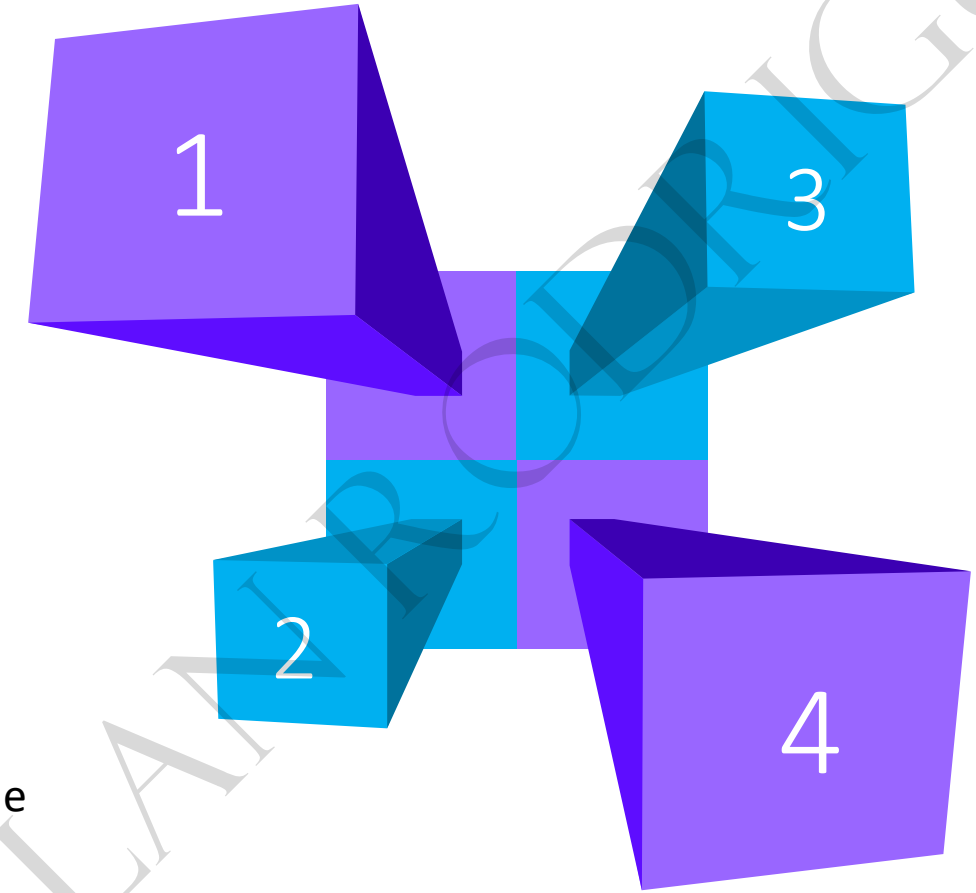
Introduction

What is cloud computing

Delivery

This is the delivery of computing services – servers , storage , databases, networking, software and more



Payment model

Here you pay for how much you use.

Cloud

The delivery of these services is done over the Internet.

Be ahead of the competition

Allows for faster innovation, flexibility and faster delivery of services.

Traditional
Data Centers

1	Less management	Don’t manage Large machine
2	Less investment	Don’t need to invest in hardware
3	Less operations	Don’t need to invest in managing the data center
4	Focus on business	You get to focus on your business and applications

Forecast

Cloud Services

Worldwide end-user spending on public cloud services forecast for 2021

332.3 billion

23.1 %

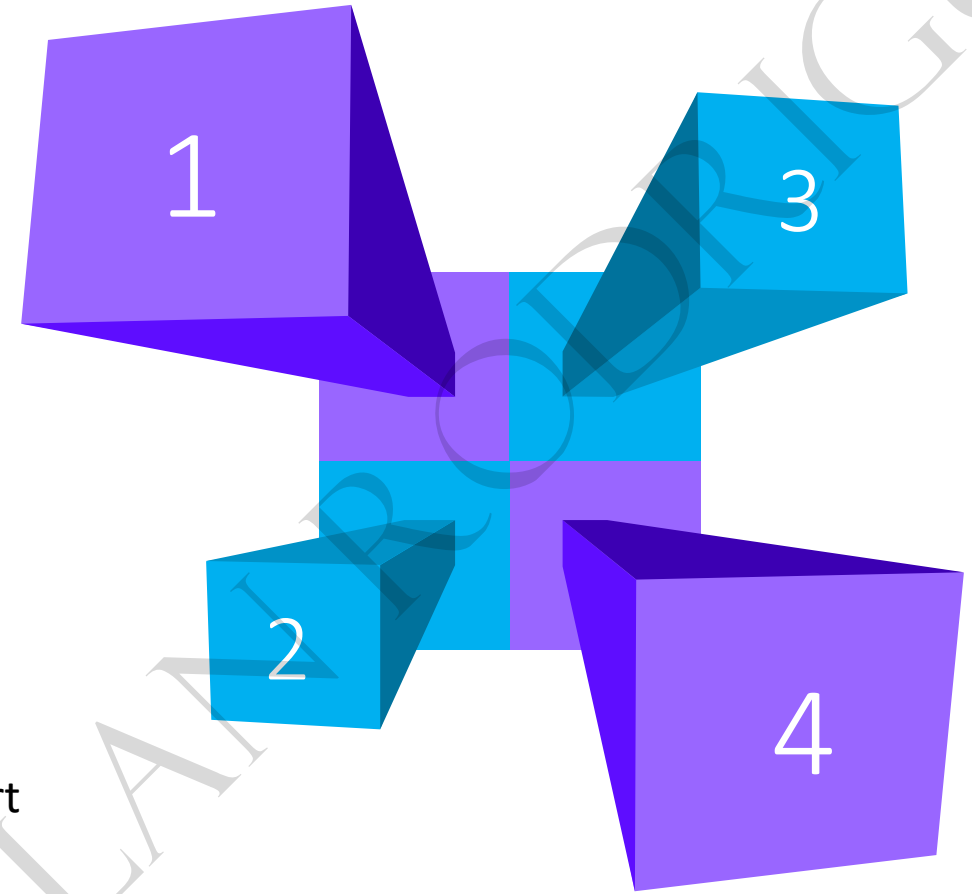
Growth in 2021

Table 1. Worldwide Public Cloud Services End-User Spending Forecast (Millions of U.S. Dollars)

	2020	2021	2022
Cloud Business Process Services (BPaaS)	46,131	50,165	53,121
Cloud Application Infrastructure Services (PaaS)	46,335	59,451	71,525
Cloud Application Services (SaaS)	102,798	122,633	145,377
Cloud Management and Security Services	14,323	16,029	18,006
Cloud System Infrastructure Services (IaaS)	59,225	82,023	106,800
Desktop as a Service (DaaS)	1,220	2,046	2,667
Total Market	**270,033**	**332,349**	**397,496**

https://www.gartner.com/en/newsroom/press-releases/2021-04-21-gartner-forecasts-worldwide-public-cloud-end-user-spending-to-grow-23-percent-in-2021

Microsoft Azure



Service

Microsoft Azure provides functionality that you can use in the form of a service.

Subscription

This is used for billing purposes.

Resource

You use the service to create a resource as part of your account.

Resource group

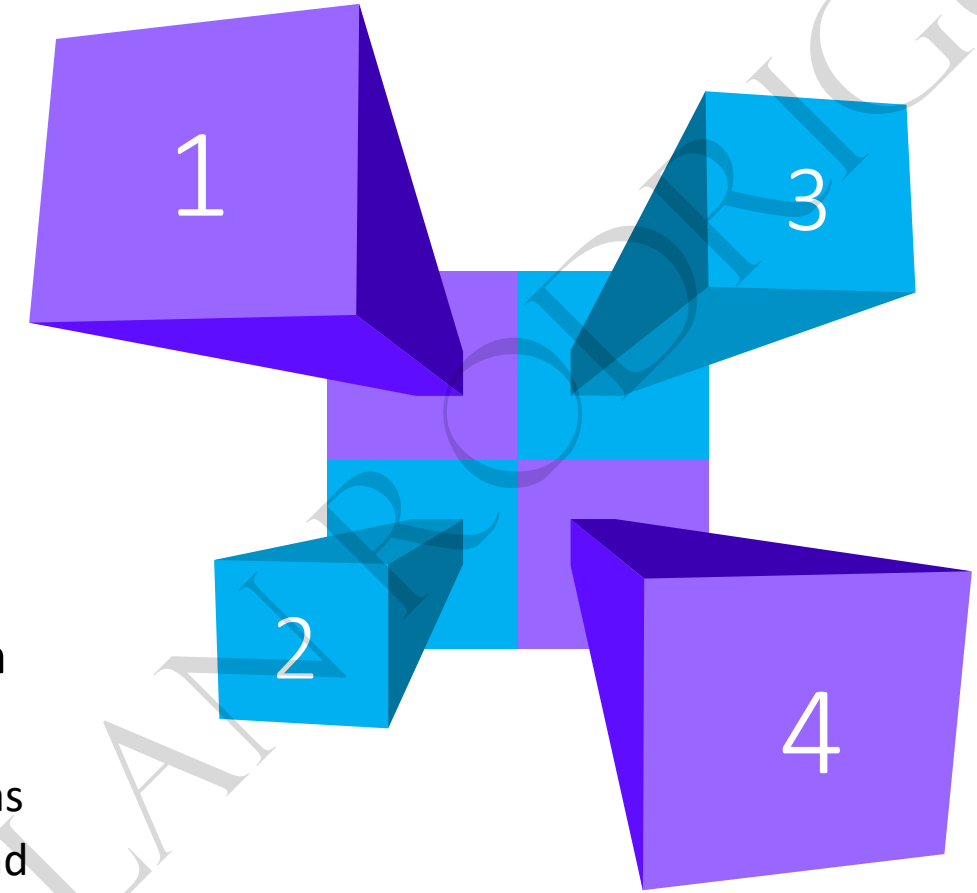
This is used to logically group resources.

Describe Azure architecture and services - Azure compute

Virtual Machine

Compute service

Virtual Machine service



Compute

This is your compute service on the Azure platform. Here you can create compute resources on-demand.

