

Introduction to Cloud Approach

CHINNAJEE RAO

Topics to be covered

- What is virtualization
- What is cloud computing
- Vendors
- AWS
- Azure
- Google app
- DevOps an intro
- Pricing
- Job roles and certifications
- conclusion

Before Cloud Computing

AWS by Chinna

Suppose you want to host a website, these are the following things that you would need to do:



Buy a stack of servers.



Keeping the peak traffic in mind, buy more servers.



Monitoring and Maintenance of your servers.

Disadvantages

AWS by Chinna



This setup is expensive.



Troubleshooting problems can be tedious and may conflict with your business goals.



Since the traffic is varying, your servers will be idle most of the time.

How did we fix this?

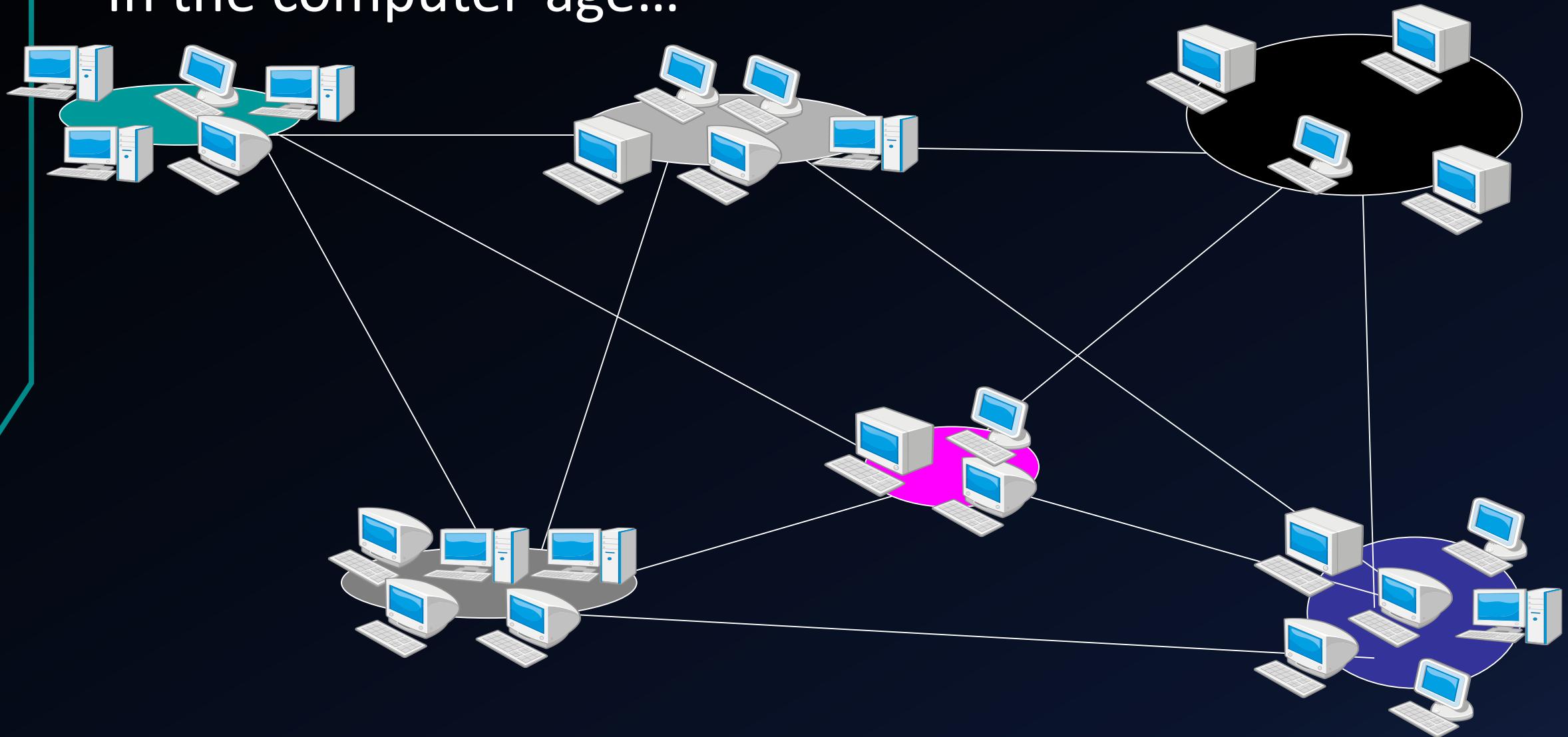


The first aid of this pain is ?

- Virtualization

What is Virtualization

In the computer-age...



A Lot of Servers/Machines...

- Web server
- Mail server
- Database server
- File server
- Proxy server
- Application server
- ...and many others

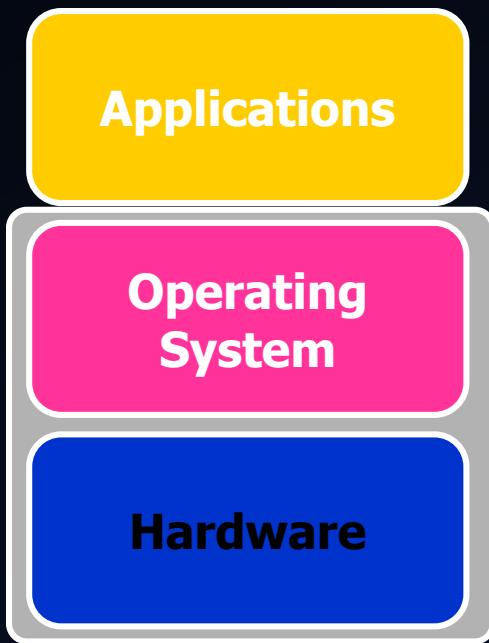
A Lot of Servers/Machines...

