UNIT III – DEFINING THE CLOUDS FOR ENTERPRISE

CLOUD COMPUTING
MR. VIJAY KOLTE

UNIT III – DEFINING THE CLOUDS FOR ENTERPRISE

What is Cloud Storage?
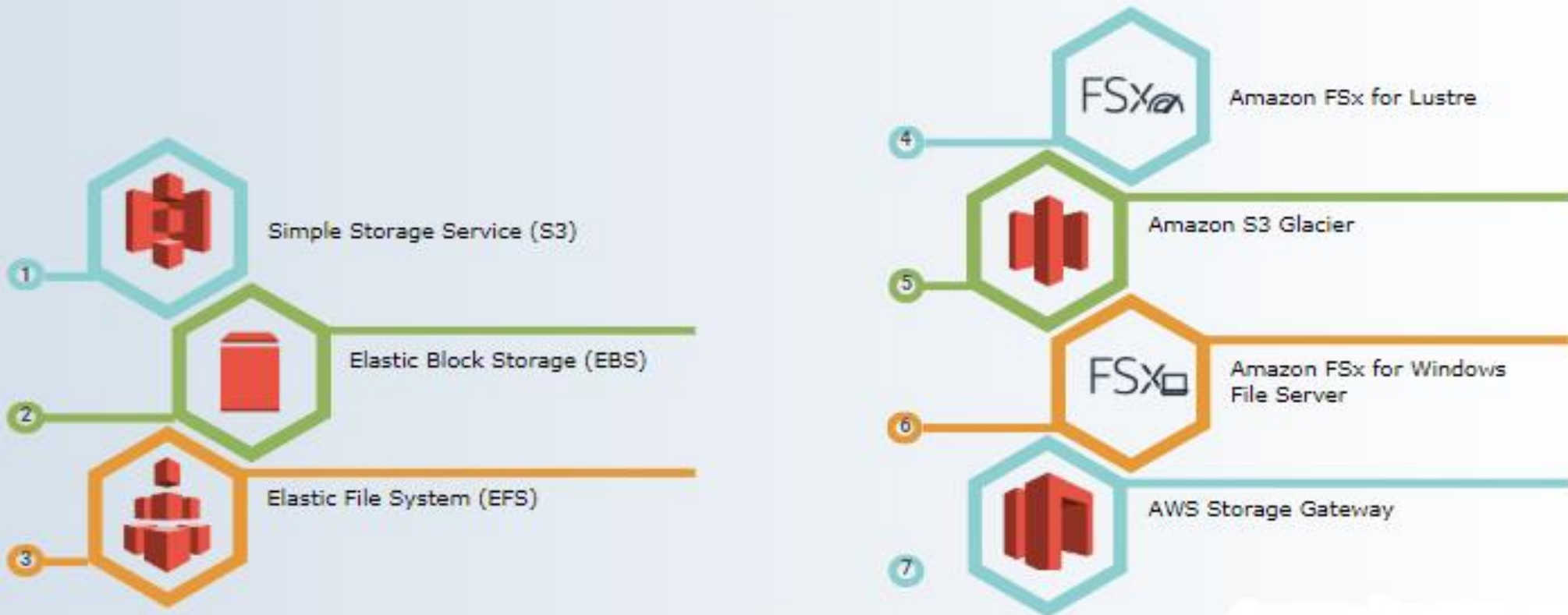
Cloud storage is a cloud computing model that stores data on the Internet through a cloud computing provider who manages and operates data storage as a service. It's delivered on demand with just-in-time capacity and costs and eliminates buying and managing your own data storage infrastructure. This gives you agility, global scale and durability, with "anytime, anywhere" data access

Benefits of Cloud Storage

1. **Total Cost of Ownership** - You can add or remove capacity on demand, quickly change performance and retention characteristics, and only pay for storage that you use.

2. **Time to Deployment** - When development teams are ready to execute, infrastructure should never slow them down. Cloud storage allows IT to quickly deliver the exact amount of storage needed, right when it's needed.

3. **Information Management** - Centralizing storage in the cloud creates a tremendous leverage point for new use cases. By using cloud storage lifecycle management policies, you can perform powerful information management tasks including automated tiering or locking down data in support of compliance requirements.

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Types of Cloud Storage

There are three types of cloud data storage: object storage, file storage, and block storage.

1. Object Storage - Applications developed in the cloud often take advantage of object storage's vast scalability and metadata characteristics. Object storage solutions like Amazon Simple Storage Service (S3) are ideal for building modern applications from scratch that require scale and flexibility and can also be used to import existing data stores for analytics, backup, or archive.

2. File Storage - Some applications need to access shared files and require a file system. This type of storage is often supported with a Network Attached Storage (NAS) server. File storage solutions like Amazon Elastic File System (EFS) are ideal for use cases like large content repositories, development environments, media stores, or user home directories.

3. Block Storage - Other enterprise applications like databases or ERP systems often require dedicated, low latency storage for each host. This is analogous to direct-attached storage (DAS) or a Storage Area Network (SAN). Block-based cloud storage solutions like Amazon Elastic Block Store (EBS) are provisioned with each virtual server and offer the ultra low latency required for high performance workloads.

Platform-as-a-Service (PaaS)

Database-as-a-Service
Self-service / on-demand database consumption, coupled with automation of operations

Compute Services
Virtual servers

Object Storage
Buckets

Block Storage

File Systems

Infrastructure-as-a-Service (IaaS)
Abstraction of Compute, Storage, Networking

Hardware

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Cloudant
By IBM

A scalable JSON document database for web, mobile, IoT, and serverless applications.

Lite • Free • IAM-enabled

Pg

Databases for PostgreSQL
By IBM

PostgreSQL is a powerful, open source object-relational database that is highly customizable.

Satellite Enabled • IAM-enabled • Service Endpoint Supported

Ds

Databases for DataStax
By IBM

DataStax is a scale-out NoSQL database built on Apache Cassandra, designed for high-availability and workload flexibility.

IAM-enabled • Service Endpoint Supported

Mg

Databases for MongoDB
By IBM

MongoDB is a JSON document store with a rich query and aggregation framework.

IAM-enabled • Service Endpoint Supported

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What is DBaaS (Database-as-a-Service)?

This service provided by IBM cloud.

✓ DBaaS (also known as managed database service) is a cloud computing service that lets users access and use a cloud database system without purchasing and setting up their own hardware, installing their own database software, or managing the database themselves.

✓ The cloud provider takes care of everything from periodic upgrades to backups to ensuring that the database system remains available and secure 24/7.

Benefits of DBaaS

Cost savings - With DBaaS, your organization pays a predictable periodic charge based on the resources you consume.

Scalability - You can quickly and easily provision additional storage and computing capacity at run time if you need it.

Simpler Management - DBaaS lightens the administrative burden on your existing IT staff and frees them to work on applications and innovation.

Software quality - The major cloud providers offer a wide variety of highly configurable DBaaS options.

