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Cloud Concepts

Train Overview

In this train we will cover the following:

We will be going over the **basics of cloud computing** and the **advantages of cloud computing**. We will also be discussing some of the **major players in cloud computing** and how they differ.

Finally we will be **diving into AWS and the AWS Cloud Adoption Framework** (CAF).

Introduction to Cloud Computing

Advantages of Cloud Computing

Introduction to Amazon Web Services (AWS)

Introduction to Google Cloud Platform (GCP)

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Overview of Cloud Computing

Cloud computing can simply be summarised as the **remote delivery of computing services over the internet to clients**.

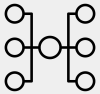
Clients typically pay a monthly or annual service fee to providers, to gain access to systems that deliver:

- **software as a service,**
- **platforms as a service, and**
- **infrastructure as a service** to subscribers.

Typical Cloud Computing Services

Servers, Storage & Databases

Networking



Analytics

Intelligence

Traditional Computing Model vs Cloud Computing Model

Traditional Computing Model

The **traditional computing model consists of various pieces of hardware** connected to a network via a remote server(s). This server (or servers) is **usually installed on the premises** and gives all employees access to **business specific data and software**.

When the business running on this computing model wants to **scale its operations, additional hardware and software needs to be purchased**/ procured and installed.

Traditional IT infrastructures are considered to be one of the most secure data hosting solutions and allows you to maintain full control of your company's applications and data.

Cloud Computing Model

Cloud computing is the delivery of storage, computational resources, analytics and intelligent services **over the internet**.

This delivery model **enables for rapid innovation** by means of **compressing the time spent on the conceptual design, detail design and implementation phases of a project**. It does so by **reducing the bottleneck between ideation**, detail design, hardware and software procurement, set-up, integration and deployment.

In a sense the cloud allows for a **one click deployment as soon as the solution is properly architected in the cloud**.

The main difference between traditional and cloud computing models is in the decentralised flexibility and scalability of cloud computing

IaaS, PaaS and SaaS

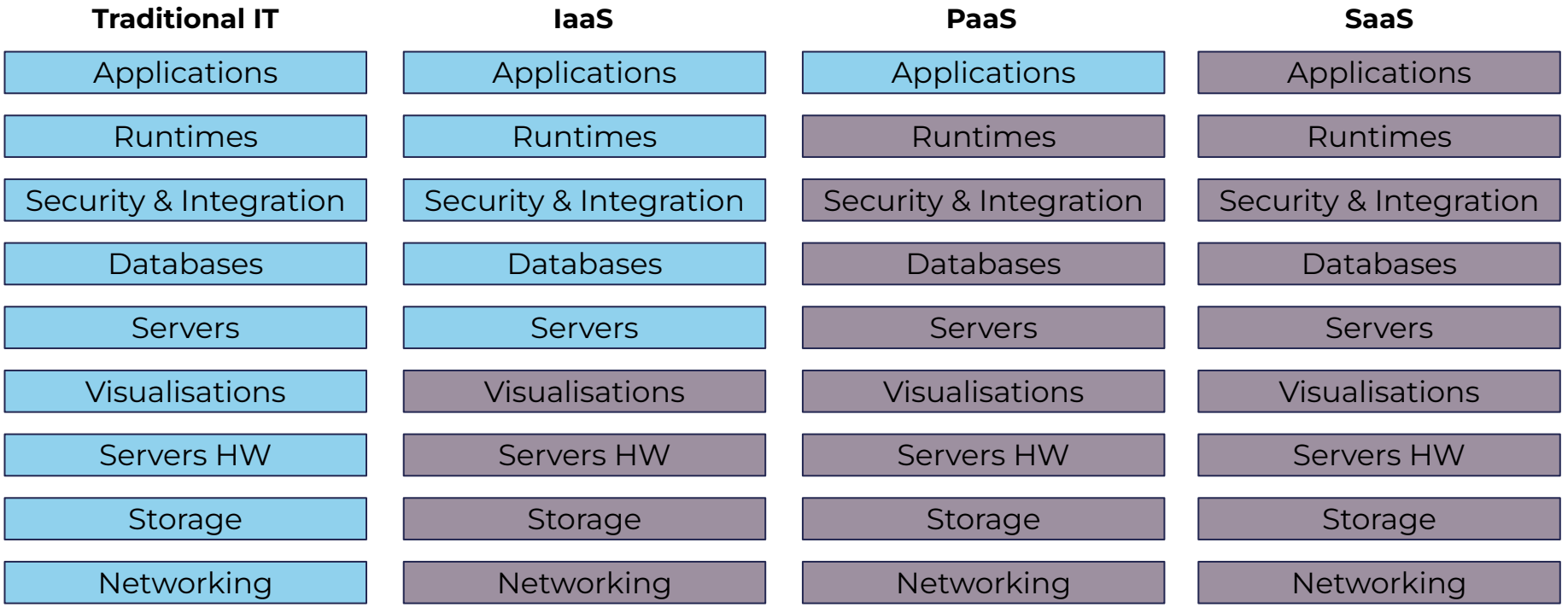
There are three cloud computing service models, namely: IaaS, PaaS and SaaS