- The data-centre is **FULL**
 - Full of under utilized servers
 - Complicate in management
- Environmental problem
 - Green IT

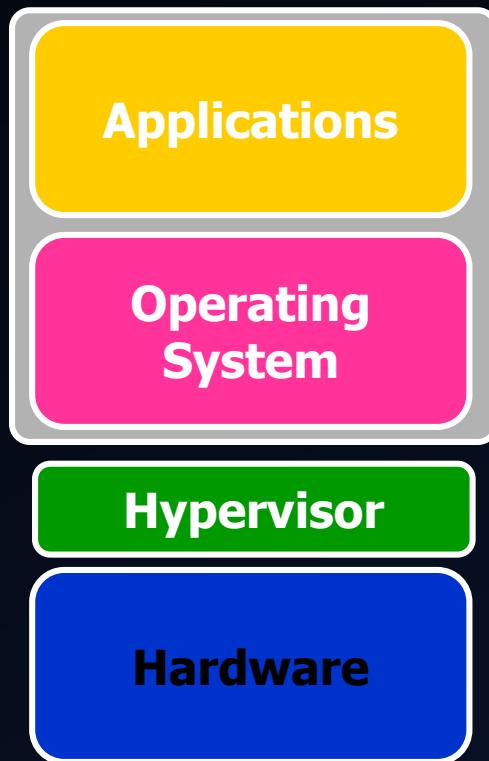
Virtualization

- **Virtualization** -- the abstraction of computer resources.
- Virtualization hides the physical characteristics of computing resources from their users, be they applications, or end users.