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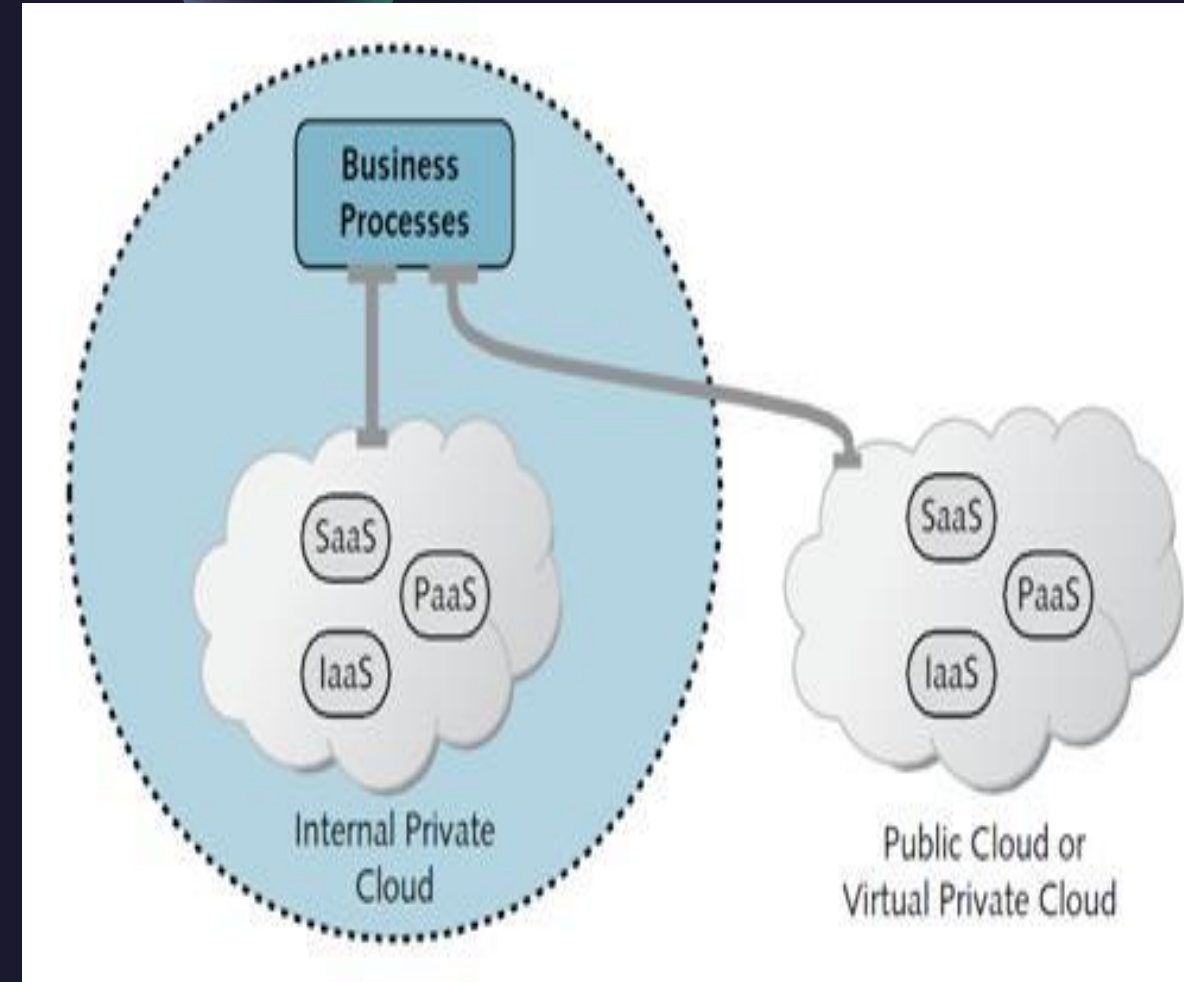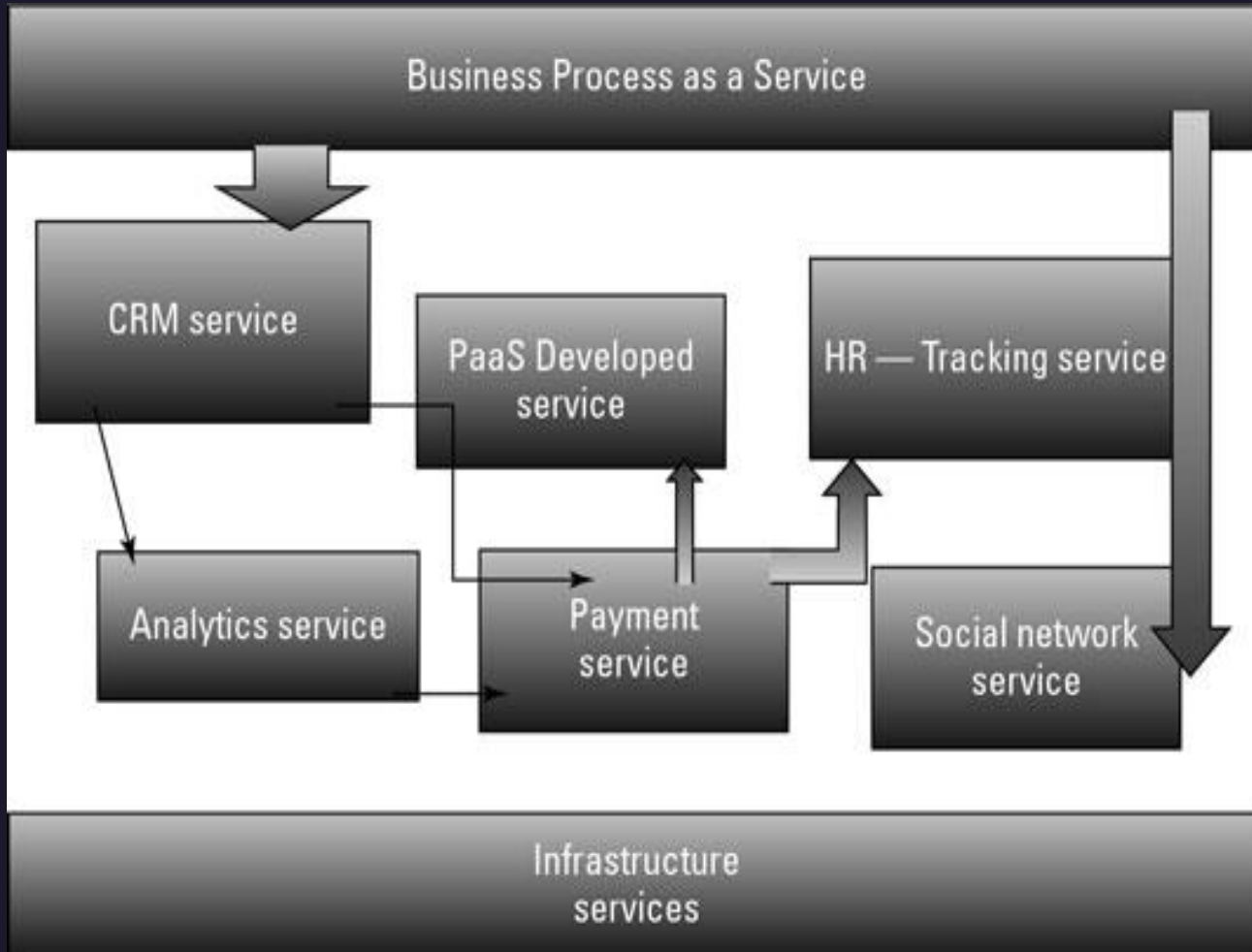
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What is business process as a service (BPaaS) in cloud computing?

Business process as a service, or BPaaS, is a type of business process outsourcing (BPO) delivered based on a cloud services model.

BPaaS provides companies with the people, processes and technology they need to operate as a pay-per-use service by making use of the availability and efficiency of a cloud-based system.

Characteristics define BPaaS

✓ The BPaaS sits on top of the other three foundational cloud services: SaaS, PaaS, and IaaS.

✓ A BPaaS service is configurable based on the process being designed.

✓ A BPaaS service must have well-defined APIs so it can be easily connected to related services.

✓ A BPaaS must be able to support multiple languages and multiple deployment environments because a business cannot predict how a business process will be leveraged in the future.

✓ A BPaaS environment must be able to handle massive scaling. The service must be able to go from managing a few processes for a couple of customers to being able to support hundreds if not thousands of customers and processes

**When would you use Information as a Service?**

Information as a service is appropriate for any organization that has various data sources and diverse eating up applications. In case your organization is small, and you have one database and one main application, at that point information as a service may not make sense.

✓ Information as a Service is an emerging cloud business model in which a company share or sells relevant Information to another company or individuals to perform their business.

✓ In the world of cloud computing where storage and compute are accessed using well-defined APIs, we also have available to us information that can be as easily accessed, also using well-defined APIs.
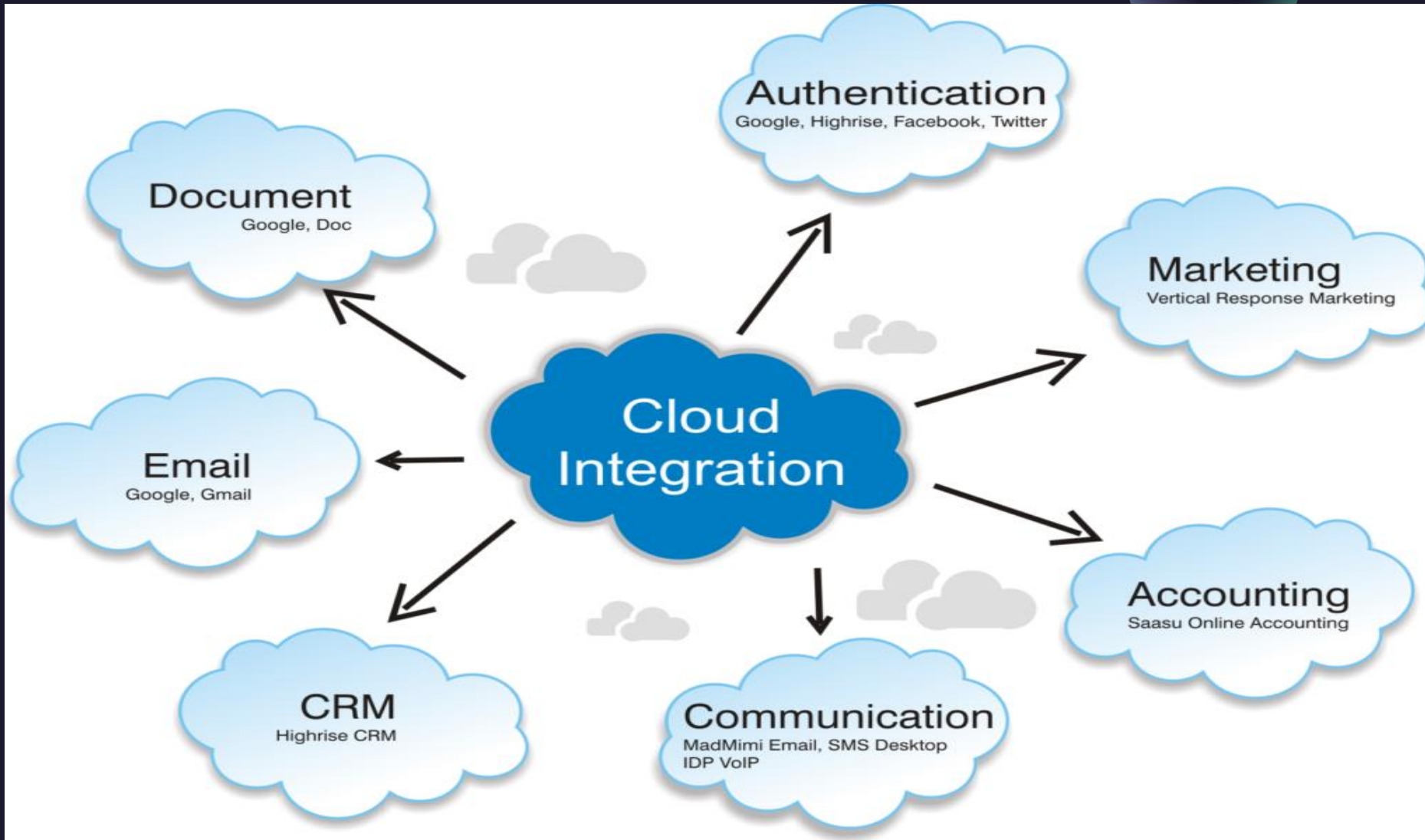
Following are general example of Information as a Service:

➢ Zip code or Address validation and lookup

➢ Payment processing

➢ Services that validate or complete data
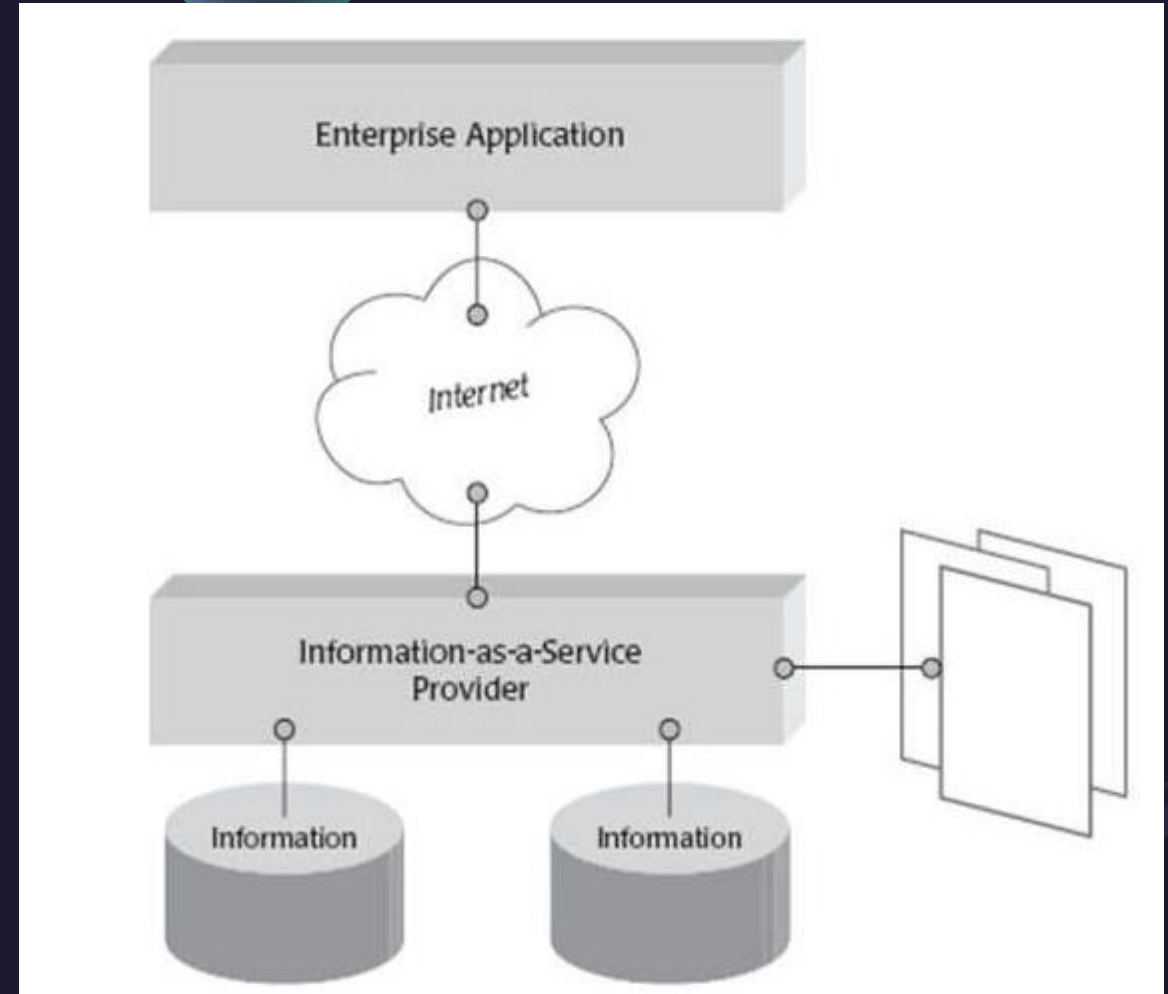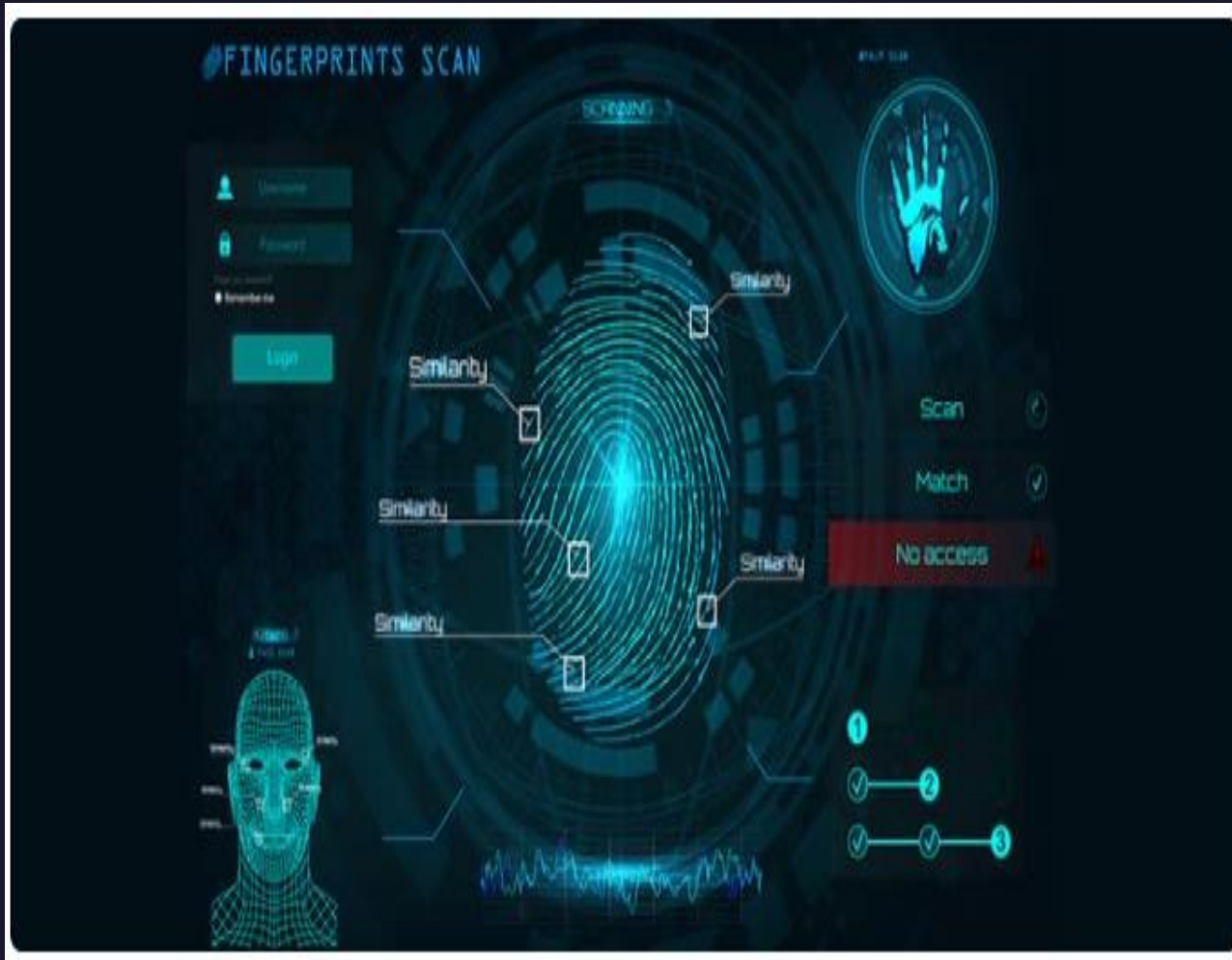
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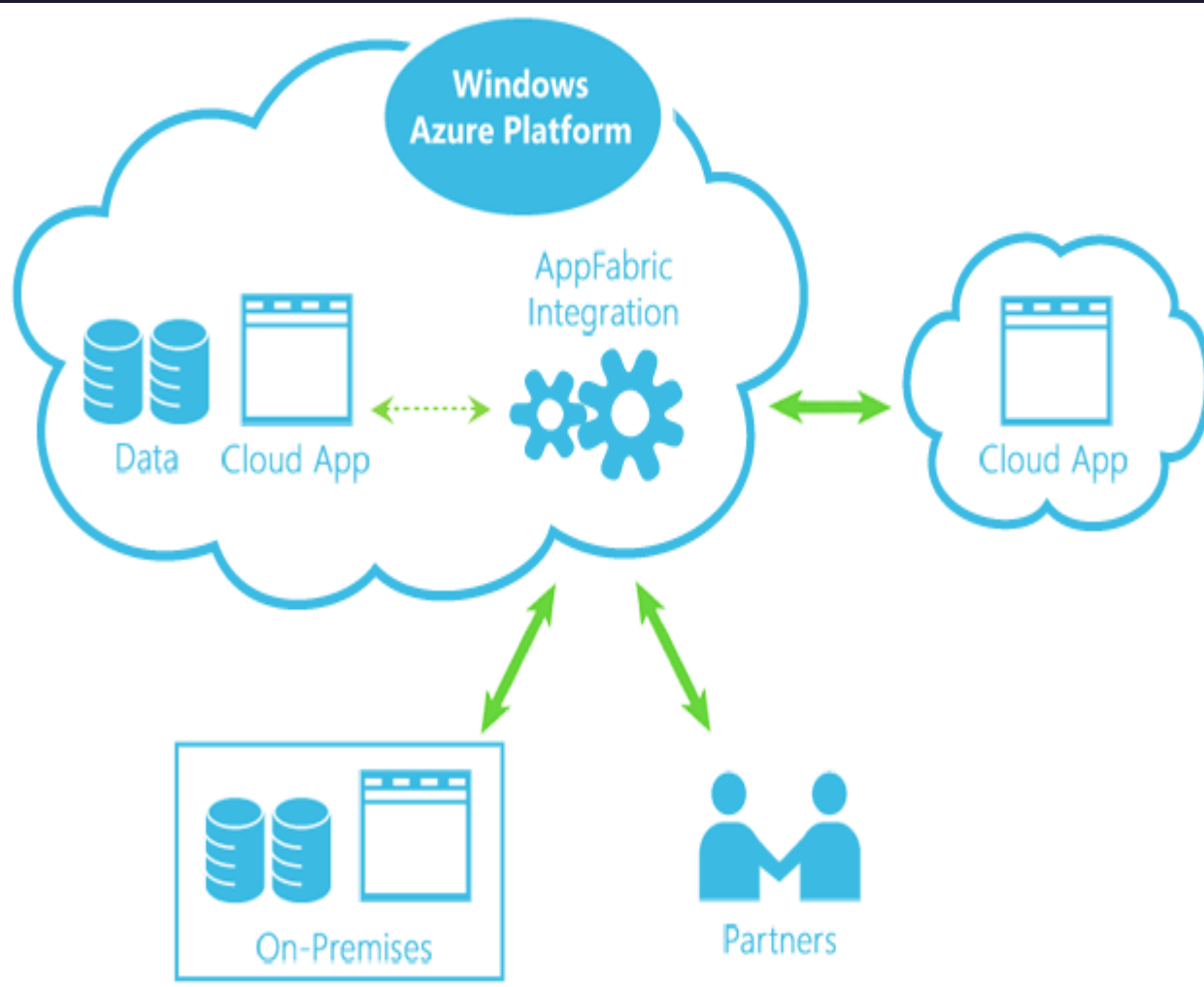**What is integration as a service in cloud computing?**