IaaS Infrastructure as a Service	PaaS Platform as a Service	SaaS Software as a Service
• Provides access to storage, networking, servers and other computing resources in the cloud on a pay-as-you-go basis. • Infrastructure is scaled based on storage requirements. • Saves cost by eliminating the need to buy and maintain own hardware. • Provides virtualized computing resources over the Internet, hosted by a third party such as Google, Amazon Web Services, or Microsoft Azure.	• Provides cloud environment to enable development, testing, management and delivery of applications. • Providers manage security, operating systems, server software and backups. • Facilitates collaborative work even in remote settings. • Emphasises focus on development, eliminating underlying infrastructure issues that may arise.	• Cloud computing service that provides software applications over the internet, on demand and typically on a subscription basis. • Eliminates requirements of installing, upgrading or managing software on local devices. • Secure storage of data, preventing loss of data due to equipment failure. • Resources can be effortlessly scaled up based on service needs.

IaaS, PaaS and SaaS Cont.

Managed By Your Company
Managed By Cloud Vendor

Comparison between vendor managed services and internally managed services for various computing models



SOURCE: UTILIZING WEB AND CLOUD-BASED TECHNOLOGIES TO SUPPORT CORPORATE BUSINESS OPERATIONS

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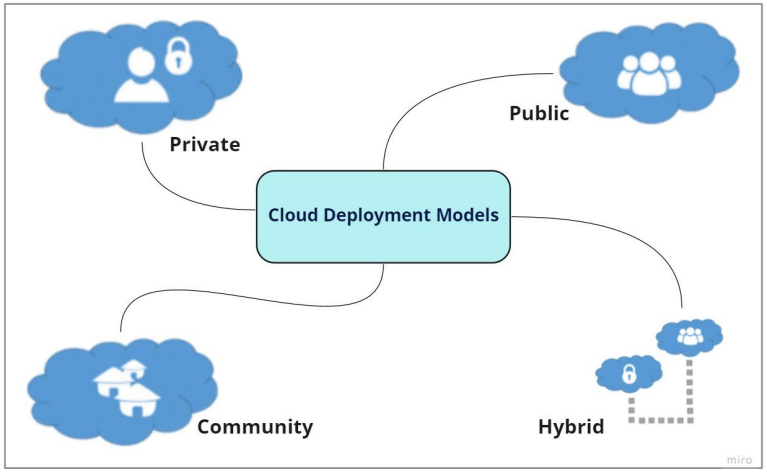
Types of Cloud Computing Deployment Model

Defining a cloud computing deployment model.

A **cloud computing deployment model** represents a specific type of cloud environment, primarily distinguished by ownership, storage size, infrastructure and accessibility. There are four main cloud deployment models.



In the next few slides we will EXPLORE each of the four deployment models in cloud computing

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Types of Cloud Computing Deployment Model: Private and Public Cloud

Features of **Public** and **Private** cloud models

Private cloud

- Popular cloud model which offers services via the internet or a private internal network to a select group of users instead of the general public.
- Offers benefits of: self service, scalability, elasticity, with additional control and customisation available.
- A selected group of users are granted access to the information kept in the repository, resulting in higher security and privacy as information is not accessible to third party providers.

