Cloud Computing

Lecture 1

- **Definition and Characteristics**
- **History and Evolution of Cloud Computing vs. Grid**

What does the word “CLOUD" mean?

- **C** — **Common**
- **L** — **Location**
- **O** — **Online**
- **U** — **Utility**
- **D** — **Demand**

Common Location independent Online Utility that is available on Demand

The vision of cloud computing

- Cloud computing allows anyone with a credit card to provision virtual hardware, runtime environments, and services. These are used for as long as needed, with no up-front commitments required.
- The entire stack of a computing system is transformed into a collection of utilities, which can be provisioned and composed together to deploy systems in hours rather than days and with virtually no maintenance costs.
- The long-term vision of cloud computing is that **IT services are traded as utilities in an open market, without technological and legal barriers**
- **In this cloud marketplace, cloud service providers and consumers, trading cloud services as utilities, play a central role.**

Basic of cloud computing

- Cloud is Economics and Computing as a Utilities

Cloud is the commercial of individual computing services delivered remotely.

The services include, but are not limited to:

- Desktops
- Disk and Storage
- Processing
- Networking
- Database and other services

Cloud supports a “On demand” Model. In other words, customers can use as many of the services as needed, and they are only charge for what is used.

- Cloud services are delivered remotely, almost always, from off-site data centers.

- The delivery of the services is by way of the internet

Cloud Definitions

NIST
National Institute of Standards and Technology
Technology Administration, U.S. Department of Commerce

- Definition from ***NIST (National Institute of Standards and Technology)***
  - 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.
  - This cloud model promotes availability and is composed of five essential characteristics, three service models, and four deployment models.

Cloud Definitions

- Definition from ***Wikipedia***
  - Cloud computing is Internet-based computing, whereby shared resources, software, and information are provided to computers and other devices on demand, like the electricity grid.
  - Cloud computing is a style of computing in which dynamically scalable and often virtualized resources are provided as a service over the Internet.

Cloud Definitions

- Definition from ***Whatis.com***
  - The name cloud computing was inspired by the cloud symbol that's often used to represent the Internet in flowcharts and diagrams. Cloud computing is a general term for anything that involves delivering hosted services over the Internet.