Integration as a Service (IaaS) is a cloud-based delivery model that strives to connect on-premise data with data located in cloud-based applications. This paradigm facilitates real-time exchange of data and programs among enterprise-wide systems and trading partners.
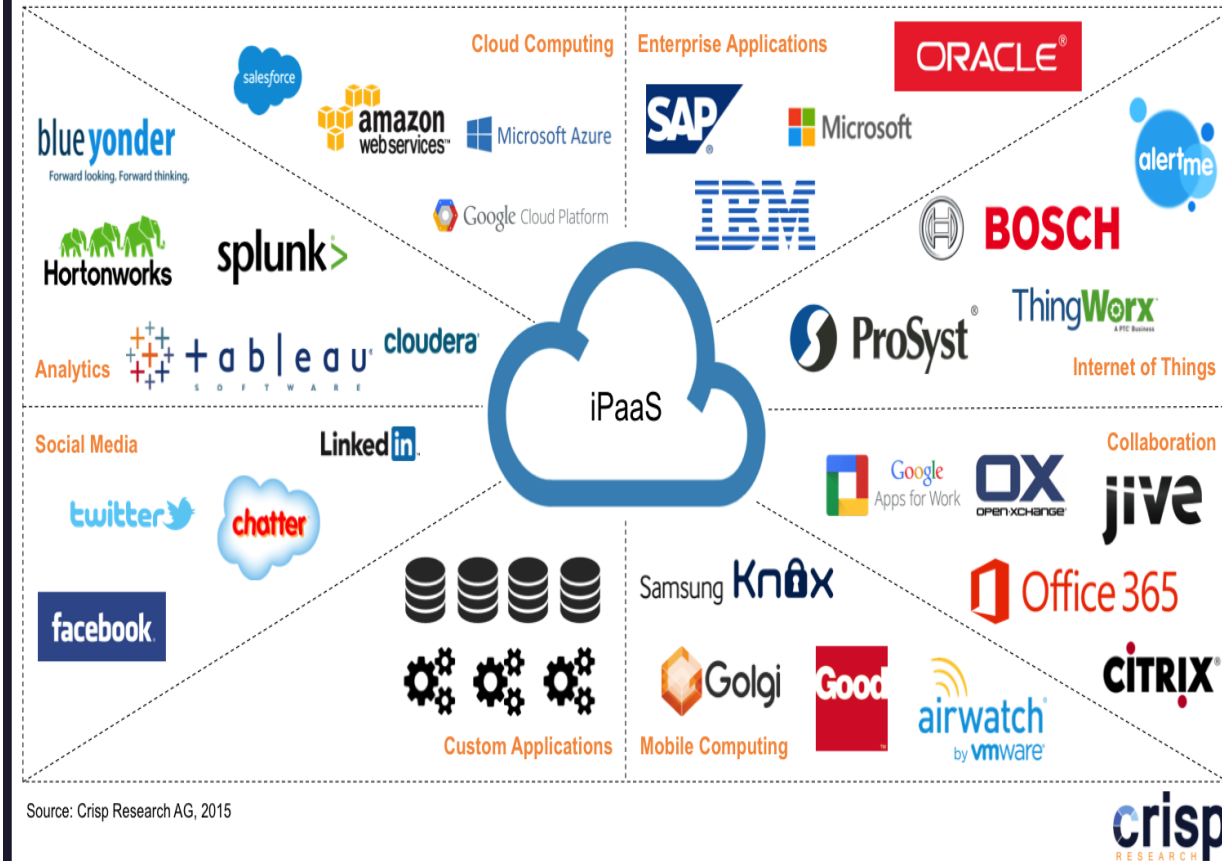
What is integration in SaaS?

SaaS integration definition: SaaS integration is defined as the process of operationally connecting SaaS solutions to other separate computer systems or applications into a single larger system, allowing each solution to functionally work together.

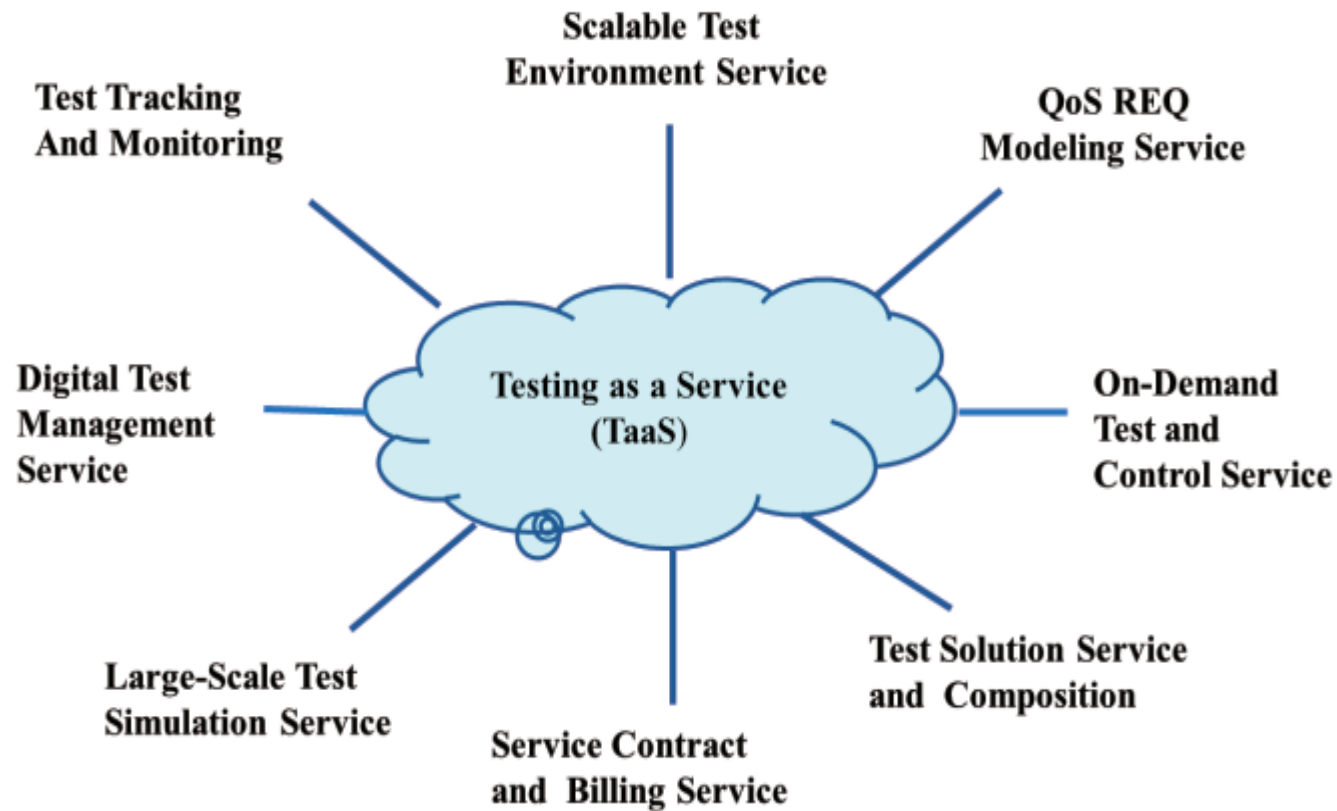| Platform Type	Common Examples
SaaS	**Google Workspace, Dropbox**, Salesforce, Cisco WebEx, Concur, GoToMeeting
PaaS	AWS Elastic Beanstalk, Windows Azure, Heroku, Force.com, Google App Engine, Apache Stratos, OpenShift

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types of testing services.

Scalable Test Environment Service

Test Tracking And Monitoring

QoS REQ Modeling Service

Digital Test Management Service

Testing as a Service (TaaS)

On-Demand Test and Control Service

Large-Scale Test Simulation Service

Test Solution Service and Composition

Service Contract and Billing Service

Stress

Compatibility

Load & Performance

Cloud Testing

Browser Performance

Functional

Latency

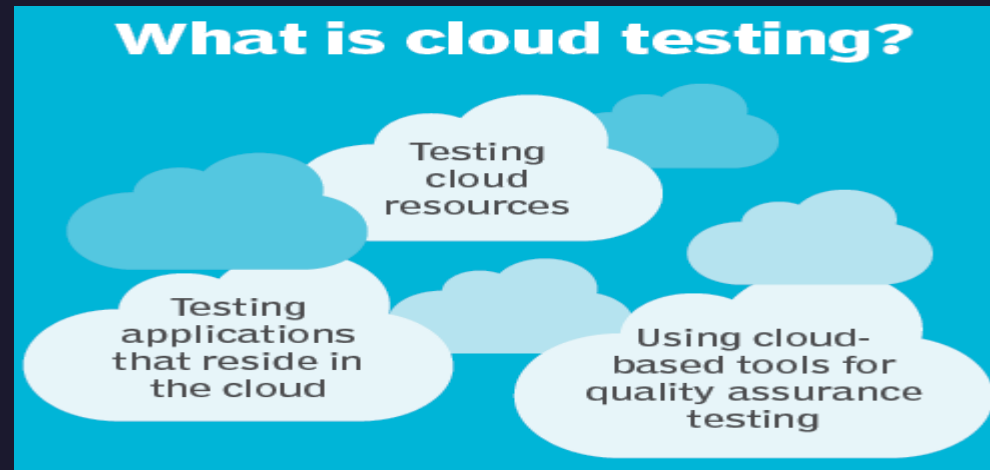# UNIT III – DEFINING THE CLOUDS FOR ENTERPRISE
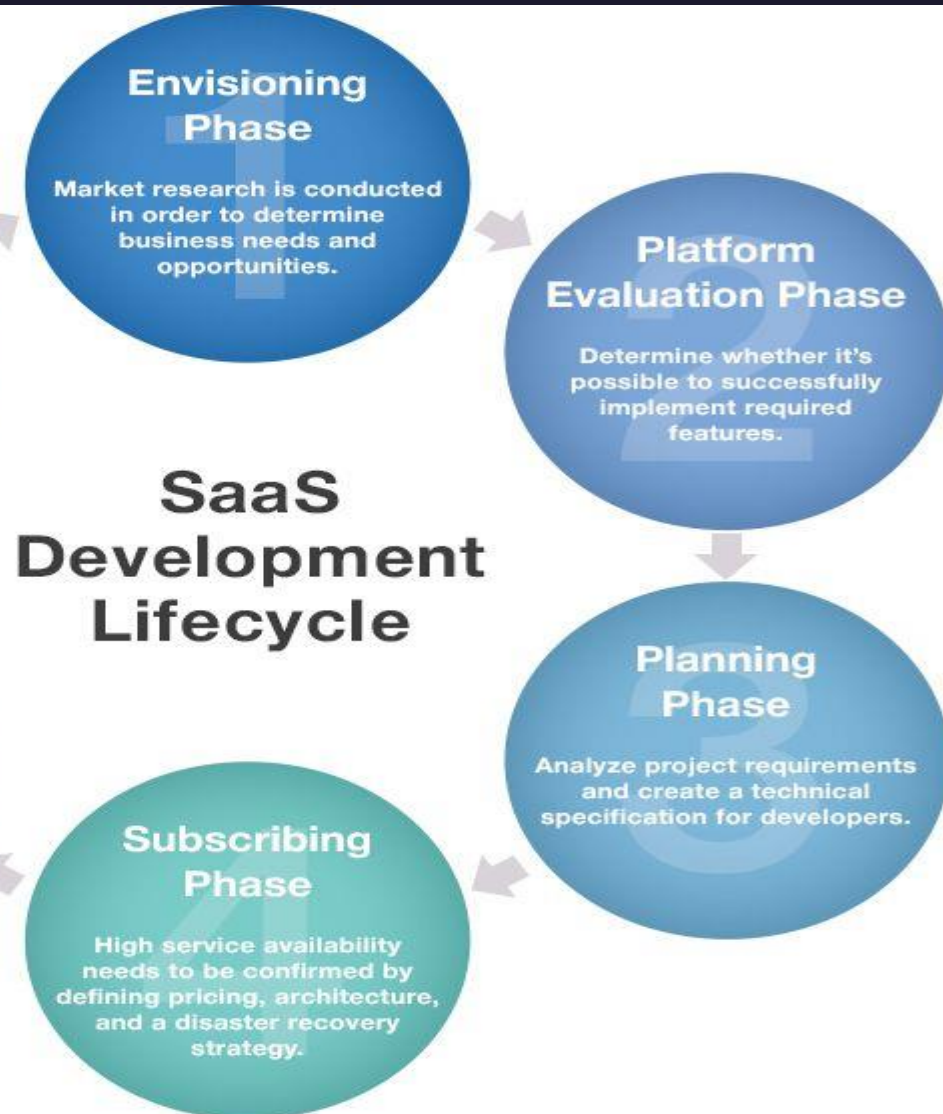
What is testing as a service?