Operating System

You can choose from operating systems such as Windows Server 2019 and different flavors of Linux.

Lifecycle

You can create the machine whenever you want. You can also terminate the machine whenever required.

Workload

You can then install different workloads on the machine.

Azure

Virtual Machines

1. Less management — You don’t manage the infrastructure.
2. Less investment — You only pay for how much you use.
3. Less operations — Don’t need to invest in managing the data center
4. Configure — You can configure various aspects of your virtual machine

Azure virtual machine deployment

Virtual Network	Public IP Address	Network Security Group	OS Disk
Isolated network On the cloud	Allows to contact the machine from the Internet	Filters traffic to and from the machine	Used to store the operating system

Availability options

What are availability sets

- This feature helps to protect your machines against infrastructure level failures.
- An unplanned event wherein the underlying infrastructure fails unexpectedly. The failures could be attributed to network failures , local disk failures or even rack failures
- Planned maintenance events , wherein Microsoft needs to make planned updates to the underlying physical environment. In such cases , a reboot might be required on your virtual machine
- You can increase the availability of your application by making use of availability sets. Each virtual machine that is assigned to the availability set is assigned a separate fault and update domain.

Fault domains

These are used to define the group of virtual machines that share a common source and network switch.

You can create **up to 3 fault domains**

Update domains

These are used to group virtual machines and physical hardware that can be rebooted at the same time.

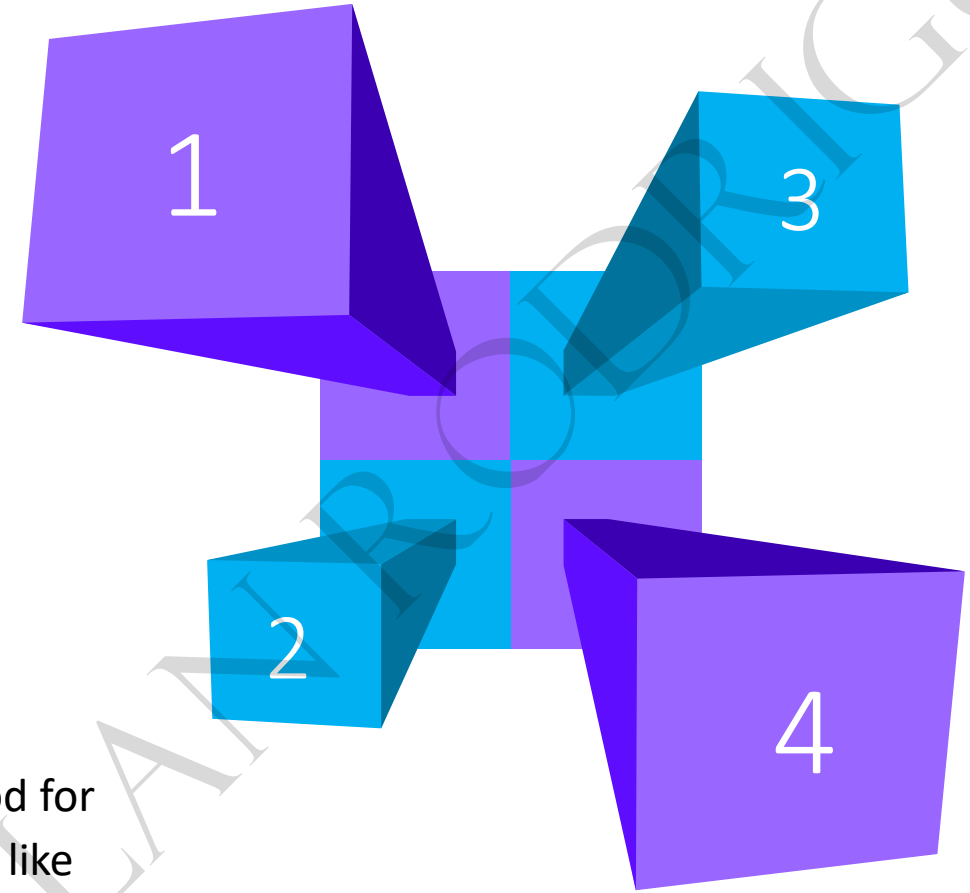
You can create

up to 20 update domains

What are availability zones

- This features help provides better availability for your application by protecting them from datacenter failures
- Each Availability zone is a unique physical location in an Azure region
- Each zone comprises of one or more data centers that has independent power, cooling, and networking
- Hence the physical separation of the Availability Zones helps protect applications against data center failures
- Using Availability Zones, you can be guaranteed an availability of 99.99% for your virtual machines. You need to ensure that you have 2 or more virtual machines running across multiple availability zones.

Virtual Machine types



General Purpose

This provides a balanced CPU-to-memory ratio. This is great for test and development environments.

Compute Optimized

This has a high CPU-to-memory ratio. This is good for medium-sized workloads like web servers.

Memory Optimized

This provides a good memory-to-CPU ratio. This is good for database-related workloads.

Storage Optimized

This provides high disk throughput which is ideal for Big Data workloads.

Virtual Machine Disks

- The Virtual machine gets allocated an OS level disk. This is a managed disk.
- The VM could also get a temporary disk. This is not a managed disk.
- The data on the temporary disk could get lost in the case of a maintenance event or if the machine is redeployed.
- You can also add new data disks to the virtual machine.

Virtual Machine IP Address

- Private IP addresses allow communication between resources in Azure.
- The private IP address gets allocated from the subnet that the virtual machine is hosted in.
- The public IP address allows Internet resources to communicate inbound into the Azure virtual machine.

Azure Web App

What is the Azure Web App service

- This is an HTTP-based service used for hosting web applications.
- Here your applications can be in .NET, .NET Core, Java, Ruby, Node.js or Python.
- Applications can run both on Windows or Linux-based platforms.
- This is a platform-as-a-service where the infrastructure is managed for you.
- App service plan defines the set of compute resources that are used to run the web application.

Azure App Service Plans

Free, Shared

Here the infrastructure is shared with other customers. You only get certain CPU quotas to run per day.

Basic, Standard Premium

Here you get dedicated Azure VM's to run the applications. Depending on the tier you can also scale out your web applications.

Isolated

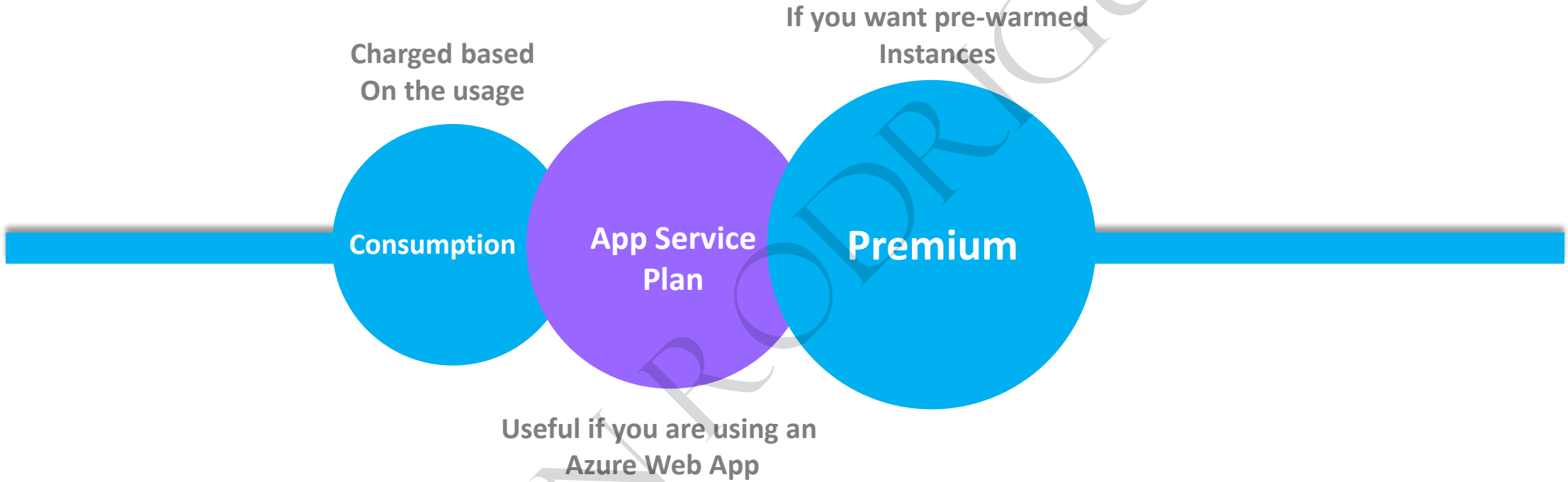
Here your apps run on dedicated Azure virtual machines and Azure virtual networks

Azure Functions

Azure Functions

- This service allows you to run small pieces of code as functions.
- Here you just develop and upload the code to an Azure Function.
- You only get billed for the amount of time the code is run.
- You can use a variety of programming languages in Azure Functions.
- C#, Java , JavaScript, PowerShell and Python.