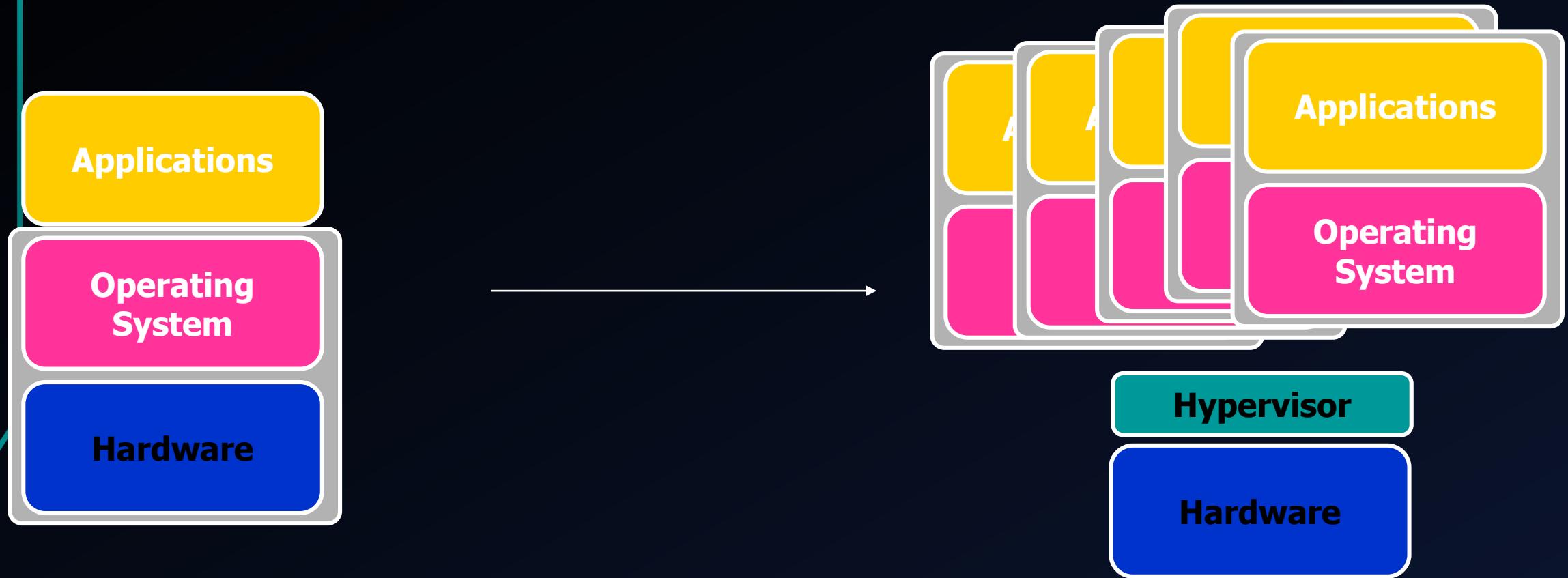
The Use of Computers



Virtualization



Virtualization -- a Server for Multiple Applications/OS

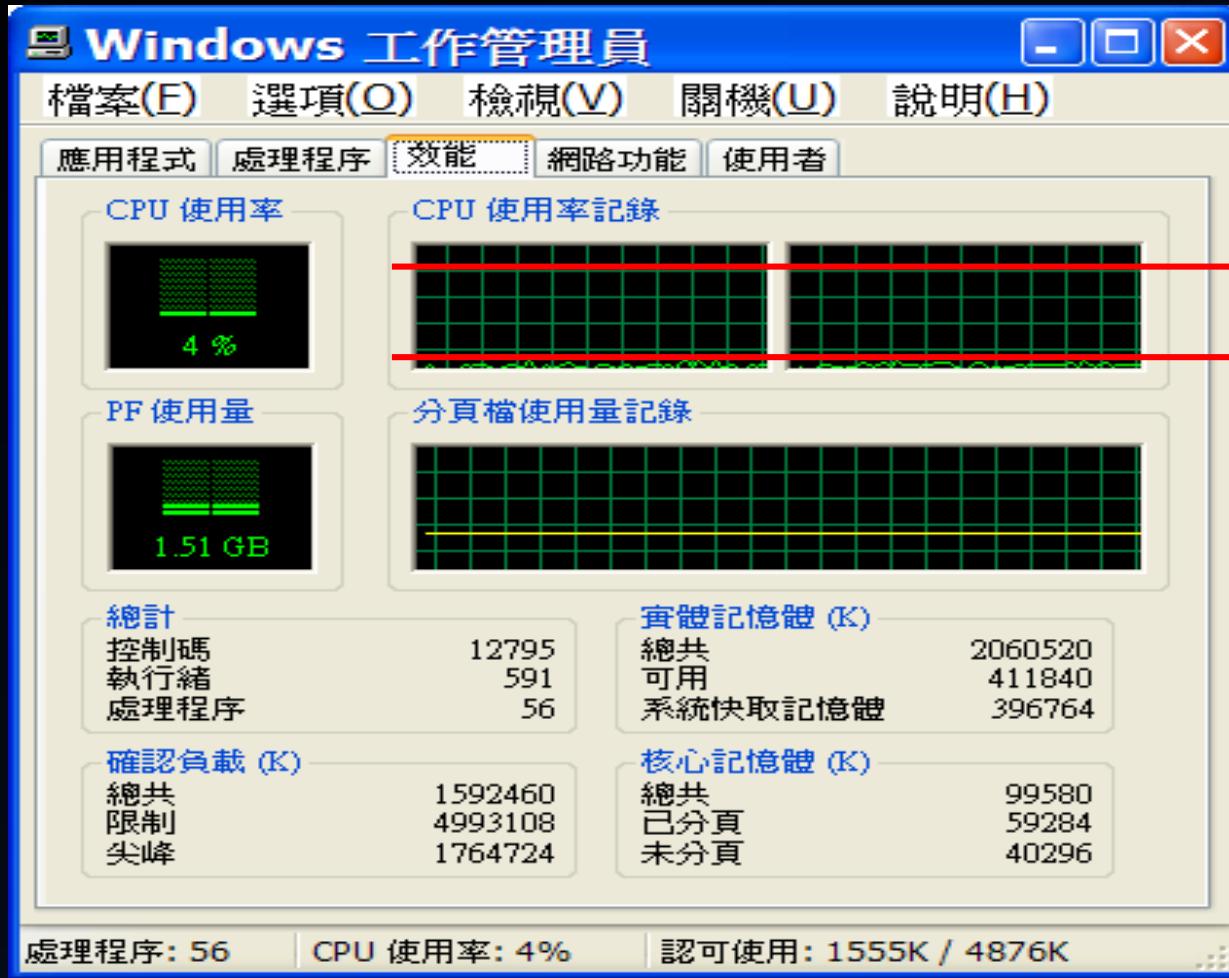


Hypervisor is a software program that manages multiple operating systems (or multiple instances of the same operating system) on a single computer system.

The hypervisor manages the system's processor, memory, and other resources to allocate what each operating system requires.

Hypervisors are designed for a particular processor architecture and may also be called **virtualization managers**.

Capacity Utilization



Virtualized system (high)

High utilized*

Low utilized

Stand alone system (low)

* But not overloaded...

Why now?

- 1960–1999
 - IBM, CP-40, CP/CMS, S/360-370, VM370, Virtual PC, VMware
- 2000–2005
 - IBM z/VM, Xen
- 2006
 - Intel VT-x
 - AMD's AMD-V
- 2008—

Types of Virtualization

- Virtual memory
- Desktop virtualization
- Platform virtualization
- Storage virtualization
- Network virtualization
- Application virtualization
 - Portable application
 - Cross-platform virtualization
 - Emulation or simulation
 - Hosted Virtual Desktop

Platform virtualization

- Type 1
 - Full virtualization
 - Paravirtualization
- Type 2
 - Hosted environment (e.g. User-mode Linux)

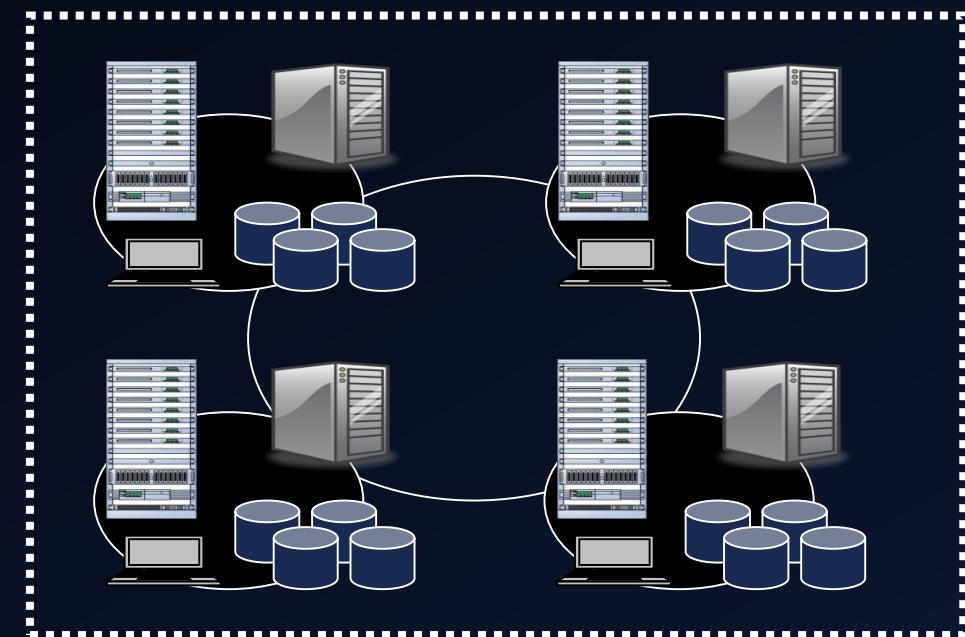
Issues in Virtualization for Cloud-Computing

- Aspects and expectation from
 - End-user
 - Operator/Manager



Virtualization

==



Issues in Virtualization for Cloud-Computing

- Virtualization implemented on

- a single machine (with multi-core CPUs)
- a cluster of machines (with multi-core CPUs)

