Cloud Concepts

26/04/2022

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Cloud Computing Introduction

Cloud Deployment Models and Service Models
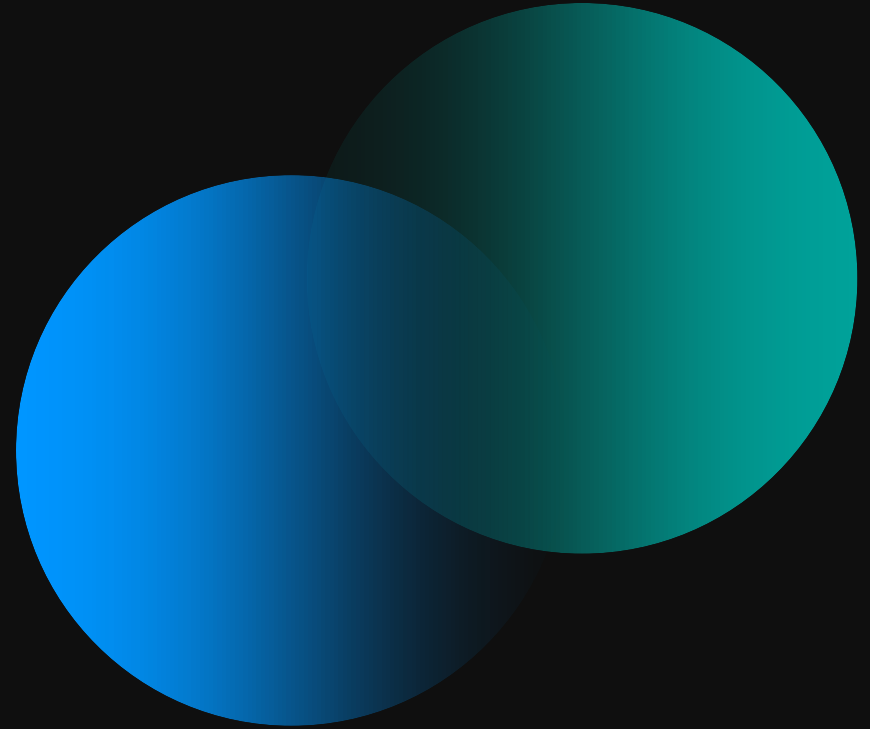
Cloud Providers

Consumption Based Model
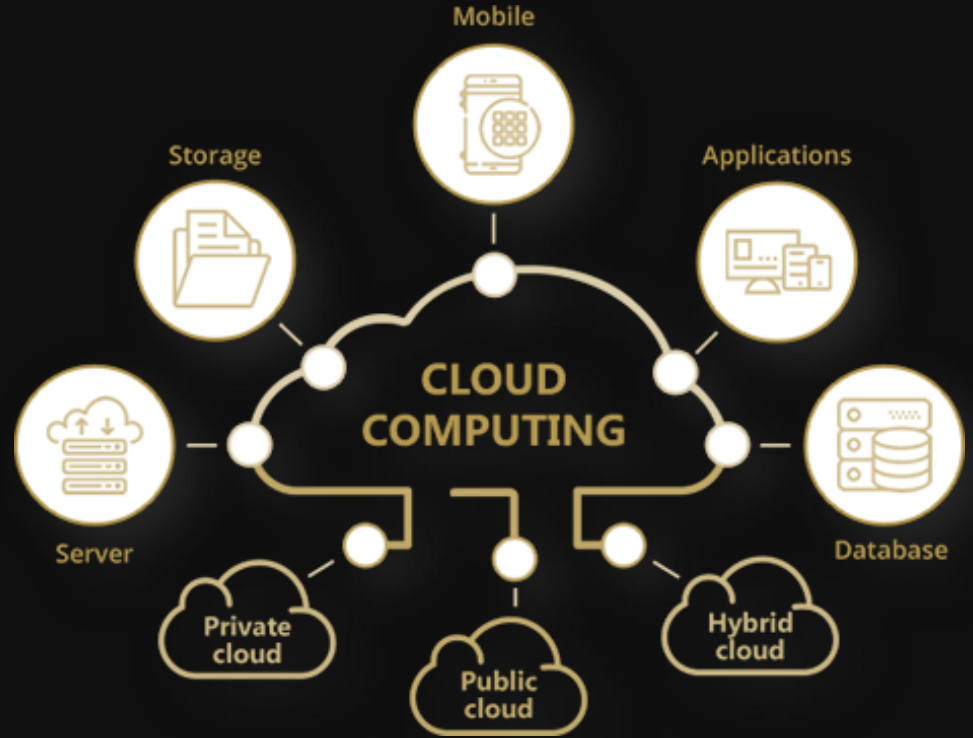
Cloud Computing Benefits