Pricing plans



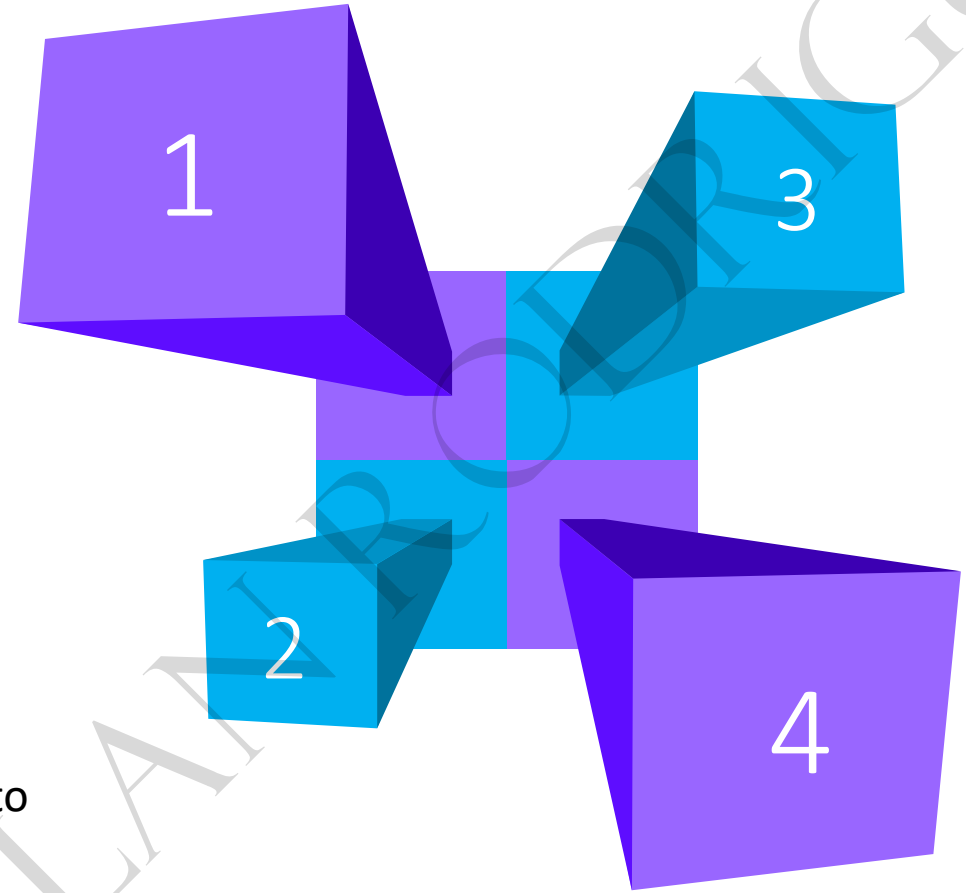
Describe Azure architecture and services - Networking

Virtual Network

Virtual Network

Isolated

This is an isolated network on Azure cloud.



Resources

You can then place resources such as Azure virtual machines within the virtual network.

Managed

Here you don’t need to deploy an infrastructure to have a network in place.

Internet

By default all resources in the virtual network can communicate outbound with the internet.

Security Groups

Network Security Groups

- This is used to filter network traffic in an Azure virtual network.
- You define different rules as part of the Network Security Group. You have Inbound and Outbound rules.
- For each rule you mention the source and destination of traffic, the port and protocol.

Application Security Groups

- This is used when you want to apply network filtering rules for a group of machines.
- Instead of mentioning the IP address of the machine, you can make the machine part of an Application Security Group.
- And then you can mention the Application Security Group in the Network Security Group.

Connectivity

Azure VPN Gateway

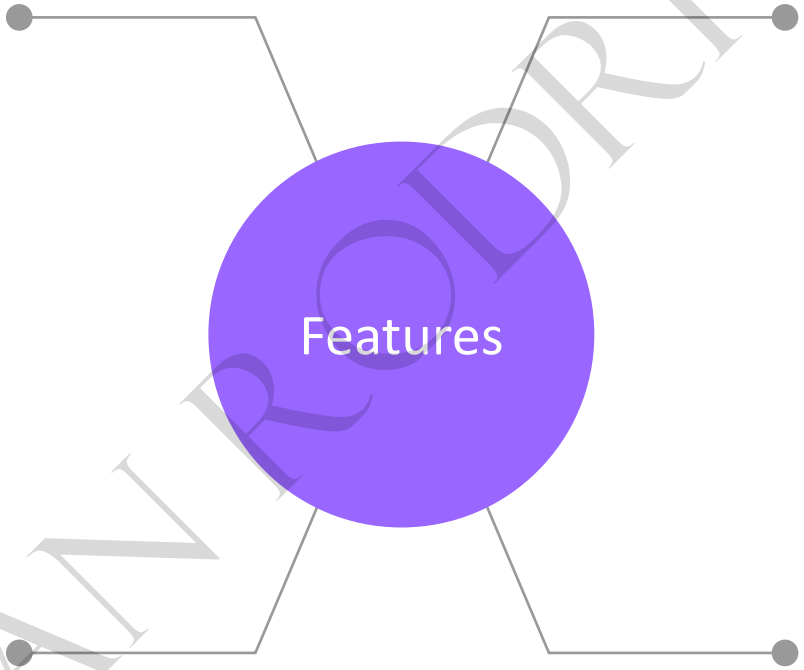
- An Azure VPN gateway can be used to send encrypted traffic between an Azure virtual network and on-premises location over the Internet.
- **Point-to-Site VPN** – This let's you create a secure connection from the Azure virtual network to an individual client computer.
- **Site-to-Site VPN** – This provides connectivity between an on-premises network and an Azure virtual network.

Azure Load Balancer

What is the Azure Load Balancer

- This service is used to distribute the incoming network traffic across a group of backend resources of servers
- You can define two types of load balancers – Public or Private Load Balancers
- You have 2 SKUs for the Load Balancer – Standard and Basic Load Balancer

Basic Load Balancer



Pricing

You are not charged for the Load Balancer

SLA

There is no SLA

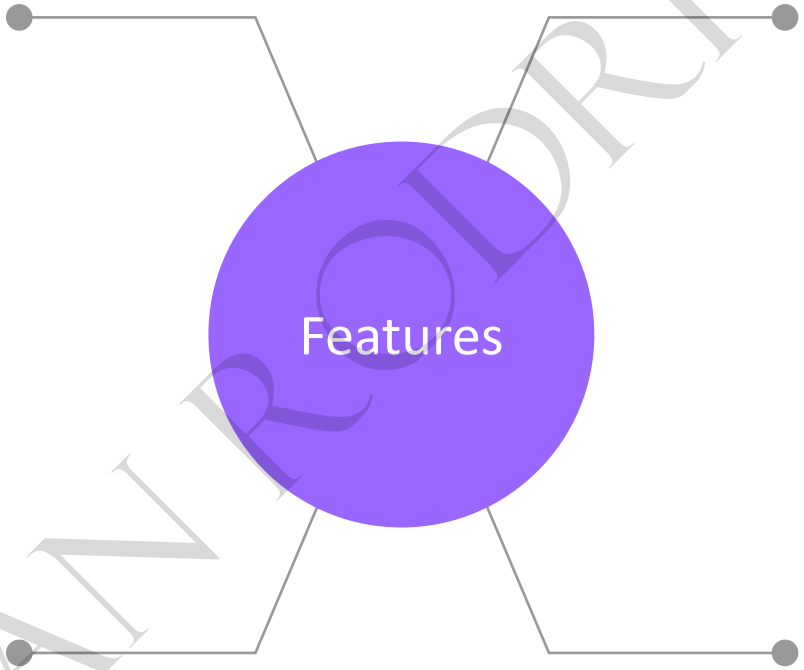
Backend machines

Here the machines need to be part of an availability set or scale set

Support for zones

There is no support for availability zones

Standard Load Balancer



Pricing

There is a price per hour

SLA

There is an SLA of 99.99%

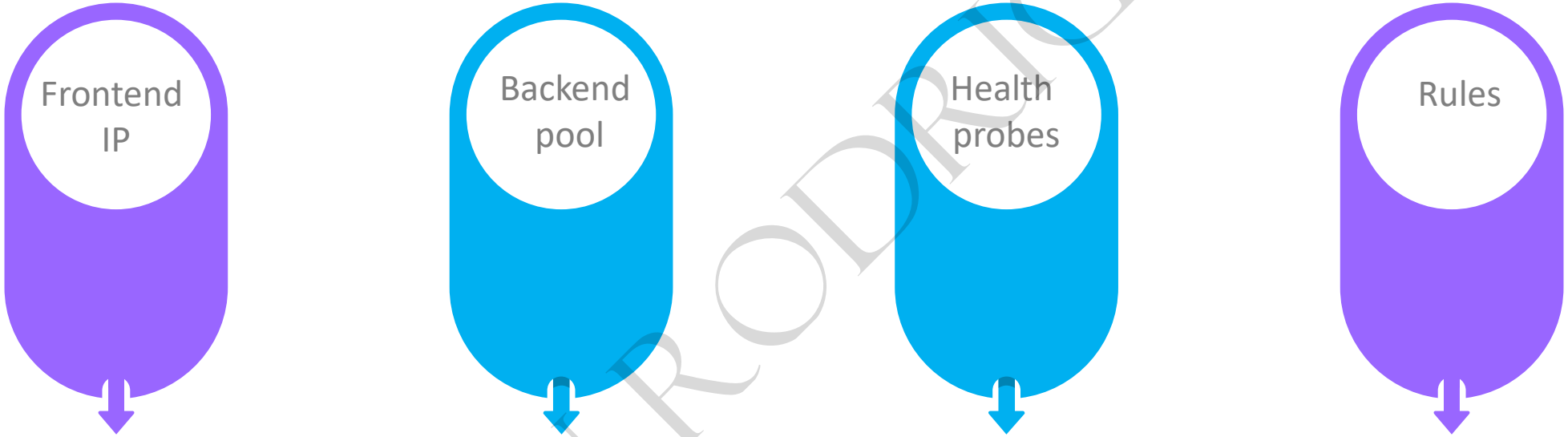
Backend machines

Here the machines need to be part of an availability set or scale set or they can be individual machines