- The state-of-the-art

- Running a Xen or a cluster of Xens



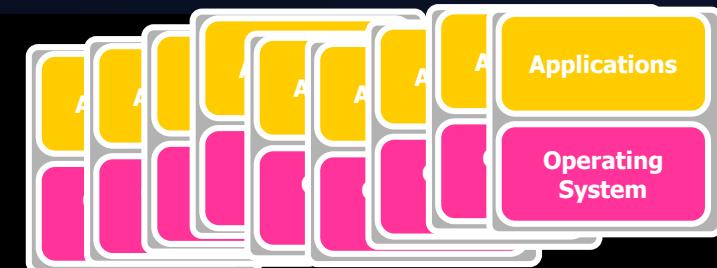
Virtualization

=



or

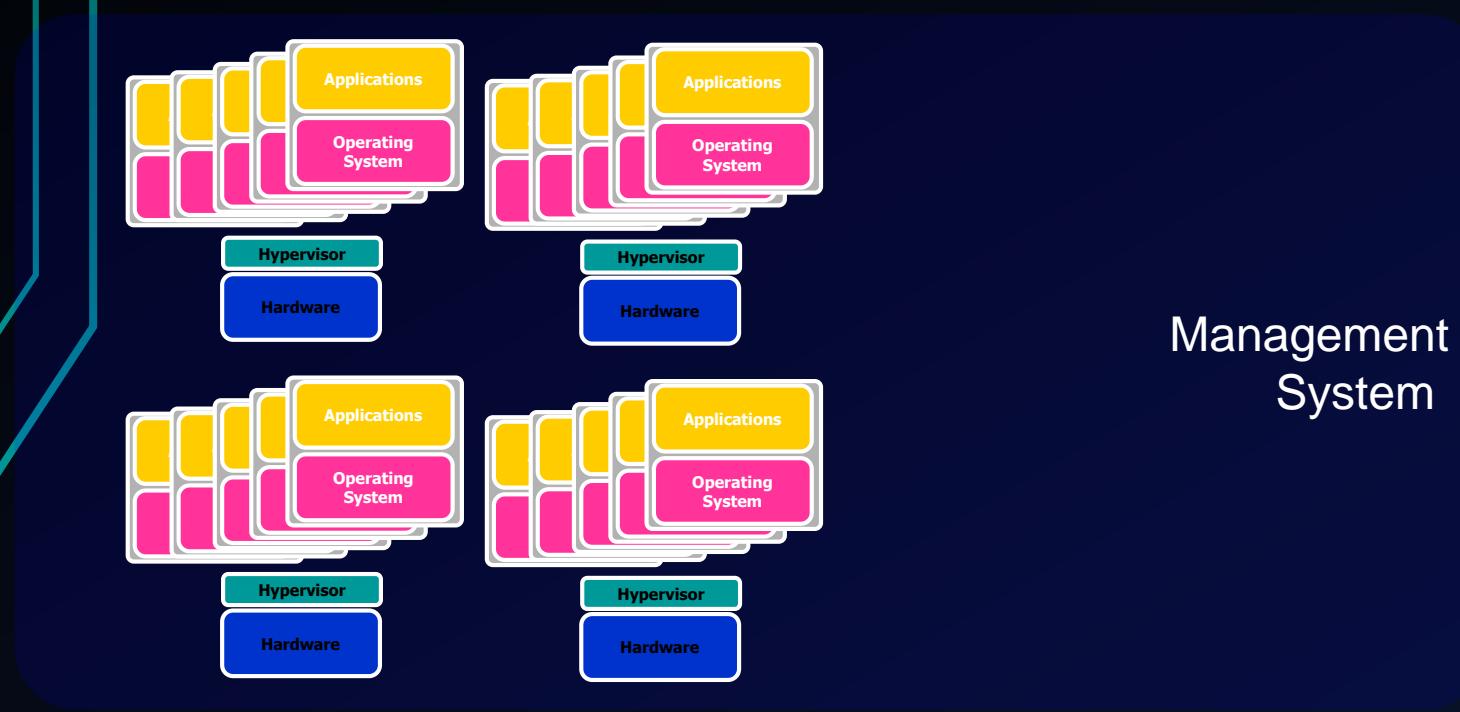
?



or

Issues in Virtualization for Cloud-Computing

- Abiquo/abicloud may provide partial solutions



Management
System

Virtualization
= 

Popular hypervisors

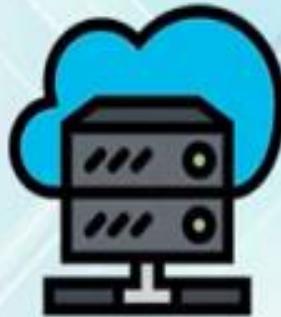
- Xen
- KVM
- QEMU
- virtualBox
- VMWare
- Xen is the selected hypervisor of the project.

Cloud Computing

INTRODUCTION TO AWS

How it Happens Now?

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Put your data on Cloud Servers and voila! No more buying expensive servers!



Scalability! Your server capacity will vary according to traffic, how cool is that?



Your cloud provider will manage your servers, hence no worries about the underlying infrastructure.

What is Cloud Computing?

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It is the use of remote servers on the internet to store, manage and process data rather than a local server or your personal computer.



Why the Cloud?

On Premises

Applications
Data
Runtime
Middleware
O/S
Virtualization
Servers
Storage
Networking

You scale, make resilient and manage

Infrastructure
(as a Service)

Applications
Data
Runtime
Middleware
O/S
Virtualization
Servers
Storage
Networking

You scale, make
resilient & manage

Platform
(as a Service)

Applications
Data
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Networking

You manage

Platform
(as a Service)

Applications
Data
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Storage
Networking

Scale, resilience and
management by vendor

Software
(as a Service)

Applications
Data
Runtime
Middleware
O/S
Virtualization
Servers
Storage
Networking

Scale, resilience and
management by vendor

Managed by vendor

Broad
Network Access

Rapid Elasticity

Measured Service

On-Demand
Self-Service

Resource Pooling

Software as a
Service (SaaS)

Platform as a
Service (PaaS)

Infrastructure as a
Service (IaaS)

Public

Private

Hybrid

Community

Essential Characteristics

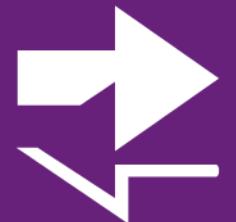
Service Models

Deployment Models

Why the Cloud?

- Rapidly setup environments to drive business priorities
- Scale to meet peak demands
- Increase daily activities, efficiency and reduced cost.

Speed



Scale



Economics



Multi-Tenancy

One Application to Rule Them All!

- The cloud provides many benefits
 - You develop and deploy to the cloud
 - Staging/Production cloud environments
 - Cloud management & monitoring
- You'd like to share those effort for all of your customers
- A Multi-tenant application is one application that serves many isolated application instances
 - Beware of privacy



Cloud Players

ARICH

vmware®

 terremark®

 Joyent®

 rackspace

 amazon
web services

Google Cloud Platform



DigitalOcean



 Microsoft Azure



AWS

INTRODUCTION TO AWS

What is AWS?

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Amazon Web Services (AWS) is a secure cloud services platform, offering compute power, database storage, content delivery and other functionality to help businesses scale and grow.

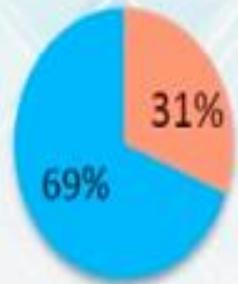


Having said that, let's take a broader look at what Amazon has to offer us, and understand the various domains in AWS.