Azure Resources and Azure Services

AtoS

Cloud Computing Introduction

Cloud Computing Introduction

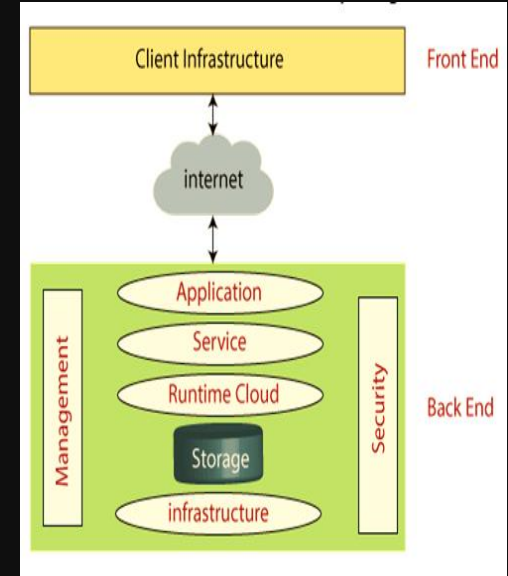## What is Cloud Computing?

Cloud Computing Introduction

What is Cloud Computing?

- Cloud refers to the internet or network. It is a technology that uses remote servers on the internet to store, manage and access data online.

- Cloud computing refers to the on-demand delivery of IT resources and applications via the internet with pay as you go pricing. Cloud computing is also a utility service giving you access to technology resources managed by experts and available on demand.

- Cloud Computing is the delivery of computing services—servers, storage, databases, networking, software, analytics, intelligence and more—over the internet (the cloud).

- You only pay for what you use, helping in lowering operating costs, running infrastructure more efficiently, and scaling as per the business needs.

- The company providing these services is referred to as a cloud provider. The cloud provider is responsible for the physical hardware required to execute the work, and for keeping it up-to-date.

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Cloud Computing Introduction
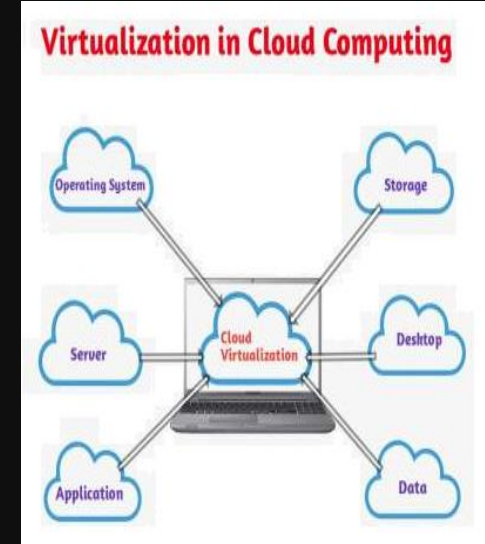
Cloud Computing Architecture

- Cloud Computing architecture is divided into the following two parts:

  - Front End: Used by the client consists of client-side interfaces and applications that are required to access the cloud computing platforms. Include web servers, thin and fat clients, tablets and mobile devices.

  - Back End: Used by the service provider, manages all the resources to provide cloud computing services. It includes huge amount of data storage, security mechanism, virtual machines, deploying models, servers, traffic control mechanism etc.

Cloud Computing Introduction
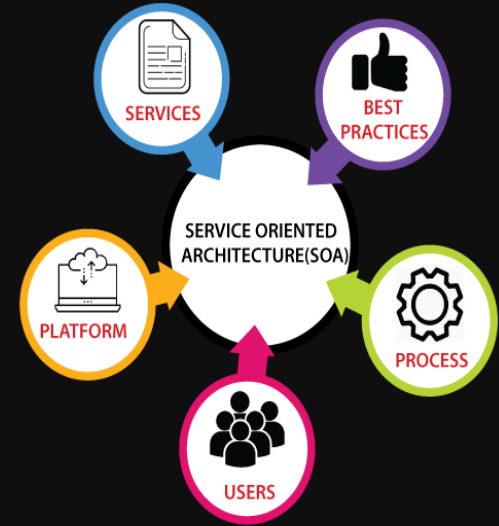
Cloud Computing Technologies

- Virtualization:

  - Virtualization is the process of creating a virtual environment to run multiple applications and operating systems on the same server. The virtual environment can be anything, such as a single instance or a combination of many operating systems, storage devices, network application servers, and other environments. Virtual Machine which is the implementation using virtualization is a software computer or a software program that works as a physical computer or physical machine and performs task such as running applications or programs as per the user's demand.
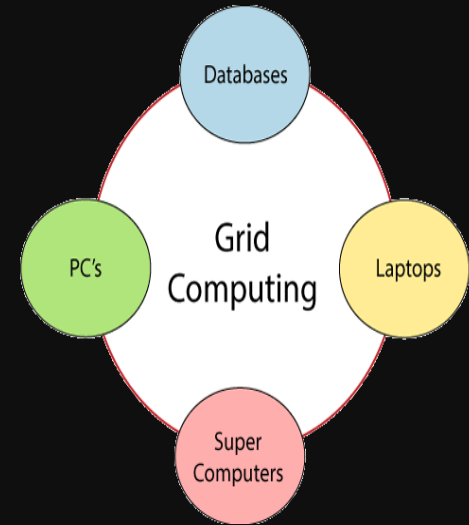
Cloud Computing Technologies