Public cloud

- The cloud resources are owned and operated by a third-party cloud service provider and delivered over the internet which is available to the general public.
- Cloud resources are shared among organisation or “tenants” who have access to the same hardware, storage and network devices.
- Some frequent uses include provision of web-based email, online office applications and storage.
- Benefits include: low cost, no maintenance and high reliability.

Types of Cloud Computing Deployment Model: Hybrid & Community Cloud

Features of **Community** and **Hybrid** cloud models

Community cloud

- Access to this cloud is granted to selected users, however, instead of one company having sole ownership of the cloud server, the cloud resources and infrastructure is shared amongst several organisations with similar backgrounds.
- Benefits include: cost reduction through shared costs; improved security, reliability and privacy.
- This model facilitates project development, management and implementation.

Hybrid cloud

- This model encompasses on-premises infrastructure or a private cloud, with a public cloud allowing data and apps to move between the two environments
- Benefits include: high flexibility, more deployment options, security, cost effective, compliance and higher value extracted from existing infrastructure.
- Allows companies to only pay for resources they temporarily use instead of having to purchase programs, and maintain additional resources and equipment that could turn redundant over time.

Why use cloud services instead of traditional infrastructure?

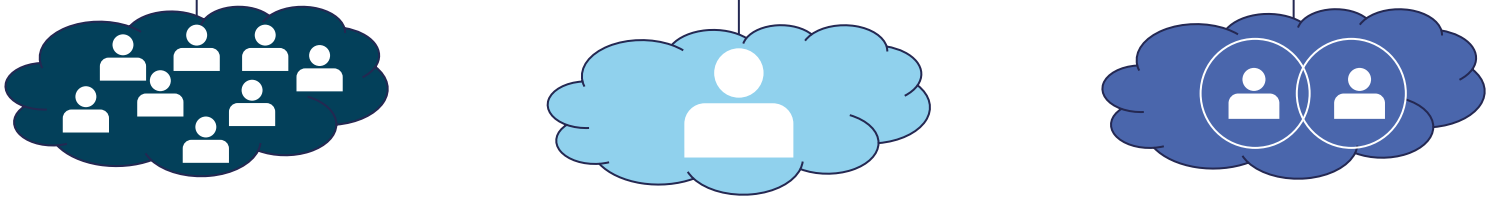
The trade-off between using cloud computing and local IT infrastructure

Prior to the advent of cloud services, companies could only think of their computing infrastructure in terms of *fixed hardware installations* which, amongst other things, were:

- **Static** - Hardware stacks have fixed storage, compute, and networking capacity. They also have to be bought upfront as a capital expense, which can be a considerable cost!
- **Difficult to maintain** - Managing onsite infrastructure requires many specialised roles including facility management, system administration, network engineering, and system technicians.
- **Inefficient** - Unless coordinated perfectly, onsite hardware is either under or over utilised at any time during the day; wasting productivity during peak traffic periods or financial resources during activity lulls.

Strengths of Different Cloud Deployment Models

Types of cloud computing



Cloud Model	Public	Private	Hybrid
Cloud Model Advantages	• Scalable • Reliable • Inexpensive • Location Independent	• Scalable • Secure • Flexible • Greater Control	• Scalable • Secure • Flexible • Cost Effective

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Main Advantages of Cloud Computing

The biggest advantages of cloud computing are the pay-as-you-go billing model and reduced time to market

1 Reduced Infrastructure Cost

Because you are not procuring physical hardware, rather just renting what is needed from a vendor, there is reduced infrastructure cost.

2 Business Continuity

Having your data stored in the cloud ensures it is backed up and protected in a secure and safe location.

3 Increased Flexibility

Employees have flexibility in their ways of working. For instance, data, software etc. can be accessed from home, on holiday, remotely.

4 Scalability

Using cloud computing enables you to scale your IT services up and down rapidly in an automated manner as your business needs change.

5 Security

By using encryption, information is less accessible to hackers or anyone not authorized to view your data.

6 Reduced Time to Market

The fact that services can be spun up on demand means a condensed time frame from ideation to deployment.

