Cloud Computing
Module 1

<u>Benefits of Cloud Computing</u>

(1)   Ability to get rid of most or all hardware and software

✔ No need to have own server, cables, network switches, backup generators, redundant routers, and so on.

✔ Cloud provider can manage all of these for a monthly fee.

✔ Reducing expenses is essential in any business model and cloud platform can benefit their consumers in this factor.

Benefits of Cloud Computing

(2) Centralized data security

Data backups are centralized in the cloud providers' data centers. Consumers do not need to take any onsite or offsite backup.

Consumers can take advantage of cloud security technologies such as data encryption and two-factor authentication for greater privacy.

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Benefits of Cloud Computing

(3) Higher performance and availability

✔ Cloud computing increases input/output operations per second (IOPS).

✔ Cloud services also offer high availability with no downtime because they're distributed across multiple cloud facilities.

✔ Cloud providers are responsible for updating cloud systems and fixing bugs and security issues in cloud software, which is transparent to end users.

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<u>Benefits of Cloud Computing</u>

(4) Quick application deployment

✔ Unpredictable business needs often require cloud computing resources on short notice.

✔ You can improve your cloud application development by quickly deploying cloud applications because they are readily available without the need to procure additional hardware or wait for IT staff to set up servers.

Benefits of Cloud Computing

(5) Instant business insights

Cloud-based platforms provide a unique opportunity to access data as soon as it's collected.

This facilitates better decision-making as well as insight into what the future may hold for your organization based on predictions from historical data.

<u>Benefits of Cloud Computing</u>

(6) Business continuity

In the event of disaster or unforeseen circumstances

Cloud is an effective solution

Benefits of Cloud Computing

(7) Price-performance and cost savings

✔ Comparatively lower initial investment is required to implement a cloud strategy.

✔ Organizations save substantial amounts in the long run as no need of maintaining expensive hardware or data centers.

✔ Since there are no upfront costs to use cloud-based systems, new businesses can test them.

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Benefits of Cloud Computing

(8) Virtualized computing

Cloud computing is perfect for virtualized computer environments because cloud resources can be allocated instantly to support significant increases in demand so you never experience downtime again.

With cloud computing, your business can expand its capabilities almost effortlessly to meet growing demands without increasing staff or capital expenditures.

Benefits of Cloud Computing

(9) Cloud computing is greener

Cloud computing is a greener technology than traditional IT solutions. By moving to the cloud, businesses can reduce their energy consumption and carbon footprint by up to 90%.

Rather than having in-house servers and software, businesses can use cloud-based services to access the same applications and data from any computer or device with an internet connection.

This eliminates the need for businesses to purchase and maintain their own IT infrastructure.

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Cloud Cube Model

Cloud Cube Model, designed and developed by Jericho forum. Which helps to categorize the cloud network based on the four-dimensional factor: Internal/External, Proprietary/Open, De-Perimeterized/Perimeterized, and Insourced/Outsourced.
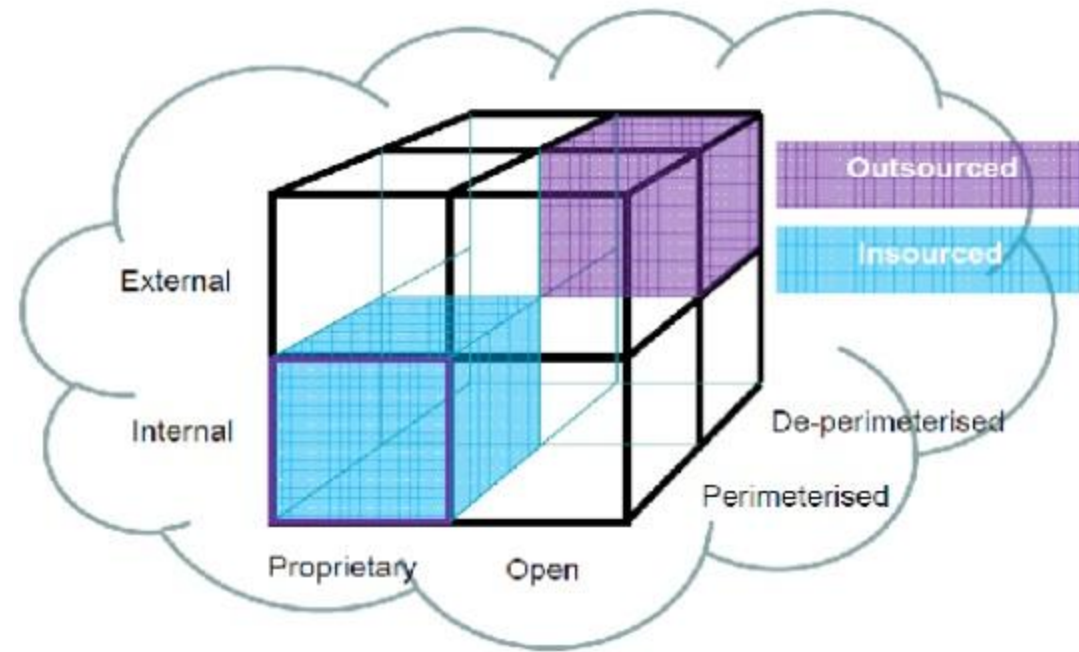
The main goal of cloud cube model is to provide the security to the cloud network and protect it.
In cloud computing security plays an important part for different cloud users.

