

Cloud Computing for Beginners

Infrastructure as a Service (IaaS)

By Idan Gabrieli



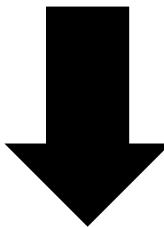
Infrastructure as a Service (IaaS)



A group of construction workers in safety vests and hard hats are standing on a large, flat concrete surface. They are positioned along a line of small, green artificial trees that are planted in the ground. The workers are looking towards the right side of the frame, where more trees and a building are visible.

Why IaaS?

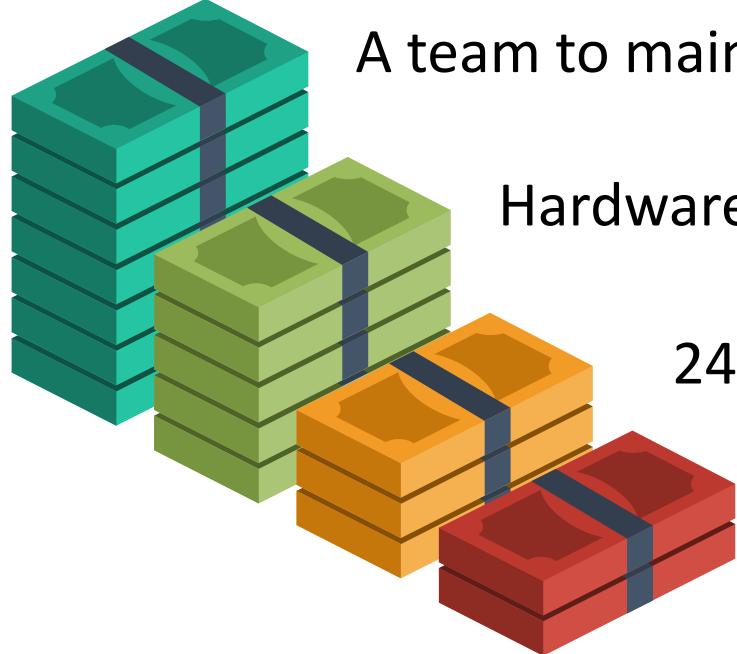
What's the **business case** of using the IaaS
in a public cloud?



The **challenges** of operating private data centers

CHALLENGE #1 - COST

Building and Running Private Data Centers



A team to maintain that complex infrastructure

Hardware and software technologies

24/7 electricity

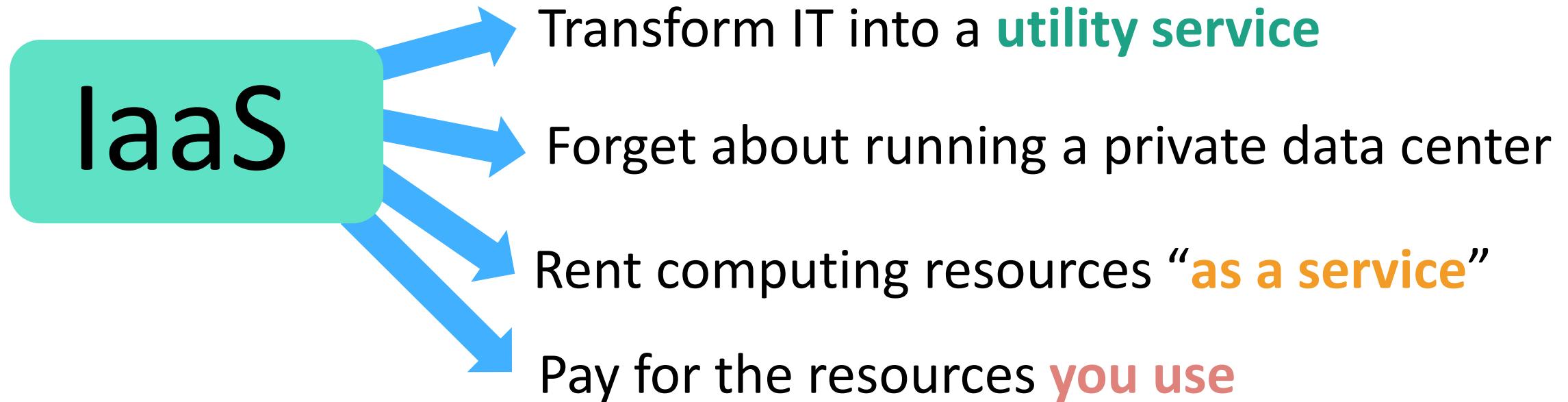
Real-estate occupied by the servers

CHALLENGE #2 - FLEXIBILITY

Building and Running Private Data Centers

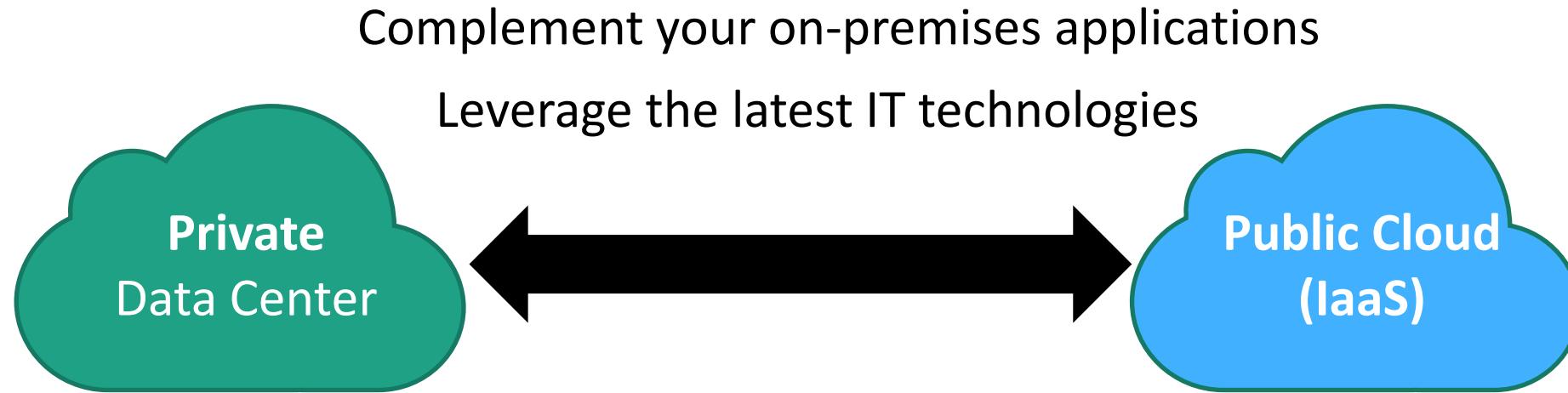


IAAS - THE BUSINESS CASE



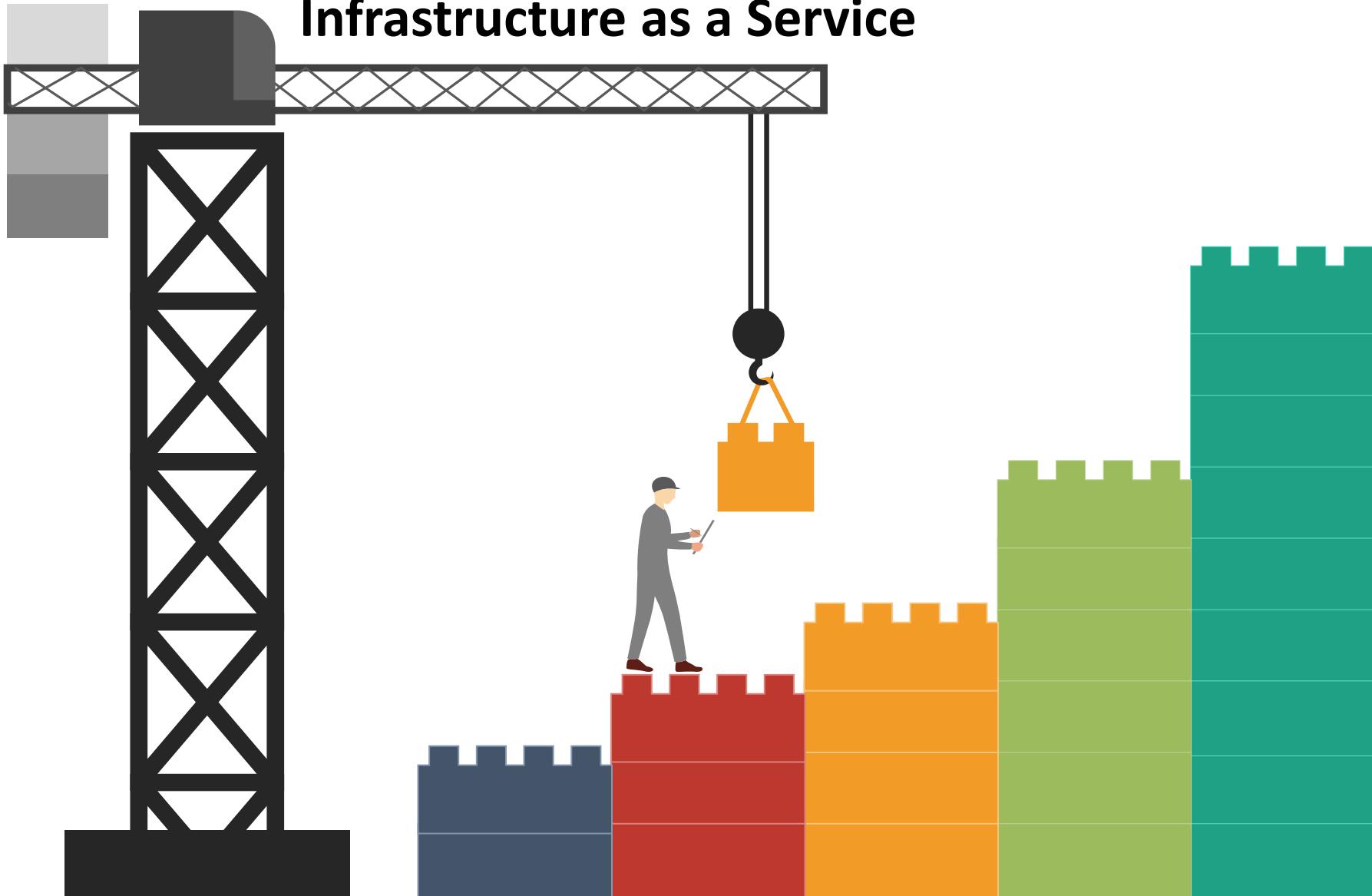
IAAS - THE BUSINESS CASE

Extend the Private Cloud



COMPUTE, STORAGE AND NETWORKING

Infrastructure as a Service



COMPUTE, STORAGE AND NETWORKING

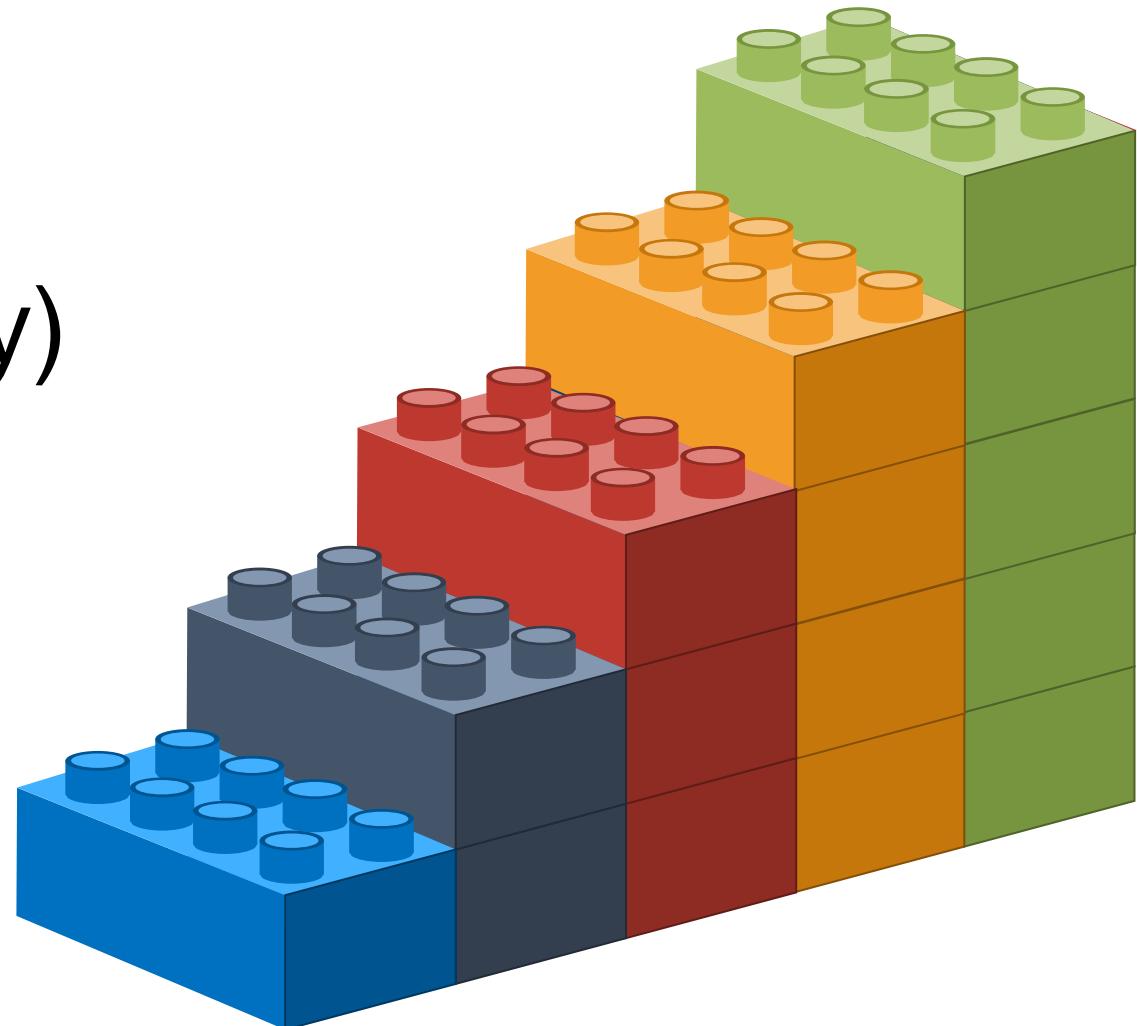
IaaS Building Blocks

 Compute

 Storage

 Networking (and Security)