- Service Oriented Architecture (SOA)

  - Service-Oriented Architecture (SOA) is an architectural approach in which applications make use of services available in the network. In this architecture, services are provided to form applications, through a communication call over the internet. Service-Oriented Architecture (SOA) allows organizations to access on-demand cloud-based computing solutions. SOA defines a way to make software components reusable via service interfaces

Cloud Computing Technologies

- Grid Computing

  - Grid computing is also known as distributed computing. It is a processor architecture that combines various different computing resources from multiple locations to achieve a common goal. In grid computing, the grid is connected by parallel nodes to form a computer cluster. These computer clusters are in different sizes and can run on any operating system. Grid computing contains the following 3 types of machines:

    - Control Node: It is a group of servers administering the network.

    - Provider: It is a computer which contributes its resources in the network resource pool.

   - User: It is a computer which uses the resources on the network.

Cloud Computing Introduction

Cloud Computing Technologies

- Utility Computing

  - Utility computing provides on demand computing resources (Computation, Storage and Programming Services via API) and infrastructure based on the pay per use method. It minimizes the associated costs and maximizes the efficient use of resources. The advantage of utility computing is that it reduced the IT cost, provides greater flexibility, and easier to manage.
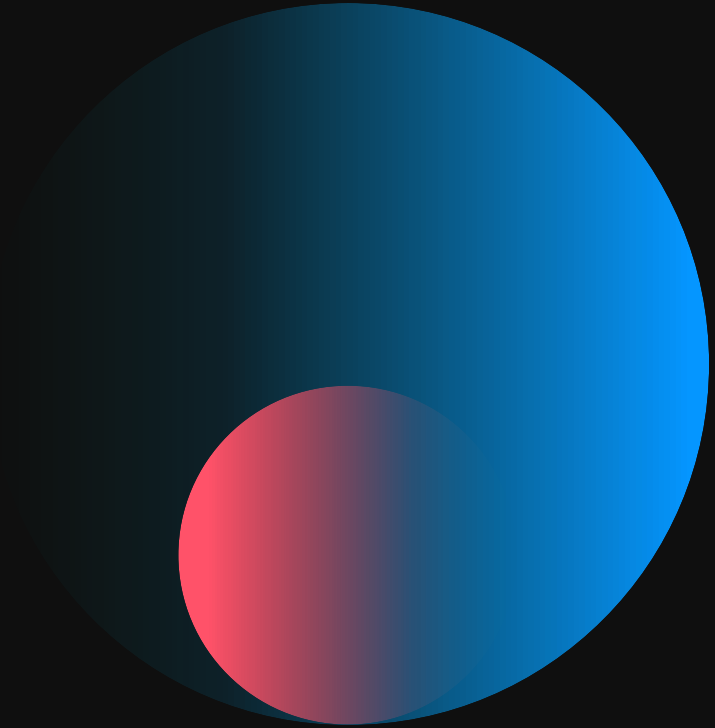
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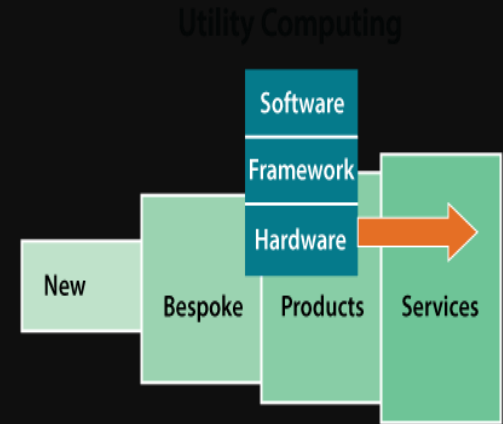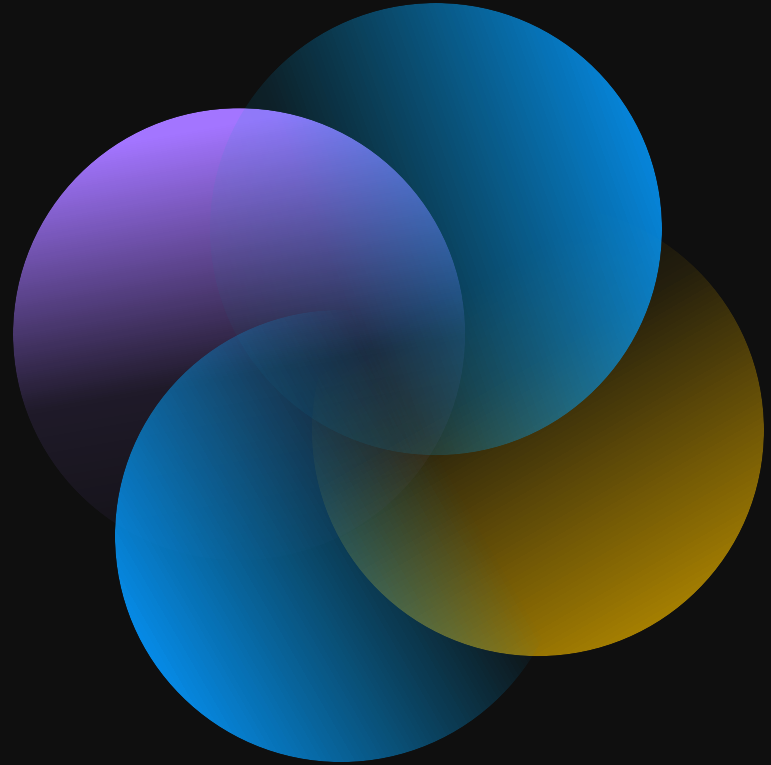
Cloud Providers