Support for zones

Here you get support for availability zones

Components of a Load Balancer



Here you define an IP address for the load balancer

This contains the backend virtual machines

This helps to check the status of the backend pool

The Load Balancing rules define how to distribute the incoming traffic

Describe Azure architecture and services - Storage

Azure Storage Accounts

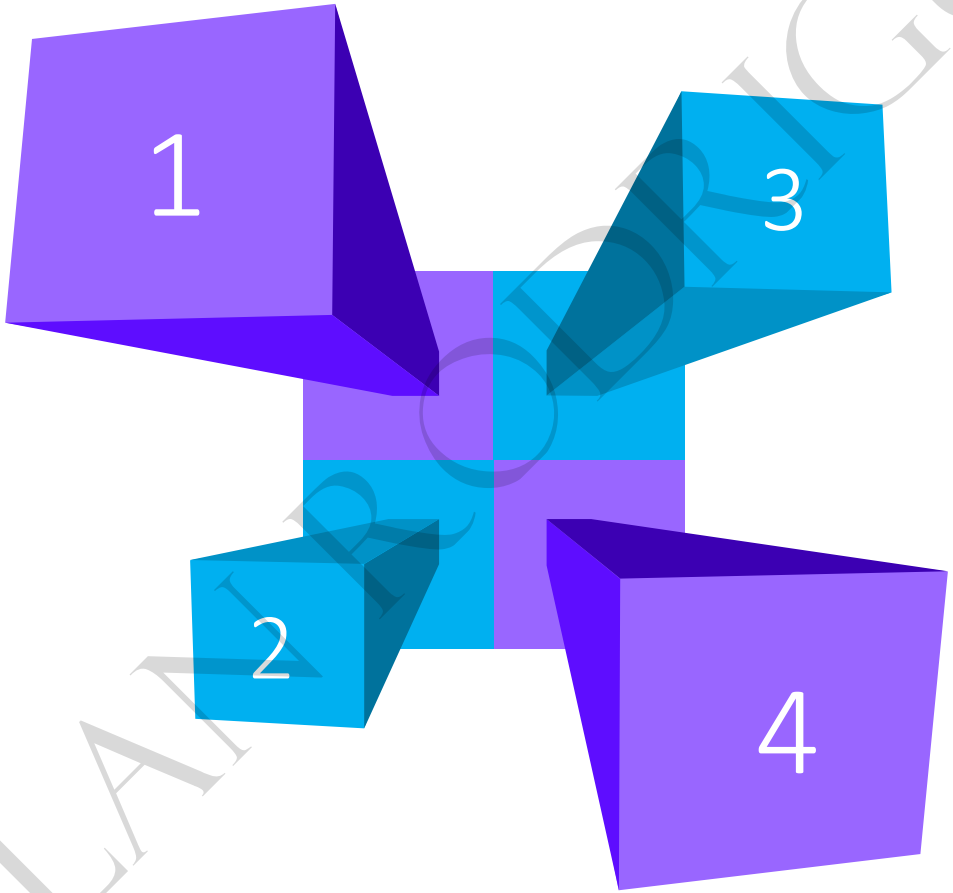
What are Azure storage accounts

- This service allows you to store objects on the cloud.
- Here you can make use of different services – Blob, Queue, File and Table.
- There are also different types of storage accounts.

Storage account types

Standard-general purpose v2

Gives you access to Blob, Queue, Table and File service



Premium file shares

This is a premium storage account for your file shares.

Premium block blobs

This is premium storage for your block blobs

Premium page blobs

This is premium storage for your page blobs.

What is Blob storage

- This service is optimized for storing large amounts of unstructured data.
- Use case examples – storing images, videos, log files, documents.
- In the blob service, you will create a container. This is used to organize a set of blobs.
- Block blobs – This is used to store text and binary data.
- Page blobs – This is used to store virtual hard drive files that are used as disks for your Azure virtual machines.

What is the File service

- This is used for hosting file shares on the cloud.
- This shares can be accessed via the SMB – Server Message Blob protocol.
- You can mount the file shares from Windows, Linux and macOS clients.

What is Azure Queue storage

- This service is used for storing large amounts of messages.
- These messages can then be accessed from anywhere in the world via the HTTP or HTTPS protocol.
- You can store millions of messages in the queue.

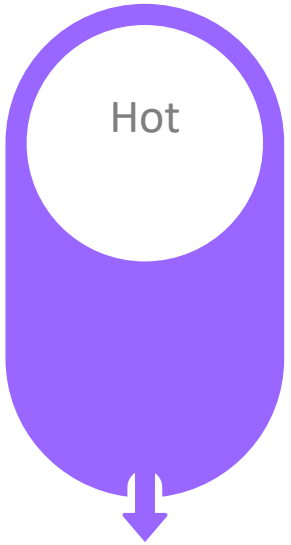
What is Azure Table storage

- This service is used for storing non-relational structured data.
- Its ideal for storing flexible data sets because it does not conform to any sort of schema.
- In the table , you store an entity which is a set of properties.
- A property is nothing but a name-value pair.
- The partition key is used to split the data across various partitions. And the row key is used to identify an item within a partition.

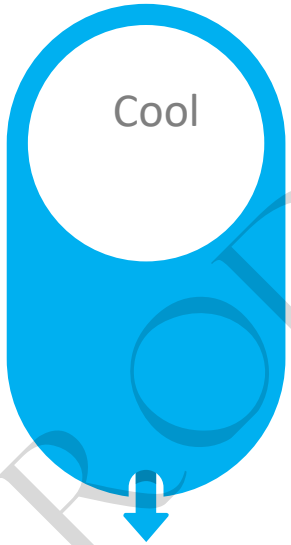
What is Azure File Sync service

- This service can be used to transform the Windows server into a quick cache of the Azure File share.
- You create an Azure File Sync resource.
- You also need to deploy the Azure File Sync agent to the Windows server.

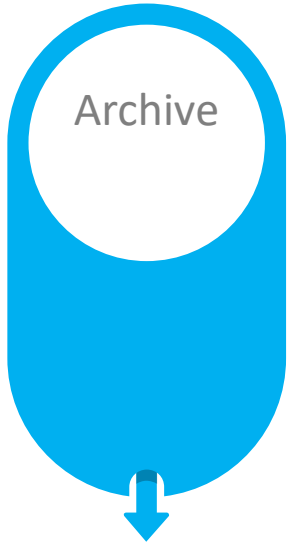
Access tiers



This is optimized for data that is accessed frequently.



This is optimized for data that is infrequently accessed and stored for at least 30 days.



This is optimized for storing data that is rarely accessed and stored for at least 180 days.

Access tiers

- The Archive access tier is good for long-term backups.
- You can set the access tier at the Storage account level to Hot or Cool.
- At the object level, you can also set the Archive access tier.

Data Redundancy

Locally redundant storage

Here data is copied synchronously three times within a single physical location in the primary region

Zone-redundant storage

Here data is copied synchronously across three Azure availability zones in the primary region

Geo-redundant storage

Here data is copied synchronously three times within a single physical location in the primary region using LRS. It then copies your data asynchronously to a single physical location in the secondary region

Geo-zone-redundant storage

Here data is copied synchronously across three Azure availability zones in the primary region using ZRS. It then copies your data asynchronously to a single physical location in the secondary region

Describe Azure architecture and services - Databases

Azure SQL database

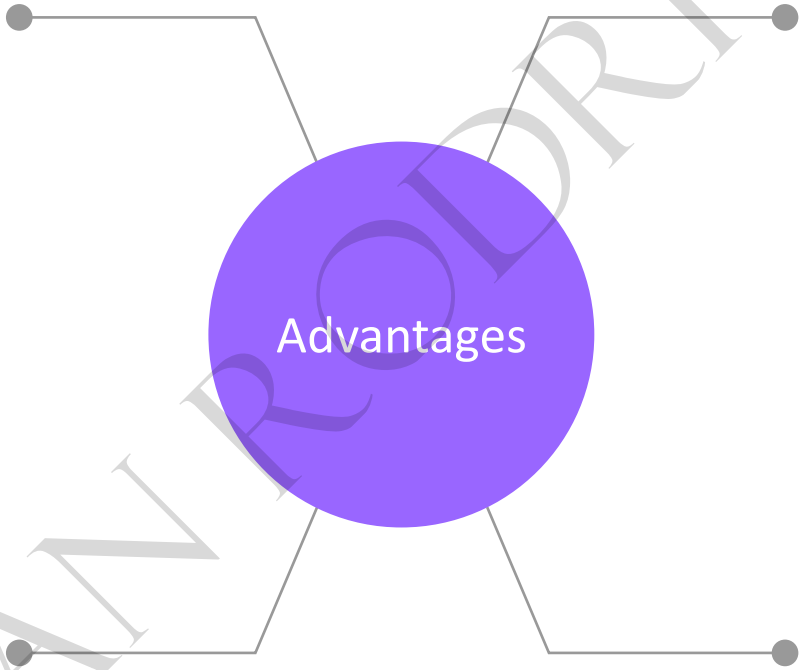
Your own server

Full control

You have full control over the underlying database engine

Security

You get to control all of the security aspects



Any version

You can use any database version

Integration

You can install custom tools for integration purposes

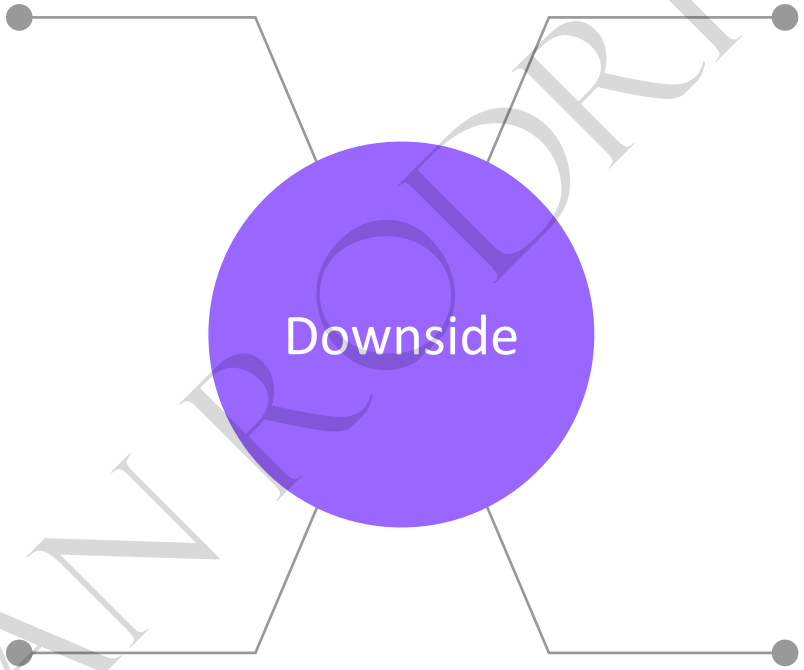
Your own server - Downside

Management

You have to manage the underlying infrastructure

Backups

You need to implement backups



High Availability

You need to manage high availability

Patching

You need to install updates

Azure SQL Database – Pricing Tiers

- DTU – Database Transaction Units.
- This is a blended measure of CPU, Memory and Input/Output.
- There are different pricing tiers when it comes to the DTU model.