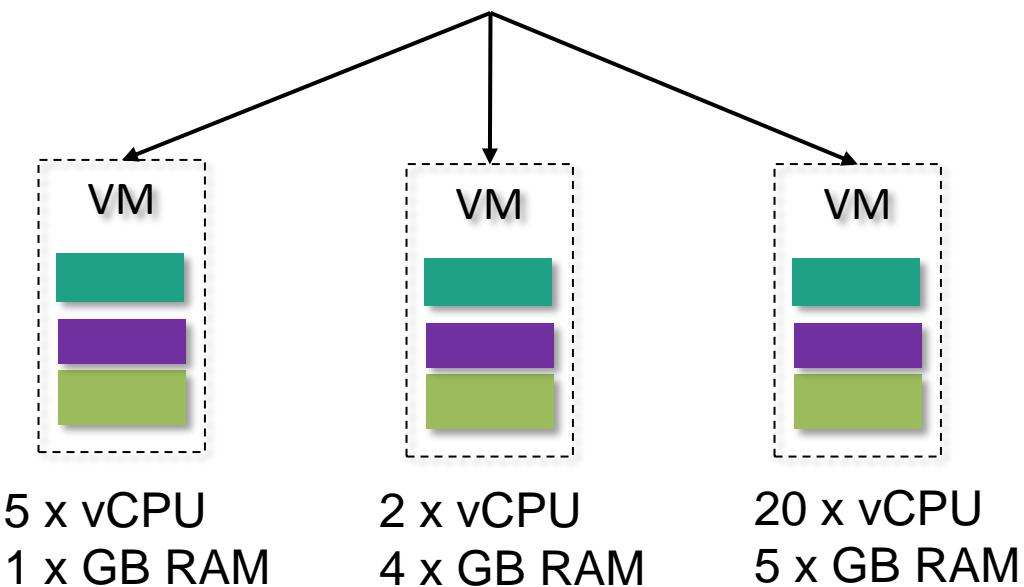
 Management



COMPUTE, STORAGE AND NETWORKING

Compute

Server-side Application

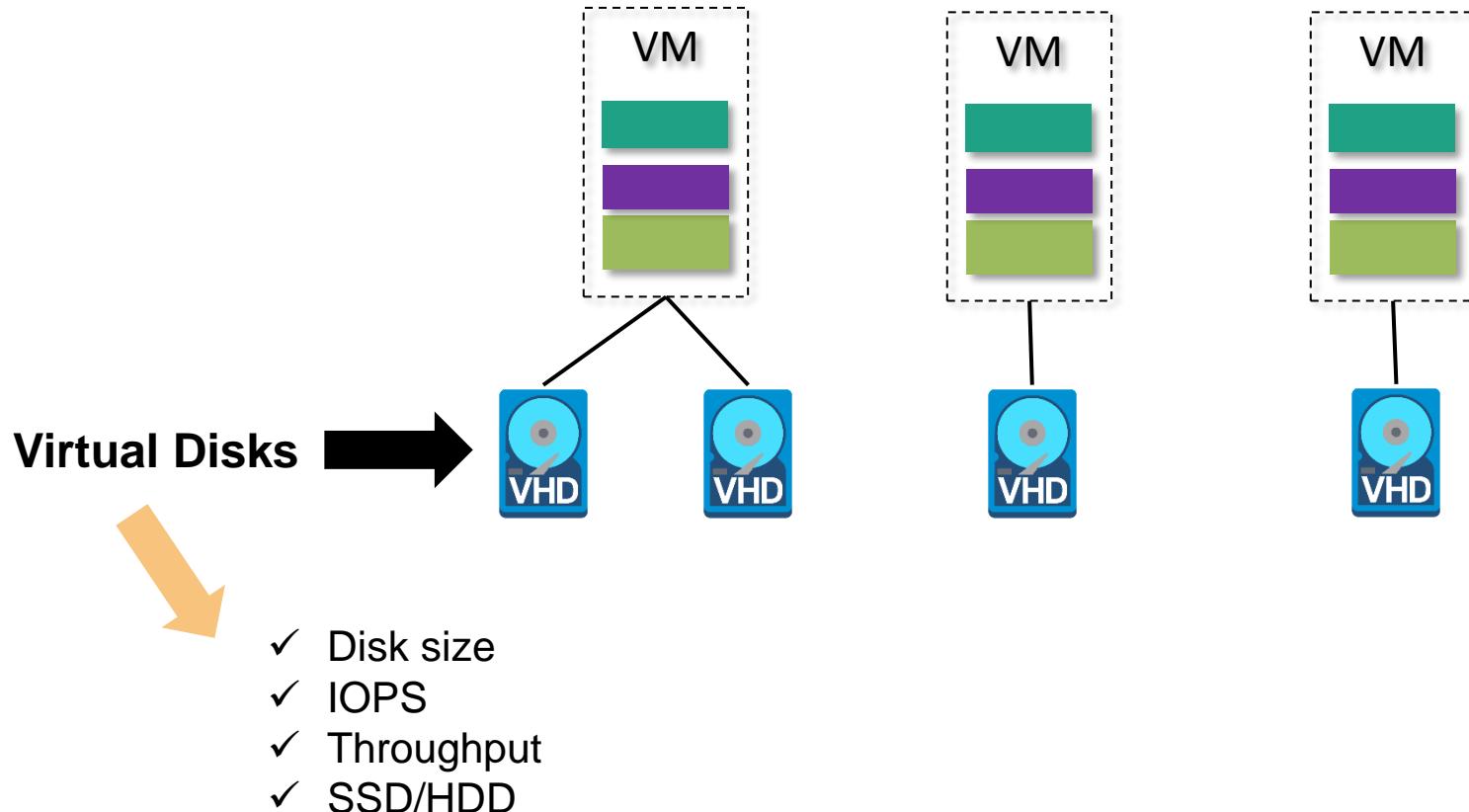


Memory-optimized VM

Compute-optimized VM

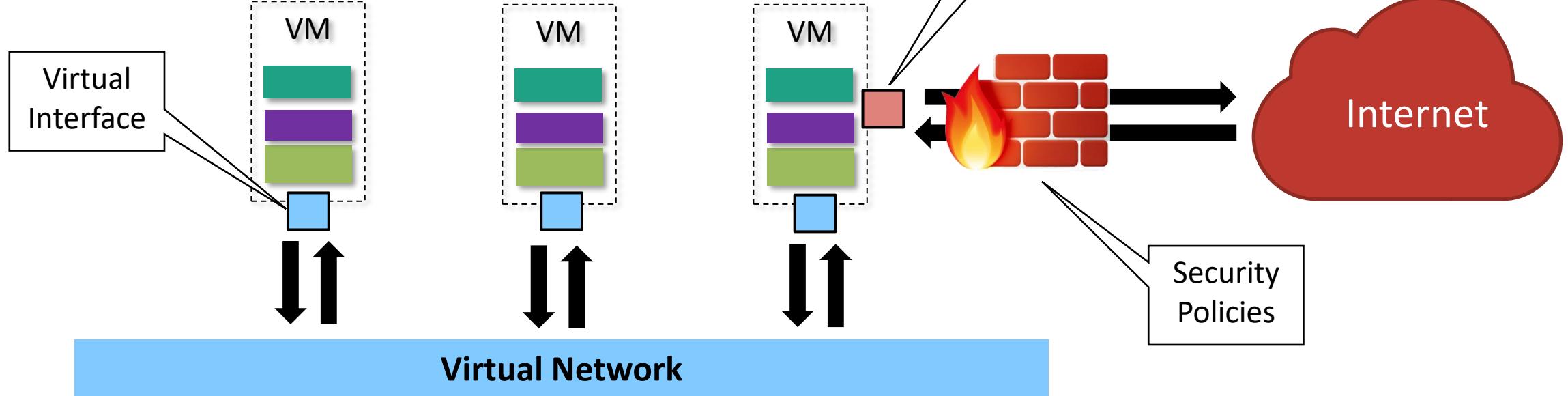
COMPUTE, STORAGE AND NETWORKING

Storage



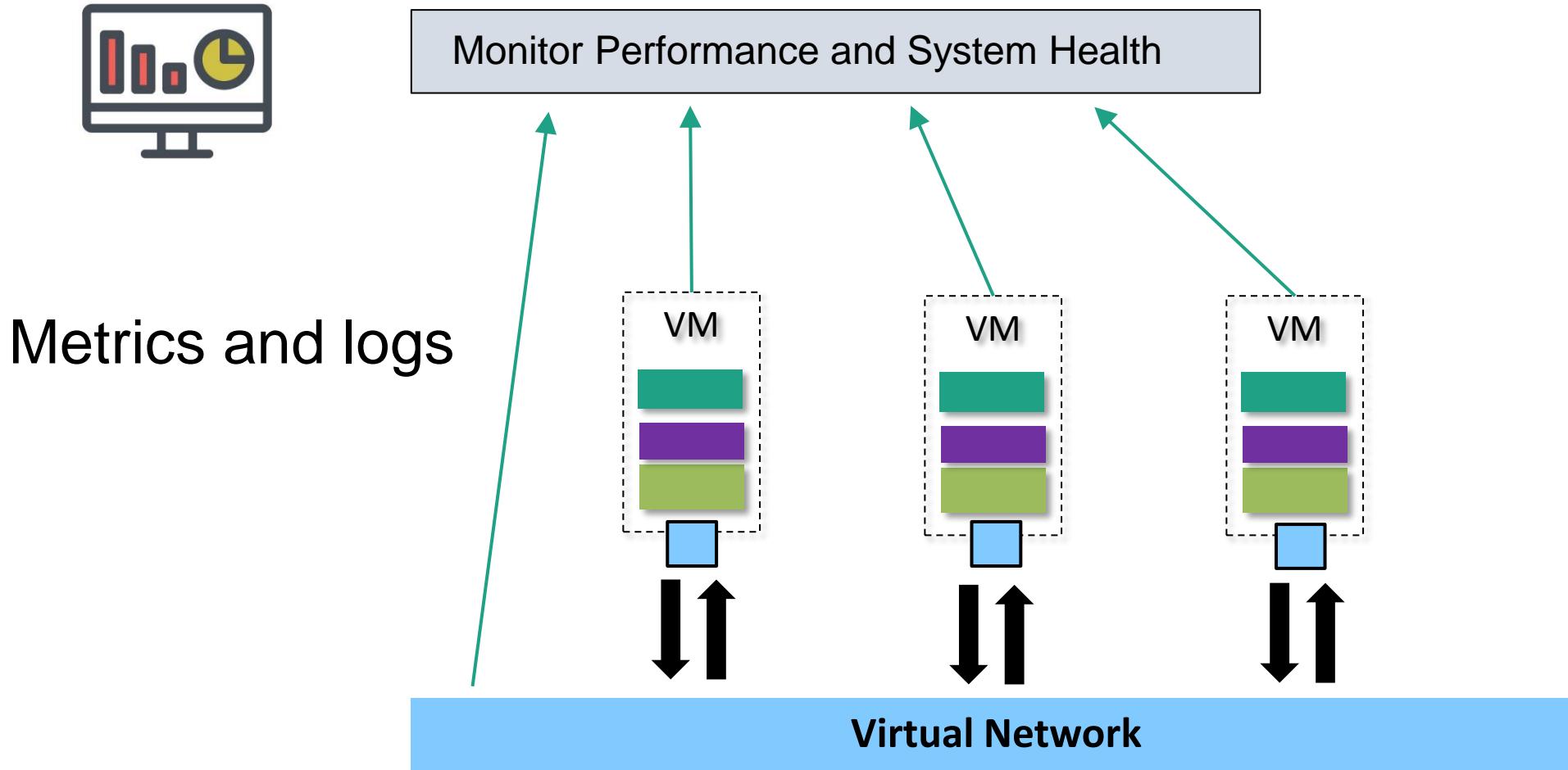
COMPUTE, STORAGE AND NETWORKING

Networking



COMPUTE, STORAGE AND NETWORKING

Management



PRICING MODELS

Charging IaaS Cloud Resources

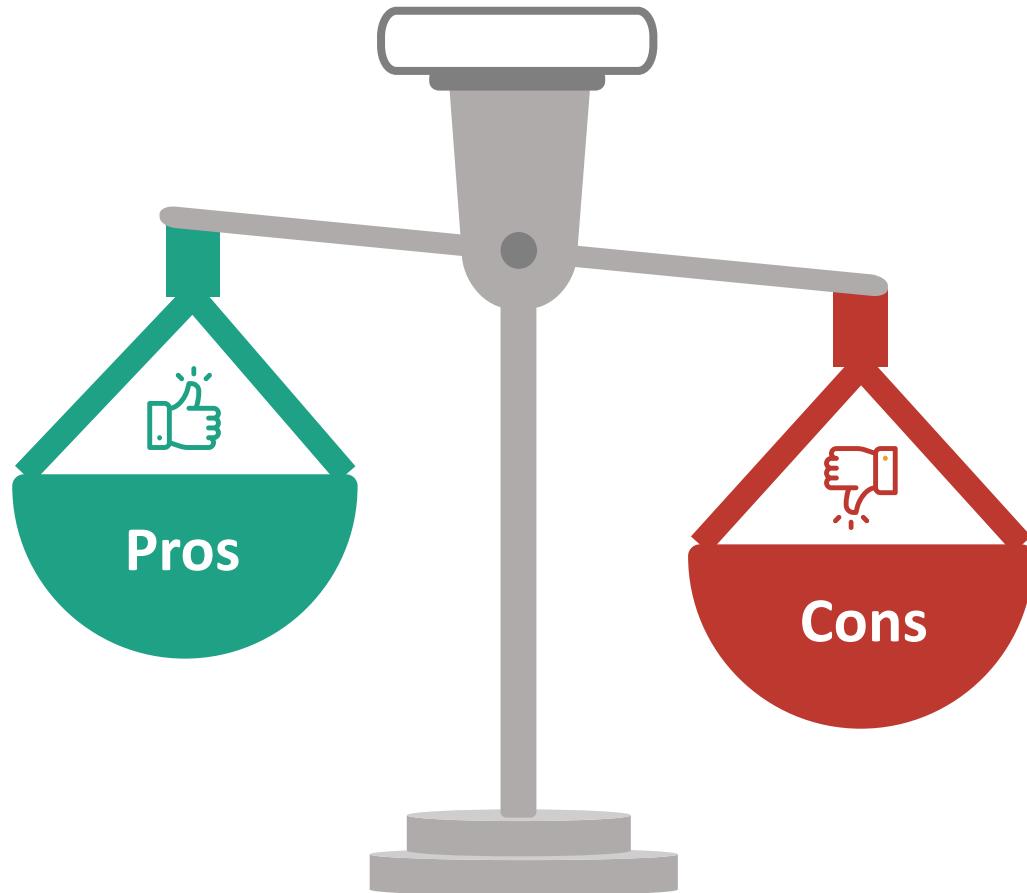
Pay-as-you-go

Prepaid reservation package

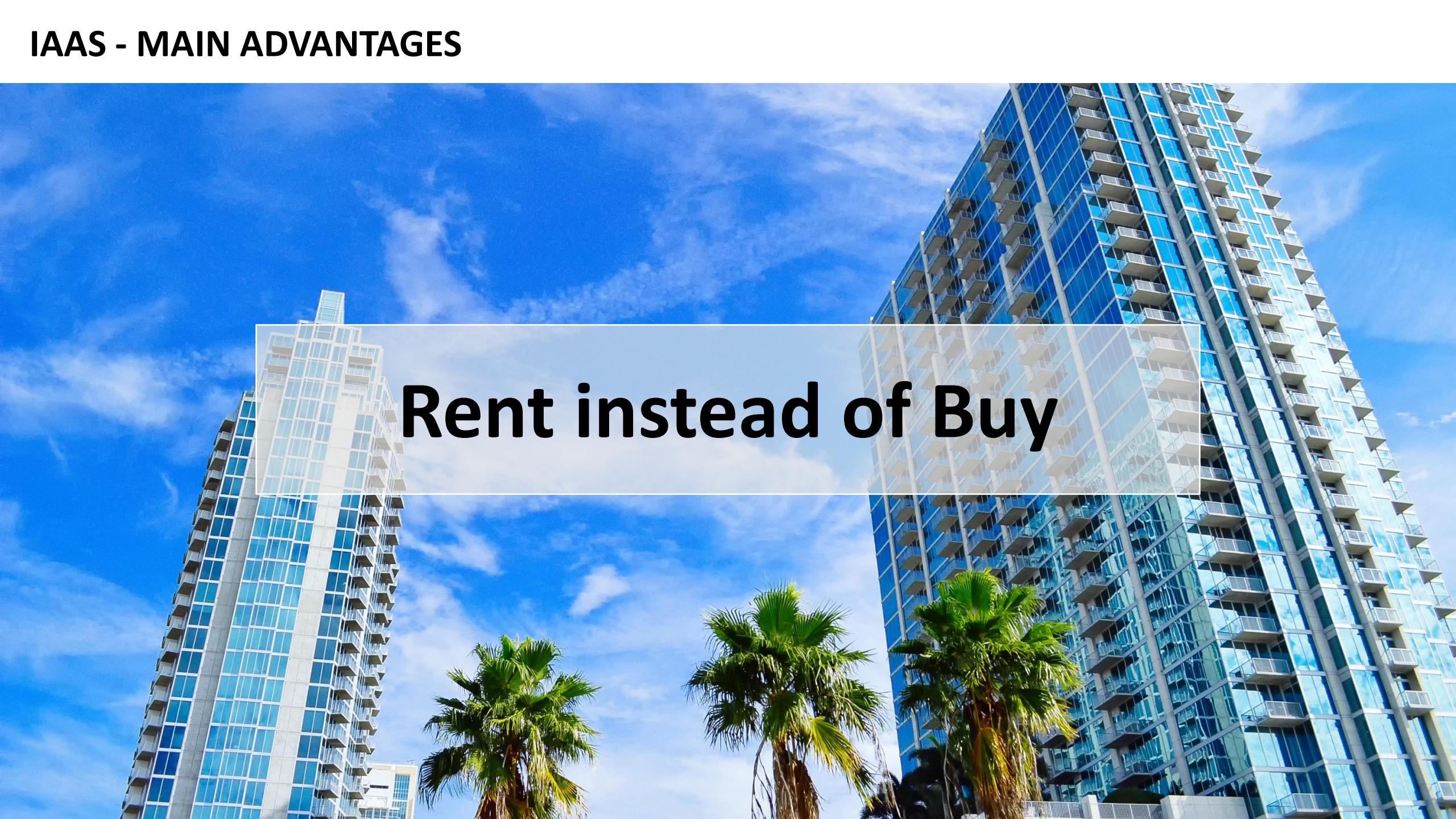
Spare capacity



IAAS - ADVANTAGES AND DISADVANTAGES



IAAS - MAIN ADVANTAGES

A photograph of two modern skyscrapers with glass facades and balconies, set against a bright blue sky with scattered white clouds. In the foreground, several green palm trees are visible.