Why AWS?

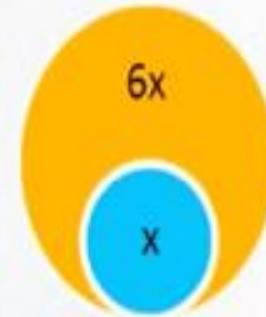
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AWS Other Cloud Providers



AWS Global Cloud Computing
Market Share

AWS All Competitors Combined

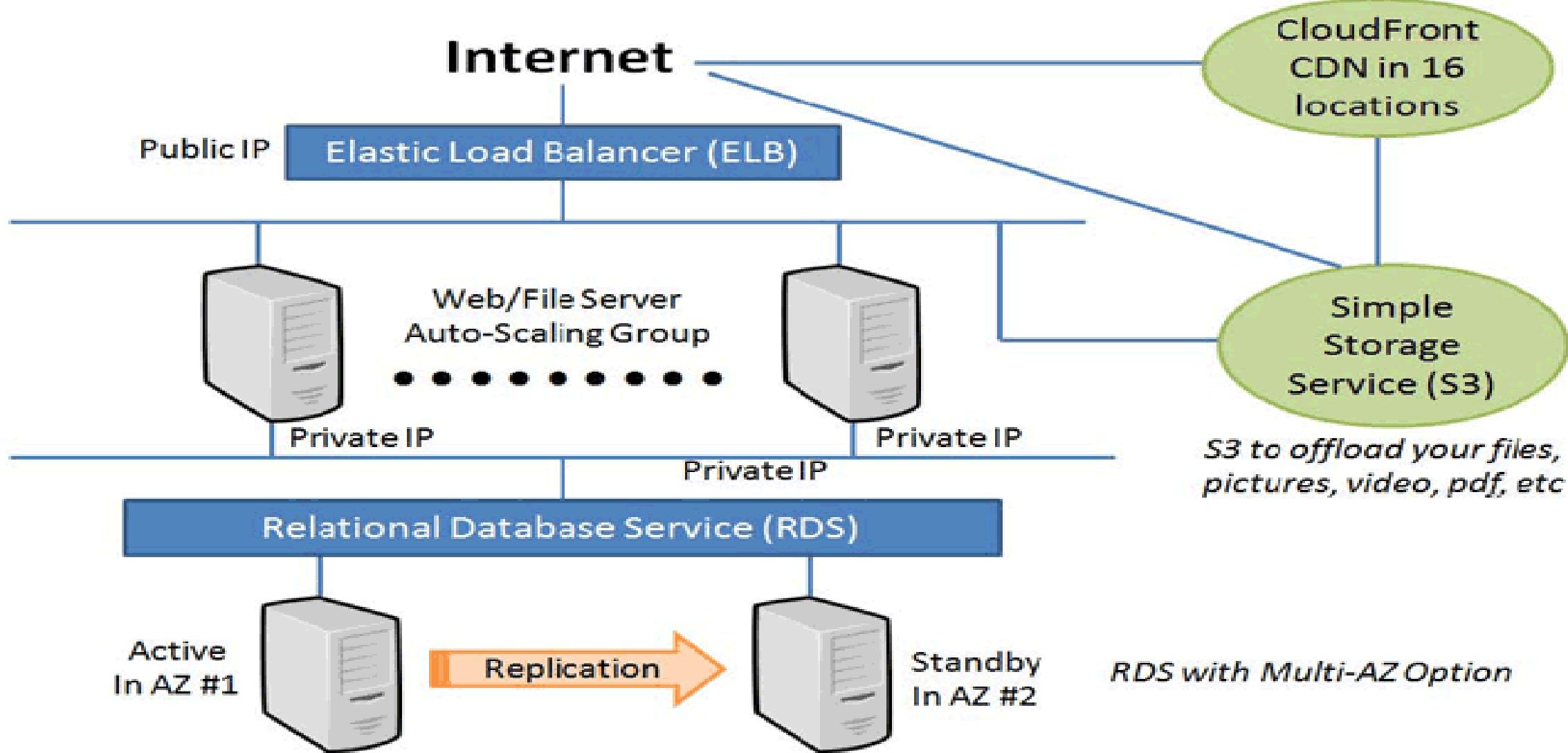


Server Capacity

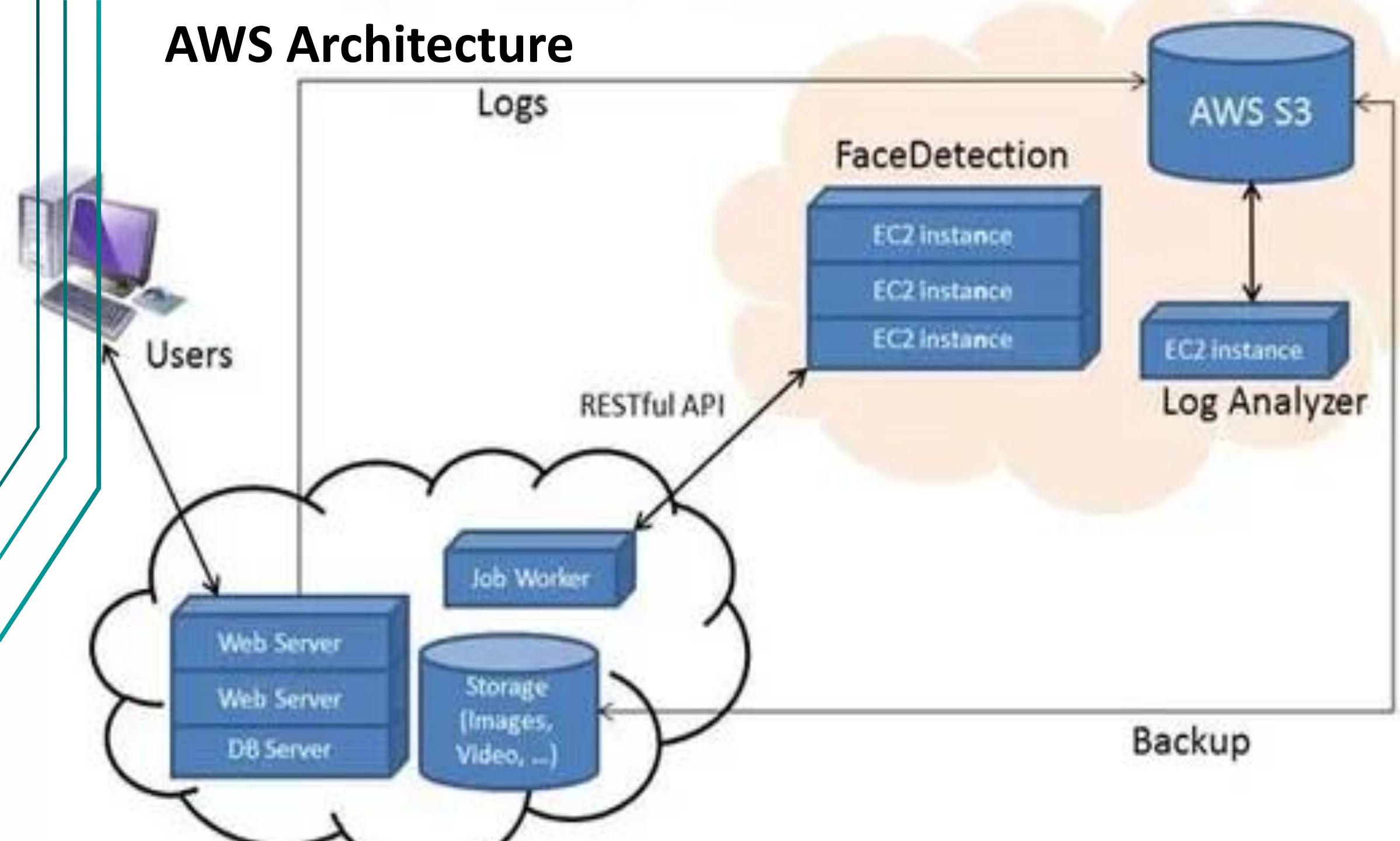


Flexible Pricing