Cloud Providers

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Cloud Computing Benefits

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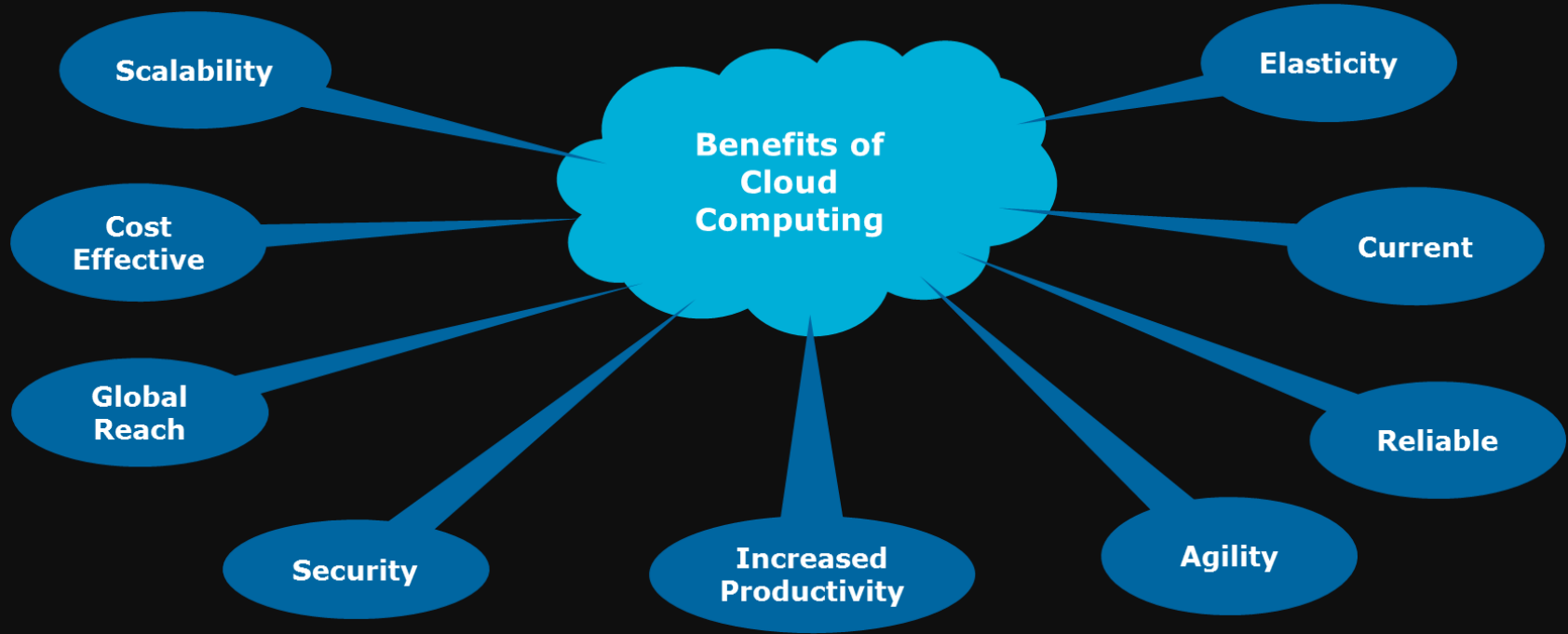
ON-PREMISE

- Physical Space
- Cabling
- Power
- Cooling
- Networking
- Racks
- Servers
- Storage
- Certification
- Labor
- 30% focus on business and 70% Managing all undifferentiated Heavy Lifting

VS

CLOUD COMPUTING

$0
to Get Started

- no long-term contracts
- 70% focus on business and 30% on configuring your cloud assets