Testing as a Service is the outsourcing of activities and operations associated with software testing activities. Like its cloud-based, as-a-service predecessors, the TaaS capabilities are accessed across a Web interface and include several self-service capabilities such as: Test cases. Security controls.

What is testing in cloud computing?

Cloud testing is the process of using the cloud computing resources of a third-party service provider to test software applications. For organizations testing cloud resources, this can ensure optimal performance, availability and security of data, and minimize downtime of the associated infrastructure or platform.
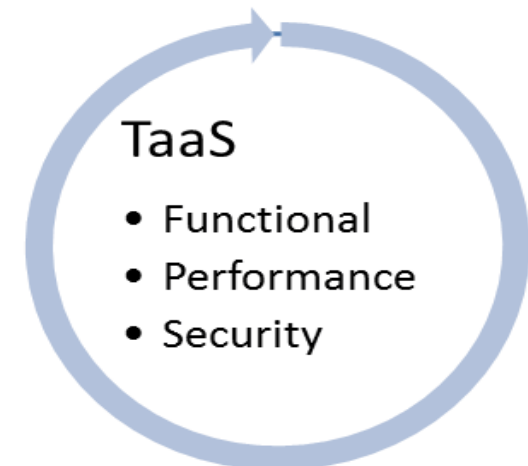

What is cloud testing?
- Testing cloud resources
- Testing applications that reside in the cloud
- Using cloud-based tools for quality assurance testing

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SaaS Development Lifecycle

Envisioning Phase
1

Market research is conducted in order to determine business needs and opportunities.

Platform Evaluation Phase
2

Determine whether it's possible to successfully implement required features.

Planning Phase
3

Analyze project requirements and create a technical specification for developers.

Subscribing Phase
4

High service availability needs to be confirmed by defining pricing, architecture, and a disaster recovery strategy.

Development Phase
5

The development framework is created, which involves various testing activities including load and performance testing of the SaaS app.

Operation Phase
6

The service is deployed. After this, you need to perform constant application updates and security checks to comply with user expectations.

Here's a SaaS testing checklist to ensure safety:

1. Test the security of the network where the SaaS application is deployed.
2. Review possible attacks and security threat scenarios.
3. Test access privileges for various roles (especially in an environment with several tenants).

TaaS
- Functional
- Performance
- Security

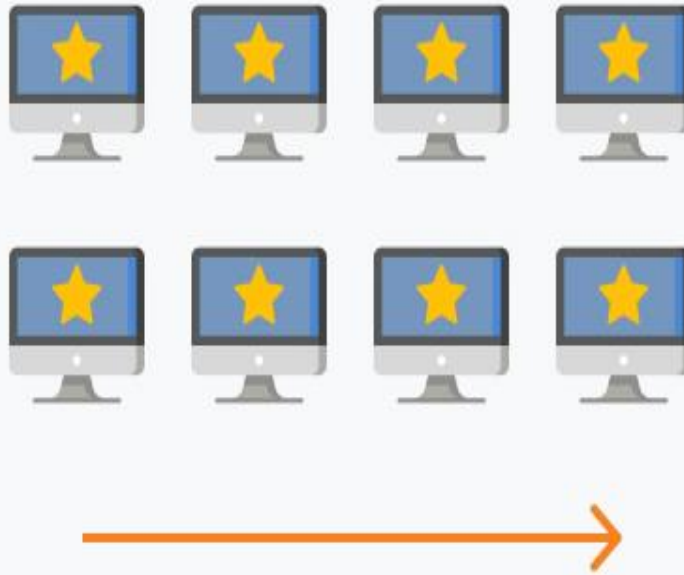# UNIT III – DEFINING THE CLOUDS FOR ENTERPRISE

VERTICAL SCALING
Increase size of instance
(RAM, CPU etc.)
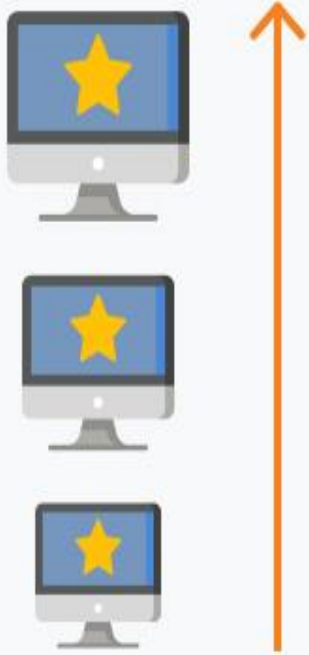
HORIZONTAL SCALING
(Add more instances)

What is Cloud Scaling?

In cloud computing, scaling is the process of adding or removing compute, storage, and network services to meet the demands a workload makes for resources in order to maintain availability and performance as utilization increases.
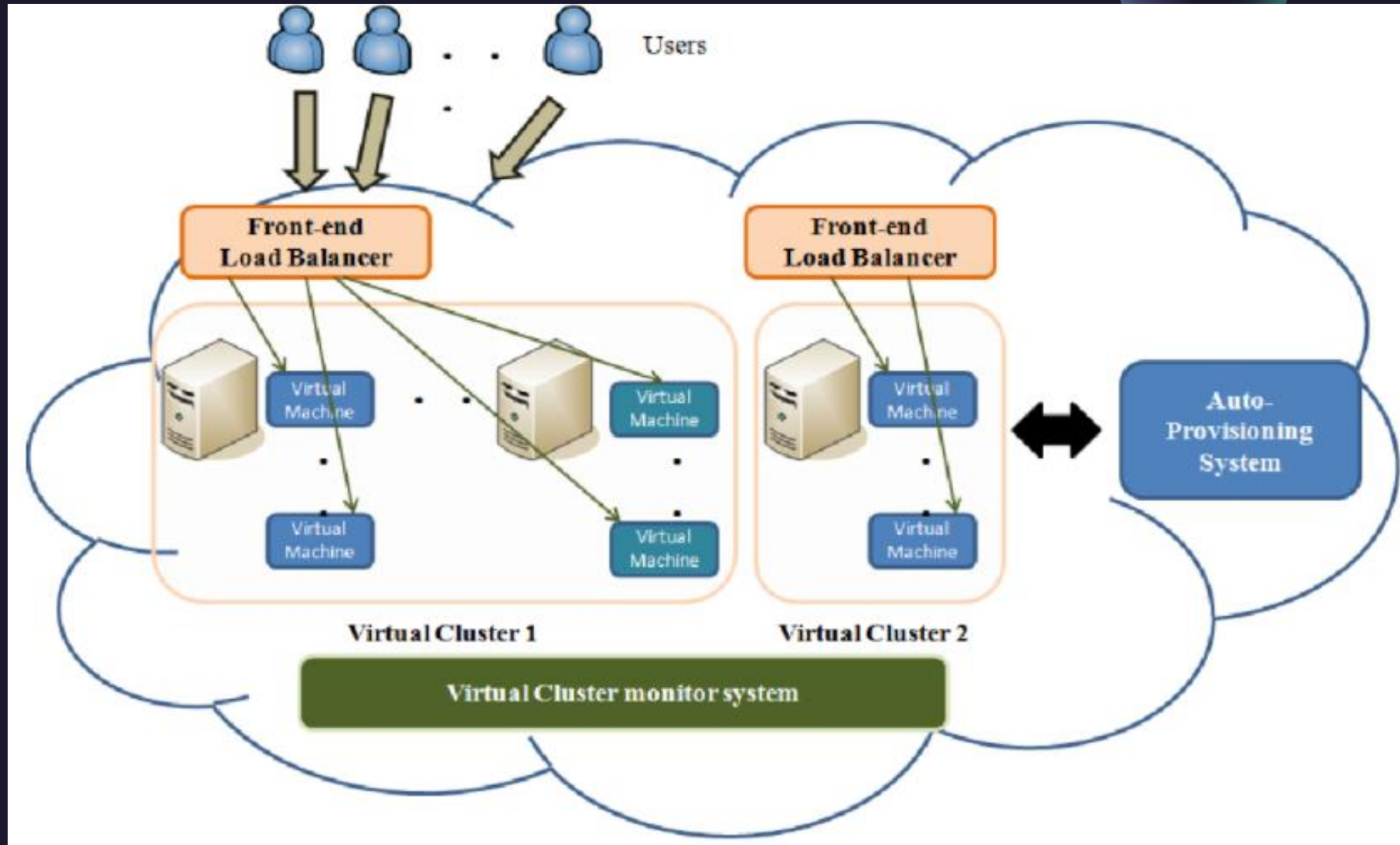
How do you scale your infrastructure?