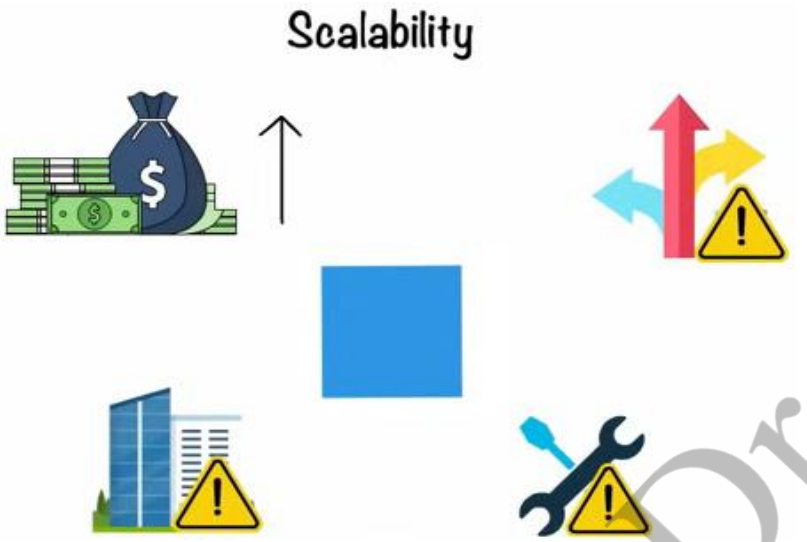
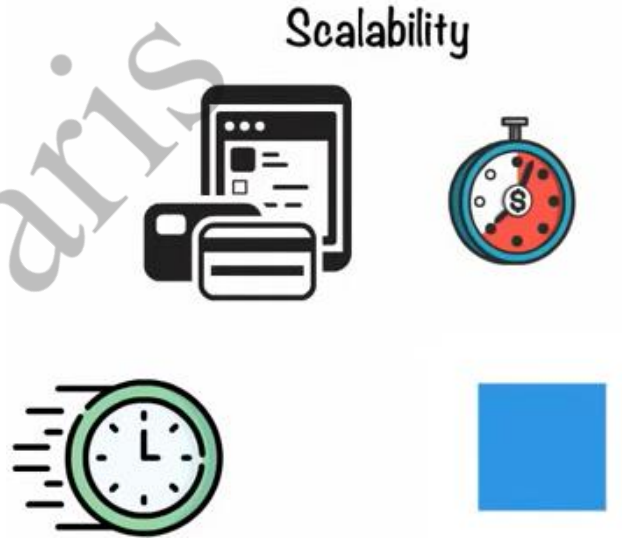
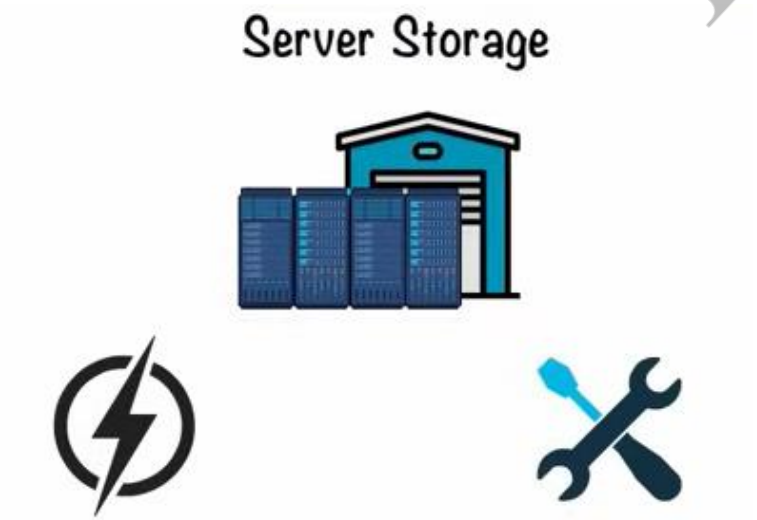
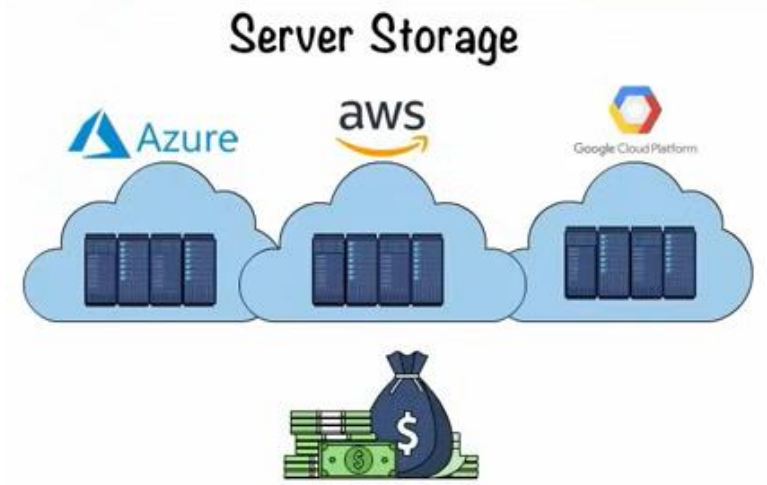
Cloud Definitions

- Definition from ***Berkeley***
  - Cloud Computing refers to both the applications delivered as services over the Internet and the hardware and systems software in the datacenters that provide those services.
  - The services themselves have long been referred to as Software as a Service (SaaS), so we use that term. The datacenter hardware and software is what we will call a Cloud.
  - When a Cloud is made available in a pay-as-you-go manner to the public…… The service being sold is Utility Computing.

