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Practical 4 :- Case study on Microsoft Azure & Amazon Ec2

Case Study -:

Microsoft Azure

The Azure platform aims to help businesses manage challenges and meet their organizational goals. It offers tools that support all industries -- including e-commerce, finance and a variety of Fortune 500 companies -- and is compatible with open source technologies. This gives users the flexibility to use their preferred tools and technologies. In addition, Azure offers four different forms of cloud computing: infrastructure as a service (IaaS), platform as a service (PaaS), software as a service (SaaS) and serverless functions.

Microsoft charges for Azure on a pay-as-you-go (PAYG) basis, meaning subscribers receive a bill each month that only charges them for the specific resources and services they have used.

Microsoft Azure, formerly known as Windows Azure, is Microsoft's public cloud computing platform. It provides a broad range of cloud services, including compute, analytics, storage and networking. Users can pick and choose from these services to develop and scale new applications or run existing applications in the public cloud.

How does Microsoft Azure work?

In addition to the services that Microsoft offers through the Azure portal, a number of third-party vendors also make software directly available through Azure. The cost billed for third-party applications varies widely but may involve paying a subscription fee for the application, plus a usage fee for the infrastructure used to host the application.

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Microsoft provides the following five different customer support options for Azure:

- Basic
- Developer
- Standard
- Professional Direct
- Enterprise (Premier)

These customer support plans vary in terms of scope and price. Basic support is available to all Azure accounts, but Microsoft charges a fee for the other support offerings. Developer support costs \$29 per month, while Standard support costs \$100 per month and Professional Direct support is \$1,000 per month. Microsoft does not disclose the pricing for Enterprise support.

What is Microsoft Azure used for?

Azure is also commonly used as a platform for hosting databases in the cloud. Microsoft offers serverless relational databases such as Azure SQL and non-relational databases such as NoSQL.

In addition, the platform is frequently used for backup and disaster recovery. Many organizations use Azure for archival storage in order to meet their long-term data retention or disaster recovery (DR) requirements

.Because Microsoft Azure consists of widely varied resource and service offerings, its use cases are extremely diverse. Running virtual machines or containers in the cloud is one of the most popular uses for Microsoft Azure. These compute resources can host infrastructure components, such as domain name system (DNS) servers; Windows Server services, such as Internet Information Services (IIS); networking services such as firewalls; or third-party applications. Microsoft also supports the use of third-party operating systems, such as Linux.

Azure products and services

Microsoft sorts Azure cloud services into nearly two dozen categories. Each category can include numerous specific instances or service types. The most popular service categories include the following:

Mobile. These products help developers build cloud applications for mobile devices, providing notification services, support for back-end tasks, tools for building application program interfaces (APIs) and the ability to couple geospatial context with data.

Compute. These services enable a user to deploy and manage VMs, containers and batch jobs, as well as support remote application access. Compute resources created within the Azure cloud can be configured with either public IP addresses or private IP addresses, depending on whether the resource needs to be accessible to the outside world.

Web. These services support the development and deployment of web applications. They also offer features for search, content delivery, API management, notification and reporting.

Analytics. These services provide distributed analytics and storage, as well as features for real-time analytics, big data analytics, data lakes, machine learning, business intelligence, internet of things (IoT) data streams and data warehousing.

Storage. This category of services provides scalable cloud storage for structured and unstructured data. It also supports big data projects, persistent storage and archival storage.

Networking. This group includes virtual networks, dedicated connections and gateways, as well as services for traffic management and diagnostics,

load balancing, DNS hosting and network protection against distributed denial-of-service (DDoS) attacks.

Media and content delivery network (CDN). These CDN services include on-demand streaming, digital rights protection, encoding, and media playback and indexing.

IoT. These services help users capture, monitor and analyze IoT data from sensors and other devices. Services include notifications, analytics, monitoring and support for coding and execution.

DevOps. This group provides project and collaboration tools, such as Azure DevOps -- formerly Visual Studio Team Services -- that facilitate [DevOps](#) software development processes. It also offers features for application diagnostics, DevOps tool integrations and test labs for build tests and experimentation.

Integration. These are services for server backup, site recovery and connecting private and public clouds.