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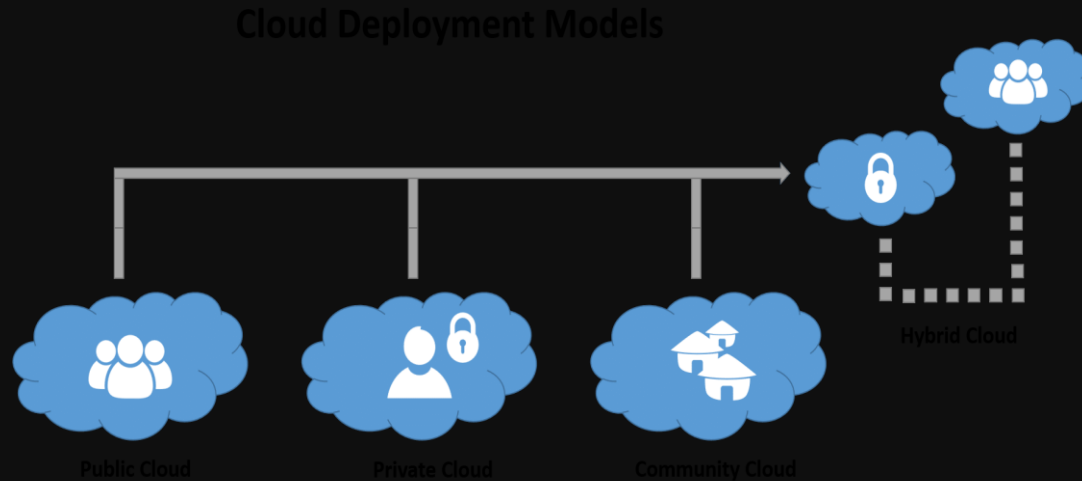# Cloud Deployment Models and Service Models

Cloud Models

- A cloud deployment model defines where the data is stored and how customers interact with it — how do they get to it, and where do the applications run? It also depends on how much of our own infrastructure we want or need to manage.

Cloud Deployment Models

Public Cloud   Private Cloud   Community Cloud   Hybrid Cloud

Cloud Models

Cloud Deployment Models

- Private Cloud:

    - Private cloud refers to a model of cloud computing where IT services are provisioned over private IT infrastructure for the dedicated use of a single organization. A private cloud is usually managed via internal resources. The organization remains the owner entirely responsible for the operation of the services they provide.

    - Ex. Microsoft, BOA

    - Advantages:
        - Configuration can support any scenario or legacy application.
        - Control (and responsibility) over security.
        - Private clouds can meet strict security, compliance or legal requirements.

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Cloud Models

Cloud Deployment Models

- Public Cloud:

  - A public cloud is owned by the cloud services provider (also known as a *hosting provider*). It provides resources and services to multiple organizations and users, who connect to the cloud service via a secure network connection, typically over the internet. Public cloud services may be free or offered through a variety of subscription or on-demand pricing schemes, including a pay-per-usage model.

  - Ex. AWS, GCP, Azure

  - Advantages:

    - High scalability/agility — you don't have to buy a new server in order to scale

    - Pay-as-you-go pricing — you pay only for what you use, no CapEx costs

    - You're not responsible for maintenance or updates of the hardware. Minimal technical knowledge to set up and use - you can leverage the skills and expertise of the cloud provider.

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Cloud Models

Cloud Deployment Models

- Hybrid Cloud:

  - A hybrid cloud deployment model uses a combination of public and private cloud resources to power company processes. You may, for example, use public cloud for data storage or public cloud computing capacities during performance peaks and use private cloud to run production lines or legacy applications. Hybrid cloud scenarios can be useful when organizations have some things that cannot be put in a public cloud, possibly for legal reasons.

  - Advantages:
    - Flexibility with what you run locally versus in the cloud. Using own equipment to meet security, compliance or legacy scenarios.
    - You can take advantage of economies of scale from public cloud providers for services and resources where it's cheaper, and then supplement with your own equipment when it's not.

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Cloud Models

Cloud Deployment Models

- Community Cloud:

  - A community cloud model is a collaborative effort where infrastructure is shared and jointly accessed by several organizations

    from a specific group that share specific computing concerns such as, security, compliance or jurisdiction considerations.

  - Ex. SBI, Axis, HDFC, Kotak

  - Advantages:

    - Flexibility and scalability: Modify properties according to the individual use cases.
    - High Availability: Community Clouds secure data by replicating data and applications in multiple secure locations.
    - Security and Compliance: Blocking users from editing and downloading specific datasets, strict regulations on sensitive data.
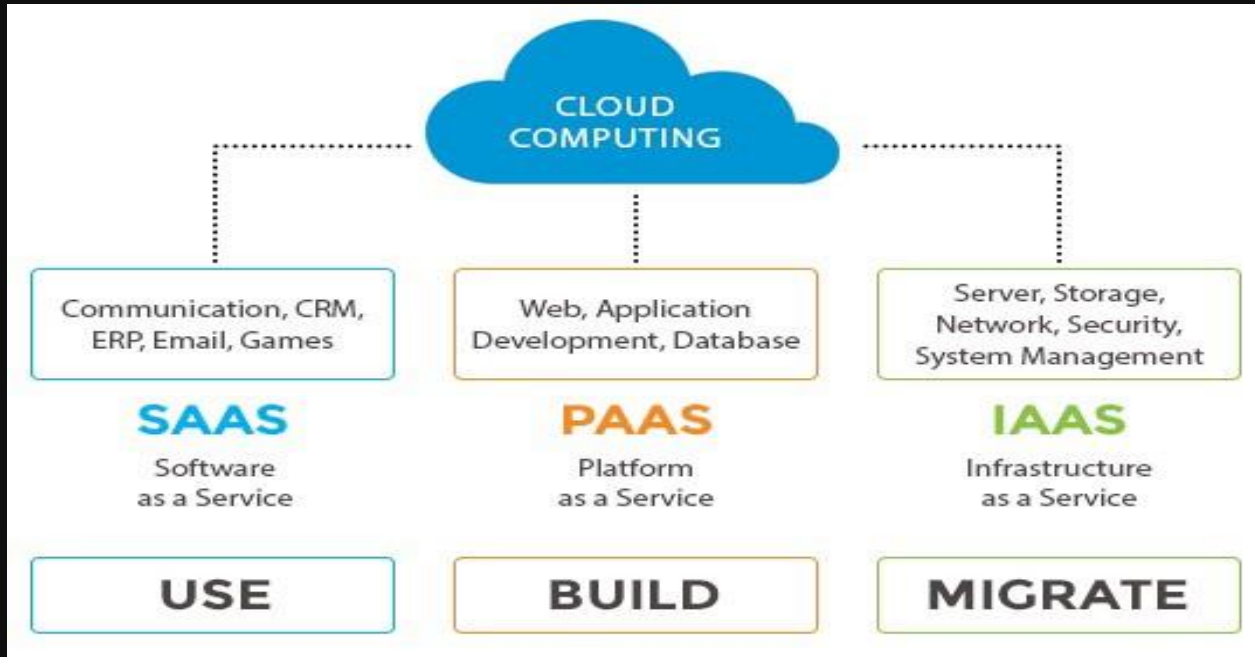
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Cloud Models

Cloud Service Models

- Infrastructure as a Service (IaaS)

- Platform as s Service (PaaS)

- Software as a Service (SaaS)
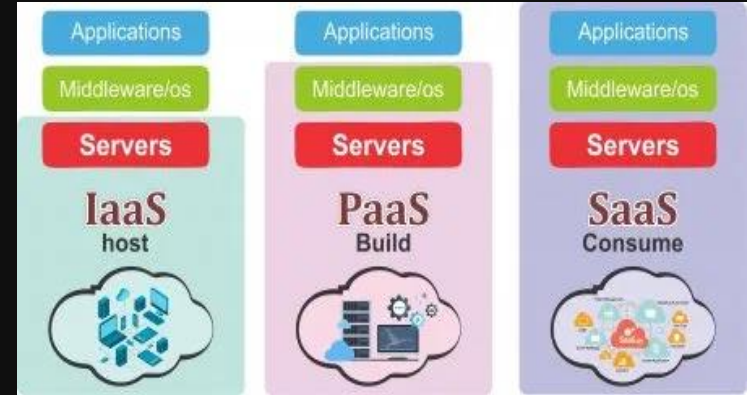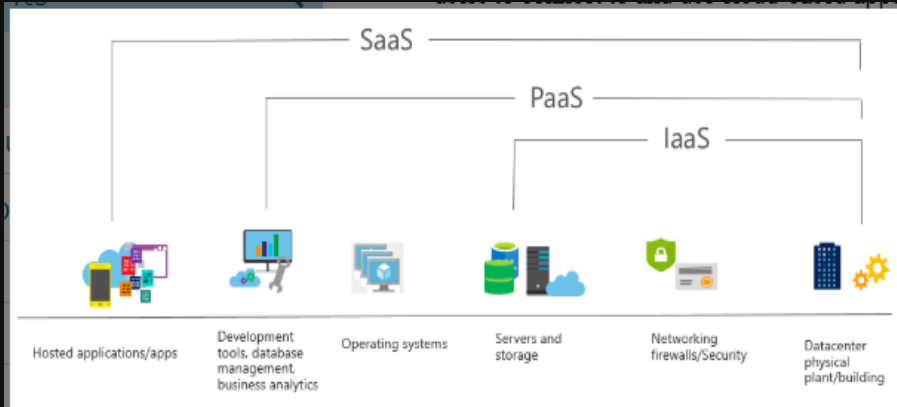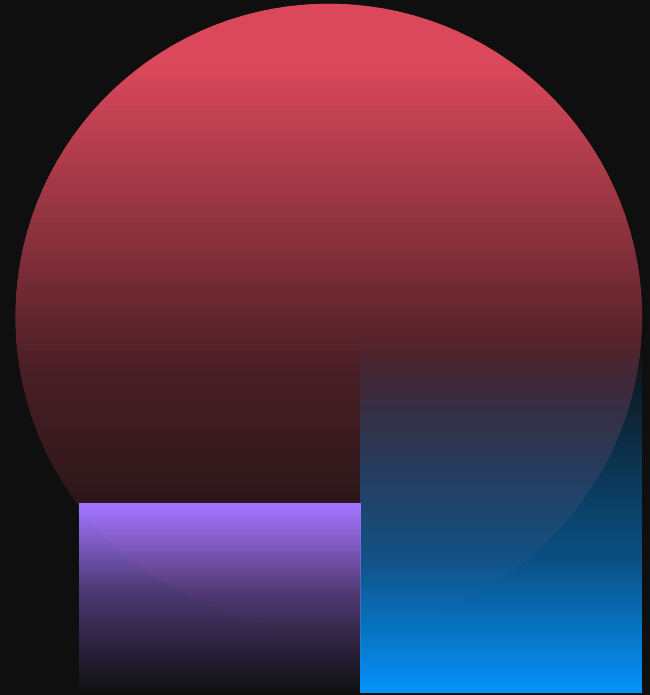
Cloud Models