IT infrastructure scaling can be done horizontally or vertically. Vertical scaling involves adding more power and resources to a cloud; horizontal scaling adds more servers. When it comes to scaling, vertical scaling is a better short-term solution, while horizontal scaling is a better long-term solution.

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What is cloud capacity?

Performance & capacity are two different attributes of a system. Cloud 'capacity' measures & concerns about how much workload a system can hold whereas 'performance' deals with the rate at which a task get performed.

What is cloud capacity planning?

Capacity planning examines what systems are in place, measures their performance, and determines patterns in usage that enables the planner to predict demand. A system uses resources to satisfy cloud computing demands that include processor, memory, storage, and network capacity.

Steps in the Capacity Planning Process

1. Estimate future capacity requirements.   2. Evaluate existing capacity and facilities and identify gaps.   3. Identify alternatives for meeting requirements.

4. Conduct financial analyses of each alternative.

5. Assess key qualitative issues for each alternative.

What is capacity planning in AWS?

➢ On-Demand Capacity Reservations enable you to reserve compute capacity for your Amazon EC2 instances in a specific Availability Zone for any duration.

➢ The number of instances for which to reserve capacity. The instance attributes, including the instance type, tenancy, and platform/OS.
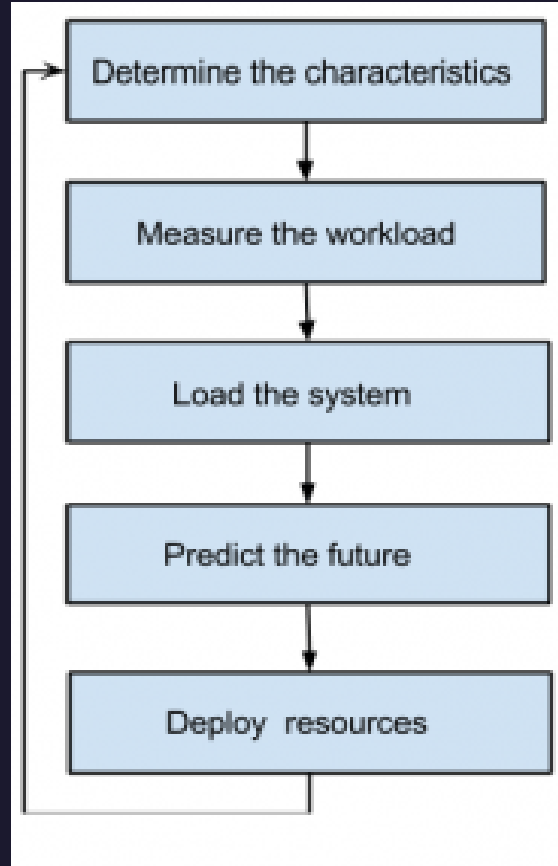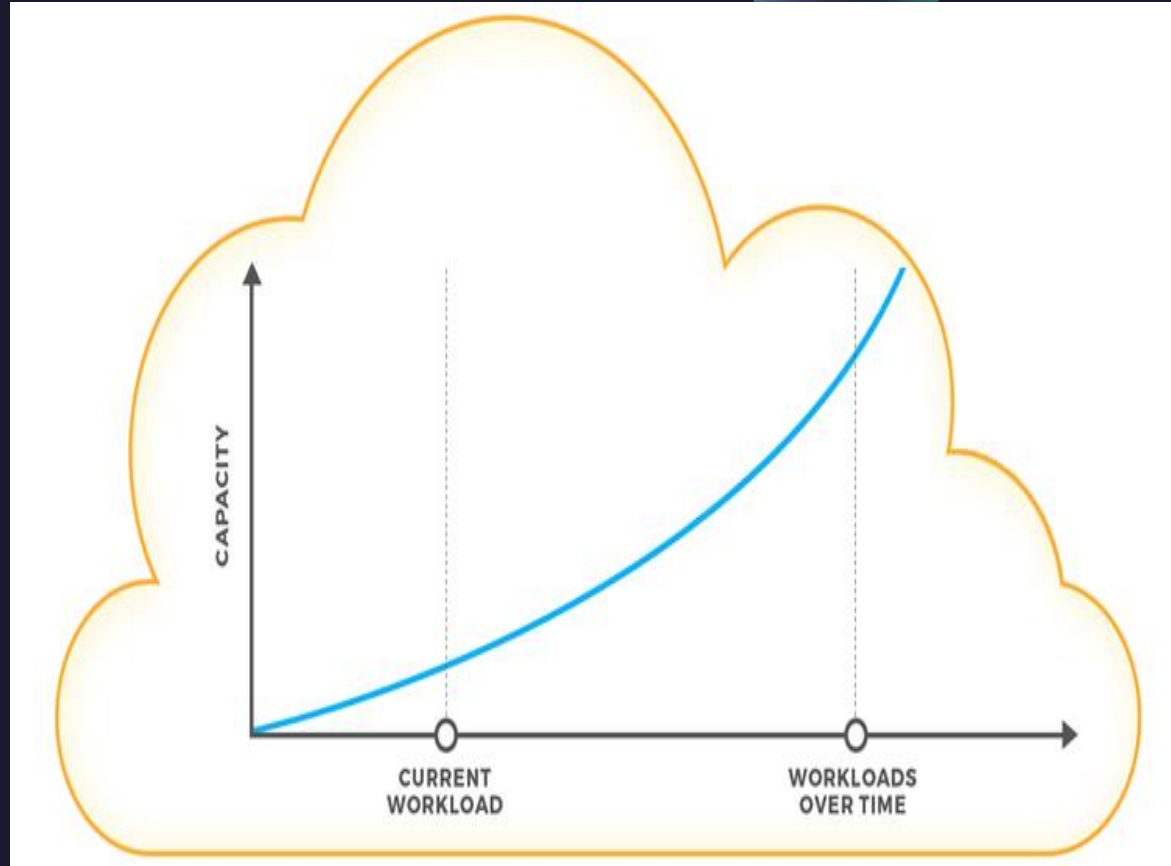
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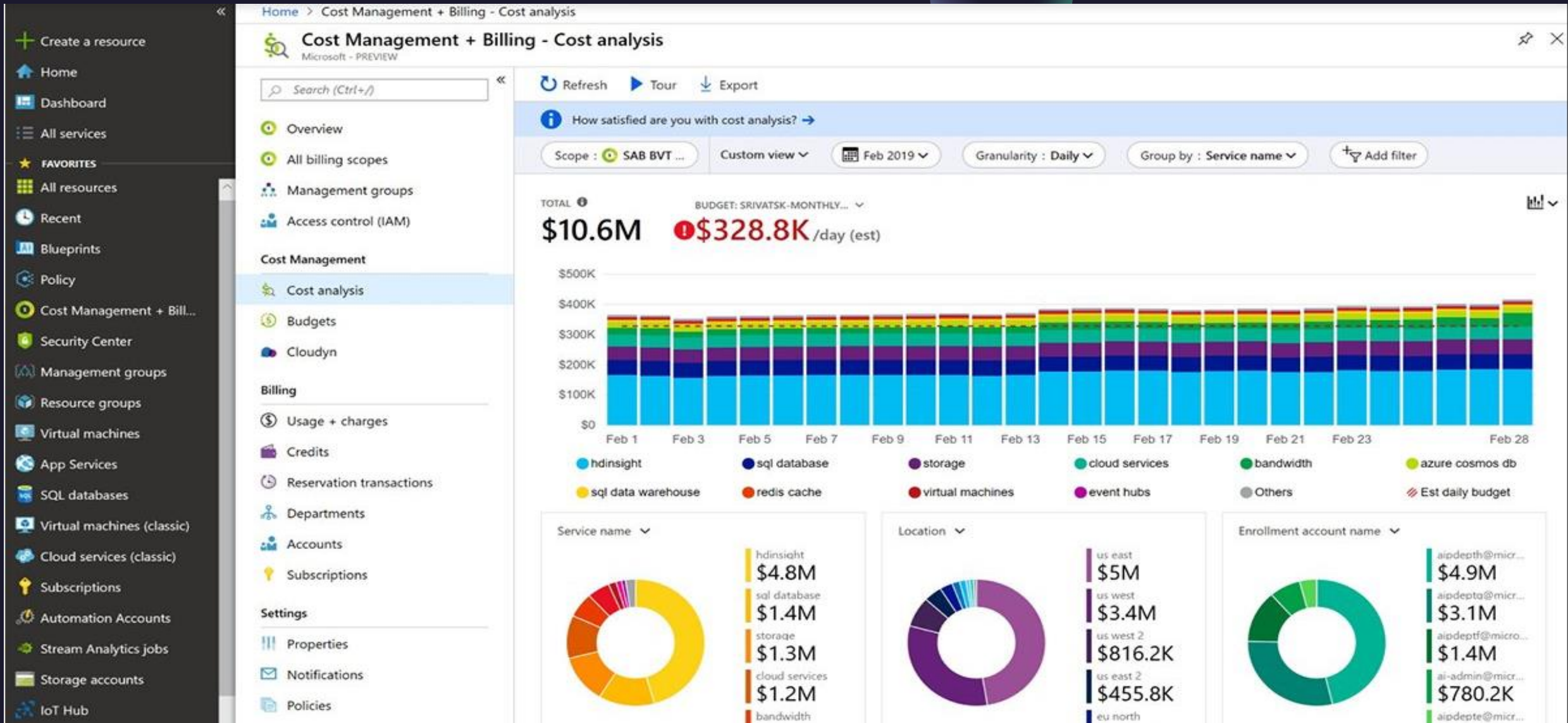
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What is Disaster Recovery?