Cloud Definitions

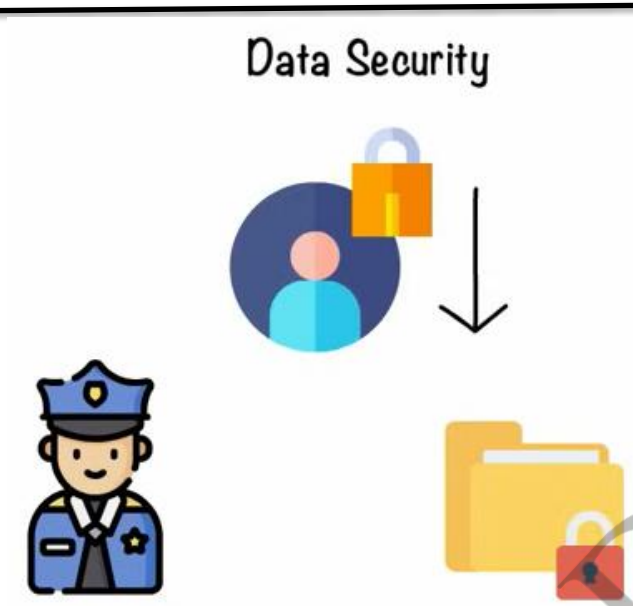
- Definition from ***Buyya***
  - A Cloud is a type of parallel and distributed system consisting of a collection of interconnected and virtualized computers that are dynamically provisioned and presented as one or more unified computing resources based on service-level agreements established through negotiation between the service provider and consumers.

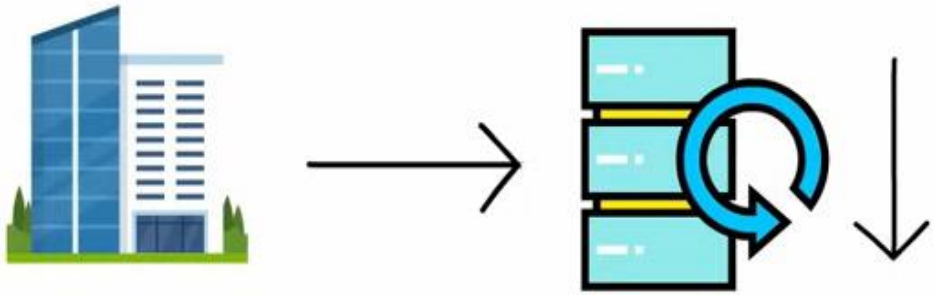
Differences between on-premises and cloud

On- Premises	On- Cloud
	
	