Cloud Service Models

Cloud Models

Cloud Service Models

- IaaS requires the most user management of all the cloud services. The user is responsible for managing the operating systems, data, and applications.

- PaaS requires less user management. The cloud provider manages the operating systems, and the user is responsible for the applications and data they run and store.

- SaaS requires the least amount of management. The cloud provider is responsible for managing everything, and the end user just uses the software.
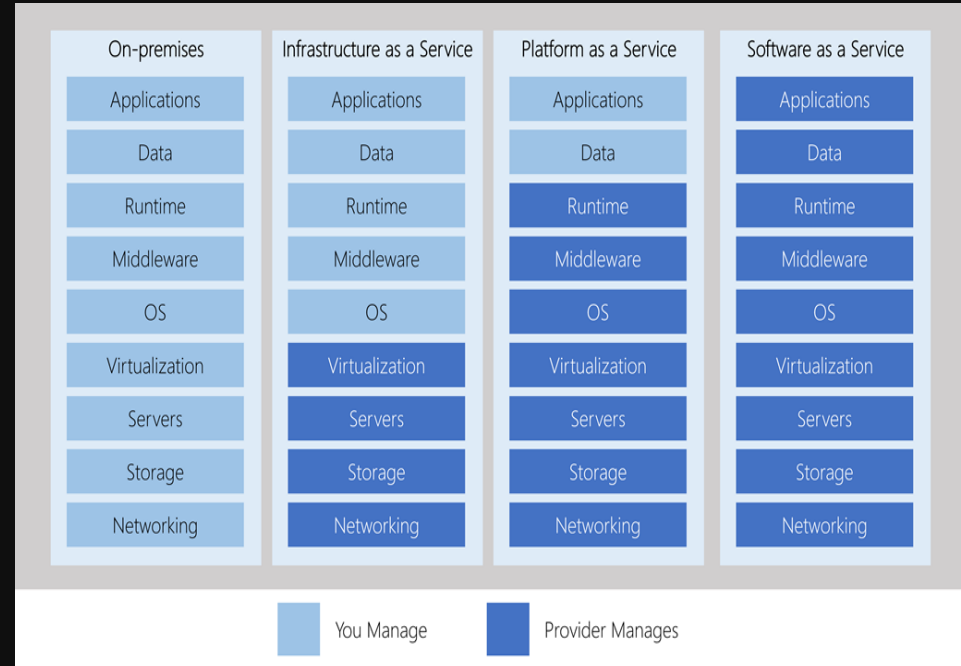
Consumption Based Model

Consumption Based Model

Economies of Scale

- Economies of scale is the ability to do things more efficiently or at a lower-cost per unit when operating at a larger scale. This cost advantage is an important benefit in cloud computing.

- It s the ability to reduce costs and gain efficiency when operating at a larger scale in comparison to operating at a smaller scale. Cloud providers are very large businesses, and are able to leverage the benefits of economies of scale, and then pass those benefits on to their customers.

- These savings are apparent to end users in a number of ways, one of which is the ability to acquire hardware at a lower cost. Cloud providers can also make deals with local governments and utilities to get tax savings, lowering the price of power, cooling, and high-speed network connectivity between sites. Cloud providers are then able to pass on these benefits to end users in the form of lower prices than what you could achieve on your own.

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Consumption Based Model
Capital Expenditure and Operational Expenditure

- **Operational Expenditure (OpEx):** OpEx is spending money on services or products now and being billed for them now. You can deduct this expense from your tax bill in the same year. There's no upfront cost. You pay for a service or product as you use it.

- **OpEx Computing Costs:**
  - Leasing software and customized features
  - Billing at the user or organization level.
  - Scaling charges based on usage/demand instead of fixed hardware or capacity.

