**MODULE 0: CLOUD BASICS (AZURE FOUNDATION)**

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1. **WHAT IS CLOUD COMPUTING?**

Imagine it is **2001**, **Ashish** has started a **Software Company**.

Cartoon a cartoon of a person holding a computer

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Now he wants to host his website on **internet** so that people all over the world could **access** it.

But, Now he has to first **Buy** those heavy **Racks** and **Servers** in his own Company Premises.

Only then can he **successfully** deploy and **Host** his apps.

**Now starts Series of Problems:**

1. **Setting up Servers** requires a lot of **Up-Front investment** (**Capex**)

A money bag with a green arrow and coins

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1. He needs to have a Proper **Office space** that can be dedicated as a **Server Room**.

A person holding a computer and pointing to a server

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1. He has to hire **Admins** and **Network Engineers** & pay them huge **salares** to constantly **Monitor** the Server Rooms.

A group of people standing in a line

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1. If the **Traffic** increases for a certain Sale, he has to **Add** more **Servers** to handle that **Traffic** but later once the Sale Period is over he would not be requiring the extra Server, hence it will result in **Under-Utilization** & **Wastage** **of money**.
2. **Maintenance** is completely **Ashish** & **Team’s** reponsibility. Server Patching, update has to be Taken care by **Ashish’s Staff**.

A group of people wearing hard hats holding tools

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So, this is where Ashish becomes **Over-Whelmed** and Decides to **Quit** his **Start-Up**.

A person holding a box with objects

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So, he calls his friend **Ramesh** and tells him his **Story.**

**Ramesh** works at **Microsoft**. After listening to this Story, Ramesh realizes that this is a **Large Scale Problem** which sooner or later will be faced by so many startup Founders.

He takes this Problem to His Team at **Microsoft**.

A group of squares in different colors

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He says there is a **Billion Dollar** untapped market for us if we can solve this **Problem**.

**Microsoft** Takes this **Problem** very seriously and decides to work on this problem.

**Microsoft** **decides**, What if we set-up our **Datacenters** across the world & **rent** our **Datacenters** to these **Small-Medium Enterprises.**

A map of the world with dots

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**This Could be a Win-Win for both the Parties.**

By Doing this, Microsoft was solving all the problems faced by Entrepreneurs.

* No need to do Up-Front Big investment (**Capex**), Only need to pay for what customers are using (**Opex**) and anytime Customers can **UnSubscribe**.
* Customers need not have an Office Space, since they will be consuming the Servers situated in Microsoft’s Premises.
* No need to Hire **Admins** and **Network Engineers** since Customers are no longer setting up their own Infrastructure.
* If Customers want to **Scale-Up** and **Scale-Down** based on Peak Days, they can very easily do that without thinking about **Under-Utilization** and **Money wastage**.

So, Now **Microsoft** actually does this Project of setting up Datacenters across the Globe and Providing their Services to Small Companies on a **Rental Basis**.

This Venture of **Microsoft** is named as **Azure**.

And this Idea, to provide the all kinds of **Datacenter Services** to **Customers** (Small Companies) **Over the Internet** is called as **Cloud Computing.**



**DELIVERY MODELS IN CLOUD COMPUTING**

There are **3 Fundamental Delivery Models** in **Cloud** **Computing**:

All the Services in **Cloud** can be categorized into these **3**

* **IAAS** : Infrastructure As a Service
* **PAAS**: Platform As a Service
* **SAAS**: Software As a Service

**IAAS:**

**Cloud Computing** also Offers **Virtual Machines** (If you don’t know what’s a VM, please Google).

VMs are just **Remote Servers**.

Ashish wants to **Play** a Game that requires **32 GB RAM**, But his Laptop has **8 GB RAM.**

In this case **Ashish** can create a **Virtual Machine** from **Cloud Portal** having **32 GB Ram** without even owning the **Hardware**.

He can just create a **VM** **Resource** in **Azure Portal**.

This **VM** will have some **IP** address and Customer can connect to that **VM** from his Own **Laptop**.

A computer with a cloud above it

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This example was for **Game** but in **Real-World** VMs are treated as **Deployment Servers.**

Let’s say Ashish wants to host a **Front-end** or **Backend** or **Database**, and he can simply create a **VM** and **Connect** to this **VM** via his own **Machine** and then **deploy** whatever workload he wants to deploy.

**What is the Advantage of VM?**

You will get a fresh **Remote machine** and now you’re free to log into this **VM** and do anything, install any software or Runtime. You will never be limited.

**What is the Disadvantage of a VM?**

Now managing that **VM** becomes your responsibility.

If there is a **security compromise**, you’re responsible.

If there is an **update** problem, you’re responsible.

If there is an **Operating System** Concern, you’re responsible.

So, yes you get the flexibility to install **anything** and **everything** but you also are now responsible for anything that goes wrong in this **VM**.

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**PAAS:**

It is also called as **Managed Service**.

**Ashish** wants to deploy a backend written in **Dotnet** but he doesn’t want to manage the **VM**, so Ashish can make use of a **PAAS Service**.

Each **PAAS Resource** performs a **Dedicated Job**.

**Example:** If there is a **PAAS** Service to host Backend, then it can’t be used to host Database.

If a **PAAS** is for **Database**, then it can’t host Backend.

But a VM can be treated in any way that you want,

The same VM can host Front-End, Back-End and DB.

so that’s the difference.

**Note: PAAS internally uses a VM in the background, but a customer can’t login to that VM.**

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