Rent instead of Buy

IAAS - MAIN ADVANTAGES



Easy Migration

IAAS - MAIN ADVANTAGES



IAAS - MAIN ADVANTAGES



Global Scale

IAAS – AND ALSO DISADVANTAGES



Security Risks

IAAS – AND ALSO DISADVANTAGES



Full Responsibility

IAAS – AND ALSO DISADVANTAGES



Service Downtime

IAAS – AND ALSO DISADVANTAGES



Vendor Lock-in

IAAS – AND ALSO DISADVANTAGES



Unexpected Costs

IAAS – TYPICAL MARKET USE CASES



#1 – Lift and Shift Migration

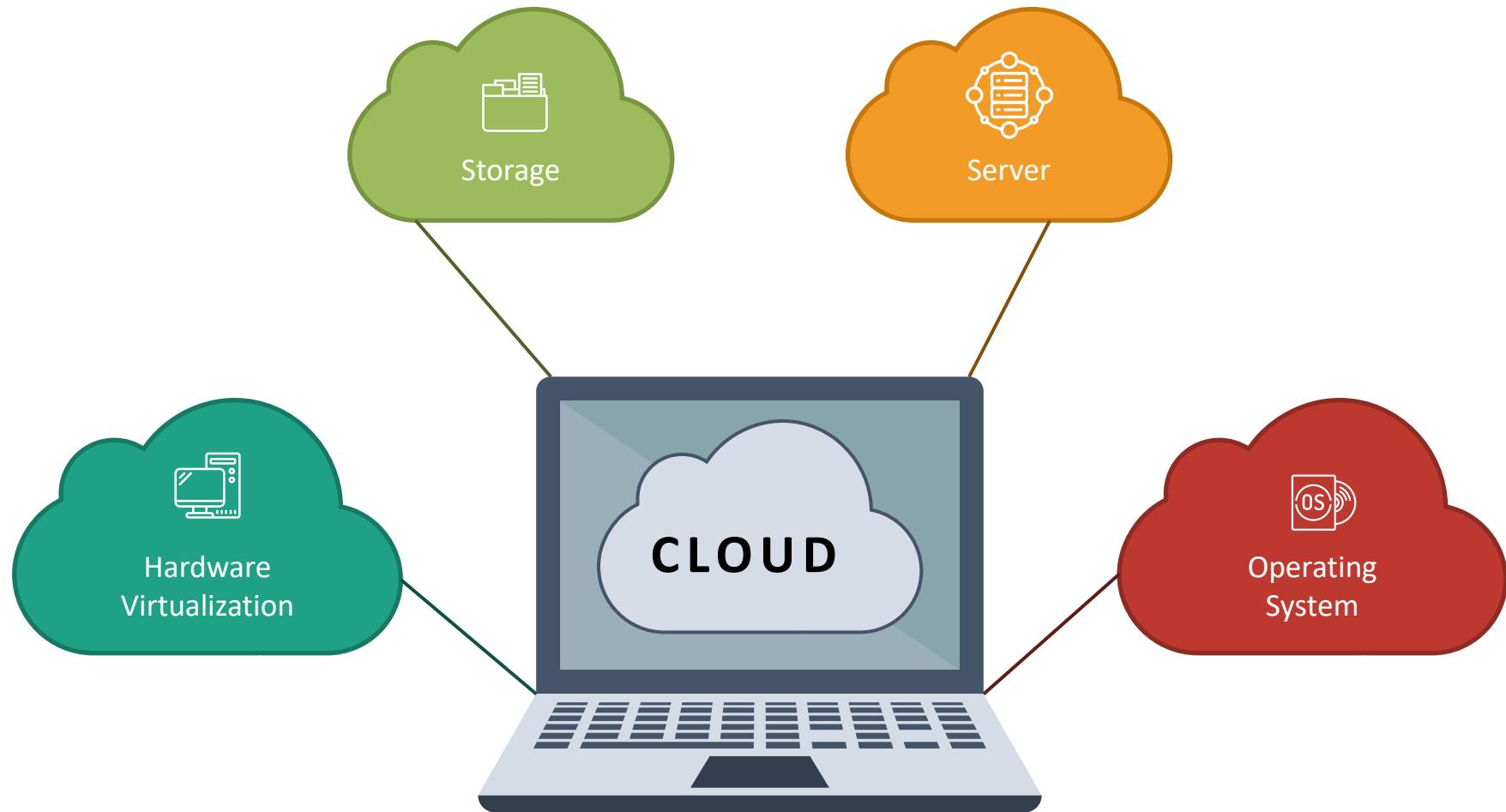
#2 – Dev/Test Environments

#3 – High-Performance Computing

#4 - Website Hosting

VIRTUALIZATION

Virtualization in Cloud Computing



VIRTUALIZATION

Types of Virtual Virtualization

Block Virtualization

Virtualizes LUNs presented to applications



Disk Virtualization

Abstracts disks into chunks in storage pools that are used to create LUNs



Tape Virtualization

Creates a virtual tape on a disk storage system

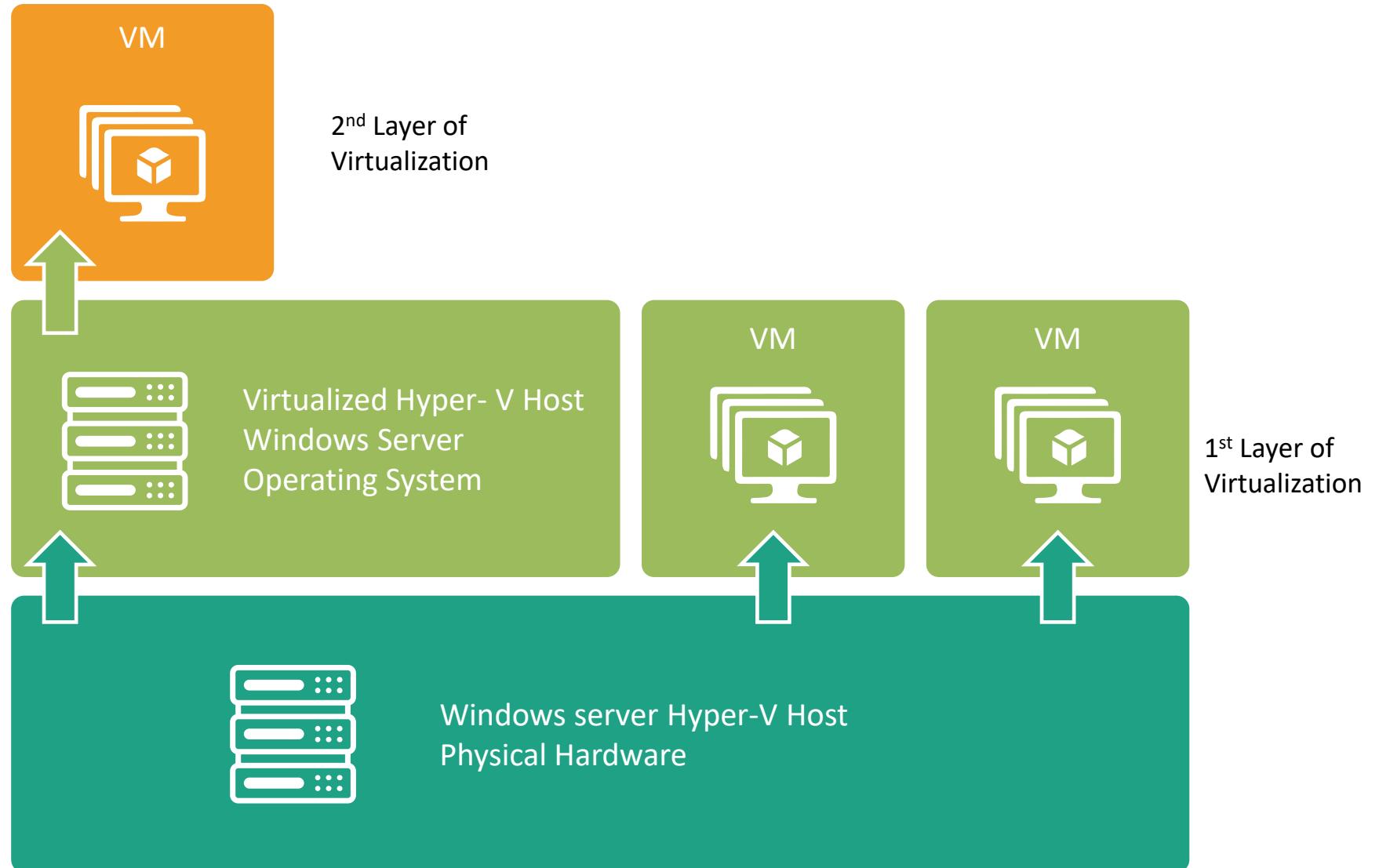


File Virtualization