Differences between on-premises and cloud

On- Premises



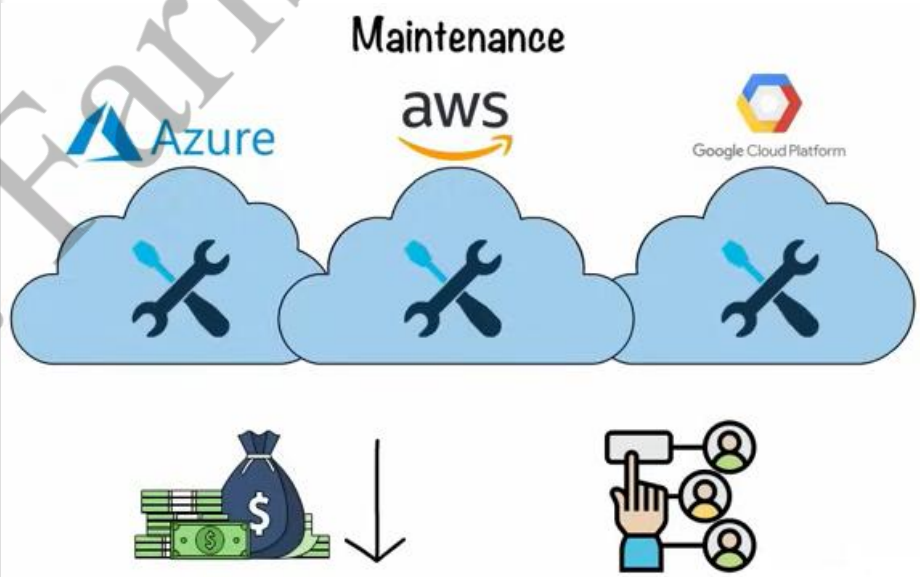


On- Cloud

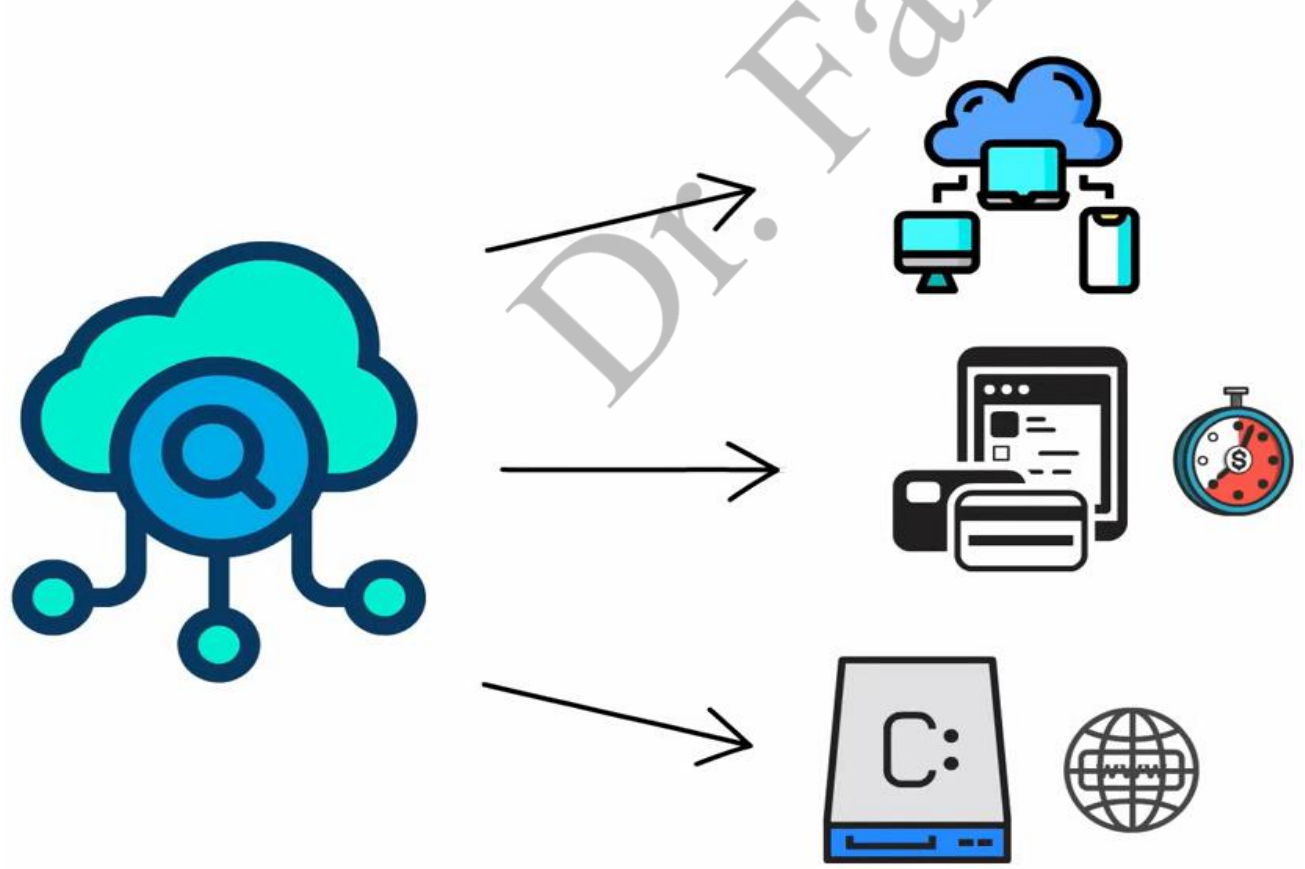
Differences between on-premises and cloud

On- Premises

On- Cloud



- Cloud computing refers to delivery-on-demand services over the internet on a pay-as-you-go basis.
- In other words, rather than managing files and services on the local storage devices, you are doing the same on the internet in an efficient manner.



