Cloude Computing
Module - 5

- **How to configure, develop and maintain Security and Privacy in cloud?**

Configuring, developing, and maintaining security and privacy in the cloud involves several steps:
1. Define Your Cloud Strategy Based on the Sensitivity of the Data Assess your data's sensitivity before deciding which cloud strategy to use. The more sensitive the data, the greater the need for security.
2. Use a Private Cloud Private clouds can offer greater security than public clouds, enabling organizations to gain more control over their data.
3. Use Encryption Encryption is a vital tool for cloud security. It helps protect data from being accessed by unauthorized individuals.
4. Implement Security Measures at All Levels Security measures should be implemented at all levels of the cloud environment, including the network application and data levels.
5. Monitor Cloud Activity Regularly monitor your cloud activity to detect any unusual behavior or potential threats.
6. Set Up Backup And Recovery Options Back up your datasets regularly. Losing the data that your organization depends on can lead to extreme disruption and financial loss.
7. Choose Reputable Cloud Service Providers Choose providers that prioritize security and privacy, comply with recognized standards, such as ISO 27001, and have strong track records in data protection.
8. Use a VPN A virtual private network (VPN) creates a private network while connected to public internet services. It provides online privacy, along with encrypted and secure connections to ensure that your data is safe.
9. Use a Password Manager A password manager can help generate more secure passwords.
10. Use an Antivirus Software Antivirus software can help get rid of malware and spyware.

- **What is Portability in cloud?**

Portability in cloud computing refers to the ability to transfer applications and data between different cloud computing environments. This enables migration of cloud services from one cloud provider to another or between public and private clouds.

Data Portability: This refers to the transfer of data from one source to another or from one service to another, i.e., from one application to another application or from one cloud service to another cloud service. It makes the cloud migration process easier and provides a better service to the customer without affecting its usability.
Application Portability: This enables the reuse of various application components in different cloud PaaS services. If the components are independent of their cloud service provider, then application portability can be a difficult task for the enterprise. But if components are not platform-specific, porting to another platform is easy and effortless.
Platform Portability: There are two types of platform portability - platform source portability and machine image portability. In the case of platform source portability, an operating system like UNIX, which is mostly written in C language, can be implemented by re-compiling on various different hardware and re-writing sections that are hardware-dependent which are not coded in C.

- **What is Reliability and high Availability in cloud?**

Reliability: In cloud computing, reliability is measured by the frequency of component failures. It ensures that your products and services work as expected. Providing highly available and reliable services in cloud computing is essential for maintaining customer confidence and satisfaction and preventing revenue losses.
High Availability: Availability in cloud computing is measured by overall cloud service downtimes. It ensures that customers can access your cloud services whenever they need to and from anywhere in the world. Most consumers consider high availability and performance the primary factors when choosing their preferred cloud services and providers.
Together, reliability and high availability ensure optimal performance within cloud-based systems. They are always a major concern in distributed systems. Various solutions have been proposed for cloud availability and reliability, but achieving true high availability requires bringing all these aspects together.

- **Describe Mobility Cloud Computing**

Mobility Cloud Computing, also known as Cloud Mobility, is an emerging trend that aims to make workload migration across platforms easier. It is related to balancing the resources and costs between different cloud services, which can be public or private.
Cloud Mobility helps to accomplish jobs and meet customer requirements in a cloud environment. It enhances the performance of operating applications by repositioning data to the intended host, reducing communication consumption,

and solving load balancing problems. An effective cloud mobility solution should enable the creation of policies to automatically transfer authorized data to a choice of private or public clouds. The data should remain encrypted in the cloud, and it should be easily and seamlessly recalled onsite as required or transferred to a different cloud as business demands change.
For example, suppose a consumer organization has put its resources at cloud C1. If C1 is not providing good services to the organization, it decides to move to a different cloud service provider C2. Moving resources from C1 to C2 is a complex task. Here's where cloud mobility comes in handy which makes it easier to move resources across different cloud services.
Weak Mobility – It permits the code to migrate through the networks. In some cases, the code has initial data assigned but without execution states. In weak mobility, the codes migrate without their execution states.
Strong Mobility – It grants the code and execution state to start again at a new resource. This can save running time, processor, registers, and program counters.

- **Describe AWS, Azure, Google cloud Platforms**

Amazon Web Services (AWS): AWS is the world's most comprehensive and broadly adopted cloud, offering over 200 fully featured services from data centers globally. It provides a highly reliable, scalable, low-cost infrastructure platform in the cloud that powers hundreds of thousands of businesses in 190 countries around the world. AWS has significantly more services, and more features within those services, than any other cloud provider–from infrastructure technologies like compute, storage, and databases–to emerging technologies, such as machine learning and artificial intelligence, data lakes and analytics, and Internet of Things.
Microsoft Azure: Azure is Microsoft's public cloud platform. It offers a large collection of services, which includes platform as a service (PaaS), infrastructure as a service (IaaS), and managed database service capabilities. The Azure cloud platform is designed to help you bring new solutions to life, solve today's challenges, and create the future. It allows you to build, run, and manage applications across multiple clouds, on-premises, and at the edge, with the tools and frameworks of your choice.
Google Cloud Platform (GCP): GCP is a suite of cloud computing services that provides a series of modular cloud services including computing, data storage, data analytics, and machine learning, alongside a set of management tools. Google Cloud consists of a set of physical assets, such as computers and hard disk drives, and virtual resources, such as virtual machines (VMs), that are

contained in data centers around the globe. It makes building, deploying, and managing applications very easy.