Virtualizes NAS and file servers into a single namespace

VIRTUALIZATION

Nested Virtualization



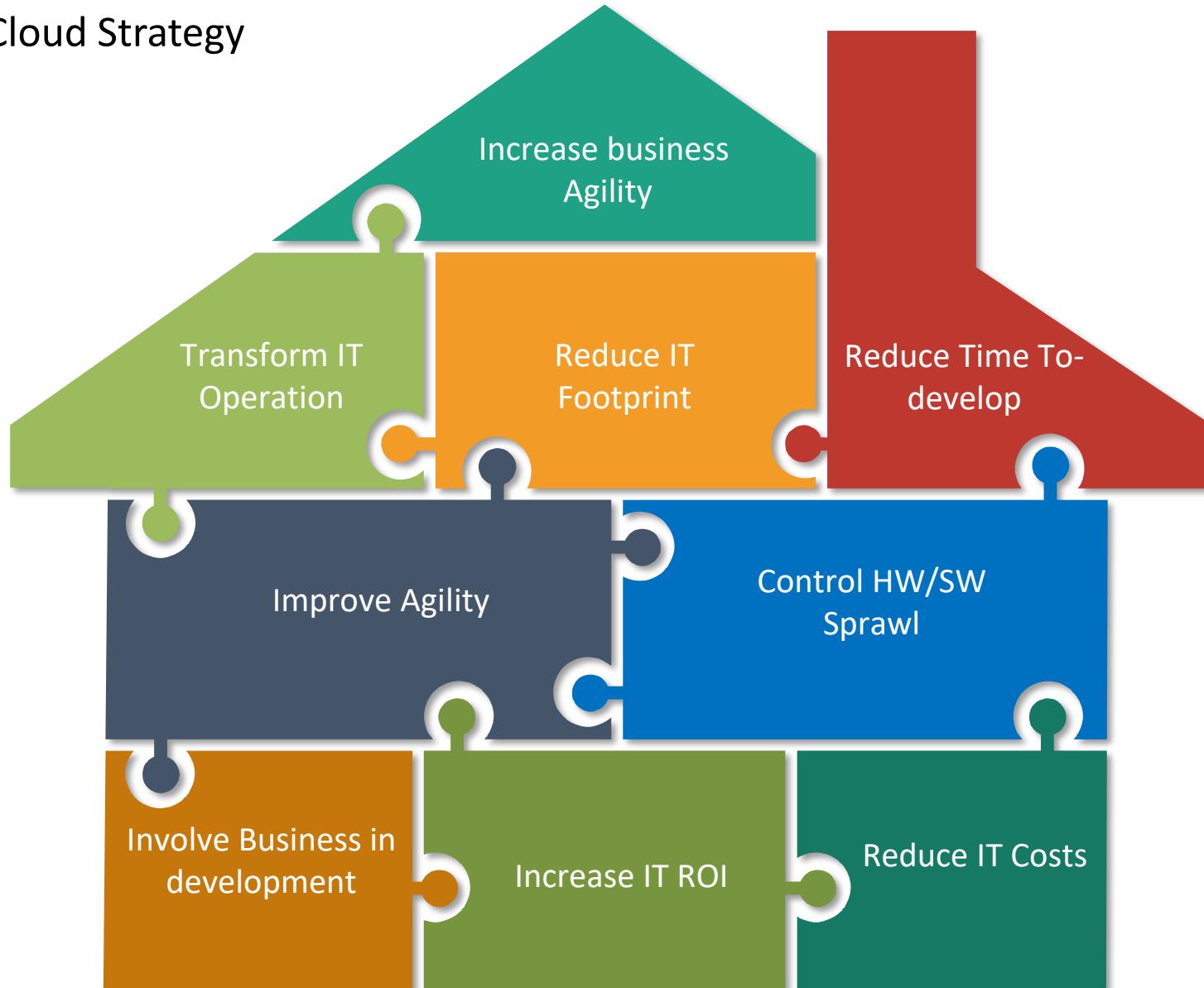
VIRTUALIZATION

Benefits of IT Virtualization



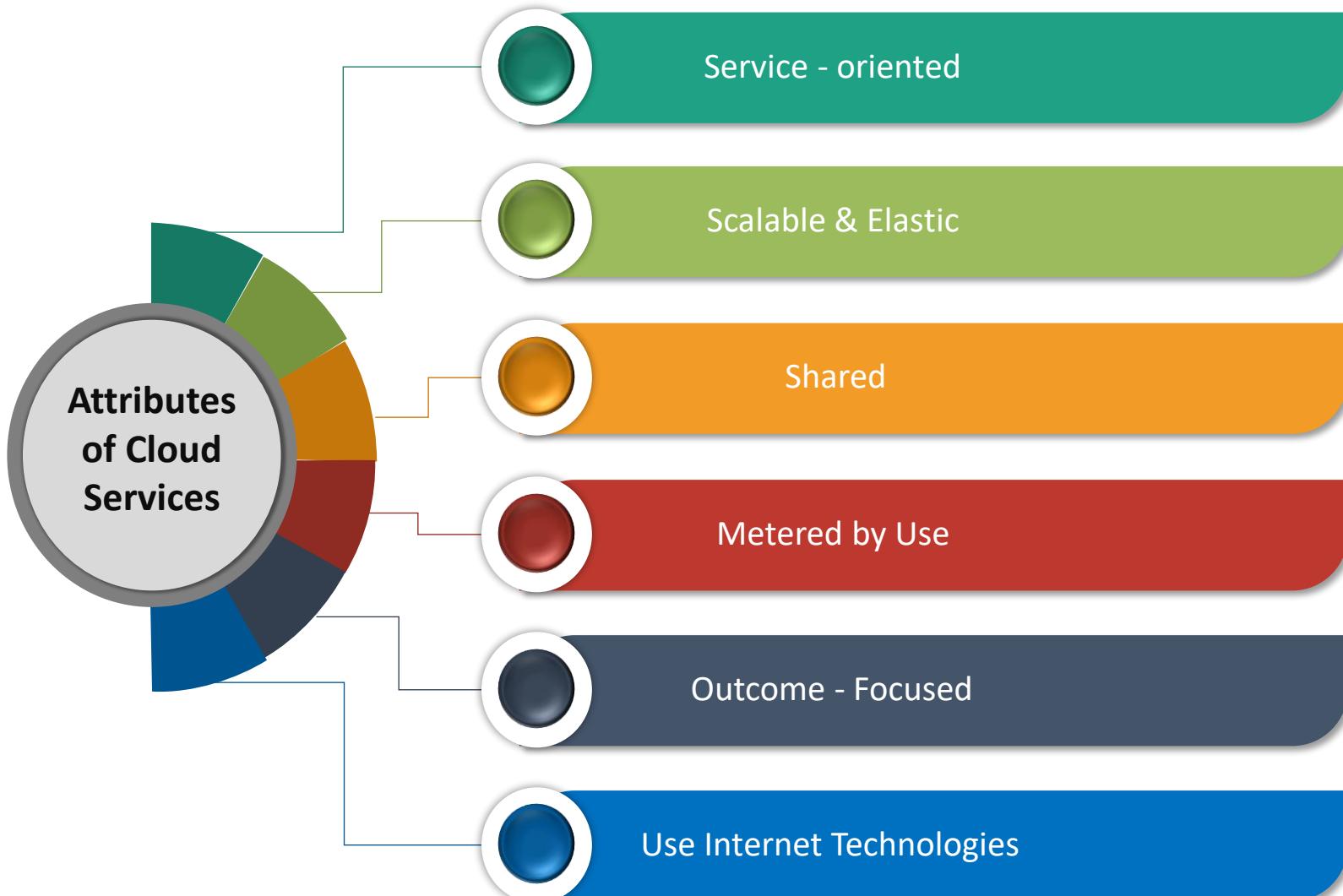
CLOUD STRATEGY

Create or Adjust Your Cloud Strategy



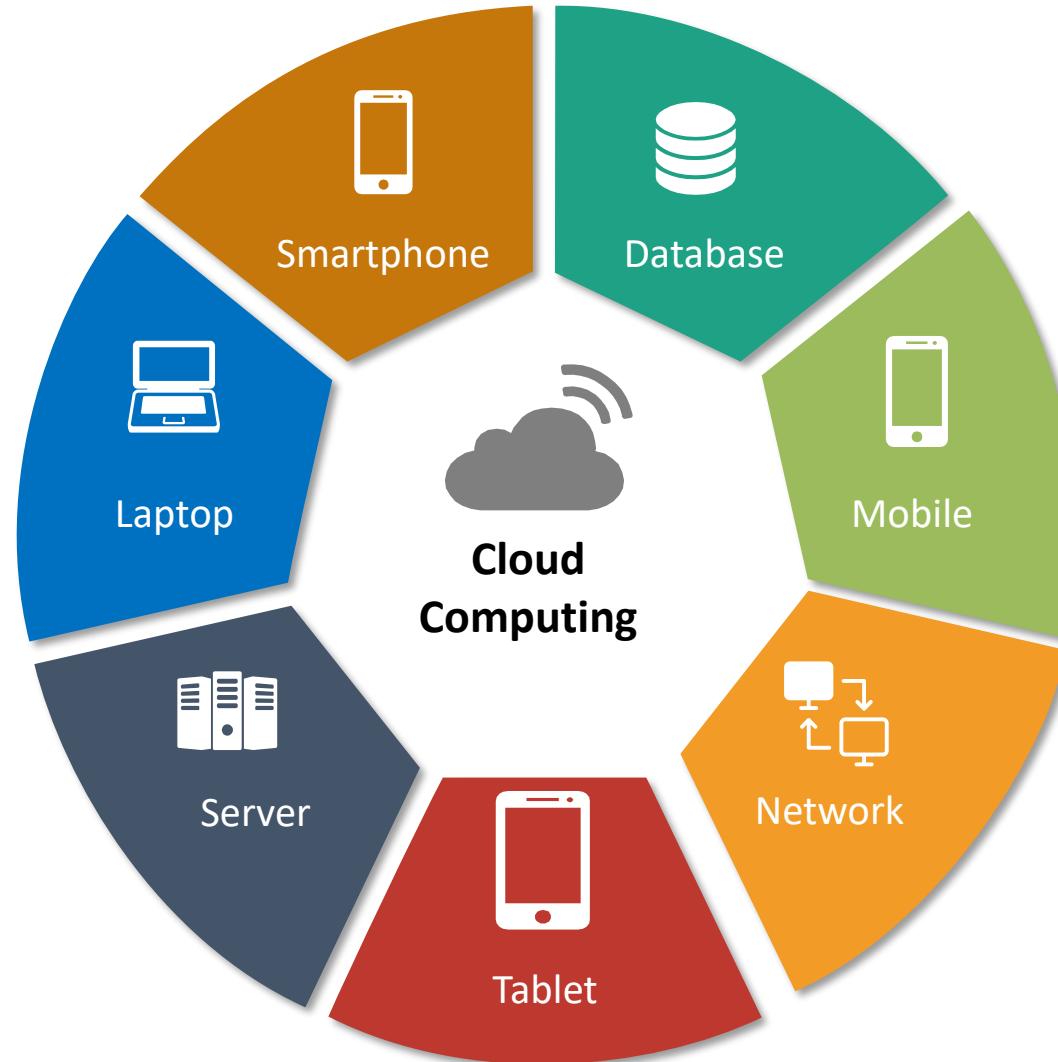
CLOUD SERVICES

Attributes of Cloud Services



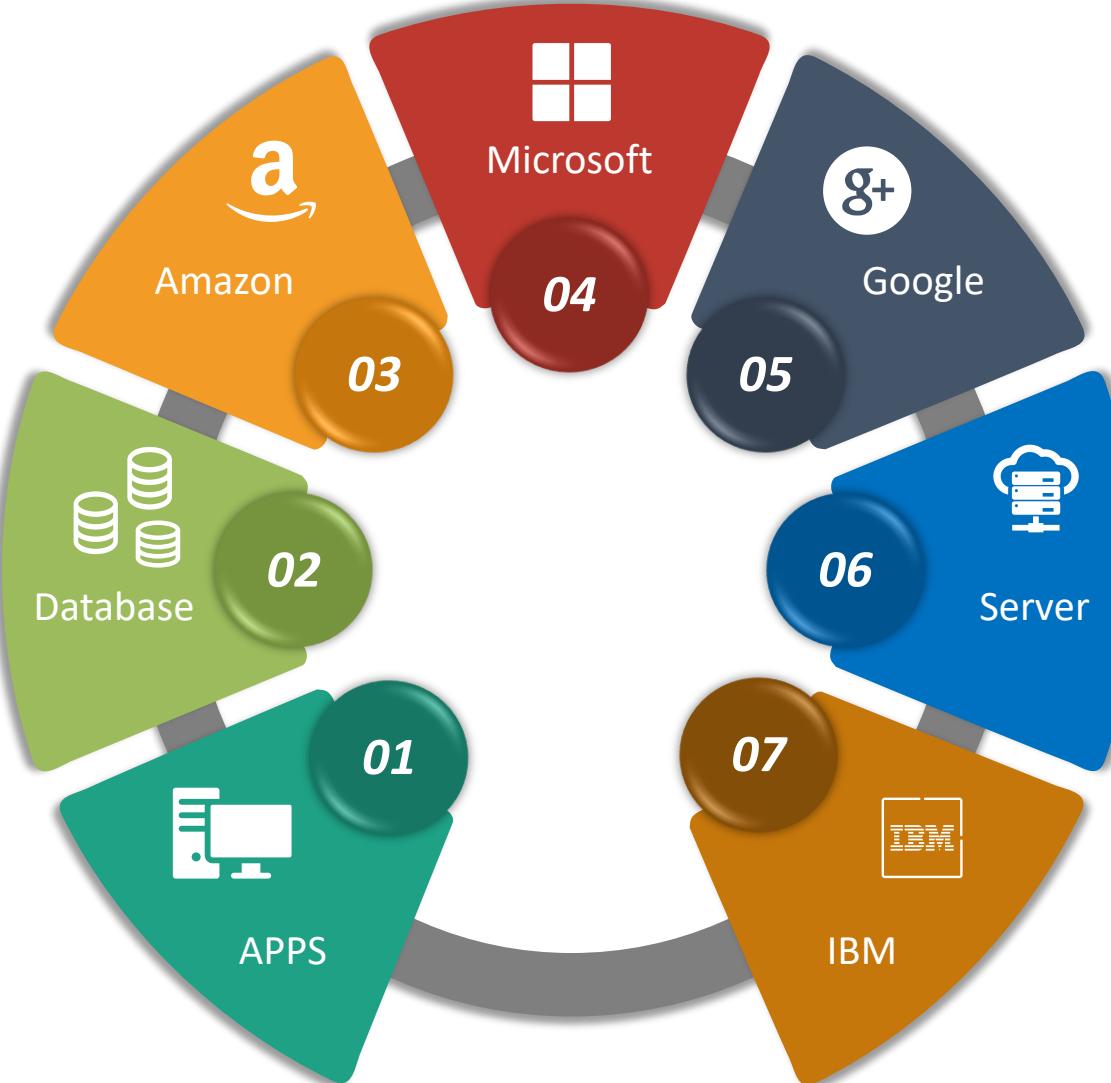
CLOUD SERVICES

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CLOUD SERVICES

Managed Cloud Services



CLOUD SERVICES

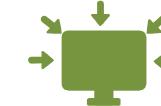
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SaaS (Software as a Service)

- ✓ Email
- ✓ CRM
- ✓ Collaborative
- ✓ ERP

Consume



PaaS (Platform as a Service)

- ✓ Application Development
- ✓ Decision Support
- ✓ Web Streaming

Build On It



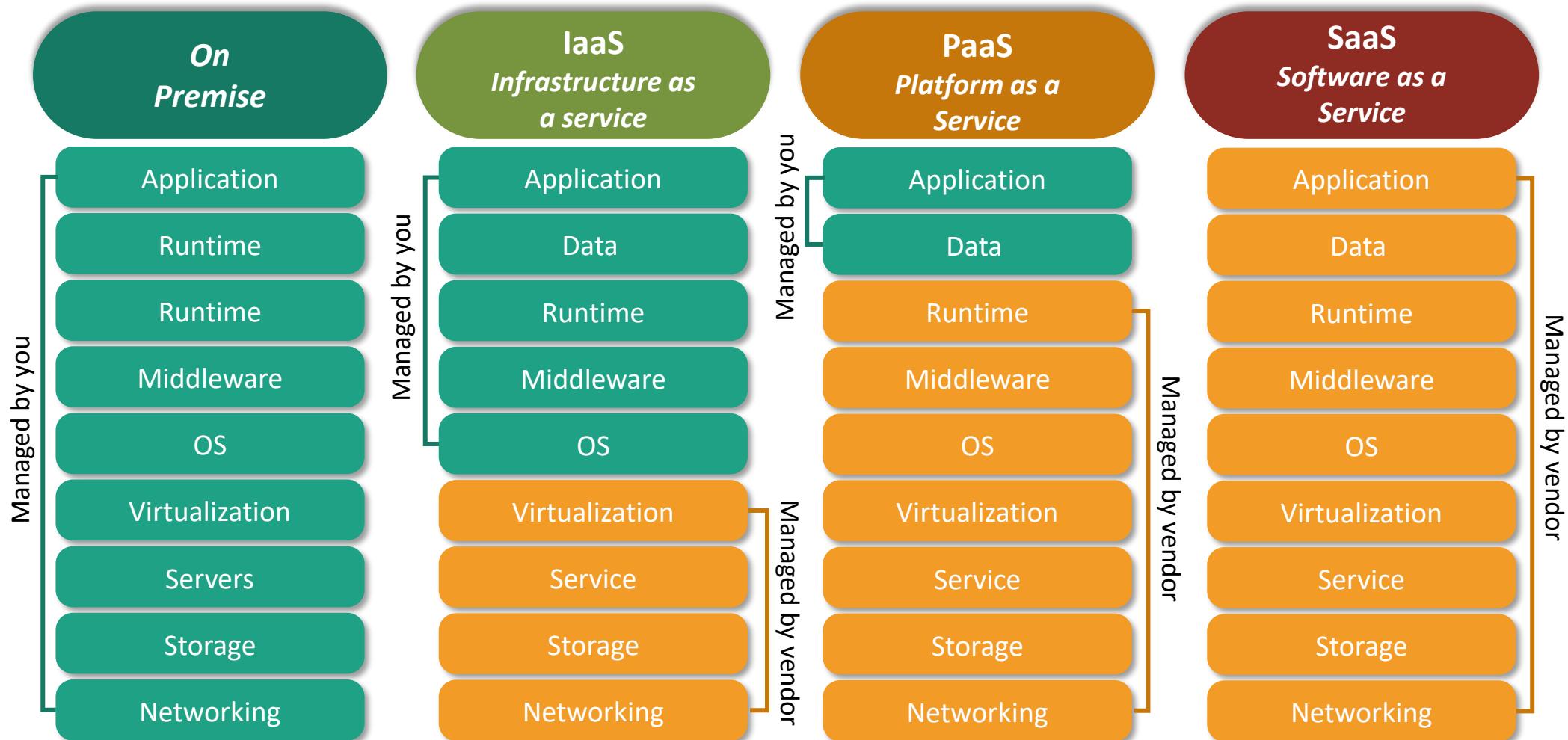
IaaS (Infrastructure as a Service)

- ✓ Caching
- ✓ Legacy (File)
- ✓ Networking (Technical)
- ✓ Security (System Management)