AWS Environment



AWS Architecture



AWS Customers and success stories

- <https://aws.amazon.com/solutions/case-studies/all/>

Domains in AWS

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Different Domains in AWS

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Compute



Migration



Security & Identity,
Compliance



Storage



Networking and
Content Delivery



Messaging



Database



Management
Tools

AWS Services

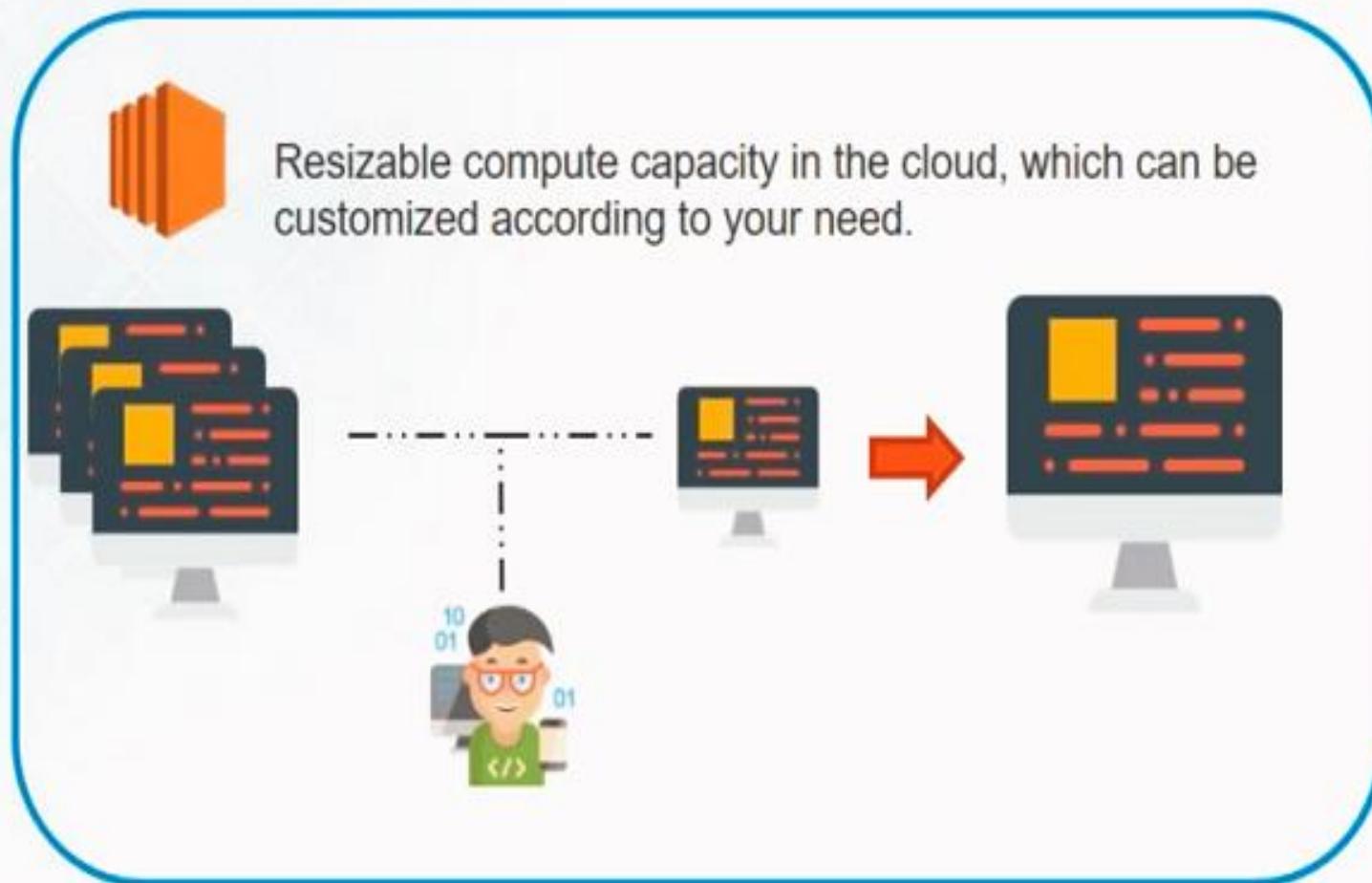
INTRODUCTION TO AWS

AWS Compute Service

INTRODUCTION TO AWS

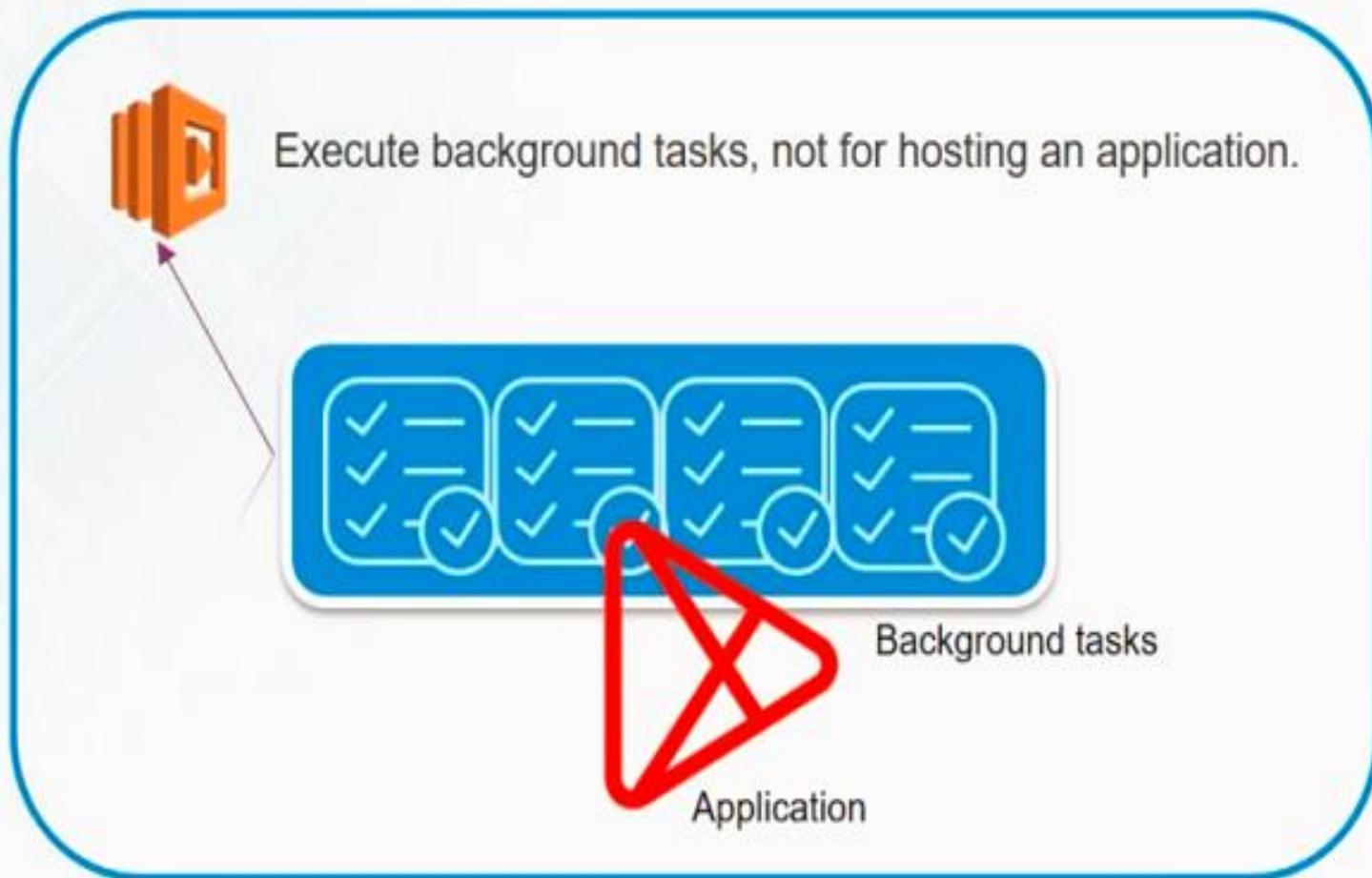
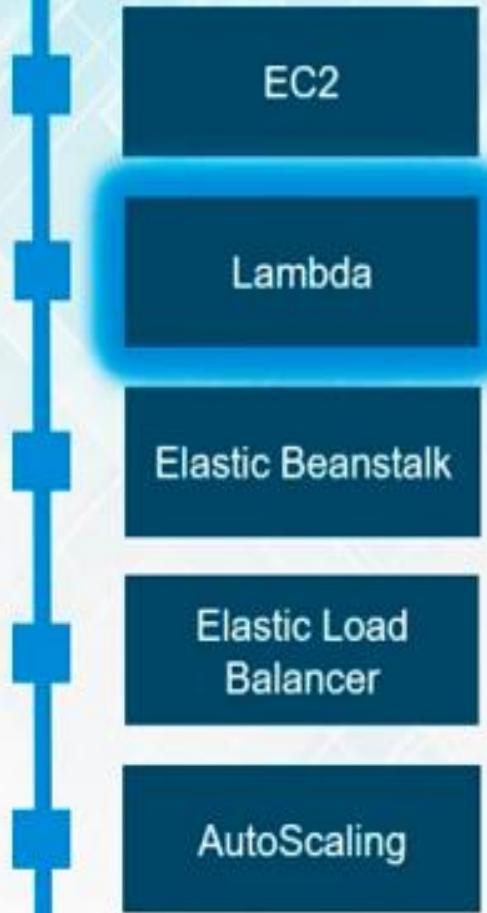
AWS Compute Services