Azure SQL Database – Pricing Tiers

	Basic	Standard	Premium
Target workload	Development and production	Development and production	Development and production
Uptime SLA	99.99%	99.99%	99.99%
Maximum backup retention	7 days	35 days	35 days
CPU	Low	Low, Medium, High	Medium, High
IOPS (approximate)*	1-4 IOPS per DTU	1-4 IOPS per DTU	>25 IOPS per DTU
IO latency (approximate)	5 ms (read), 10 ms (write)	5 ms (read), 10 ms (write)	2 ms (read/write)
Columnstore indexing	N/A	S3 and above	Supported
In-memory OLTP	N/A	N/A	Supported

Reference - https://docs.microsoft.com/en-us/azure/azure-sql/database/service-tiers-dtu

Azure SQL Database – Pricing Tiers

- vCore-based purchasing model.
- Here you can independently scale compute and storage.
- You can make use of the hybrid benefit model. Here you can save on costs if you have existing SQL Server licenses.

Azure SQL Database – Managed Instance

- This is a deployment model that provides native integration with the Azure virtual network service.
- It provides near 100% compatibility with the latest SQL Server features.
- Here again the infrastructure is managed for you.
- Companies can also easily migrate their existing on-premises databases to the Managed Instance.

Azure database for MySQL

- MySQL is an open-source relational database management system.
- You can store your data in the form of tables.
- You can query for data using the Structured Query Language (SQL).
- Azure Database for MySQL is a fully managed database service.
- Here the underlying platform is managed by the service itself.
- Here you also get high availability, backups and patching as well.

Azure database for PostgreSQL

- PostgreSQL is a free and open-source relational database management system.
- It has support for transactions that follow the ACID concepts – Atomicity, Consistency, Isolation and Durability.
- It also has support for views, foreign keys, triggers and stored procedures.
- Azure Database for PostgreSQL is a fully managed database service.
- Here the underlying platform is managed by the service itself.
- Here you also get high availability, backups and patching as well.

What is Azure Synapse Analytics

This is an enterprise analytics service.

This helps you to host your data warehouses and also helps you get insights on the data being hosted.

You can use Spark technologies for your Big data needs.

You can also use pipelines for your data integration needs.

What is Azure Databricks

This is a platform which has a set of tools that can be used for building, deploying, sharing and maintaining enterprise-grade data solutions.

You can use Azure Databricks to process, store, clean and analyze your data.

You have interactive notebooks, data ingestion , compute management.

What is Azure Cosmos DB

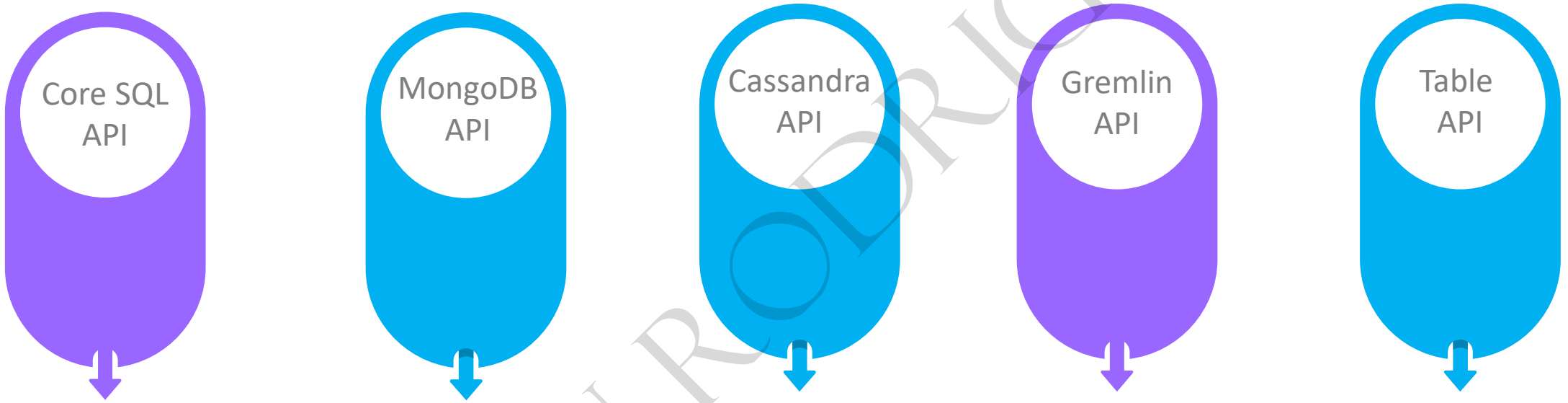
This is a fully managed NoSQL database.

The database provides fast response time and is highly scalable.

Here the underlying infrastructure is completely managed by Azure.

Commonly used for web, mobile, gaming and IoT applications that need to handle massive amounts of data.

Cosmos DB API



If you need to query for items using Structured query language

If you need to host a MongoDB compatible database

If you need to host a Cassandra compatible database

If you need to host a graph-based database

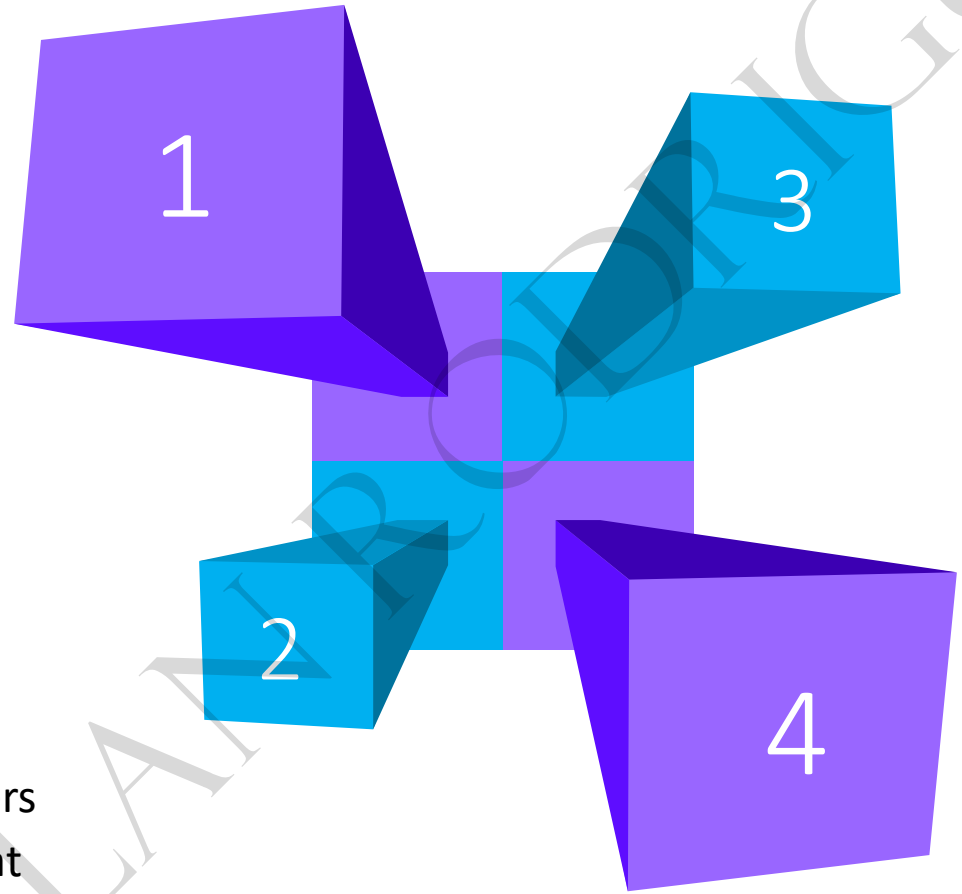
If you need to store data in the form of tables

Describe cloud concepts

Economies of Scale

Understanding

Economies of Scale



Basics

This is the ability to carry out tasks more efficiently or at a lower-cost per unit when operating at a large scale.

Discount

When the demand increases, cloud providers can then get hardware at discount prices.

Benefit

This becomes a benefit to the customer wherein the discounts can be passed to the customer.

Service cost

If the number of customers increase the chances of services costs can go down.

Capital Expenditure

This is when you pay money upfront

- Server Costs
- Storage Costs
- Software Licenses
- Datacenter costs

Operational Expenditure

Ongoing money spent on services

- Human Resources
- Maintenance
- Software Support
- Datacenter Costs - Cooling

Cloud Service Models

Infrastructure as a service

- An example is the Azure virtual machine service.
- Here you don’t need to manage the underlying infrastructure.
- The physical servers and storage is managed for you.
- This helps remove the capital expense and reduces ongoing cost.
- The Virtual Machine also has an SLA. To achieve that SLA for any on-premise server would require a lot of work.
- Infrastructure cloud services also allow you to scale based on demand

Platform as a service

- An example is the Azure SQL Database service or the Azure Web App service.
- Here you don’t need to manage the infrastructure or even the underlying operating system and platform components.
- You can just start hosting your data or your web application.
- Reduces deployment time.
- You can use an array of database technologies available in the case of Azure.
- All of these services use a Pay-as-you-go model.