Migrate To It

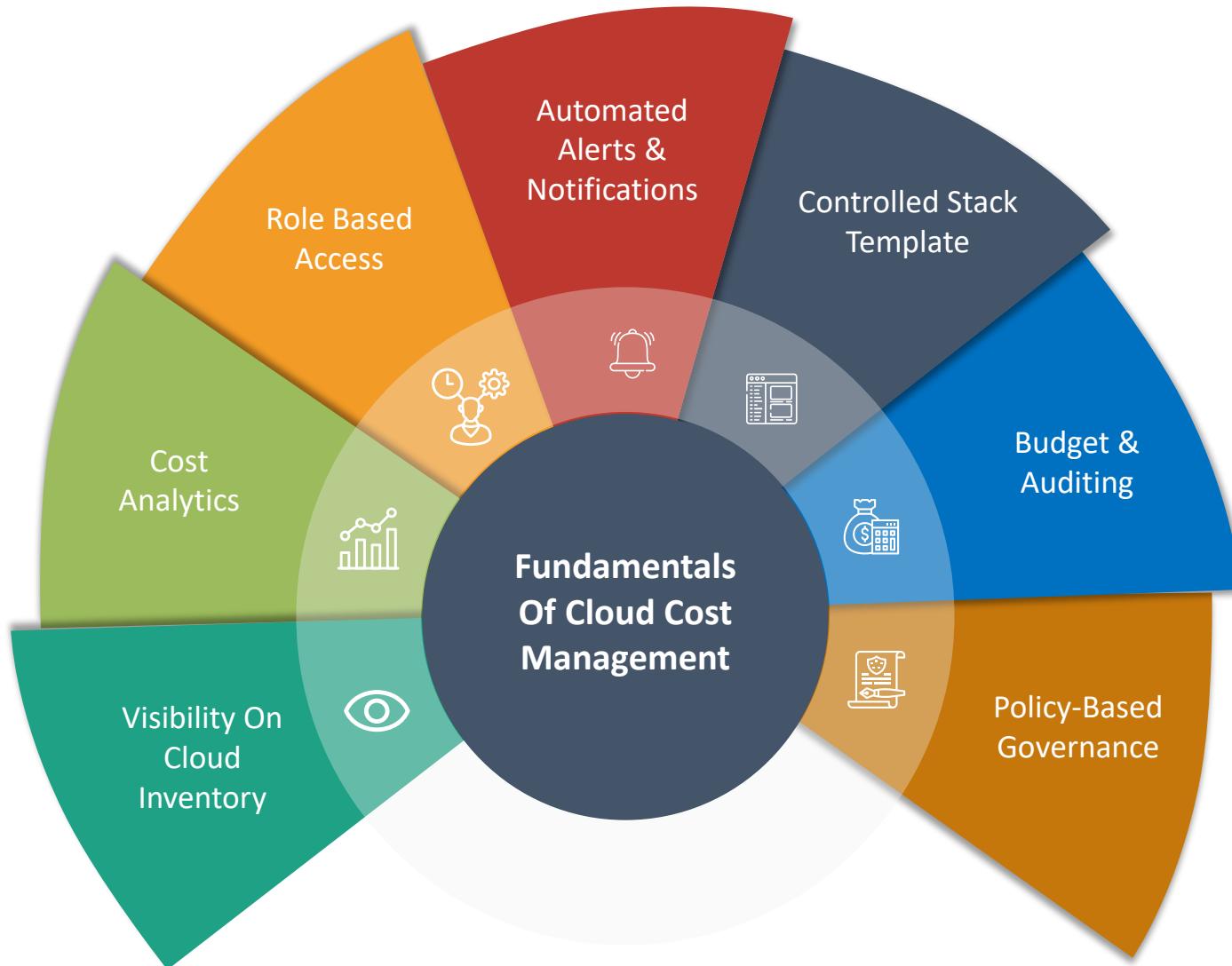
CLOUD SERVICES

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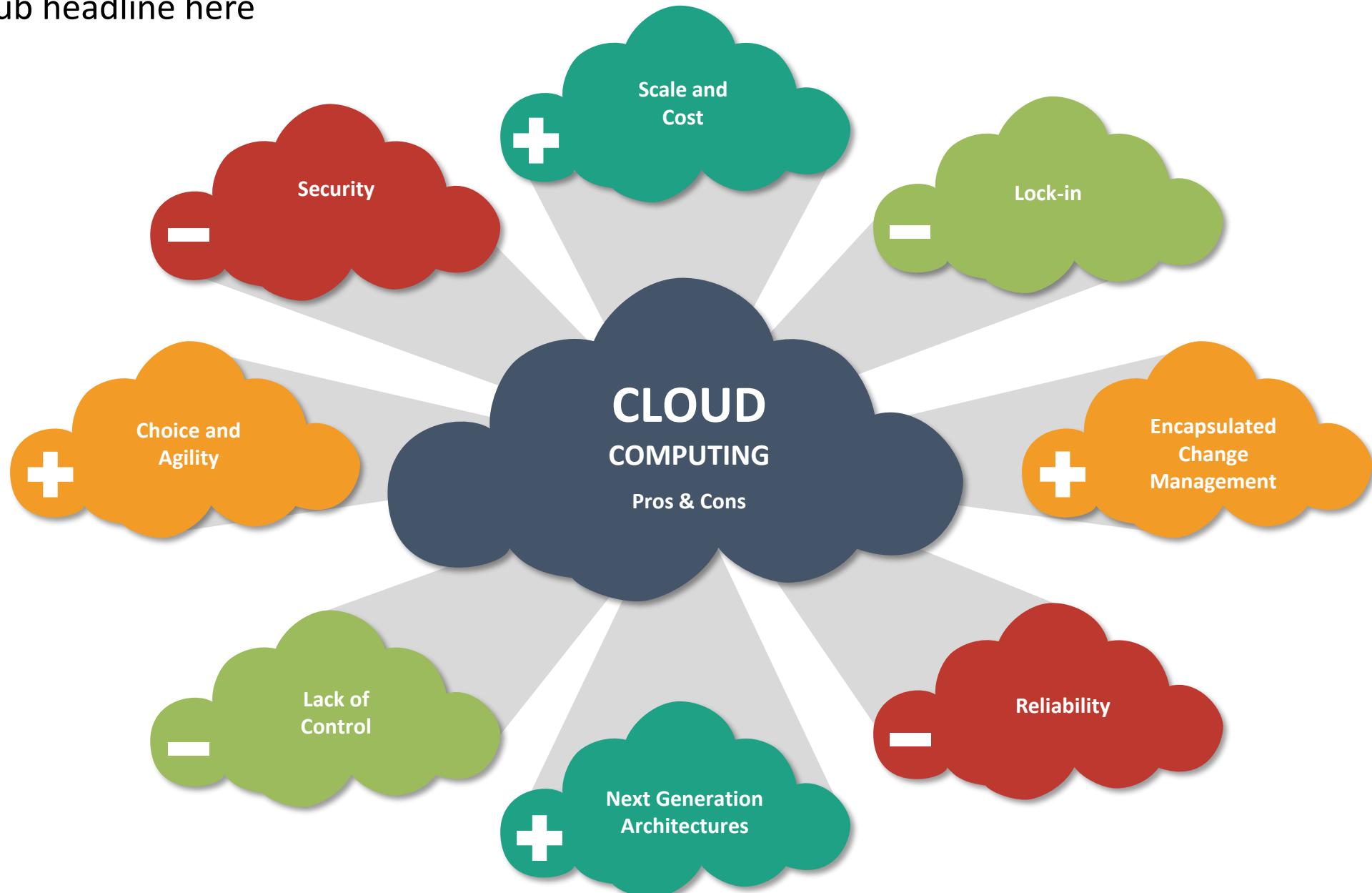
CLOUD MANAGEMENT

Fundamentals Of Cloud Cost Management



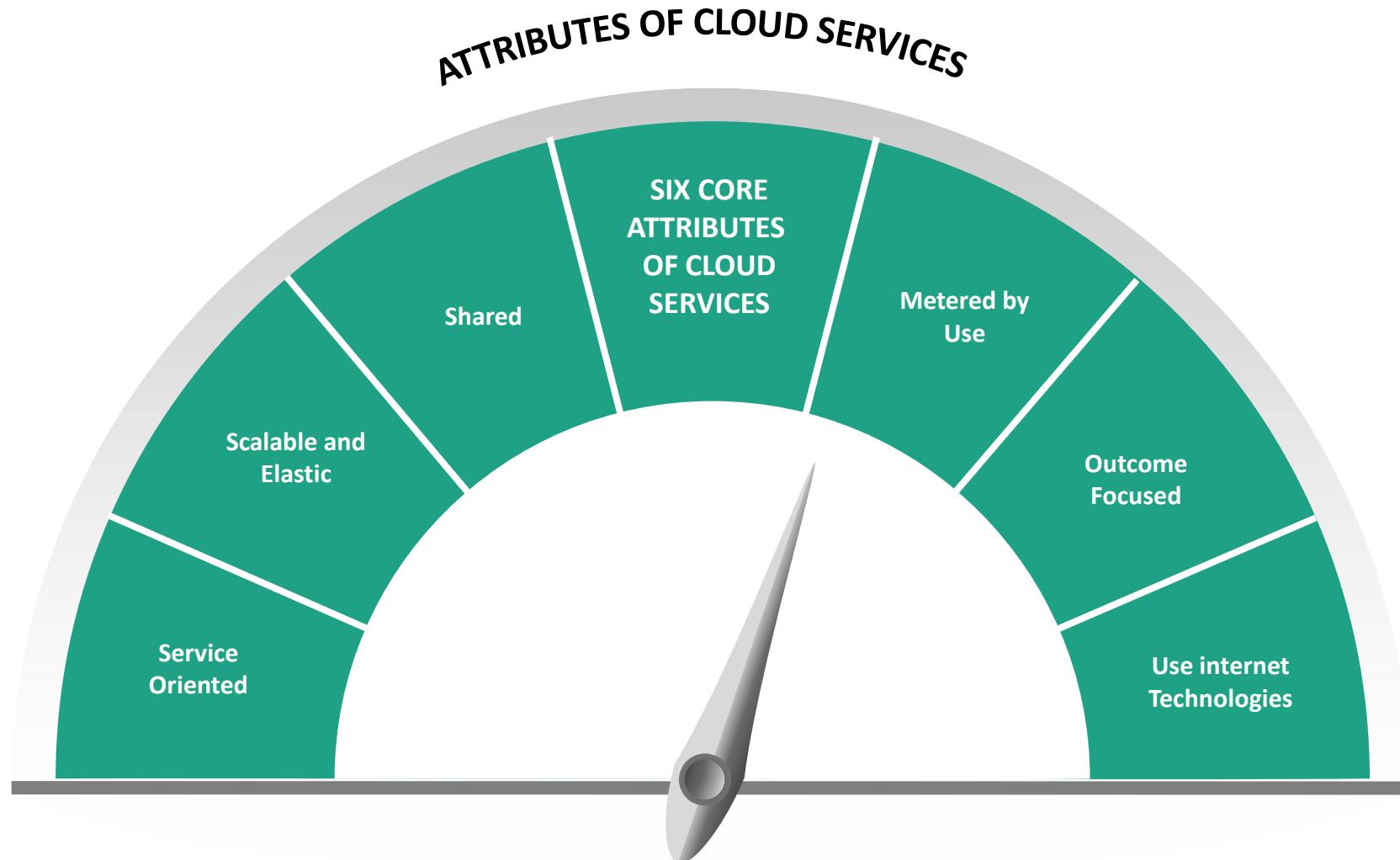
CLOUD COMPUTING

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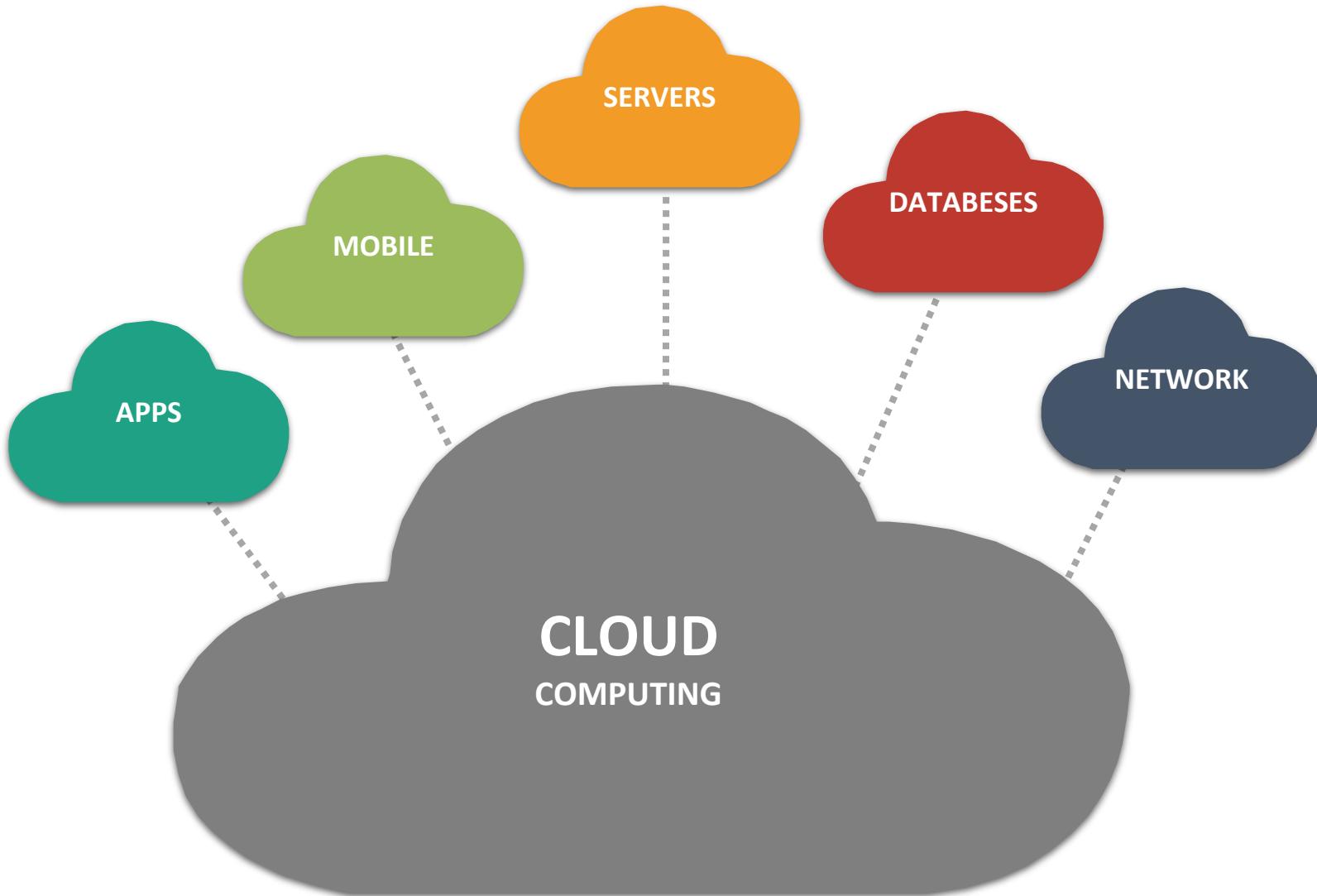
CLOUD COMPUTING

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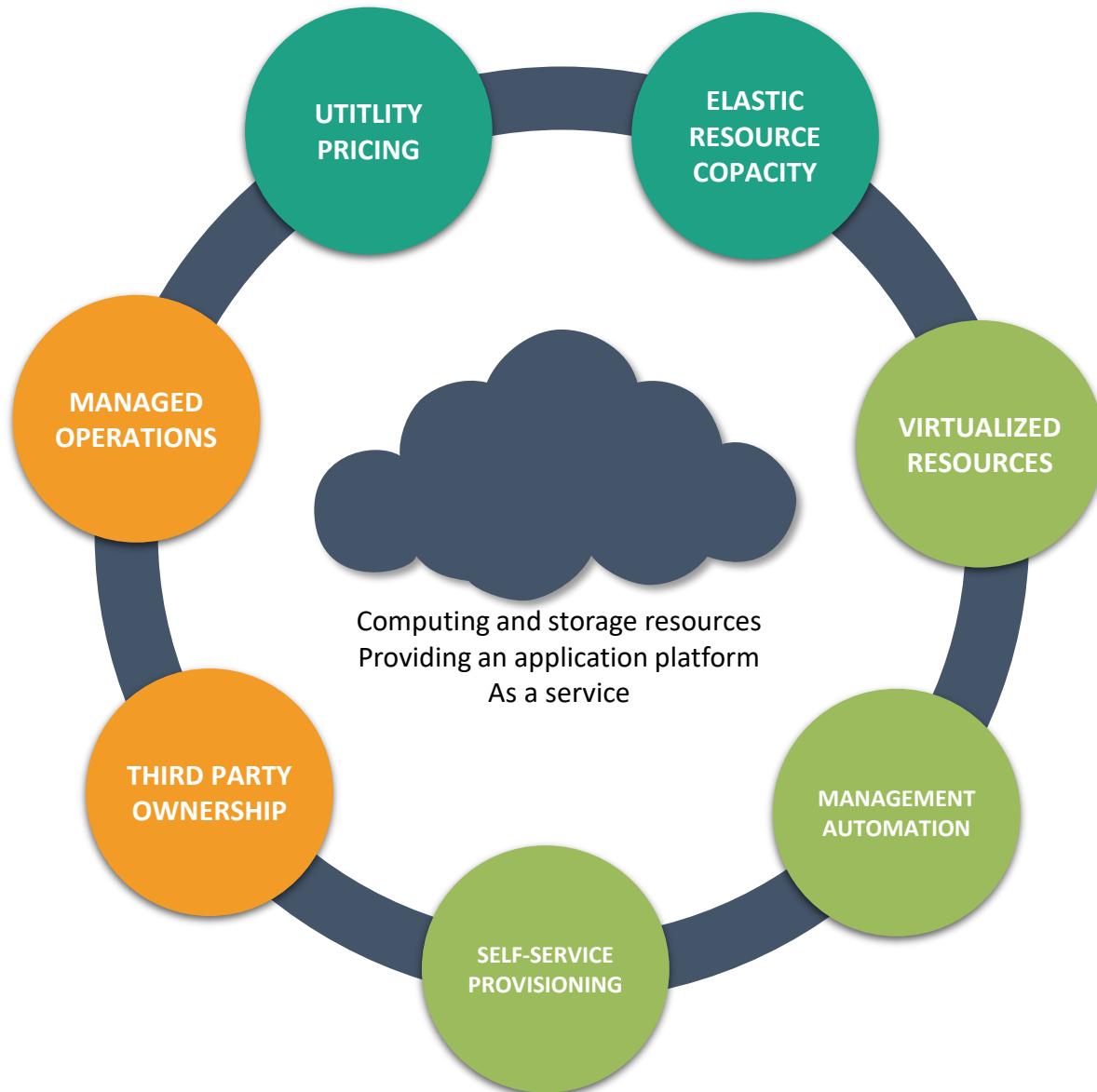
CLOUD COMPUTING

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CLOUD COMPUTING

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ECONOMIC ELEMENTS:

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You can change it.

