):** Raw infrastructure, such as servers and storage, is provided from the vendor premises directly as an on-demand service: **Amazon Web Services, GoGrid…**



Types of Clouds

- ***Public***
  - Resources are dynamically provisioned on a self-service basis.
  - Provided by an off-site third-party provider who shares resources and bills utility computing basis.
- ***Private***
  - Capitalise on data security, corporate governance, and reliability concerns.
  - Users "still have to buy, build, and manage clouds“
  - lacks the economic model that makes cloud computing such an intriguing concept.
- ***Hybrid***
  - A *hybrid cloud* environment consists of multiple internal and/or external providers.

Cloud Deployment Model



Cloud Engineering

- Cloud engineering is the application of a systematic, disciplined, quantifiable, and interdisciplinary approach to the ideation, conceptualization, development, operation, and maintenance of cloud computing, as well as the study and applied research of the approach, i.e., the application of engineering to cloud. It is a maturing and evolving discipline to facilitate the adoption, strategization, operationalization, industrialization, standardization, productization, commoditization, and governance of cloud solutions, leading towards a cloud ecosystem. Cloud engineering is also known as cloud service engineering.

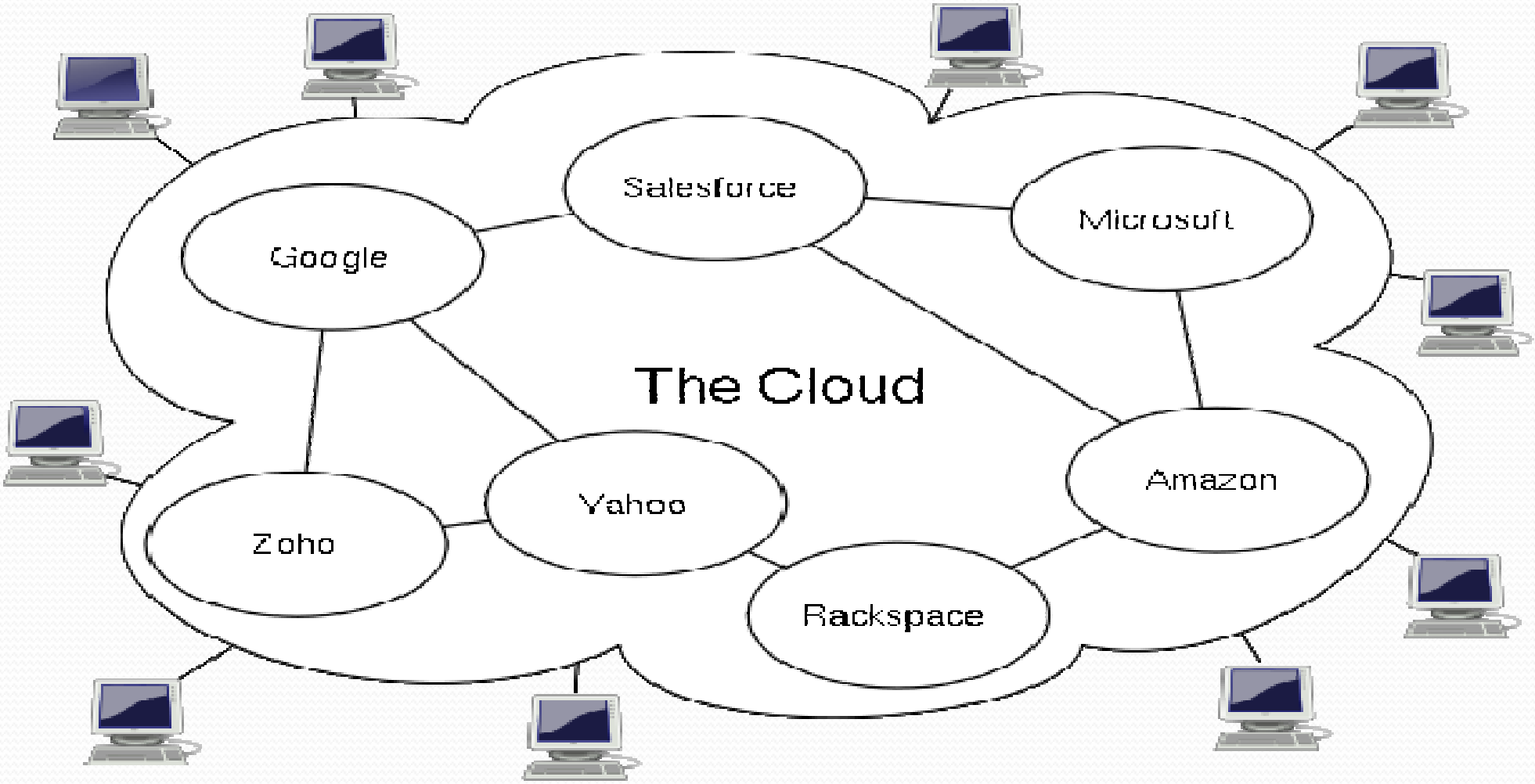
Cloud storage

- Cloud storage is a model of networked **computer data storage** where data is stored on multiple virtual servers, generally hosted by third parties, rather than being hosted on dedicated servers. **Hosting** companies operate large data centers; and people who require their data to be hosted buy or lease storage capacity from them and use it for their storage needs. The **data center** operators, in the background, **virtualize** the resources according to the requirements of the customer and expose them as virtual servers, which the customers can themselves manage. Physically, the resource may span across multiple servers.