Software as a service

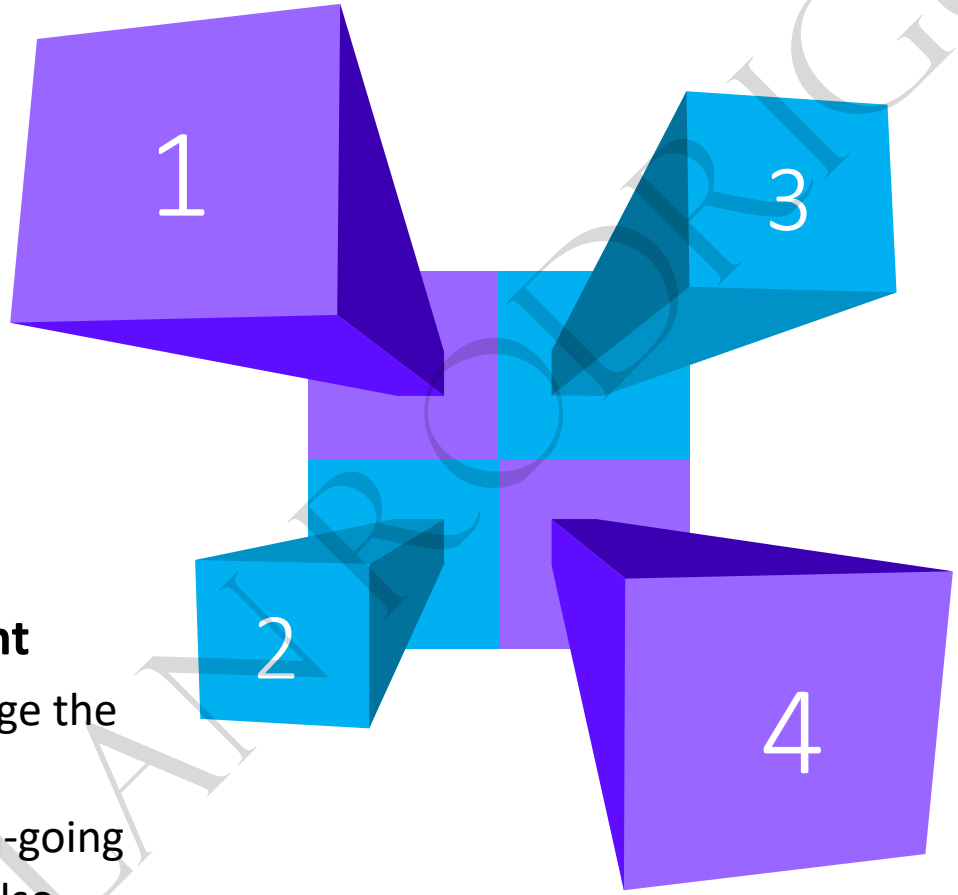
- An example is Microsoft Office 365.
- Here you don’t need to manage the infrastructure or even the underlying operating system, platform components or even the software.
- Here you just start directly using the software.
- You can access your application data from anywhere.
- You don’t have the headache of managing anything.

Cloud Model types

Public Cloud

- These are services that are offered over the public internet
- It’s available to anybody who wants to use them. Users then pay based on service they use.
- Here all the servers and storage is managed by the cloud provider.

Public Cloud Advantages



Investment

No need for a capital investment – You normally don’t pay any money upfront to use a cloud service. Most of the services are based on a pay-as-you-go model

Reachability

Cloud providers such as Azure have data centers located at different regions across the world.

Management

You don’t need to manage the underlying physical infrastructure. Hence on-going maintenance costs are also reduced.

Ease of use

You can quickly provision resources on the cloud. It allows you to get up and running in no time.

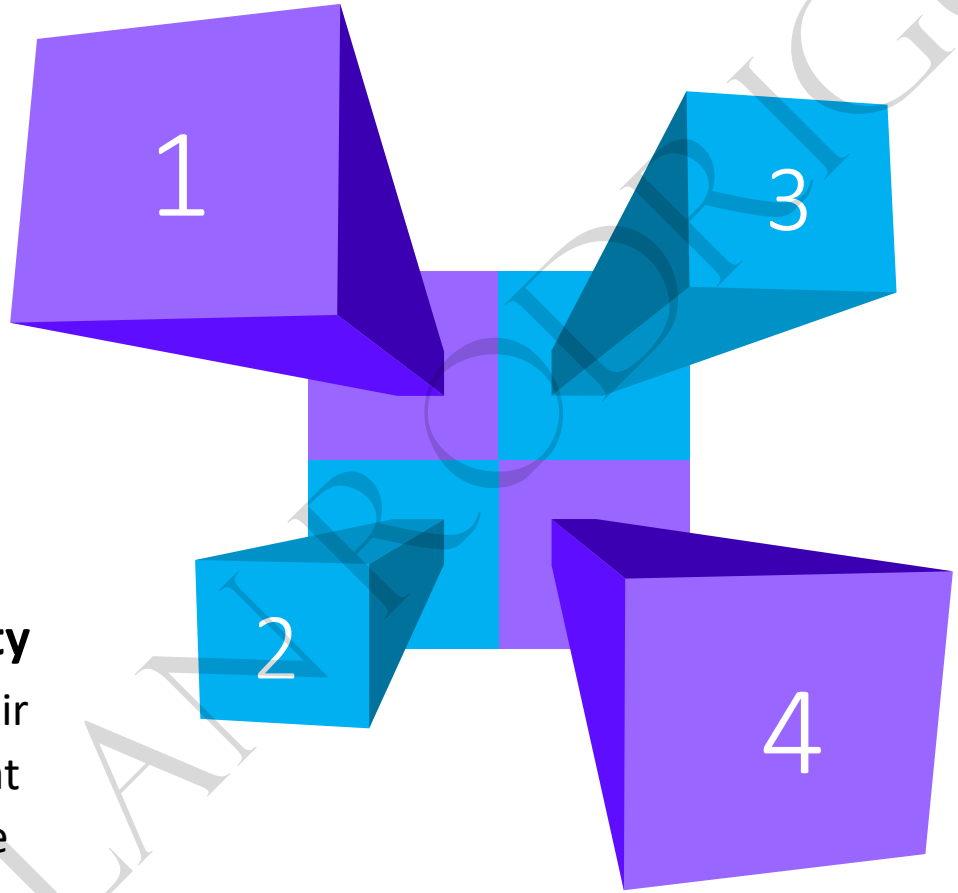
Private Cloud

- These are set of services that are normally only used by users of a business or organization.
- The private cloud could be hosted either on the company's on-premise environment. Or it could be provided by a third-party service provider.

Private Cloud Advantages

Control

The business has complete control over the environment.



Data

The data held in the environment is in complete control by the business.

Security

They can implement their own security protocols at every layer to secure the environment.

Flexibility

You can implement various technologies and not bound to any platform.

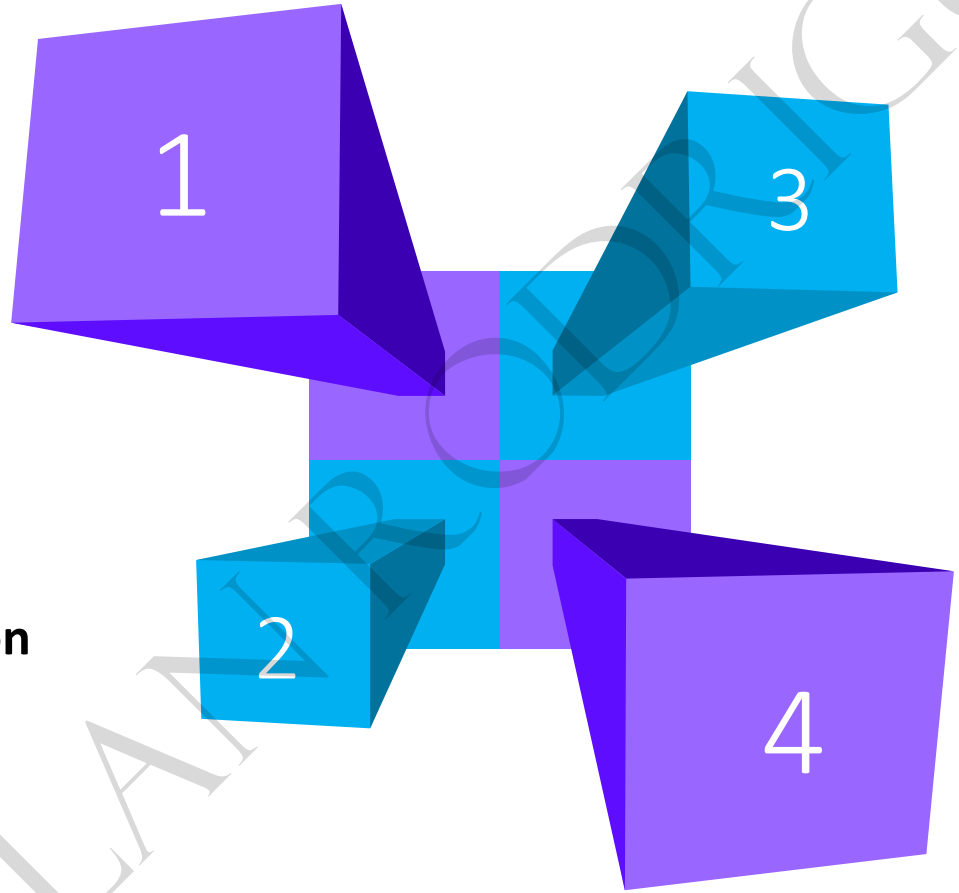
Hybrid Cloud

- This is a combination of both the public and private cloud.
- It allows data and applications to be shared across both cloud environments.

Hybrid Cloud Advantages

Current Investment

Businesses can still leverage their existing on-premise environment. This is important if they have already made a substantial investment in getting their environment in place.



Data

They can keep data which needs to be secured by their standards in their on-premise environment.

Extension

They can extend their infrastructure to the cloud without making a further investment.

Migration

They can move workloads to the cloud gradually.

Describe Azure architecture and services - Other services

Azure Traffic Manager

Azure Traffic Manager

- This is a DNS-based traffic load balancer.
- Here you can direct traffic to endpoints based on different routing methods.
- **Priority Routing method** – Here the routing will go to the secondary endpoint if the primary endpoint is not available.
- **Weighted Routing method** – Here the requests can be routed to the endpoints based on different weights.

Azure Content Delivery Network

Azure Content Delivery Network

- This service helps to deliver content efficiently to end-users across the world.
- It makes use of edge servers across the world to deliver content to users.
- You can place the Azure CDN profile in front of your web endpoint.

Azure DevOps

Azure DevOps

- **Azure Boards** – This has support for planning and tracking your work items.
- **Azure Repos** – This is used as a version control system to version control source code.
- **Azure Pipelines** – This provides continuous integration and delivery pipelines.
- **Azure Test Plans** – Here you can carry out manual testing via the use of testing tools.
- **Azure Artifacts** – Here you can share packages – Maven ,npm, NuGet

Azure Bot

- You can build a conversational agent with the use of the Bot service.
- You can easily build bot applications with the use of the Bot SDK.
- You can also build virtual agents with the use of Power Virtual Agents.