Identity. These offerings ensure only authorized users can access Azure services and help protect encryption keys and other sensitive information in the cloud. Services include support for [Azure Active Directory](#) and multifactor authentication.

Development. These services help application developers share code, test applications and track potential issues. Azure supports a range of application programming languages, including JavaScript, Python, .NET and Node.js. Tools in this category also include support for Azure DevOps, software development kits (SDKs) and blockchain.

Containers. These services help an enterprise create, register, orchestrate and manage huge volumes of containers in the Azure cloud, using common container platforms such as Docker and orchestration platforms including Kubernetes.

Databases. This category includes database as a service (DBaaS) offerings for SQL and NoSQL, as well as other database instances -- such as Azure Cosmos DB and Azure Database for PostgreSQL. It also includes Azure SQL Data Warehouse support, caching, and hybrid database integration and migration features. Azure SQL is the platform's flagship database service. It is a relational database that provides SQL functionality without the need for deploying a SQL server.

Security. These products provide capabilities to identify and respond to cloud security threats, as well as manage encryption keys and other sensitive assets.

AI and machine learning. This is a wide range of services that a developer can use to infuse AI, machine learning and cognitive computing capabilities into applications and data sets.

Migration. This suite of tools helps an organization estimate workload Migration costs and perform the actual migration of workloads from local data centers to the Azure cloud.

Management and governance. These services provide a range of backup, recovery, compliance, automation, scheduling and monitoring tools that can help a cloud administrator manage an Azure deployment.

Mixed reality. These services are designed to help developers create content for the Windows Mixed Reality environment.

Blockchain. The Azure Blockchain Service lets you join a blockchain consortium or create your own.

Intune. Microsoft Intune can be used to enroll user devices, thereby making it possible to push security policies and mobile apps to those devices. Mobile apps can be deployed either to groups of users or to a collection of devices. Intune also provides tools for tracking which apps are being used. A remote wipe feature allows the organization's data to be securely removed from devices without removing a user's mobile apps in the process.

Azure for DR and backup

Some organizations use Azure for data backup and disaster recovery. Organizations can also use Azure as an alternative to their own data center storage. Public clouds have proven ideal for high-volume, short-duration

tasks such as data analytics. Organizations can use almost limitless storage capacity in the cloud to store vast data sets, perform analytics tasks and then dismiss data as it ages or becomes unusable -- all without procuring or deploying hardware in a local data center. This type of *utility computing* has been a fundamental driver behind public cloud adoption since its inception.

Rather than invest in local servers and storage, increasing numbers of organizations choose to run some, or all, of their business applications in Azure. To ensure availability, Microsoft has Azure data centers located around the world. As of January 2020, Microsoft Azure services are available in 55 regions, spread across 140 countries. Unfortunately, not all services are available in all regions. Therefore, Azure users must ensure that workload and data storage locations comply with all prevailing compliance requirements or other legislation.

Privacy

Data security concerns and regulatory compliance requirements make privacy a major issue for cloud subscribers. To address these worries, Microsoft has created the online Trust Center, which provides detailed information about the company's security, privacy and compliance initiatives. According to the Trust Center, Microsoft will only use customer data if it is necessary to provide the agreed upon services and it will never disclose customer data to government agencies unless it is required by law.

At the same time, Azure provides numerous services such as identity and access management, firewall and other security services to help Azure users establish a secure infrastructure and monitor for intrusion in a timely manner. Security services are critical to public cloud adoption by helping users ensure the privacy of sensitive data and important workloads.

Azure pricing and costs

Similar to other public cloud providers, Azure primarily uses a PAYG pricing model that charges based on usage. However, if a single application uses multiple Azure services, each service might involve multiple pricing tiers. It's common for one service to use a subset of other services -- each adding to the total cost of the intended service.

For example, a common application running in a VM might incur one cost. The storage instance associated with the workload might incur a second cost. Networking services and reporting tools might all drive additional costs for the workload. Alternatively, services such as Azure Functions are free, but users pay for the computer and other resources needed to run the function for the duration of the function's execution -- usually to the closest second.

In addition, if a user makes a long-term commitment to certain services, such as computer instances, Microsoft offers a discounted rate. For example, Azure reserved VM instances claim to save users up to 80 percent on VM costs.