- **Benefit:**
  - With the OpEx model, companies wanting to try a new product or service don't need to invest in equipment. Instead, they pay as much or as little for the infrastructure as required. OpEx is particularly appealing if the demand fluctuates or is unknown.

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Consumption Based Model

Capital Expenditure Vs. Operational Expenditure

- **Capital Expenditure (CapEx):** CapEx is the spending of money on physical infrastructure up front, and then deducting that expense from your tax bill over time. CapEx is an upfront cost, which has a value that reduces over time.

- **CapEx computing costs:** A typical on-premises datacenter includes costs such as:
  - Server and Storage costs
  - Network costs
  - Datacenter infrastructure costs
  - Backup and archive costs
  - Organization continuity and disaster recovery costs
  - Technical personnel

- **Benefit:** Planning the expenses at the start of a project or budget period. Costs are fixed.

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Consumption Based Model

What is Consumption Based Model?

- Cloud service providers operate on a consumption-based model, which means that end users only pay for the resources that they use. Whatever they use is what they pay for.

- This consumption-based model brings with it many benefits, including:

    - No upfront costs.

    - No need to purchase and manage costly infrastructure that they may or may not use to its fullest.

    - The ability to pay for additional resources when they are needed.

    - The ability to stop paying for resources that are no longer needed.

- This also allows for better cost prediction. Prices for individual resources and services are provided so you can predict how much you will spend in a given billing period based on your expected usage. You can also perform analysis based on future growth using historical usage data tracked by your cloud provider.
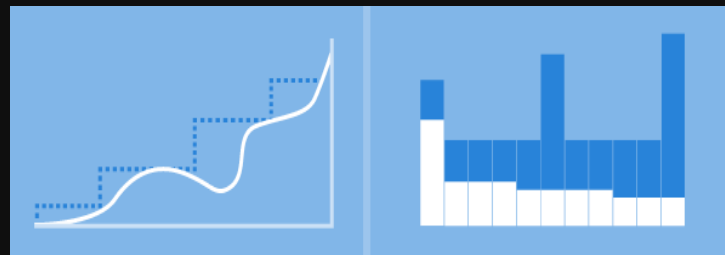
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Azure Resources and Azure Services
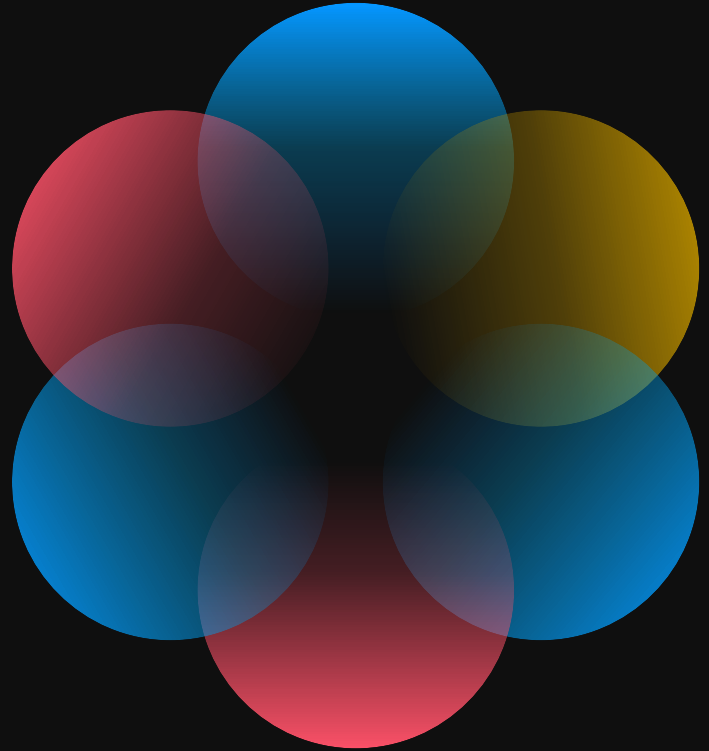
Azure Resources and Azure Services

Azure Resources and Services

- A resource is an entity managed by Azure.

- Azure Virtual Machines, Virtual Networks, Databases, Storage accounts are all examples of Azure Resources.

- Some of the services provided by Azure are:

  - Compute: Cloud compute capacity and scale on demand and only pay for the resources.

  - Database: Rapid growth and innovate faster with secure, enterprise grade and fully managed database services.

  - Storage: Secure, massively scalable cloud storage for data, apps and workloads.

  - Networking: Connect cloud and on-premises infrastructure and services.

  - Security: Protect enterprise from advanced threats across workloads.

  - AI + Machine Learning: Create the next generation applications using artificial capabilities.

  - Integration: Seamlessly integrate on-premises and cloud-based applications, data and processes across the enterprise.

  - Internet Of Things: Bring IoT to any device and any platform, without changing the infrastructure.

  - Web: Build, deploy and scale powerful web applications quickly and efficiently.

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Thank you

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