Azure DevTest Labs

- This helps you to use virtual machines and platform-as-a-service environments in the form of labs.
- You can use pre-configured bases and also add artifacts when creating VMs.
- You can make use of Lab policies to track and control lab usage and costs.

Azure Cognitive Services

- This helps to build Artificial Intelligence-based applications.
- You have different categories when it comes to the services – Vision, Speech, Language and Decision.
- You have several deployment options that include Azure Functions, App service, Logic Apps.

Azure Logic App

- This helps to build workflows. You don’t need to have coding experience to build the workflow.
- **Trigger** – A workflow can start based on a trigger.
- **Action** – This is a step that can be executed in the workflow.

Azure Machine Learning

- This is a cloud service that can be used by data scientists and engineers to build machine learning products.
- You can train and deploy machine learning models.
- You can use the Machine Learning Studio to work with various aspects related to Machine Learning.

Azure Key Vault

- This is a cloud service that can be used for storing and accessing secrets.
- The secrets can be your API keys, passwords, certificates or cryptographic keys.

Azure Batch

- This service is used to run large-scale parallel and high-performance computing batch jobs.
- Azure Batch can manage the compute machines used for running the jobs.
- You can use Azure Storage accounts for storage of the input , output files and the applications.

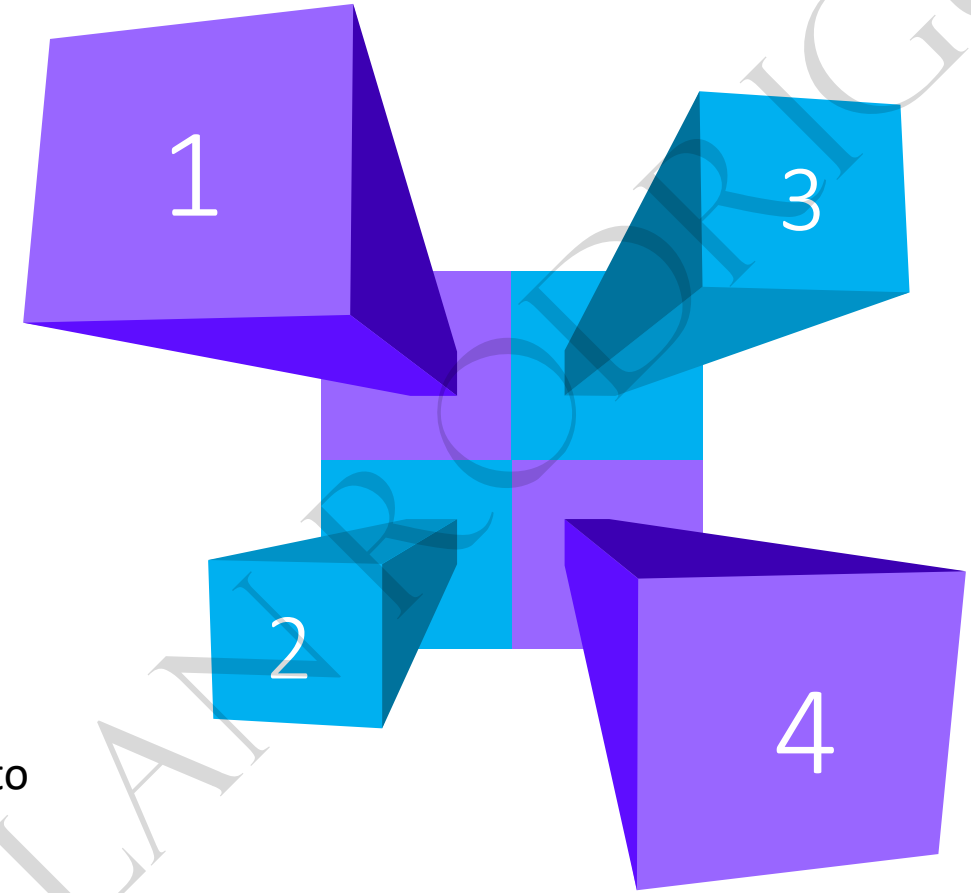
Describe Azure architecture and services - Identity and Access

Azure Active Directory

Azure Active Directory

Identity

This is a cloud-based identity and access management service.



Azure and Microsoft 365

This identity provider works for both Azure and Microsoft 365.

Access

You can authenticate users and grant access to resources.

Security

You have different security features available.

Azure Active Directory Licensing

- **Azure Active Directory Free** – Here you get user and group management, basic reports.
- **Azure Active Directory Premium P1** – Dynamic groups, more hybrid capabilities.
- **Azure Active Directory Premium P2** – Azure AD Identity Protection, Privileged Identity Management.

Multi-Factor Authentication

- The use of MFA - Multi-Factor Authentication to provide an extra layer of security when it comes to authentication.
- It’s a good practice to enable MFA for your privileged users.

Conditional *Acess*

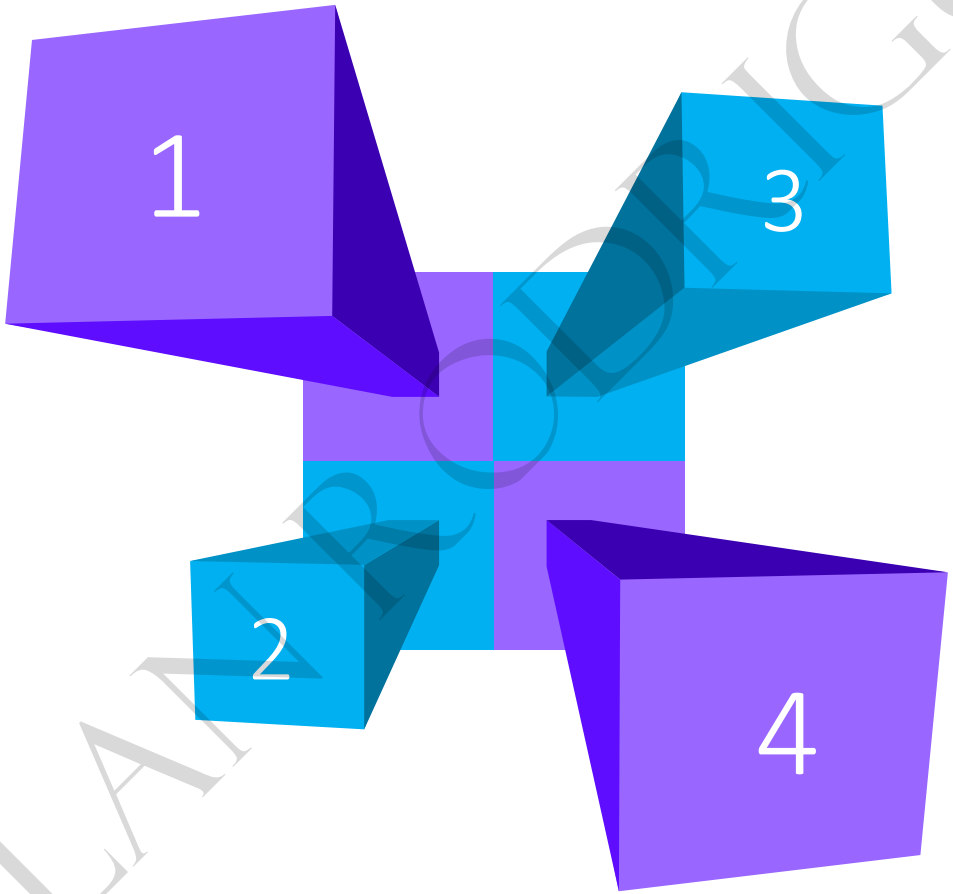
Azure AD Conditional Access

Conditions

Here you can define conditions based on which you want to give access to users for a resource.

Signals

You can make use of different signals for the conditions – User and their location, device they are logging from, the Application , real-time risk.



Access

Based on the condition you can decide whether the user should be allowed access , blocked access or they require the user of MFA.

Enforced

These rules are enforced after the first-factor authentication is complete.

Microsoft Defender for Cloud

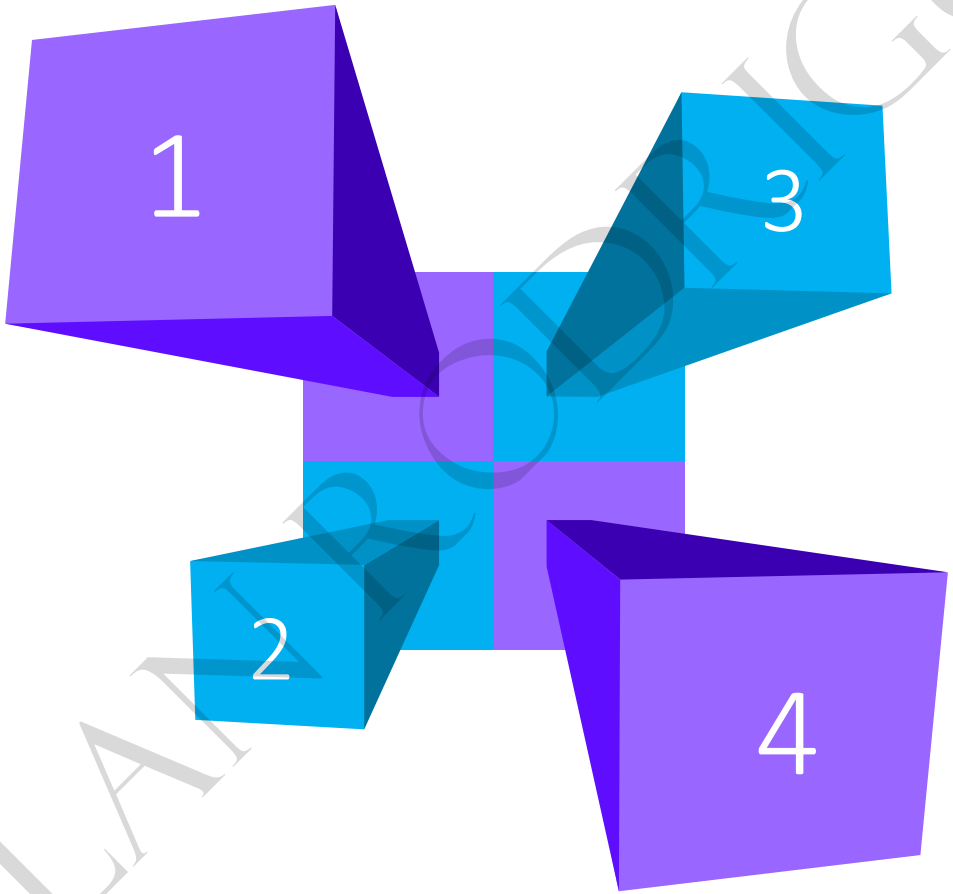
Microsoft Defender for Cloud

Purpose

This is a Cloud Security Posture and Cloud Workload Protection Platform. You can monitor Azure resources, Amazon Web services resources and on-premises resource.