Even simple applications can involve many interdependent cloud services and resources. Given the many factors involved in cloud service pricing, an organization should review and manage its cloud usage to minimize costs. Azure-native tools, such as Azure Cost Management, can help monitor, visualize and optimize cloud spending. It's also possible to use third-party tools, such as Cloudability or RightScale, along with emerging FinOps practices to manage Azure resource usage and associated costs.

Case Study –:

Amazon EC2

Elastic IP addresses allow you to allocate a static IP address and programmatically assign it to an instance. You can enable monitoring on an Amazon EC2 instance using Amazon CloudWatch² in order to gain visibility into resource utilisation, operational performance, and overall demand patterns (including metrics such as CPU utilisation, disk reads and writes, and network traffic). You can create an Auto-scaling Group using the Auto-scaling feature³ to automatically scale your capacity on certain conditions based on metric that Amazon CloudWatch collects. You can also distribute incoming traffic by creating an elastic load balancer using the Elastic Load Balancing service. Amazon Elastic Block Storage (EBS)⁵ volumes provide network-attached persistent storage to Amazon EC2 instances. Point-in-time consistent snapshots of EBS volumes can be created and stored on Amazon Simple Storage Service (Amazon S3)⁶. Amazon S3 is a highly durable and distributed data store. With a simple web services interface, you can store and retrieve large amounts of data as objects in buckets (containers) at any time, from anywhere on the web using standard HTTP verbs. Copies of objects can be distributed and cached at 14 edge locations around the world by creating a distribution

using Amazon CloudFront⁷ service – a web service for content delivery (static or streaming content). Amazon SimpleDB⁸ is a web service that provides the core functionality of a database- real-time lookup and simple querying of structured data – without the operational complexity. You can organise the dataset into domains and can run queries across all of the data stored in a particular domain. Domains are collections of items that are described by attribute-value pairs.

Amazon Relational Database Service⁹ (Amazon RDS) provides an easy way to setup, operate and scale a relational database in the cloud. You can launch a DB Instance and get access to a full-featured MySQL database and not worry about common database administration tasks like backups, patch management etc.

Amazon Simple Queue Service (Amazon SQS)¹⁰ is a reliable, highly scalable, hosted distributed queue for storing messages as they travel between computers and application components.

Amazon Simple Notifications Service (Amazon SNS) provides a simple way to notify applications or people from the cloud by creating Topics and using a publish-subscribe protocol.

Amazon Elastic MapReduce provides a hosted Hadoop framework running on the web-scale infrastructure of Amazon Elastic Compute Cloud (Amazon EC2) and Amazon Simple Storage Service (Amazon S3) and allows you to create customized JobFlows. JobFlow is a sequence of MapReduce steps.

Amazon Virtual Private Cloud (Amazon VPC) allows you to extend your corporate network into a private cloud contained within AWS. Amazon VPC uses IPsec tunnel mode that enables you to create a secure connection between a gateway in your data centre and a gateway in AWS.

Amazon Route⁵³ is a highly scalable DNS service that allows you manage your DNS records by creating a HostedZone for every domain you would like to manage.

AWS Identity and Access Management (IAM) enables you to create multiple Users with unique security credentials and manage the permissions for each of these Users within your AWS Account. IAM is natively integrated into AWS Services. No service APIs have changed to support IAM, and existing applications and tools built on top of the AWS service APIs will continue to work when using IAM. AWS also offers various payment and billing services that leverage Amazon's payment infrastructure.

All AWS infrastructure services offer utility-style pricing that require no long-term commitments or contracts. For example, you pay by the hour for Amazon EC2 instance usage and pay by the gigabyte for storage and data transfer in the case of Amazon S3. More information about each of these services and their pay-as-you-go pricing is available on the AWS Website. Note that using the AWS cloud doesn't require sacrificing the flexibility and control you've grown accustomed to: You are free to use the programming model, language, or operating system (Windows, OpenSolaris or any flavor of Linux) of your choice. You are free to pick and choose the AWS products that best satisfy your requirements—you can use any of the services individually or in any combination.

Because AWS provides resizable (storage, bandwidth and computing) resources, you are free to consume as much or as little and only pay for what you consume. You are free to use the system management tools you've used in the past and extend your datacenter into the cloud.