Cloud cube model also enables secure collaboration of cloud formations

It is helpful for different types of organizations and businesses.

Cloud Cube Model

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Cloud Cube Model

Dimensions of Cloud Cube Model

(1) Internal/External:

The most basic cloud form is the **external and internal cloud form**.
The external or internal dimension defines the physical location of the data. It acknowledges us whether the data exists inside or outside of your organization's boundary.

Here, the data which is stored using a **private cloud** deployment will be considered internal and data outside the cloud will be considered external.

Cloud Cube Model

Dimensions of Cloud Cube Model

(2) Proprietary/Open

The second type of cloud formation is **proprietary/open**. The proprietary or open dimension states about the state of ownership of the **cloud technology** and interfaces. It also tells the degree of interoperability, while enabling data transportability between the system and other cloud forms.

The **proprietary dimension** means, that the organization providing the **service is securing** and protecting the data under their ownership.

The **open dimension** is using a technology in which there are more suppliers. Moreover, the user is not constrained in being able to share the data and collaborate with selected partners using the open technology.

(3) Perimeterized/de-perimeterized:

The Perimeterised and De-perimeterized dimension tells us whether you are operating inside your traditional it mindset or outside it.

Perimeterized dimension means, continuing to operate within the traditional IT boundary.

With the help of VPN and operation of the virtual server in your own IP domain, the user can extend the organizations perimeter into external Cloud Computing domain. This means that the user is making use of the own services to control access.

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Perimeterized/de-perimeterized:

In De-perimeterized dimension, the data will be encapsulated with metadata and mechanisms, which will further help to protect the data and limit the inappropriate usage.

(4) Insourced/Outsourced

The **Insourced/Outsourced dimensions** have two states.

In the *outsourced dimension* the services provided by the third party.

In the *insourced dimension* the services provided by the own staff under the control.

Cloud Cube Model

How to Secure Data in the Cloud Cube Model?
There are some steps and points to keep in mind before securing your data in a cloud cube model:
Step 1
The **classification of the data**, the customer should know what rules must be applied to protect it.

Step 2
It should be **ensured**, the data exist only in specific trust levels.

Step 3
It should check that what **regulatory compliance and restrictions** are applicable. For example, the data should stay in a particular boundary and whether it has to stay in the safe harbor or not.

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How to Secure Data in the Cloud Cube Model?

After the data is classified and is ready to put in the required zone, the assigned person is in a position to decide the following factors:-

The data and processes, which are to be moved in the cloud.
At what level the user wants to operate in the cloud. It can be infrastructure, platform, software, or **platform as a service**.
The cloud formations, which are mostly compatible as per the requirement.
The level of **operation in the cloud** can be different as per the requirement.
Below is the chart which shows the Cloud layers, where the cloud operates.

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