Secure Score

It continually assesses the security posture of your resources. It generates a secure score based on the assessment.



Recommendations

You get recommendations on how to improve the security of your resources.

Threats

It can also detect and resolve threats to resources and services.

Azure Active Directory Domain Services

- This provides managed domain services on Azure.
- Here you don’t need to manage the domain controllers.
- You get features such as domain join, group policies etc.

Microsoft Sentinel

What is Microsoft Sentinel

- This is a cloud service that provides a solution for SEIM (Security Information Event Management) and SOAR (Security Orchestration Automated Response)
- This provides a solution that helps in the following
- **Collection of data** – Here you can collect data across all users, devices, applications and your infrastructure. The infrastructure could be located on-premise and on the cloud.
- It helps to detect undetected threats.

What is Microsoft Sentinel

- It helps to hunt for suspicious activities at scale.
- It helps to respond to incident rapidly.
- Once you start using Microsoft Sentinel, you can start collecting data using a variety of connectors.
- You have connectors for a variety of Microsoft products and other third-party products as well.
- You can then use in-built workbooks to get more insights on the collected data.

Microsoft Sentinel

Microsoft Sentinel

What is Azure Firewall

- This is a fully-managed firewall security service.
- This service can be used to protect your workloads running within an Azure virtual network.
- Here you don’t manage the underlying infrastructure and you get high availability for the service.

Zero Trust

- **Verify Identity** – Here you also implement security for your identities – Multi-Factor Authentication. Because there are so many cases of Identity theft.
- **Verify devices** – Make sure to enroll devices, users log in from trusted devices.
- **Verify access** – Access to privileged resources.

Describe Azure management and governance

Management Groups

Azure Management Groups

- You have the ability to organize subscriptions into management groups.
- You can then manage access and policies at the management group level.
- By default there is a root management group that is known as the Tenant root group.

Azure Policy

Azure Policy

- This service can be used to assess the compliance of your resources.
- You can use the in-built policy definitions or even create your own policy definitions.
- You also have the option to remediate non-compliant resources.

Azure Resource locks

Resource locks

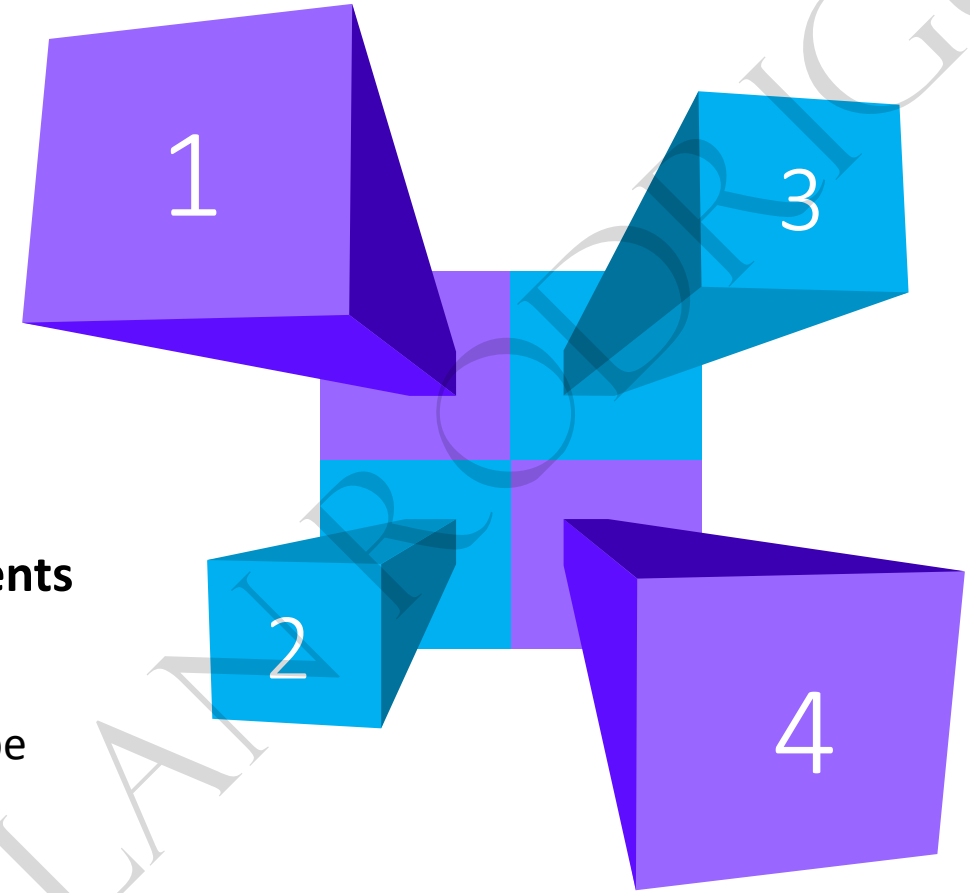
- Locking resources can help ensure users don’t accidently delete or modify resources.
- There are two types of locks
- **CanNotDelete** - authorized users can still read and modify a resource, but they can't delete the resource.
- **ReadOnly** - authorized users can read a resource, but they can't delete or update the resource.

Azure Blueprints

Azure Blueprints

Role assignments

If you need specific roles to be assigned.



Resource groups

If you need certain resource groups to be in place.

Policy assignments

This is if you need specific policies to be applied.

ARM templates

If there are resources that need to be deployed.

Azure Blueprints - Stages

- **Definition** – Here you define the Blueprint itself. The Blueprint needs to be saved to either a management group or a subscription.
- When you save the Blueprint to a management group, the Blueprint can be assigned to any subscription which is part of the management group.
- To save the Blueprint definition, you need to have Contributor access to either the management group or the subscription.

Azure Blueprints - Stages

- **Publishing** – Once the Blueprint is defined, you can publish it. Here you can assign a version number for the Blueprint.
- **Assignment** – Here the Blueprint is then assigned to a subscription.
- You can protect resources deployed via the Blueprint resource locks.
- Here even if there is a user with the Owner role, still the user will not be able to remove the lock.
- You can only remove the lock by unassigning the blueprint.

Different tools

Tools for Azure

- **Azure PowerShell** – This can be used to managing and administering Azure-based resources.
- **Azure CLI** – This a cross-platform command-line tool that can be used to manage and administer Azure-based resources.
- **ARM templates** – Here you can define your resources as code.
- You can then deploy the code file to Azure Resource Manager.

Azure Advisor

Azure Advisor

- Here you get recommendations based on resources deployed as part of your Azure subscription.
- **Reliability** – How to improve the reliability of your resources.
- **Security** – Helps in detection of threats and vulnerabilities.
- **Performance** – Improve the performance of your applications.
- **Cost** – Reduce the overall expenses incurred as part of your Azure account.
- **Operational Excellence** – Get better operational efficiency for your resources.

Azure *Monitor*

Azure Monitor

- Here you get metrics for the underlying resources deployed as part of your Azure subscription.
- You can also collect log data with the help of a Log Analytics workspace.
- You can define Azure Monitor alerts to send an alert if a specific condition is being reached for your Azure resources.

Application *Insights*

Application Insights

Monitoring

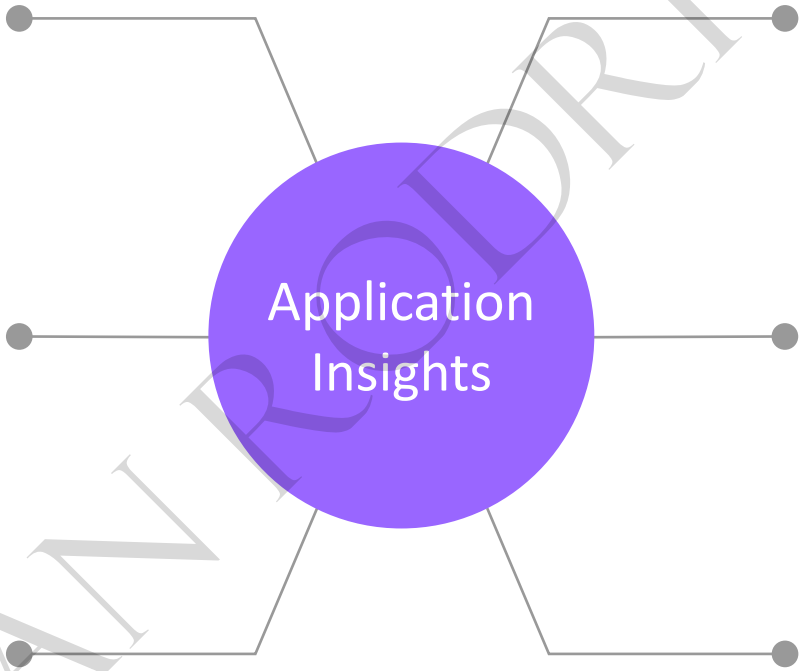
This provides the feature of application performance management and monitoring of live web applications.

Aspects

Here you can see aspects such as detecting performance issues or any other issues.

Support

There is support for .NET, Node.js, Java and Python.



Applications

This works for applications hosted in Azure, on-premises environments, or other cloud platforms.

Integration

It has Integration with the Visual Studio IDE.

Users

You can also see how users interact with your application.