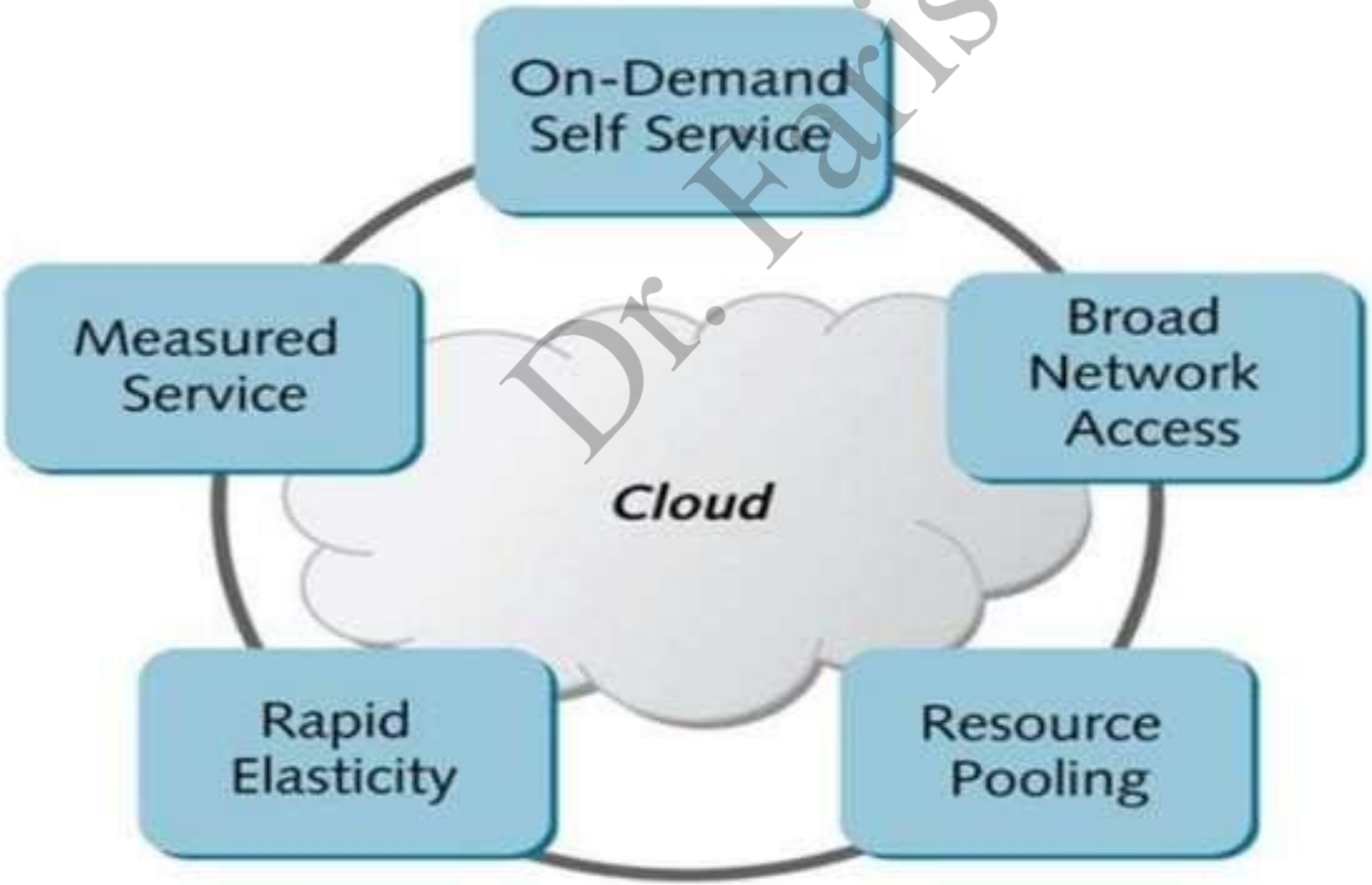
Cloud Computing Characteristics

CHARACTERISTICS

- Cloud computing has some interesting characteristics that bring benefits to both cloud service consumers (CSCs) and cloud service providers (CSPs).

- **No up-front commitments**
- **On-demand access**
- **Nice pricing**
- **Simplified application acceleration and scalability**
- **Efficient resource allocation**
- **Energy efficiency**
- **Seamless creation and use of third-party services**

ESSENTIAL CHARACTERISTICS OF CLOUD



CHARACTERISTICS

➢ ON DEMAND SELF- SERVICE:

Users are able to provision cloud computing resources without human interaction mostly done through a web based self service portal(management console)

➢ BROAD NETWORK ACCESS:

Cloud computing resources are accessible over the network,supporting heterogeneous client platforms such as mobile devices and workstations.

➢ RESOURCE POOLING:

Service multiple customers from the same physical resources,by securely seperating the resources on logical level.