- **Accessing AWS, Azure and Google cloud Platforms**

Amazon Web Services (AWS): You can access and manage Amazon Web Services through the AWS Management Console, AWS Command Line Interface (AWS CLI), or the Software Development Kits (SDKs). The AWS management console is a web-based interface to access AWS. It requires an AWS account and also has a smartphone application for the same purpose.
Microsoft Azure: You can access Microsoft Azure resources through the Azure Portal, Azure Power Shell, and Azure CLI. The Azure portal is a web-based interface where you can manage all of your applications in one unified hub—including web apps, databases, virtual machines, virtual networks, storage, and Visual Studio team projects.
Google Cloud Platform (GCP): There are several ways to access Google Cloud Platform services. The Google Cloud Console is a web-based user interface that provides a simplified, easy-to-use interface for managing GCP services. The gcloud command-line tool allows you to interact with GCP services using the command line. To access Google cloud you need to satisfy one of the below conditions: Have a Google cloud workspace account, Have a Google cloud identity account, or Have a Google account.

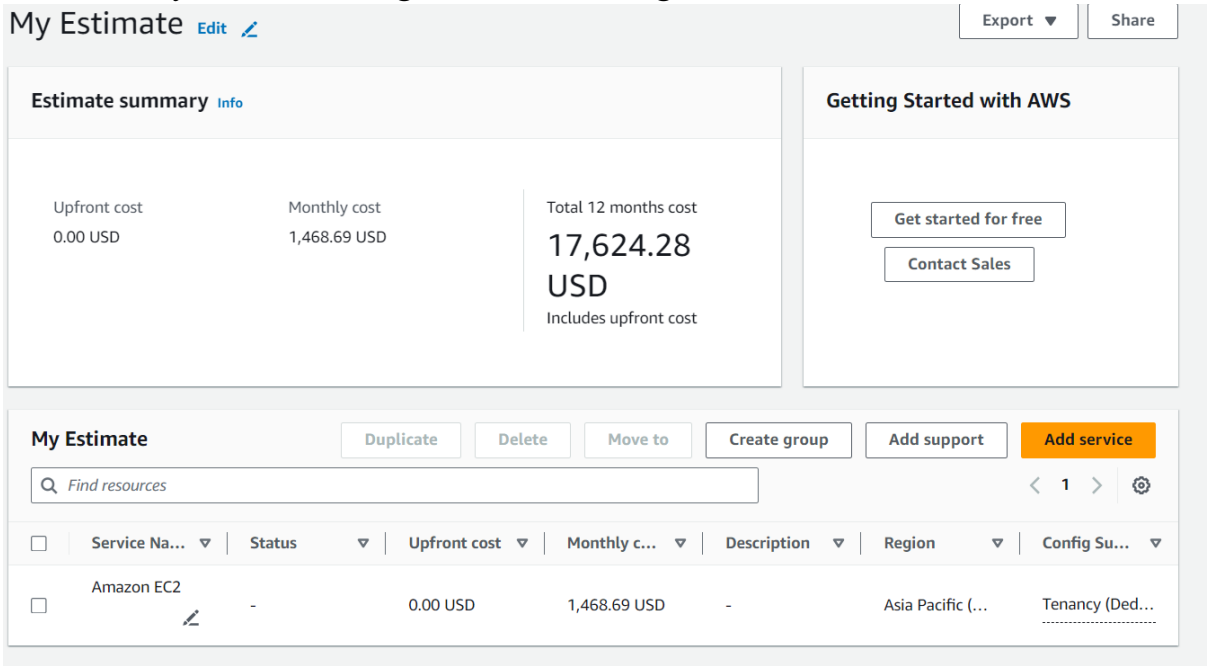
- **Create compute, create network, create storage on AWS , Azure and GCP**

AWS:
Compute: You can create compute resources in AWS using Amazon Elastic Compute Cloud (EC2). EC2 offers granular control for managing your infrastructure with the choice of processors, storage, and networking.
Network: In AWS, you can create a Virtual Private Cloud (VPC) for all your AWS resources. You can control your virtual networking environment, including selection of your own IP address range, creation of subnets, and configuration of route tables and network gateways.
Storage: AWS offers a variety of storage solutions. For instance, you can use Amazon Simple Storage Service (S3) for object storage, Amazon Elastic Block Store (EBS) for block storage, and Amazon Elastic File System (EFS) for file storage.
Azure:
Compute: In Azure, you can create a variety of virtual machines (VMs) depending on your workload requirements. You can choose from general-purpose, memory-optimized, compute-optimized, and other types of VMs.