ARCHITECTURAL ELEMENTS:

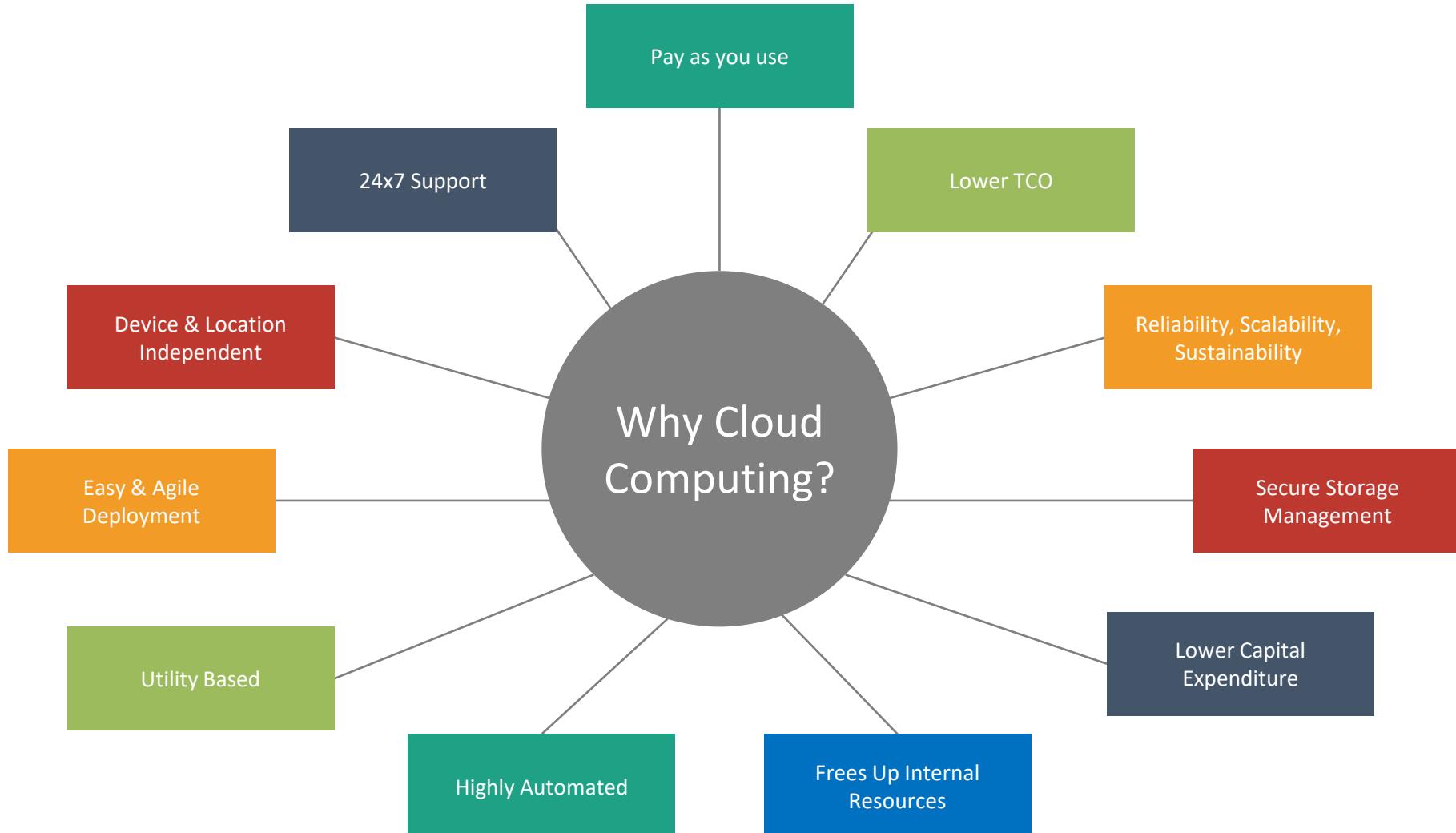
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STRATEGIC ELEMENTS:

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You can change it.

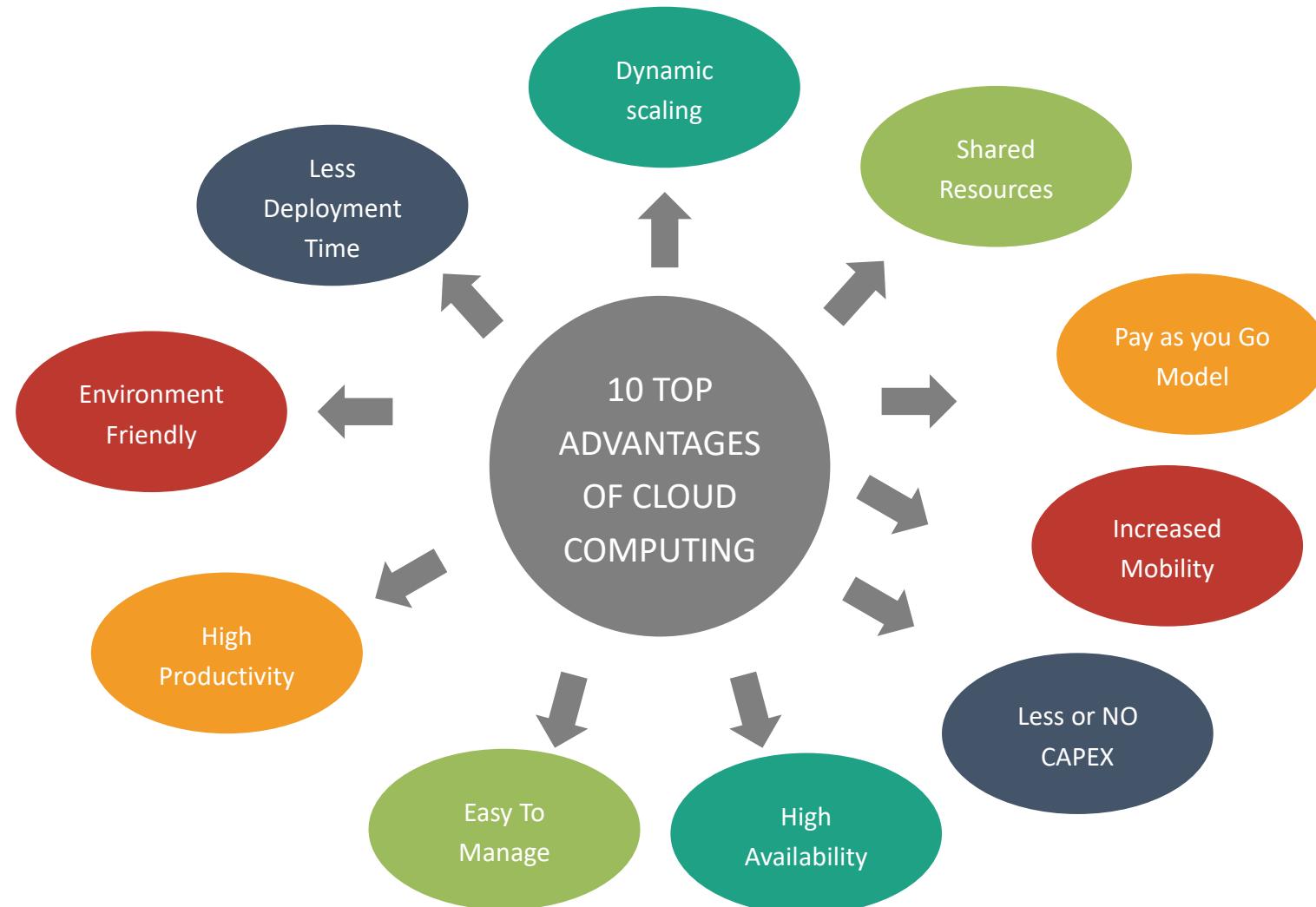
CLOUD COMPUTING

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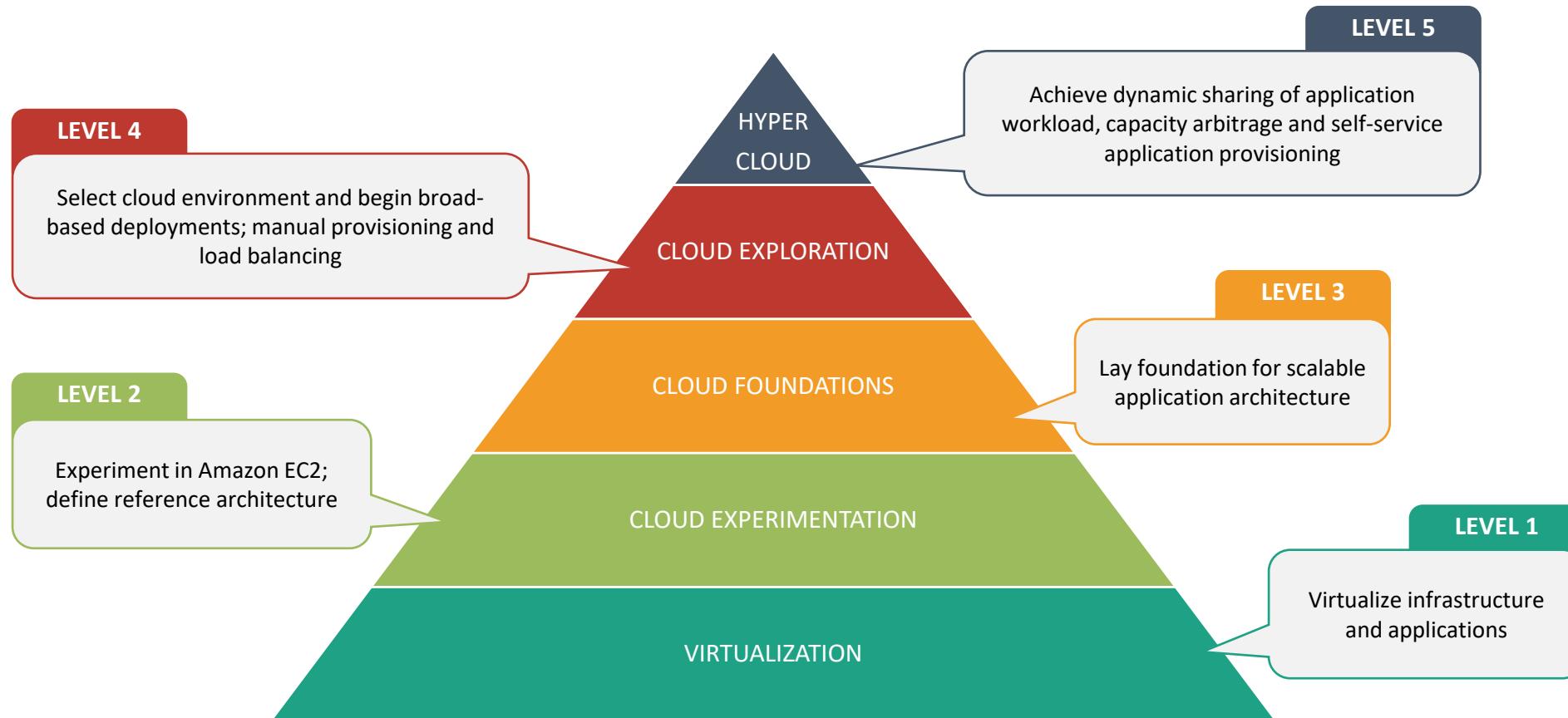
CLOUD COMPUTING

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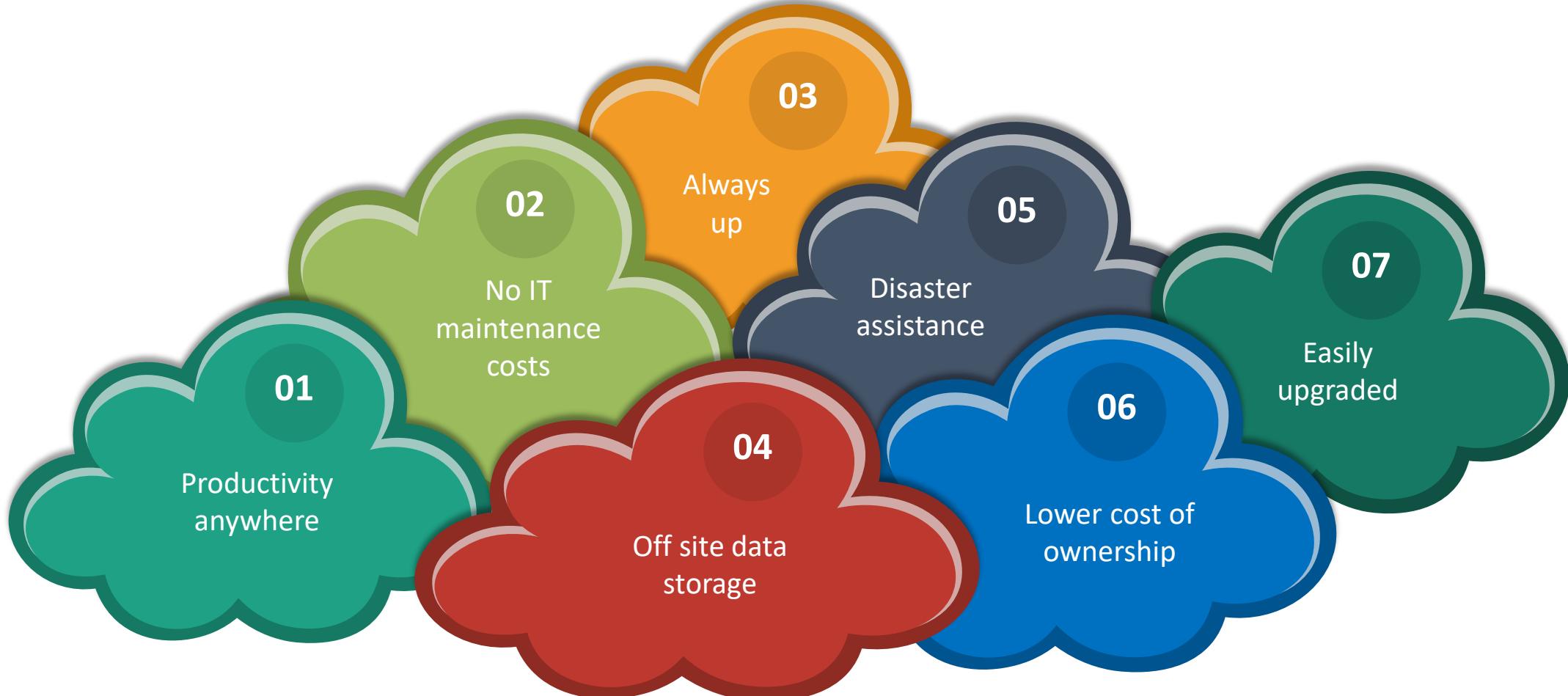
CLOUD COMPUTING

The Cloud Computing Adoption Model



CLOUD BENEFITS

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CLOUD ADOPTION

Barriers to Cloud Adoption

Security

The key concern is data privacy: organizations do not have control of or know where their data is being stored

Interoperability

A universal set of standards and/or interfaces has not yet been defined, resulting in a significant risk of vendor lock-in

Latency

All access to the cloud is done via the internet, introducing latency into every communication between the user and the environment Platform or Language

Resource Control

The amount of control that the organization has over the cloud environment varies greatly

Constraints

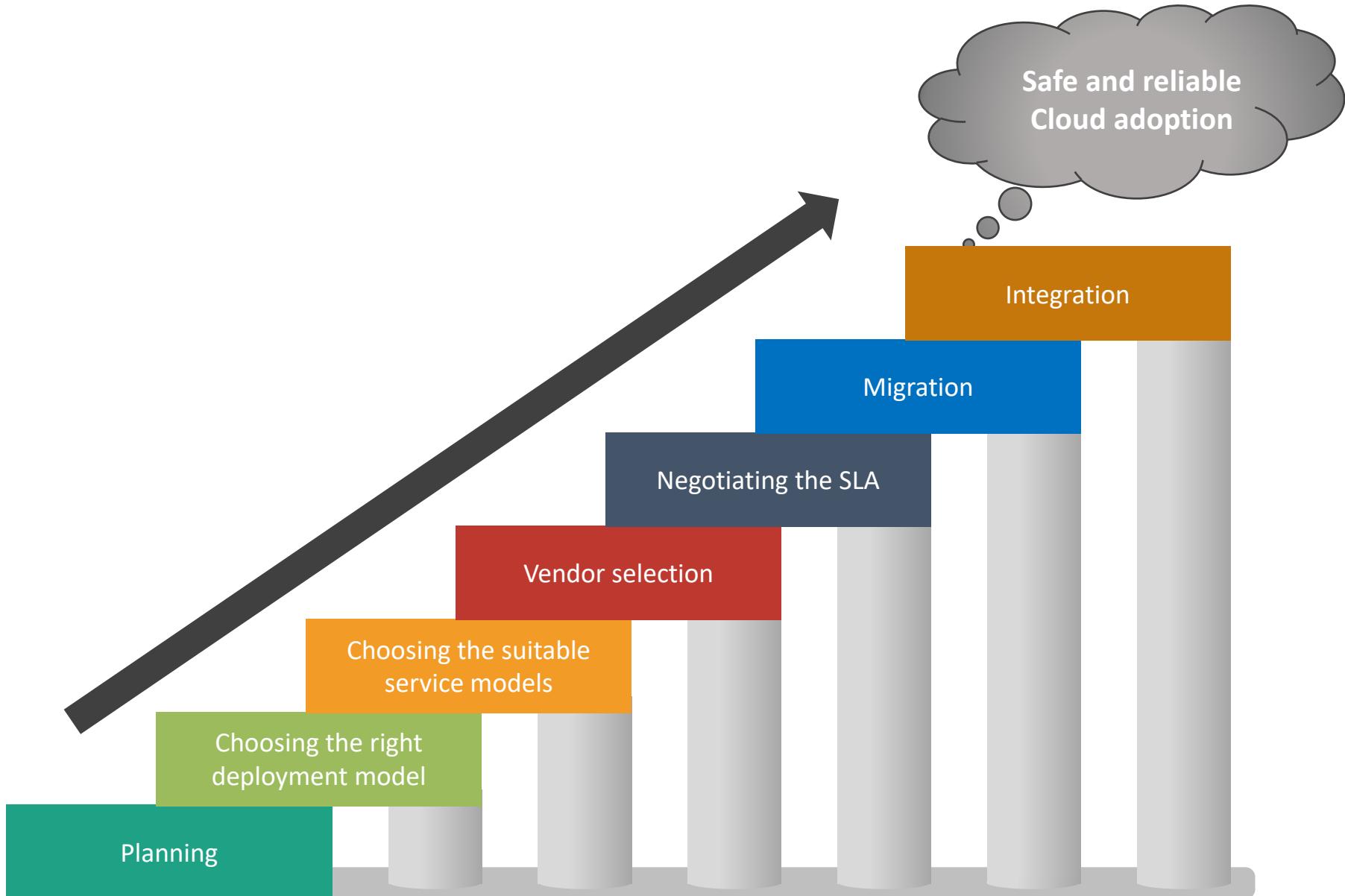
Some cloud environments provide support for specific platforms and languages only