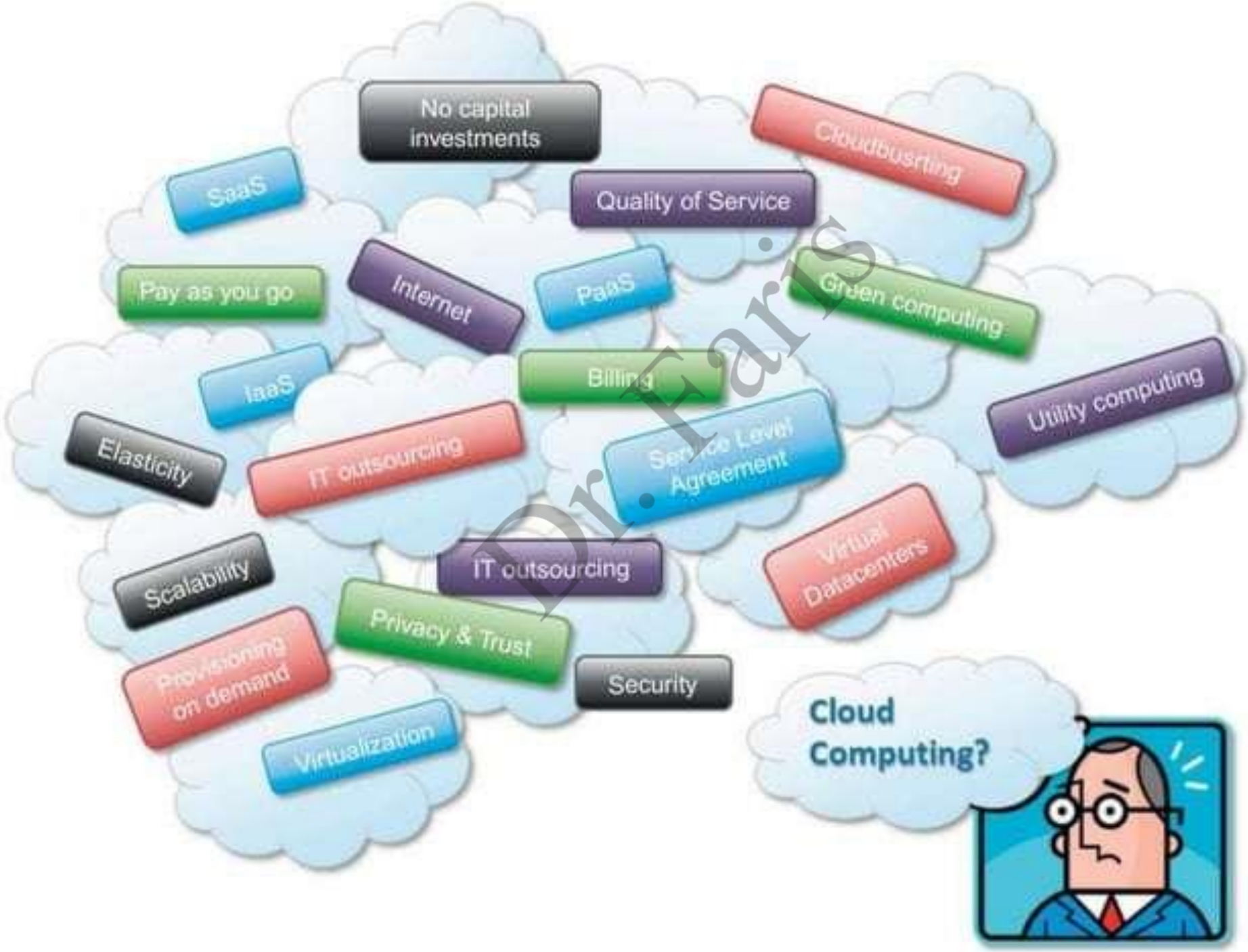
CHARACTERISTICS

- **RAPID ELASTICITY:**

  Resources are provisioned and released on demand and/or automated based on triggers and parameters.This will make sure your application will have eactly the capacity it needs at any point of time.

- **MEASURED SERVICES:**

  Resource usage are monitored and measured and reported (billed)transparently based on utilization.In short pay for use.


No capital investments
Cloudbursting
SaaS
Quality of Service
Pay as you go
Internet
PaaS
Green computing
IaaS
Billing
Utility computing
Elasticity
IT outsourcing
Service Level Agreement
Virtual Datacenters
Scalability
IT outsourcing
Privacy & Trust
Provisioning on demand
Security
Virtualization
Cloud Computing?