Disaster recovery is an organization's method of regaining access and functionality to its IT infrastructure after events like a natural disaster, cyber attack, or even business disruptions related to the COVID-19 pandemic. A variety of disaster recovery (DR) methods can be part of a disaster recovery plan.
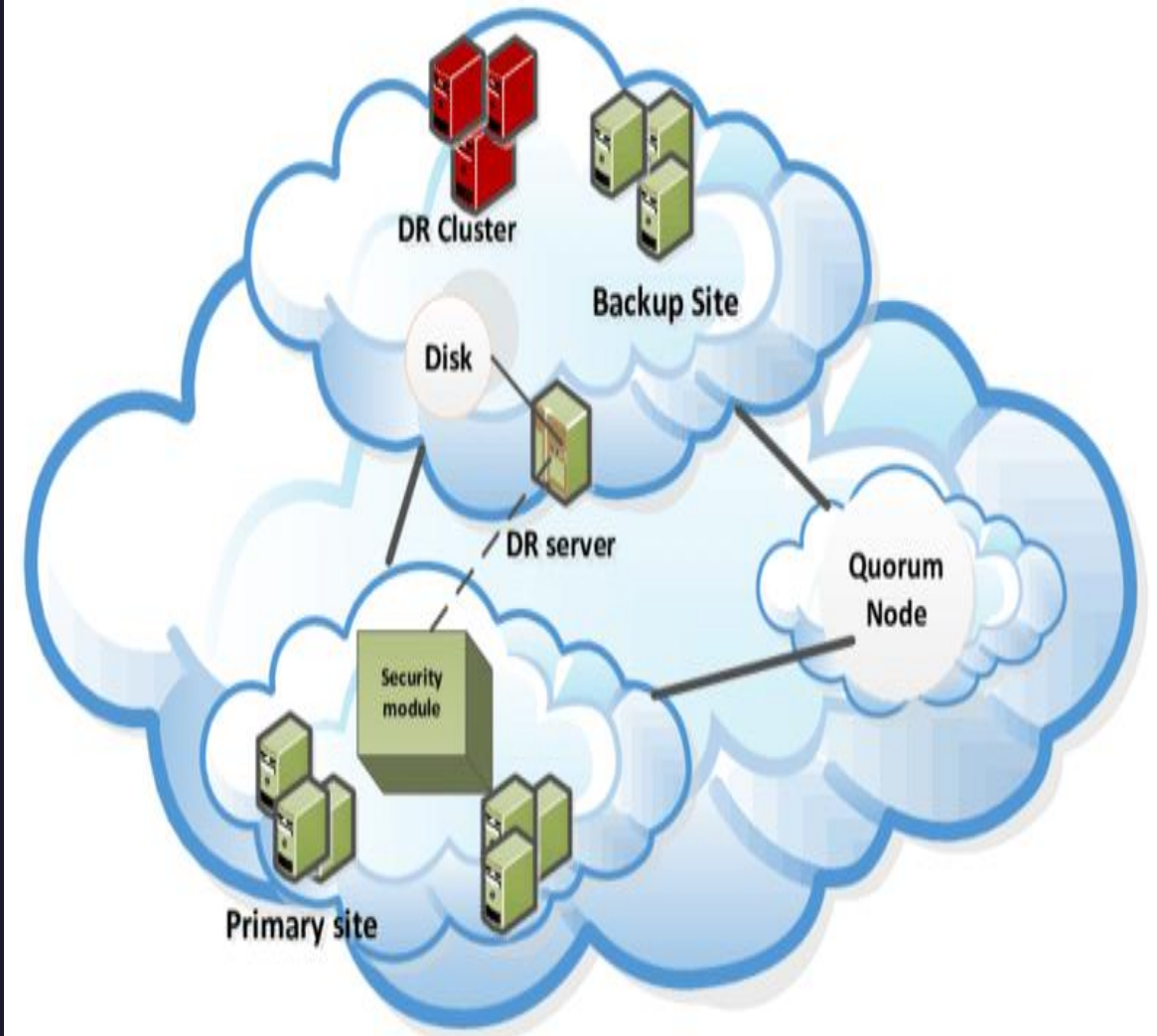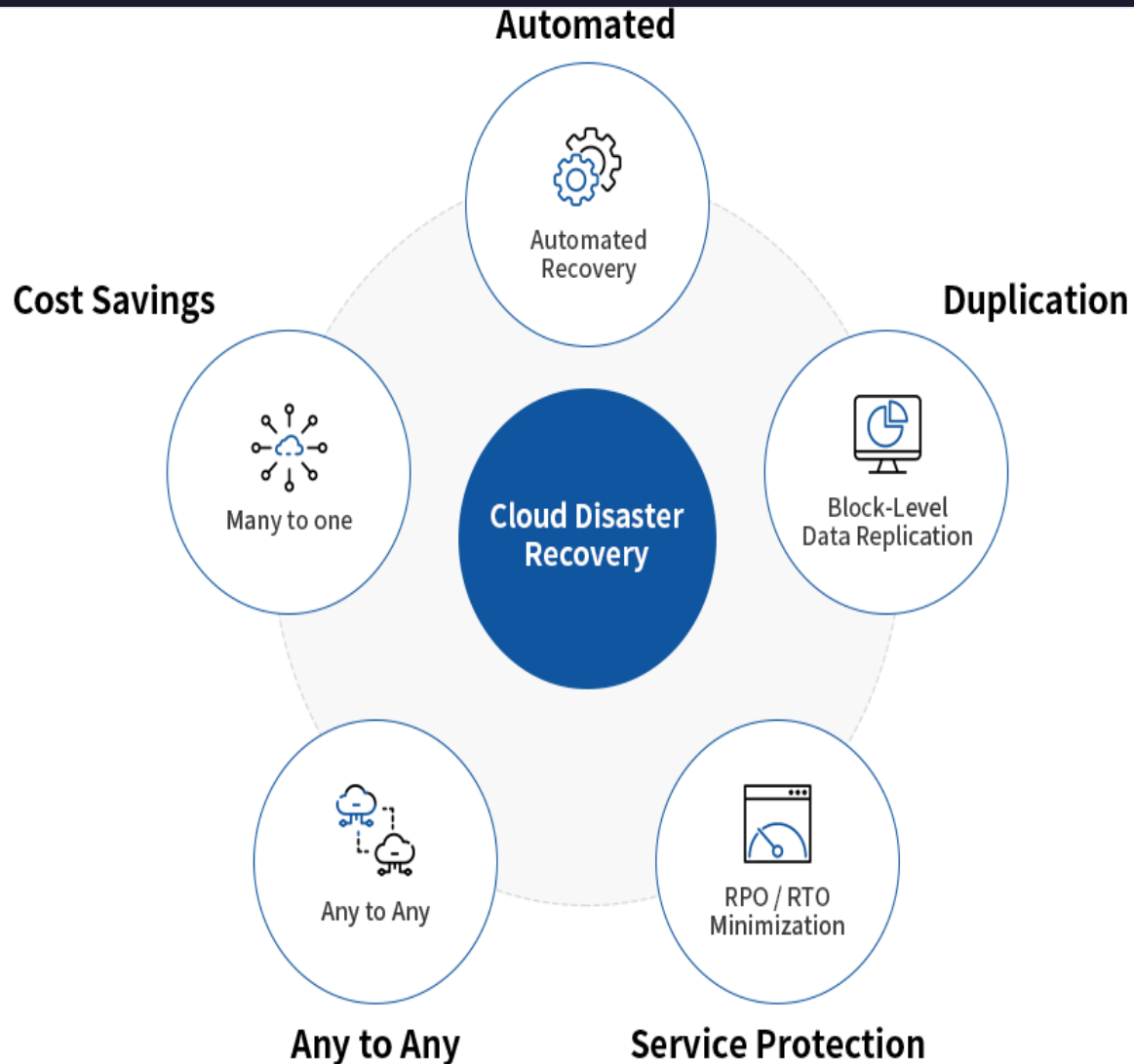
Cloud disaster recovery (CDR) is a cloud-based managed service that helps you quickly recover your organization's critical systems after a disaster and provides you remote access to your systems in a secure virtual environment. … This creates faster recovery times at a fraction of the cost.

Types of Cloud Disaster Recovery

Cloud-based data protection services are of three types:

➢ Backup as a Service (BaaS)

➢ Recovery as a Service (RaaS)
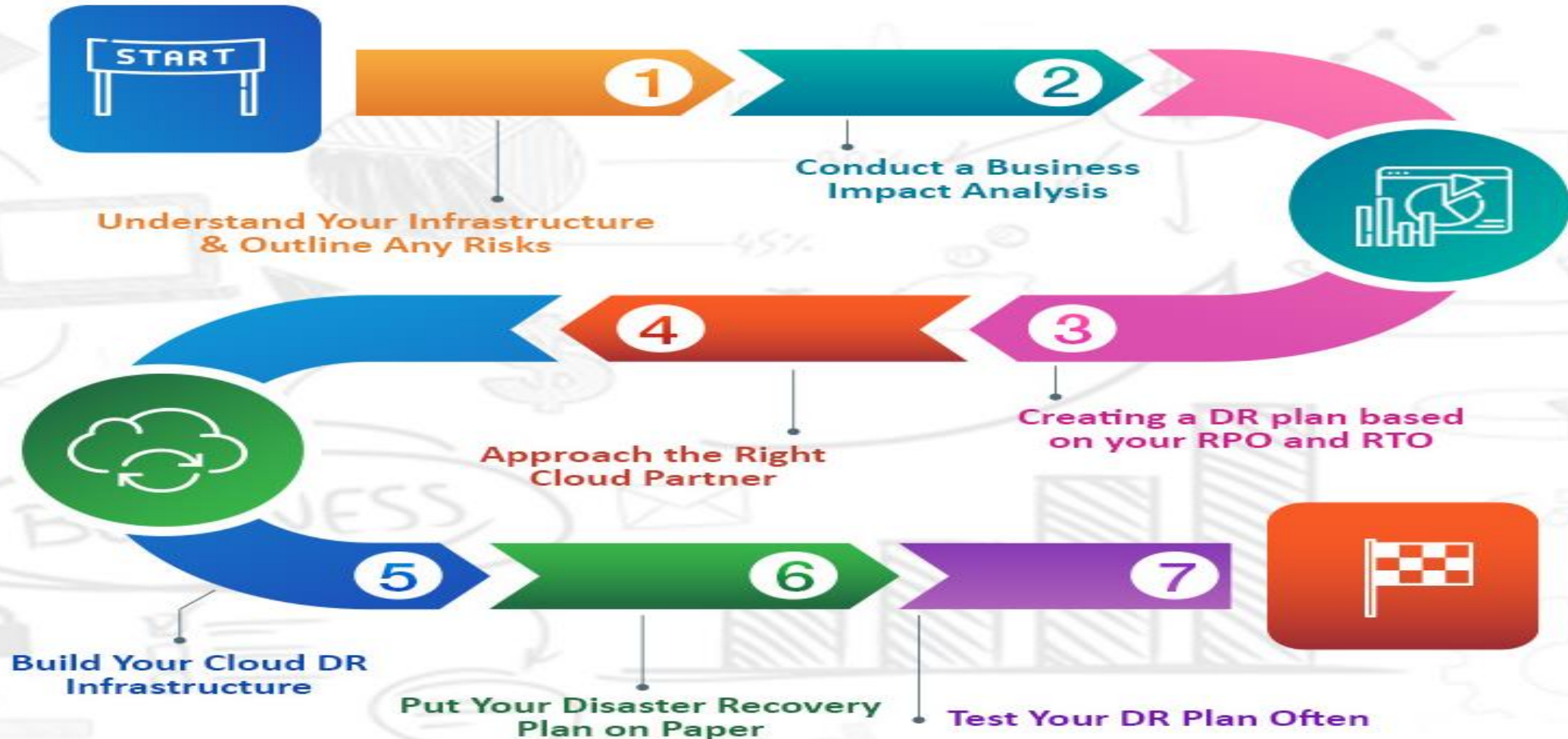
➢ Disaster Recovery as a service (DRaaS)