Legal Issues

There are concerns in the cloud computing community over jurisdiction, data protection, fair information practices, and international data transfer

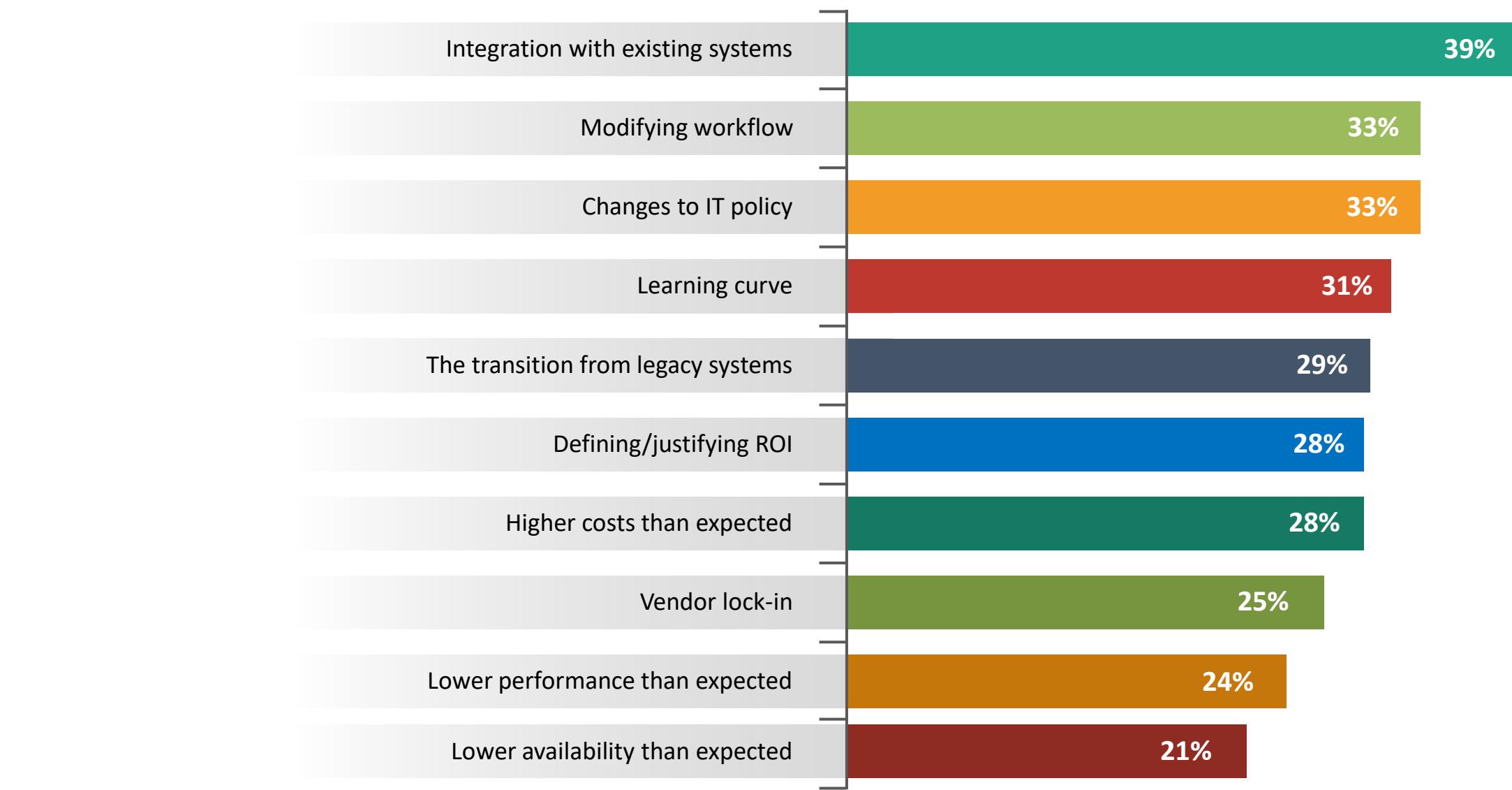
CLOUD ADOPTION

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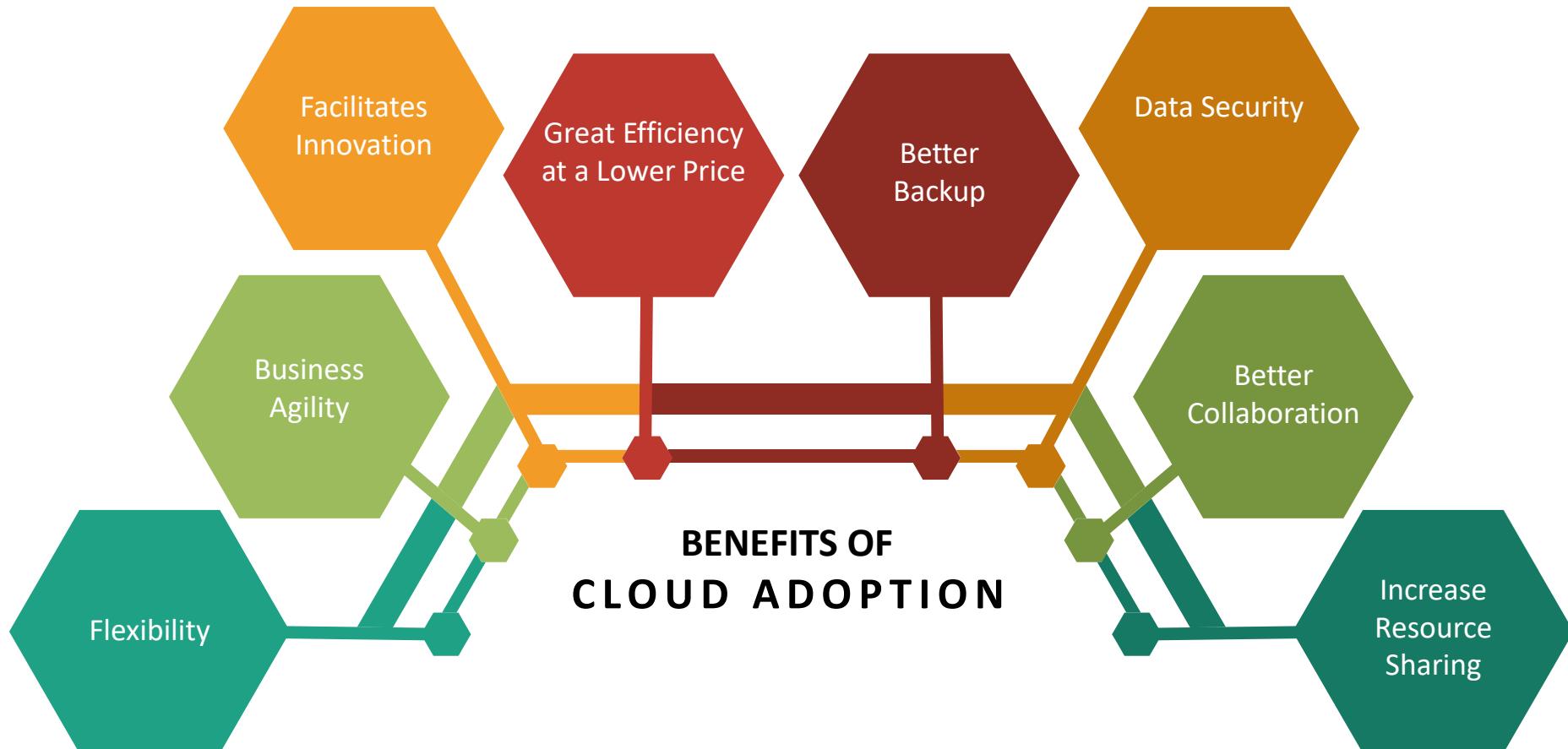
CLOUD ADOPTION

Challenges Faced During Cloud Adoption



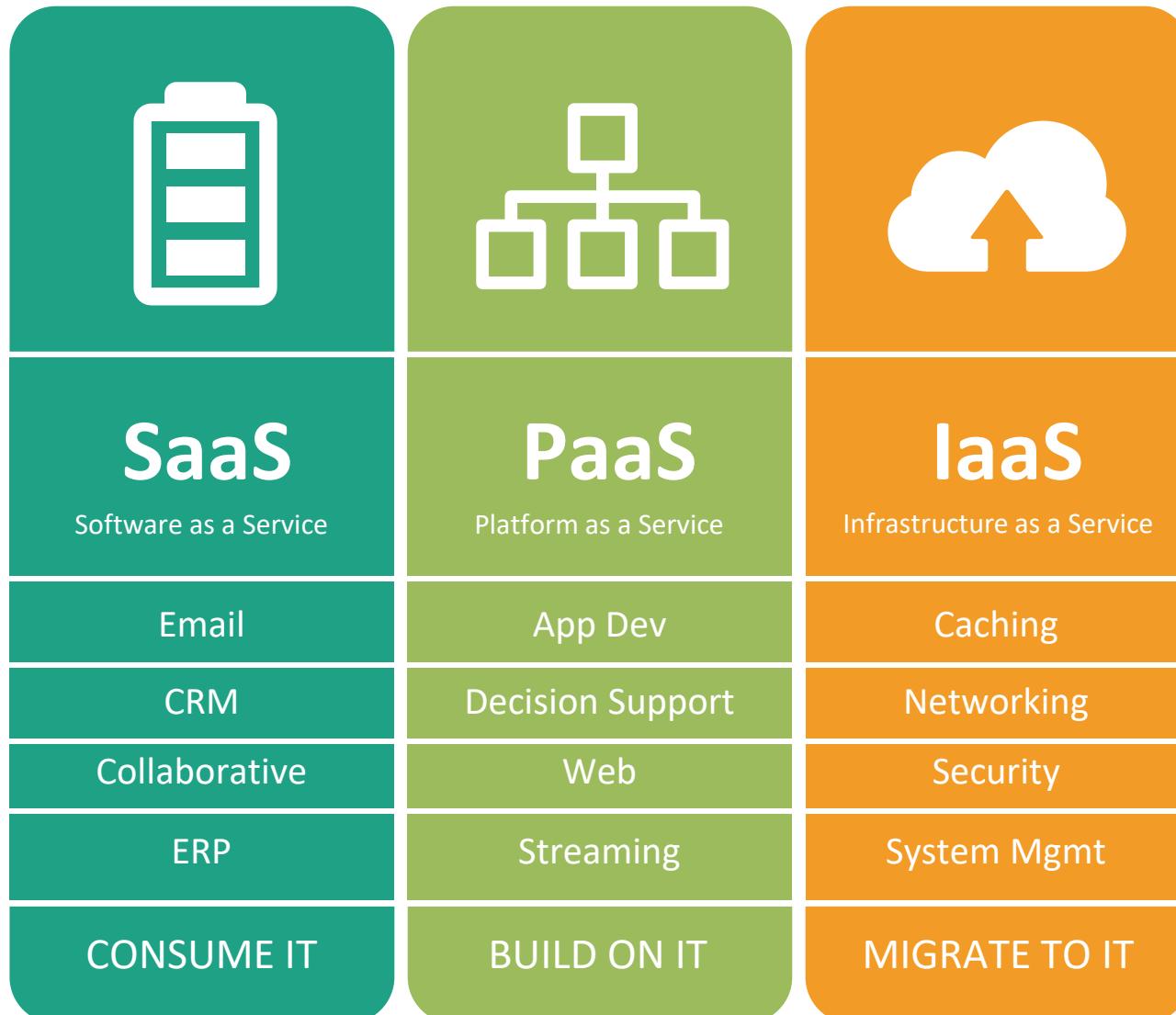
CLOUD ADOPTION

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INFRASTRUCTURE AS A SERVICE (IAAS)

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INFRASTRUCTURE AS A SERVICE (IAAS)

Cloud Computing Service Categories

SaaS - Software as a service

A software distribution model in which a third-party provider hosts applications and makes them available to customers over the internet

EXAMPLES

Salesforce, NetSuite and Concur

PaaS - Platform as a service

A model in which a third-party provider hosts application development platforms and tools on its own infrastructure and makes them available to customers over the internet

EXAMPLES

AWS Elastic Beanstalk, Google App Engine and Heroku

IaaS - Infrastructure as a service

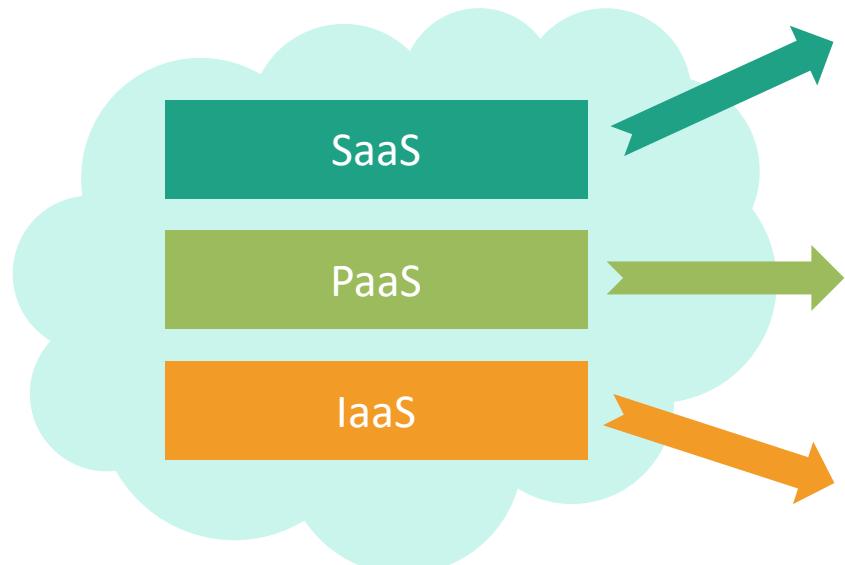
A model in which a third-party provider hosts servers storage and other virtualized compute resources and makes them available to customers over the internet

EXAMPLES

AWS, Microsoft Azure and Google compute Engine

INFRASTRUCTURE AS A SERVICE (IAAS)