List of Cloud computing providers

Infrastructure as a Service	Platform as a Service	Software as a Service
amazon web services	Google App Engine	salesforce.com Success. Not Software.
GoGrid Control in the Cloud	amazon web services	ZOHO
Sun microsystems	the rackspace cloud	Google Apps
	Windows Azure	Microsoft Office Live
	force.com platform as a service	
	Joyent	

Cloud computing providers



Advatages of cloud computing

- Lower computer costs
- Improved performance
- Reduced software costs
- Instant software updates
- Improved document format compatibility
- Unlimited storage capacity
- Increased data reliability
- Universal document access
- Latest version availability

Difficulties for cloud computing

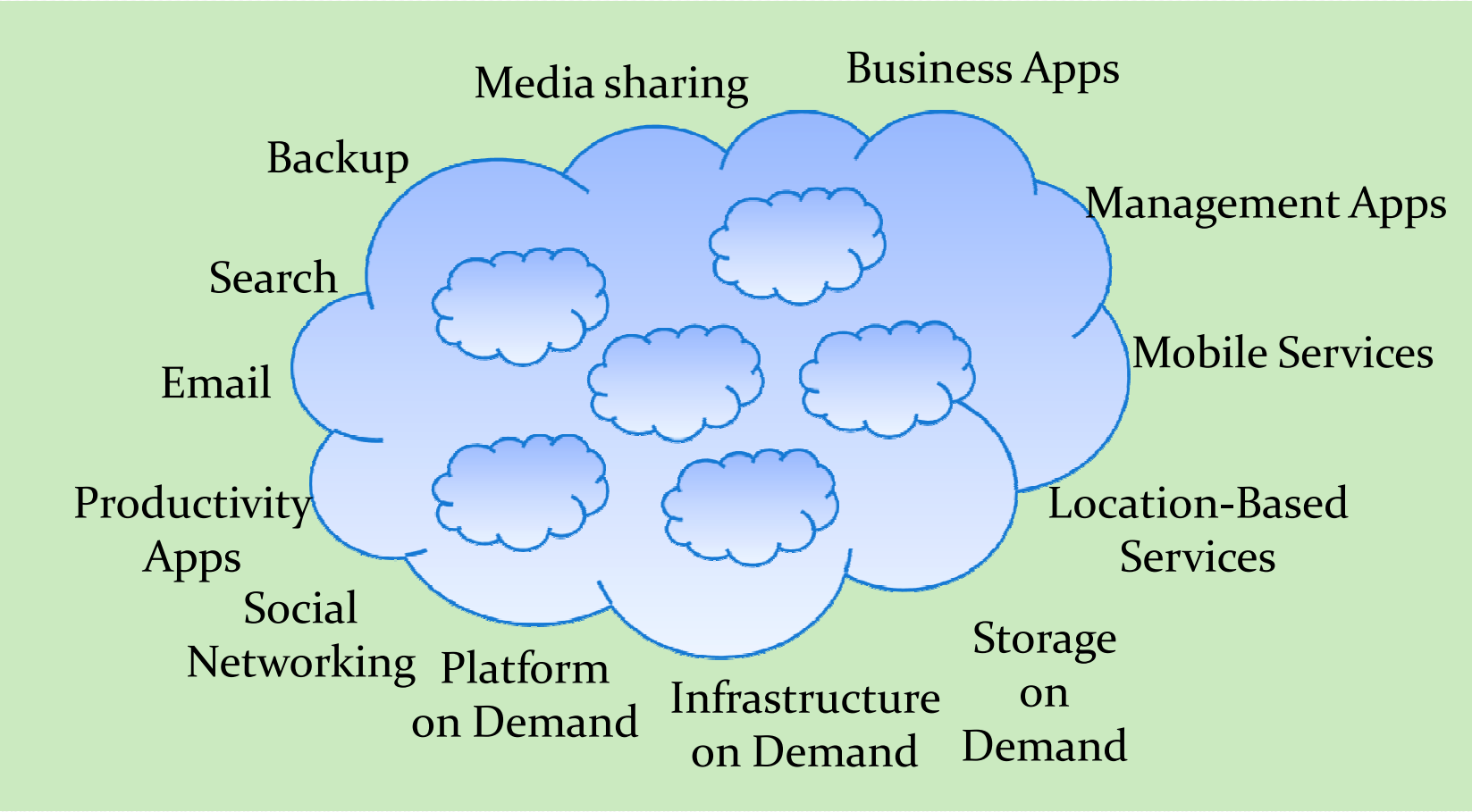
- Continuous high availability
- Cosistency
- Interoperability and standarlization
- Scalability of all components
- Data secrecy
- Legal and political problem of data store and translation across regions
- Performance issue
- Difficulty customizing
- Organizational obstacle

Potencial issues in cloud computing

- Privileged user access.
- Regulatory compliance.
- Data location.
- Data segregation.
- Recovery.
- Investigative support.
- Long-term viability.

“Everything as a Service”

Delivered by the Cloud



Cloud Computing Means Many Different Things To Different People

Monank
Dobariya

THANK YOU.....!!