Types of Disaster Recovery

- ✓ Data center disaster recovery.
- ✓ Network disaster recovery.
- ✓ Virtualized disaster recovery.
- ✓ Cloud disaster recovery.
- ✓ Disaster recovery as a service (DRaaS)

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Cloud Disaster Recovery Plan

START

1. Understand Your Infrastructure & Outline Any Risks
2. Conduct a Business Impact Analysis
3. Creating a DR plan based on your RPO and RTO
4. Approach the Right Cloud Partner
5. Build Your Cloud DR Infrastructure
6. Put Your Disaster Recovery Plan on Paper
7. Test Your DR Plan Often
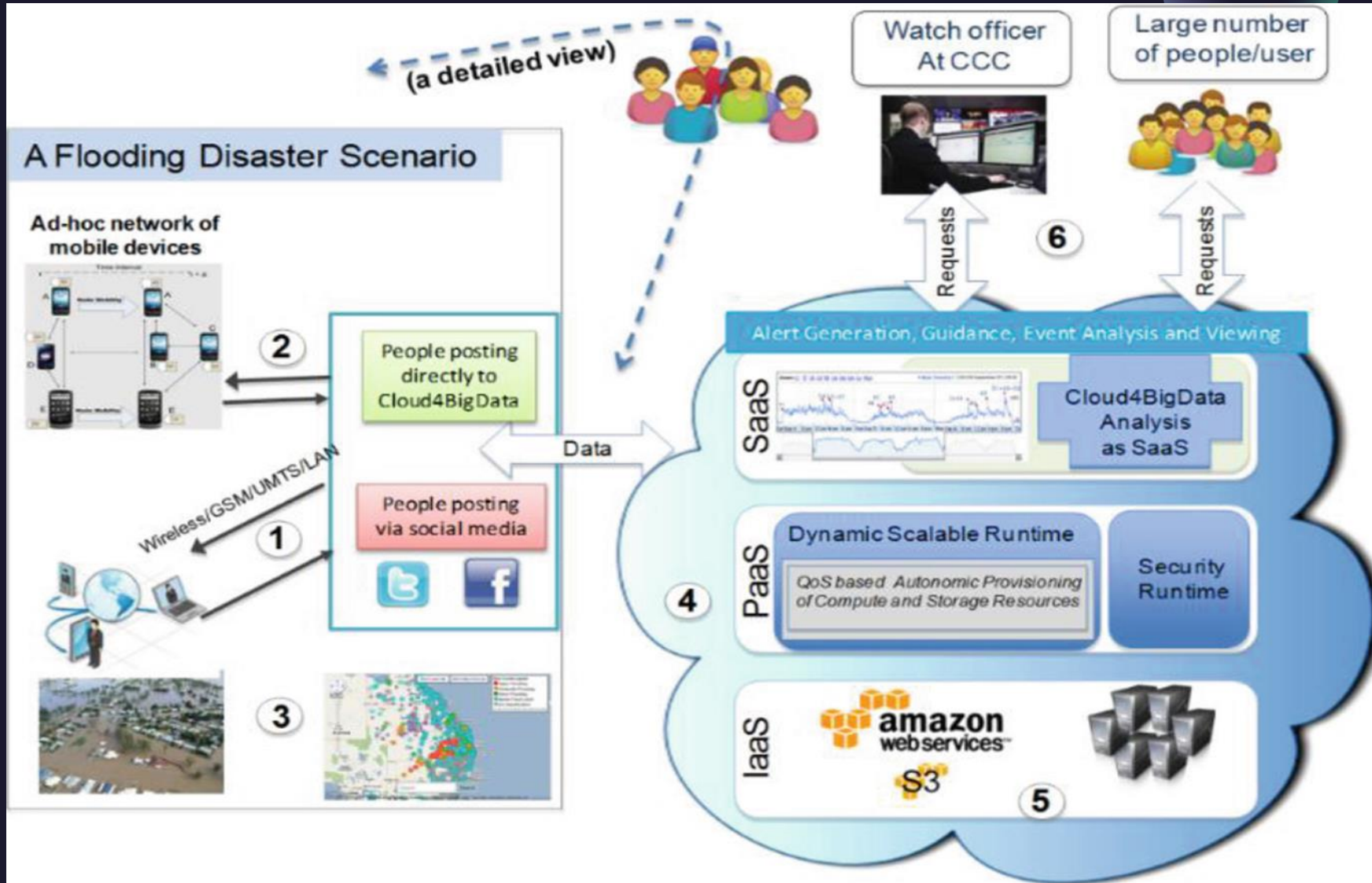
What is Disaster Management?

Disaster management is a process of effectively preparing for and responding to disasters. It involves strategically organizing resources to lessen the harm that disasters cause. It also involves a systematic approach to managing the responsibilities of disaster prevention, preparedness, response, and recovery.

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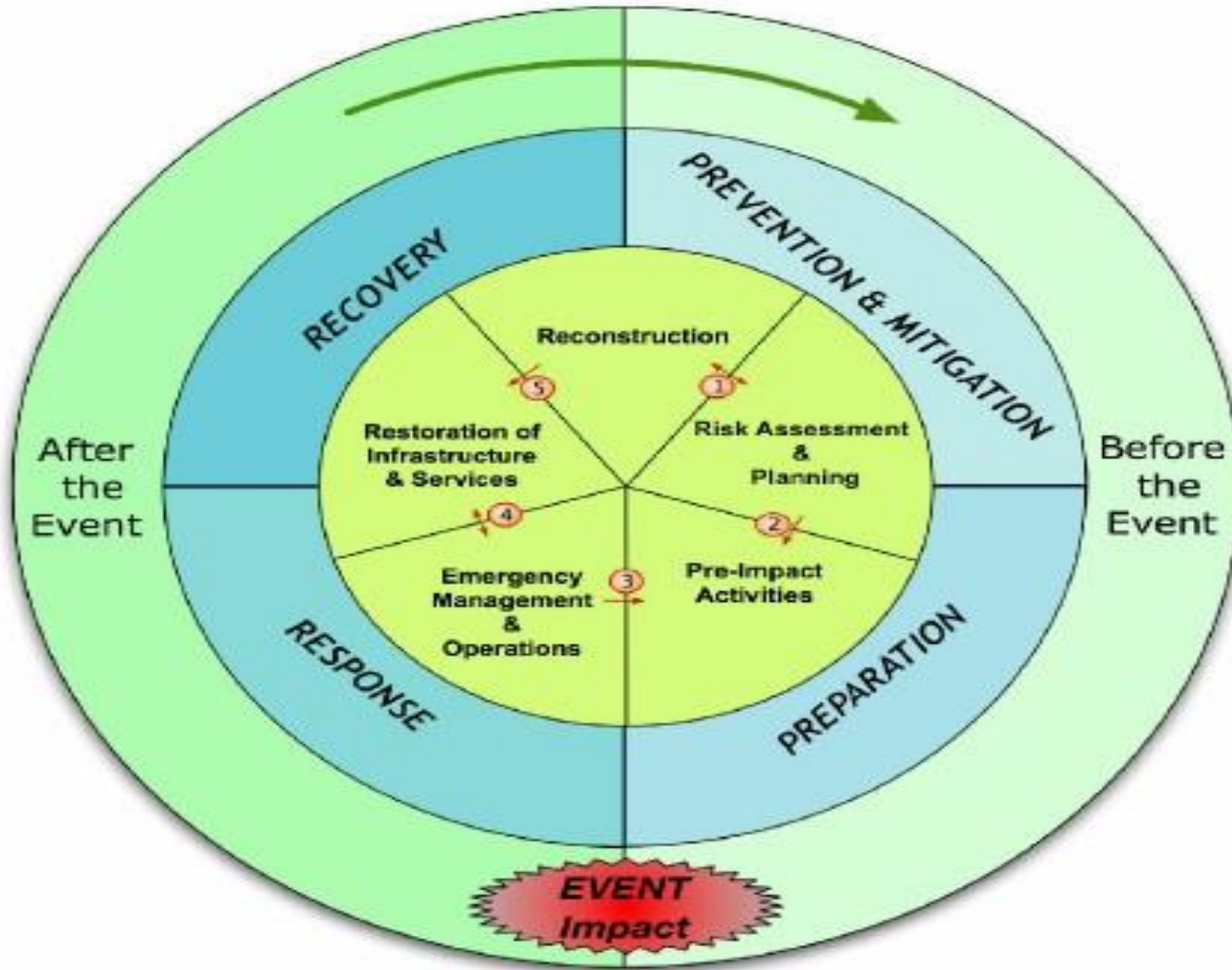
Mitigation: actions taken to eliminate a hazard or reduce its potential impact.

Preparedness: planning for major emergencies, including training and exercises.

Response: actions taken in response to emergencies.

Recovery: actions taken after a disaster to restore services and reconstruct communities.