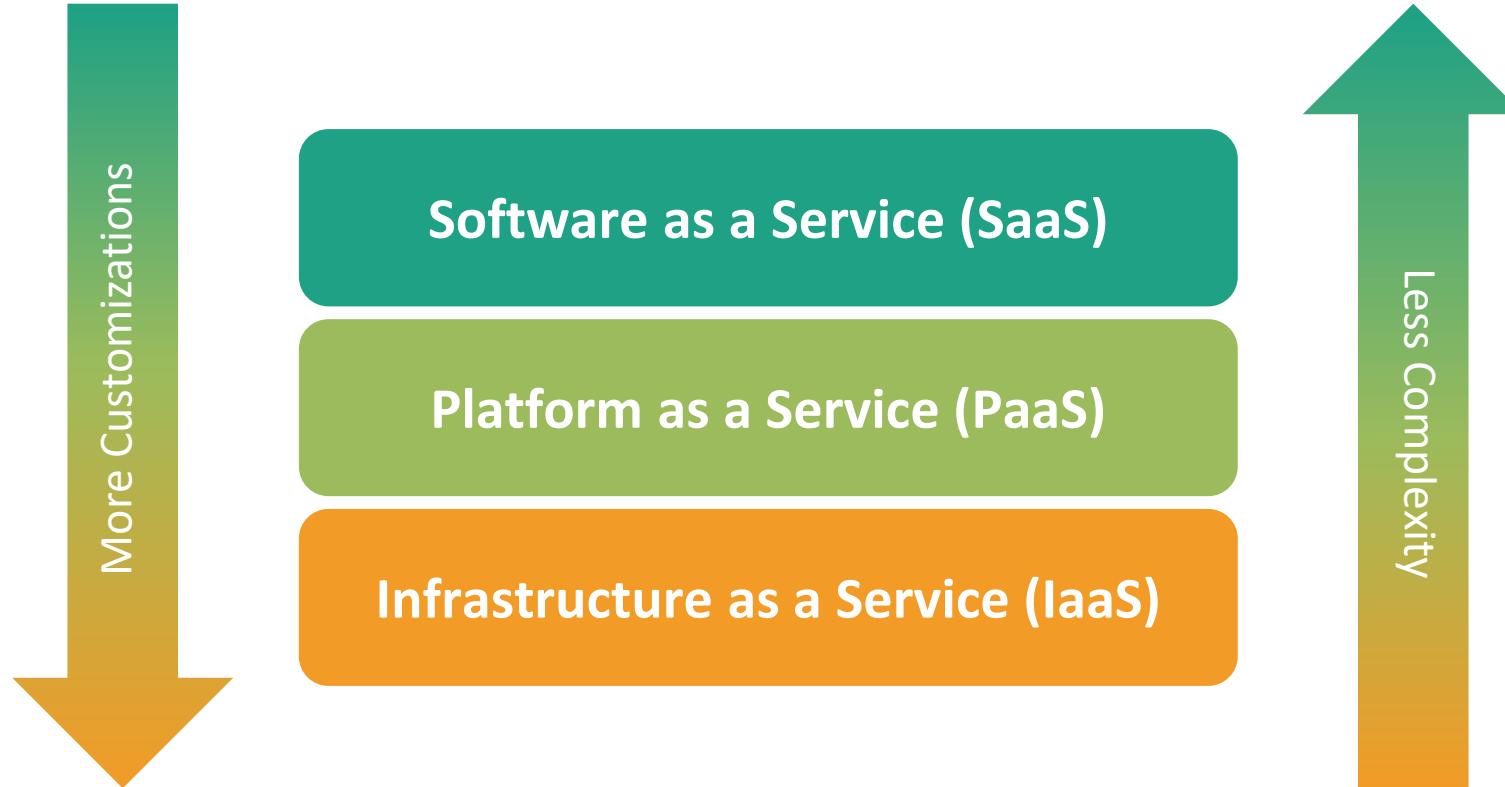
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Who Uses It	What Services are available	Why use it?
Business users	Email, office automation, CRM, website testing, wiki, blog, virtual desktop...	To complete business tasks
Developers and deployers	Service and application test, development integration and deployment	Create or deploy applications and services for users
System managers	Virtual machines, operating systems, message queues, networks, storage CPU, memory, backup services	Create platforms for service and application test development, integration and deployment

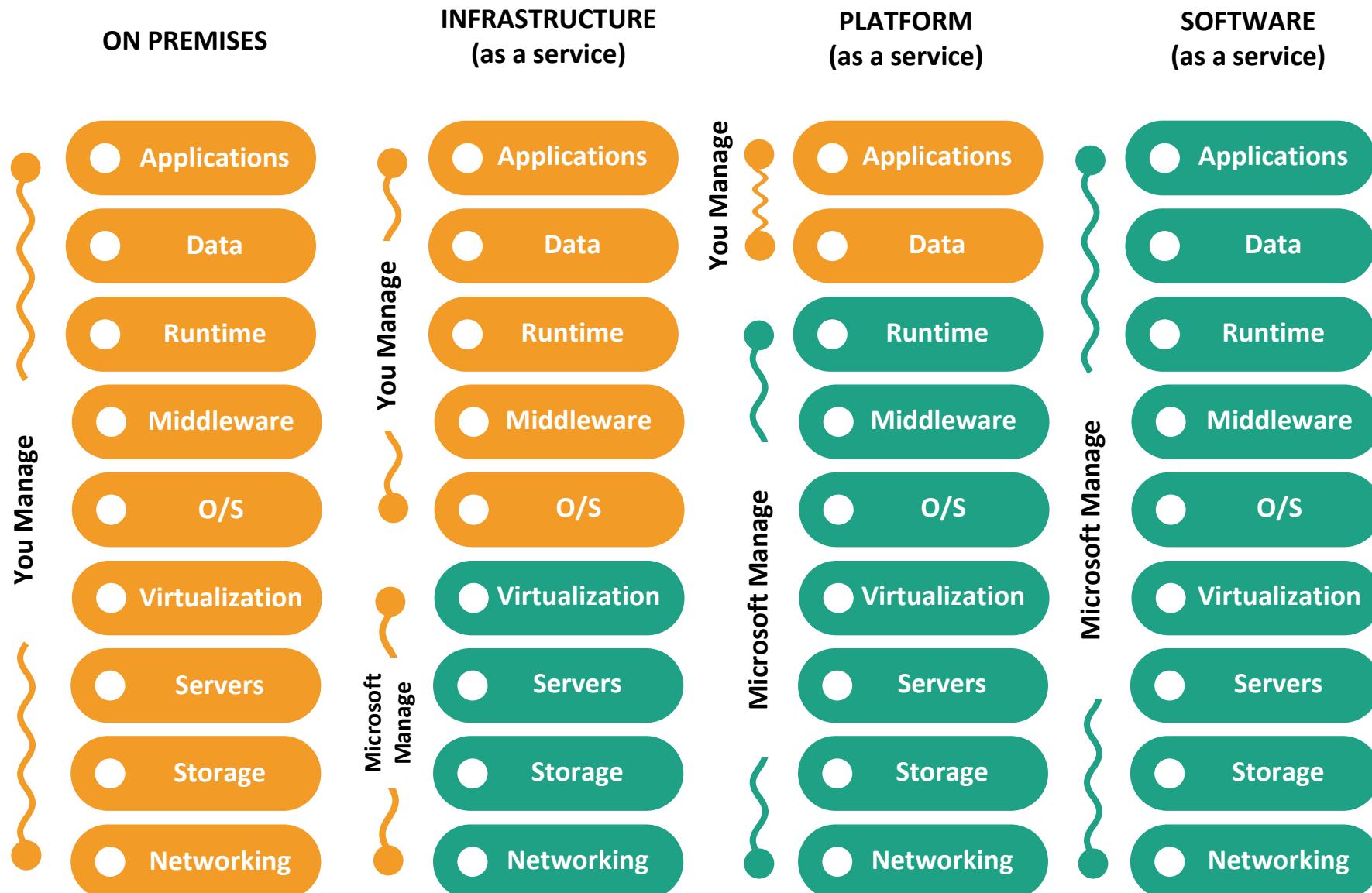
INFRASTRUCTURE AS A SERVICE (IAAS)

Important Concepts



INFRASTRUCTURE AS A SERVICE (IAAS)

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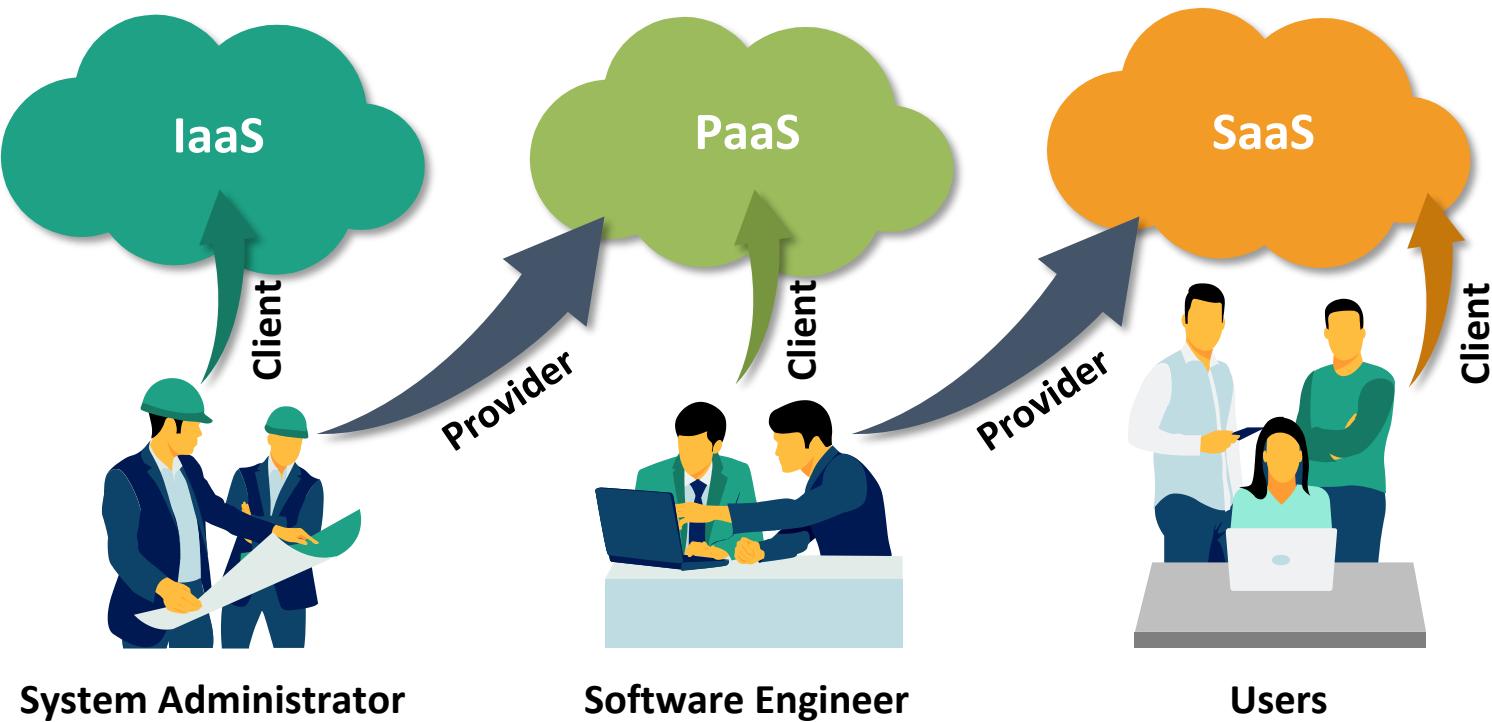


INFRASTRUCTURE AS A SERVICE (IAAS)

Cloud Delivery Models

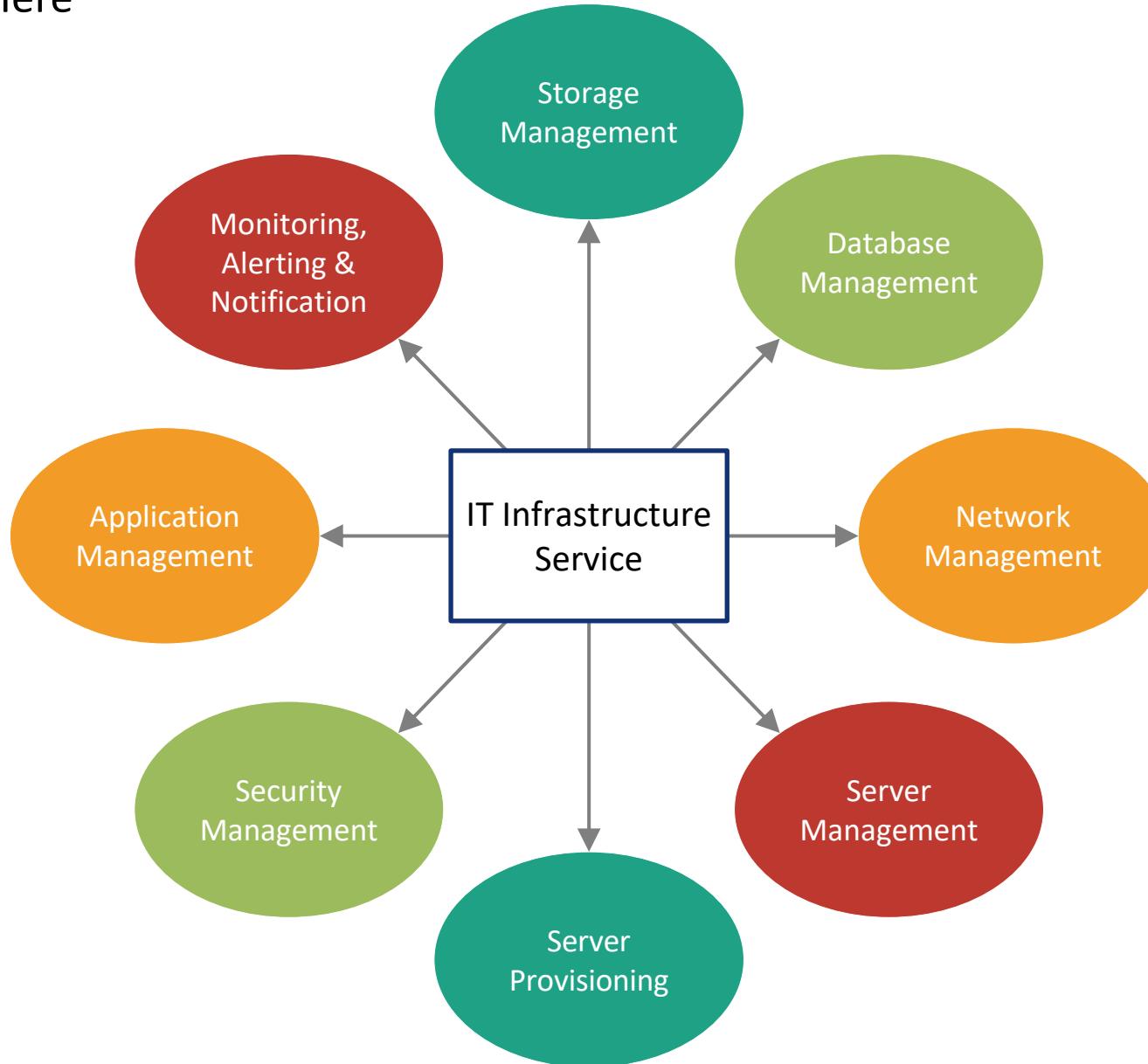
IaaS (Infrastructure – as – a – Service)

- A. IaaS is a provision model in which an organization used to support operations, including storage, hardware, servers and networking components.
- B. The service provider owns the equipment and responsible for running and maintaining it.
- C. The client typically pays on a per-use basis.



INFRASTRUCTURE AS A SERVICE (IAAS)

Enter Your Sub Headline Here



INFRASTRUCTURE AS A SERVICE (IAAS)

Enter Your Sub Headline Here

Pay-As-you-Go

Ability to collect timely, accurate data on the usage data and costs and allocating assets and resources to customers

Agility in Product offering and Launching

Subscriptions business need to experiment with price, feature, product, package more easily than perpetual license software to scale up business

Subscriber Expectation management

Continuous innovation in service offering to reach customer expectations and keep them satisfied

Payments & Dunning

Supporting different modes of payments and timely collection of payments

IaaS Business Challenges

Partner / Reseller Settlements

Managing your entire value chain and handling multiple partner settlements

Tax Management

Multi-currency and multi-country taxation system

Increased Customer Churn

Need for analytics to measure MRR, customer profitability customer usage

Complex Business Models

Subscription businesses become complex over time due to multi stack implementation & orchestration

INFRASTRUCTURE AS A SERVICE (IAAS)

IaaS Challenges

Security & data integrity



Data movement



Performance



Multi-tenancy impacts



Vendor scalability unknown



More expensive 'at scale'?



Vendor lock-in



INFRASTRUCTURE AS A SERVICE (IAAS)

IaaS Pro & Cons

Benefits	Challenges
<ul style="list-style-type: none">• Systems managed by SLA should equate to fewer breaches• Higher return on assets through higher utilization• Reduced cost driven by<ul style="list-style-type: none">• Less hardware• Less floor space from smaller hardware footprint• Higher level of automation from fewer administrators• Lower power consumption• Able to match consumption to demand	<ul style="list-style-type: none">• Portability of applications• Maturity of systems management tools• Integration across cloud boundary• Extension of internal security models

INFRASTRUCTURE AS A SERVICE (IAAS)

Infrastructure As A Service