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High Level Overview of AWS

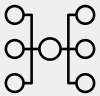
AWS is the market leader in cloud computing and offers more than 175 products from data centres around the globe. As of 2020, **AWS opened its first data centre in Cape Town**, South Africa.

As of 2020, **AWS dominated the cloud computing space** with a market share of 32.4% followed by 17.6% and 6% market share for Azure and GCP, respectively.

AWS Product Focus

Versatility in Service Offering:
Amazon offers more than 175 cloud computing services, more than any other cloud vendor.

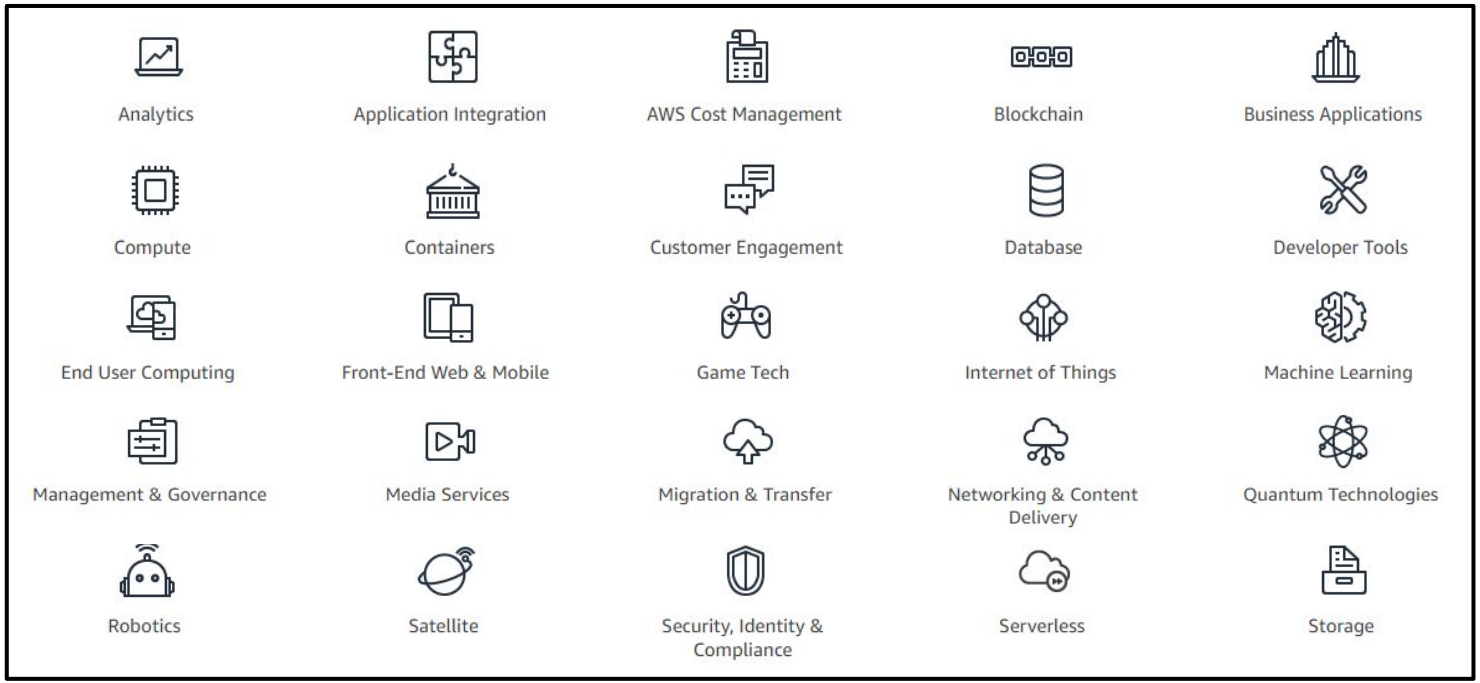
Storage Services:
Amazon boasts a broad range of storage services ranging from block storage, archive storage and backup storage services.



Computing Services:
Amazon has market leading computational services that can be spun up on demand in real-time.