Advantages

- Cloud computing is helping enterprises, governments, public and private institutions, and research organizations shape more effective and demand-driven computing systems
- **Large enterprises can offload some of their activities to cloud-based systems.**
- **Small enterprises and start-ups can afford to translate their ideas into business results more quickly, without excessive up-front costs**
- **System developers can concentrate on the business logic rather than dealing with the complexity of infrastructure management and scalability.**
- **End users can have their documents accessible from everywhere and any device.**

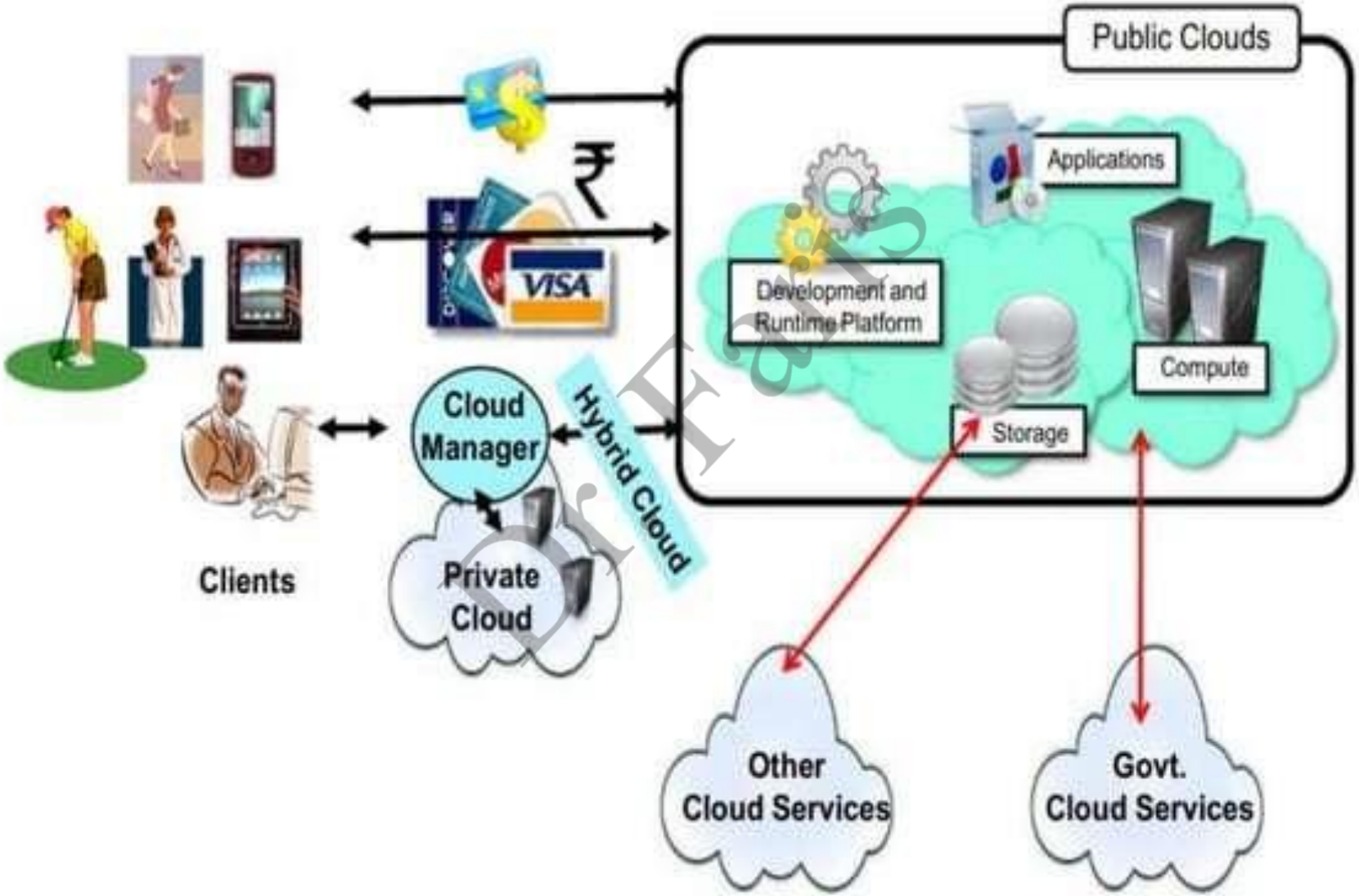


FIGURE 1.3

A bird's-eye view of cloud computing.