Network: Azure provides Virtual Networks for private networks in Azure. You can create a virtual network and then create two virtual machines (VMs) in the network.
Storage: Azure provides different types of storage accounts for storing your data. You can create a storage account using the Azure portal, Azure PowerShell, Azure CLI, or an Azure Resource Manager template.
Google Cloud Platform (GCP):
Compute: In GCP, you can create compute instances using the gcloud command-line tool or the Google Cloud Console.
Network: GCP provides Virtual Private Cloud (VPC) for managing your cloud resources. You can create an auto mode or custom mode VPC network.
Storage: GCP offers various storage services like Google Cloud Storage for object storage, Persistent Disk for block storage, and File store for file storage.

- **Compare Cloud pricing of resources and services on all platform**

Amazon Web Services (AWS):
AWS offers a pay-as-you-go approach for pricing for the vast majority of their cloud services.
With AWS, you pay only for the individual services you need, for as long as you use them, and without requiring long-term contracts or complex licensing.
AWS pricing is similar to how you pay for utilities like water and electricity.
You can estimate your costs using the AWS Pricing Calculator.



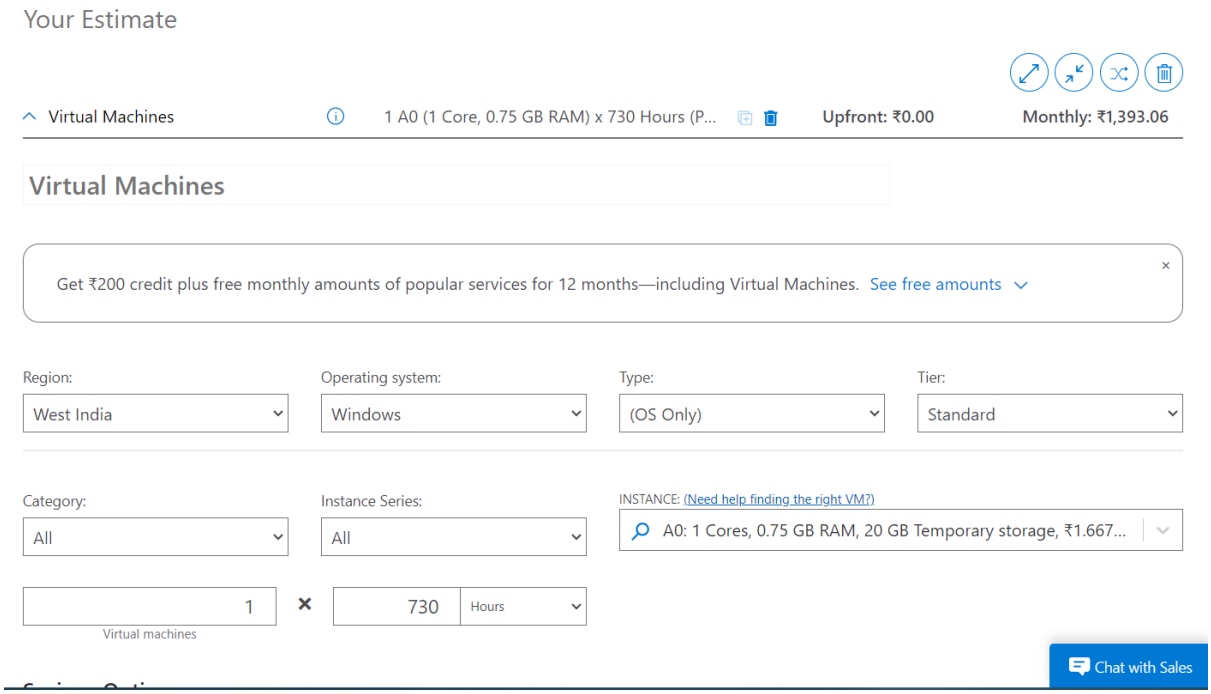
Microsoft Azure:

Azure also offers a pay-as-you-go pricing model.

It provides the flexibility to remove or add services as you wish.

If you are planning to use the cloud for a long period, and are willing to make an extended-period upfront commitment to your cloud deployment, you can achieve greater savings than you would with the pay-as-you-go model.

You can estimate your costs using the Azure Pricing Calculator.



Google Cloud Platform (GCP):

Google Cloud offers several pricing models, including pay-as-you-go, long-term reservations, and a free tier option.

With Google Cloud's pay-as-you-go pricing structure, you only pay for the services you use.

Google Cloud saves you money over other providers through automatic savings based on monthly usage and by pre-paying for resources at discounted rates.

Here you can check on link Google Cloud Pricing Calculator.