Products and Services Offered by AWS

To deep dive into each of the products offered by AWS in the below categories please follow this link



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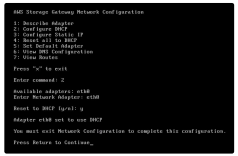
Interacting with AWS

We can interact with AWS in three ways, namely: the **AWS management console**, the **command line interface** and via **software development kits**

AWS Management Console

The AWS Management Console is a web-based application used to navigate, consume and monitor solutions built with the AWS stack.



Command Line Interface (AWS CLI)

The AWS Command Line Interface (AWS CLI) is an open source tool that enables you to interact with AWS services using commands in your command line shell.

Software Development Kits (SDKs)

AWS SDKs allow you to access and manage AWS services with your preferred development language or platform.

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High Level Overview of GCP

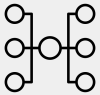
Google Cloud Platform (GCP) is the newcomer in the cloud computing industry.

Google Cloud Platform is **similar** to both **AWS and Azure**, in the **delivery of cloud services** over the internet. However, GCP **focuses on different strategic areas** than AWS and Azure. The focus of GCP is on **reliability, user-friendliness and data and analytics**.

GCP Product Focus

Future-proof infrastructure:
Deliver services to users, globally, with speed and reliability - all on Google's infrastructure.

Powerful data and analytics:
Easily extract, manage, transform, load, and visualise data with Google Cloud data analytics products.



Serverless:
Build solutions from start to finish without spending time crafting strategies for capacity, reliability and performance.

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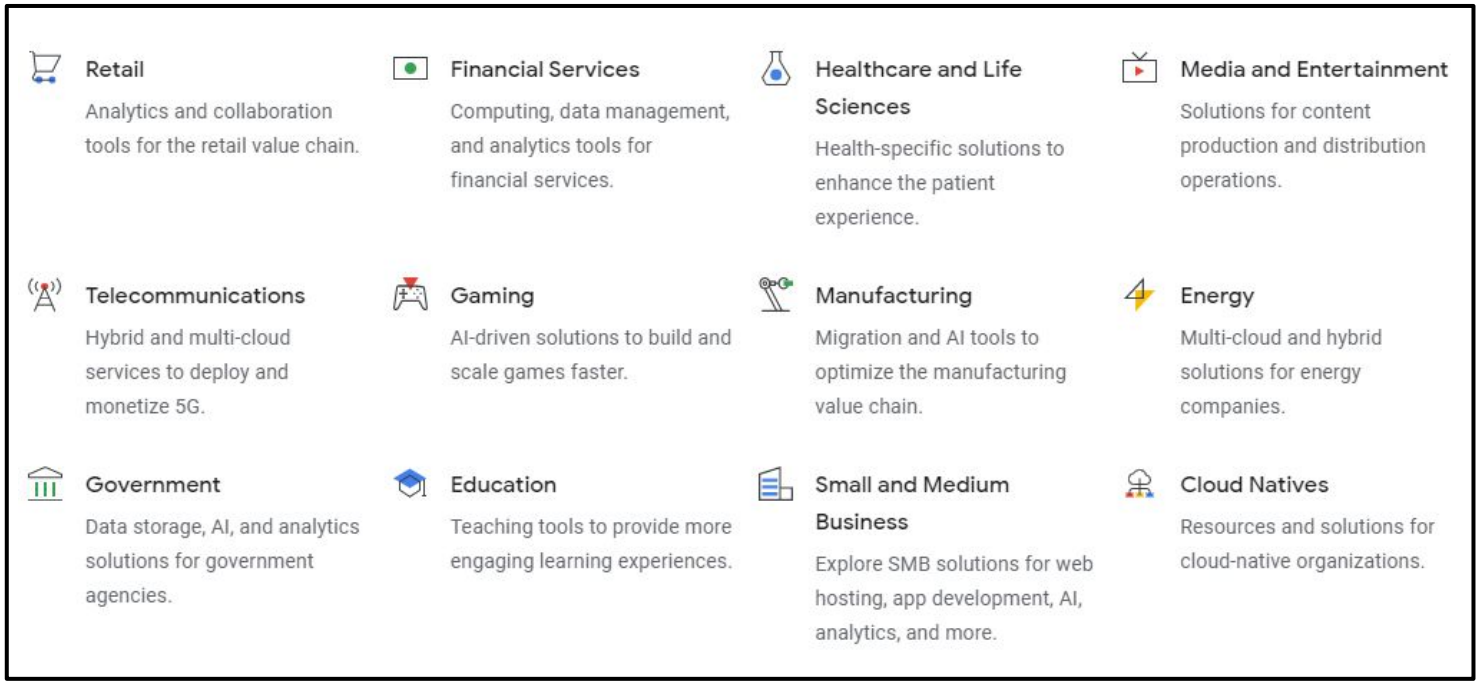
Products and Services Offered by GCP

To deep dive into each of the products offered by GCP in the below categories please follow [this link]



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High Level Overview of Microsoft Azure

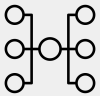
Microsoft Azure is the closest contender to AWS in terms of product offering, with products in categories ranging from analytics to IoT.

Microsoft Azure does however have the **advantage of strong branding** and a **large consumer base**. This is a key value proposition for Azure as clients choosing a cloud vendor might opt to go with Azure given its **ease of integration** with existing software solutions.

Azure Product Focus

Strong Brand:
Microsoft leverages its strong brand to upsell and cross sell cloud computing services and products

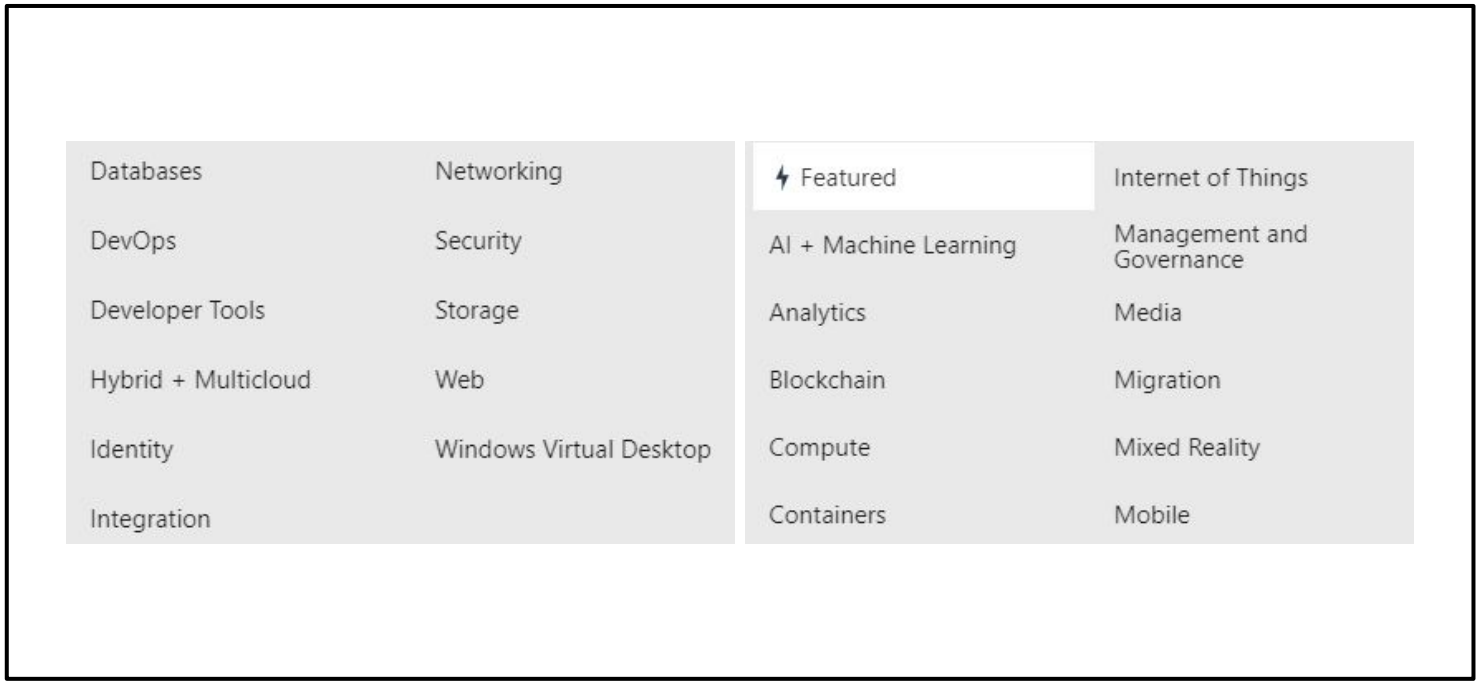
Analytics And Intelligence:
Azure offers AI and ML services in the text, speech, video, image and tabular data domain



DevOps:
Microsoft Azure offers multiple services for the CI/CD pipeline

Products and Services Offered by Microsoft Azure

To deep dive into each of the products offered by Azure in the below categories please follow this link



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Strategic Differences between AWS, GCP and Azure

Although all three vendors provide similar services, they have differences in their strategic focus and hence their target market

- Developer and management tools
- ML and predictive analytics
- Databases and storage solutions
- Business productivity tools
- Compute
- Storage

- Data management and storage
- App development
- Business analytics and AI
- Productivity and work management tools

- Big data and predictive analytics
- Game and app development
- Scalable data warehousing
- Blockchain technology
- Dev Ops
- IoT integration

Source: [Comparing AWS, Azure and GCP]

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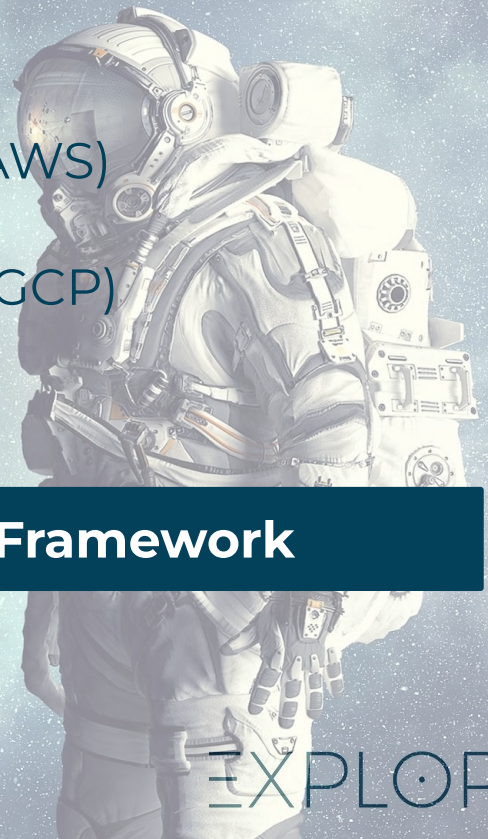

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Introduction to the AWS Cloud Adoption Framework (CAF)

The AWS CAF focuses on the business and technical aspects that need to be considered when implementing cloud solutions. The AWS CAF can be used as a guide when navigating your corporate cloud adoption strategy

Perspective	Area of Focus
Business	Business support capabilities to optimise business value with cloud adoption. **Typical Roles/Stakeholders: Business and finance managers, strategy management**
People	People development, training, communication, and change management **Typical Roles/Stakeholders: Human resources, staffing, and people managers**
Governance	Managing and measuring business outcomes and KPIs related to cloud adoption initiatives. **Typical Roles/Stakeholders: CIO, programme managers, project managers, enterprise architects, and portfolio managers**
Platform	Develop, implement, maintain and optimise cloud solutions and services. **Typical Roles/Stakeholders: CTO, IT managers and solutions architects**
Operations	Allows system health and reliability through the move to the cloud, and delivers an agile cloud computing operation **Typical Roles/Stakeholders: IT operation and support managers**
Security	Ensures that the workload deployed or developed in the cloud aligns to org. security control, resiliency and compliance requirements. **Typical Roles/Stakeholders: CISCO, IT security managers and analysts, and head of audit and compliance**

Source: How AWS CAF Transforms Business

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Conclusion

What we've learnt

What is cloud computing, different cloud deployment models and the difference between the major players in the cloud industry.

Major advantages of cloud computing models compared to traditional models

The ins and outs of the AWS cloud adoption framework

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