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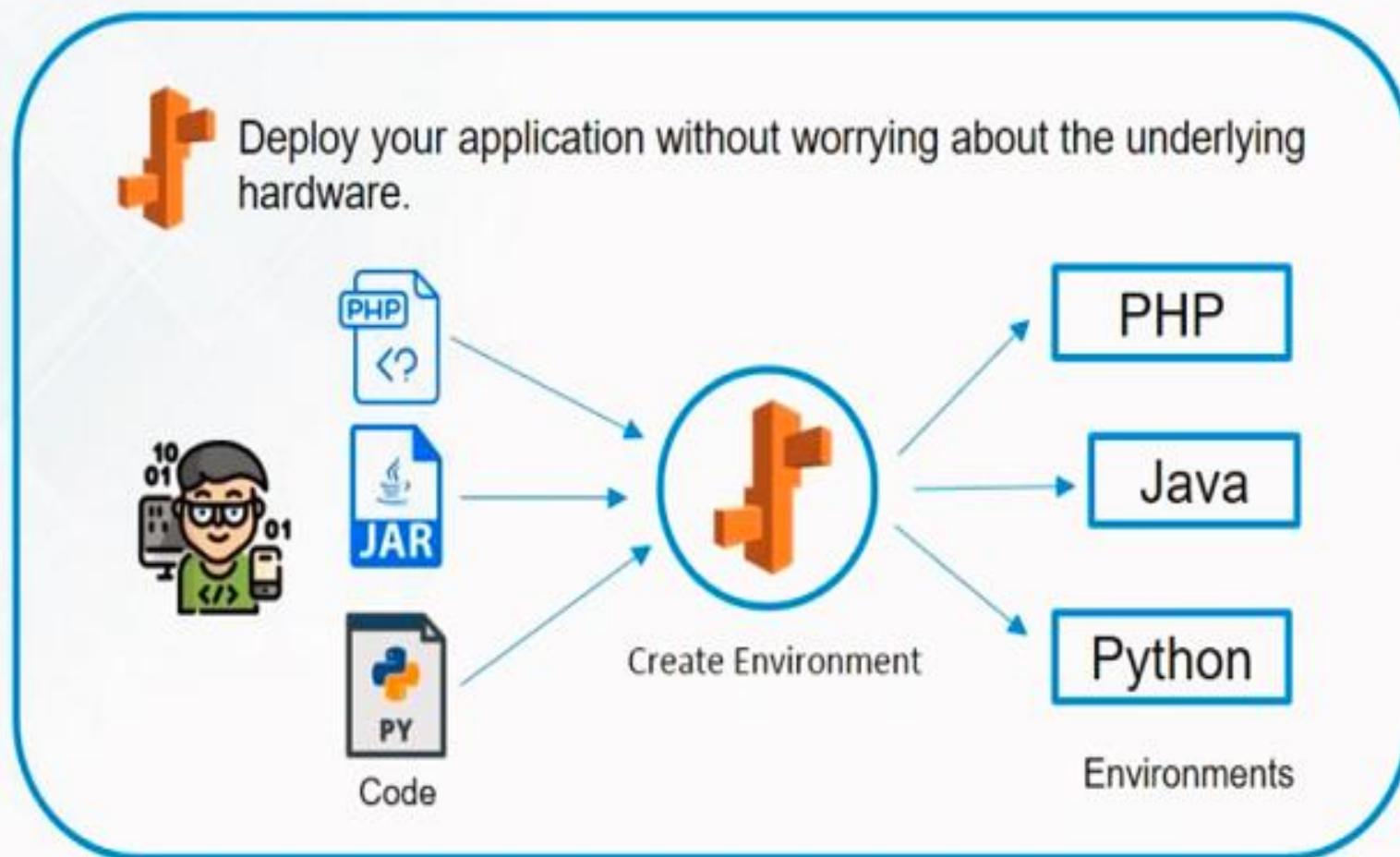
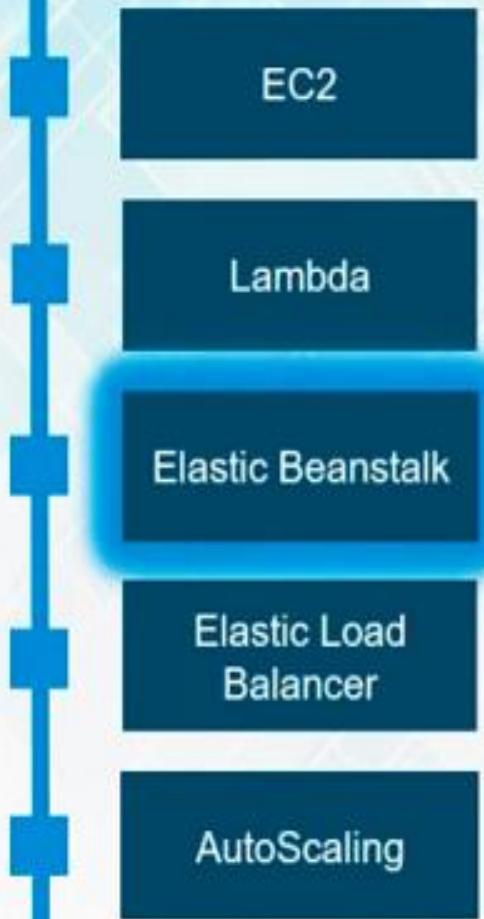
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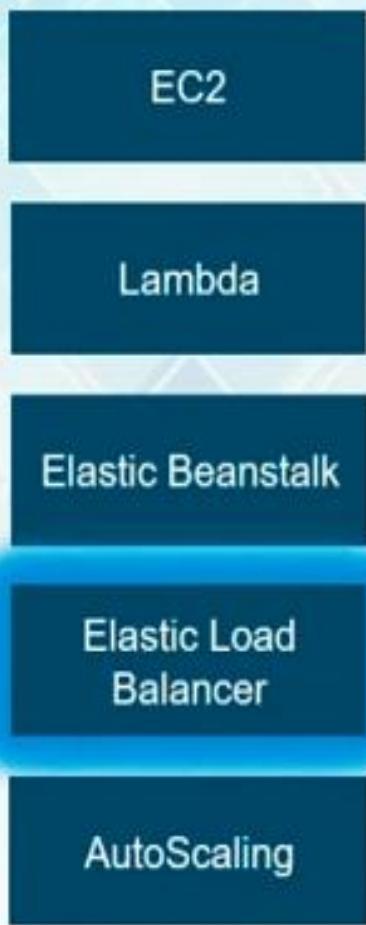
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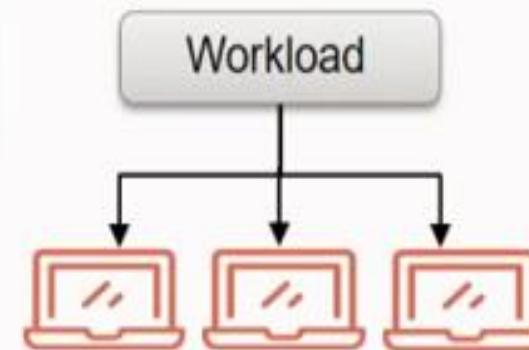
AWS Compute Services

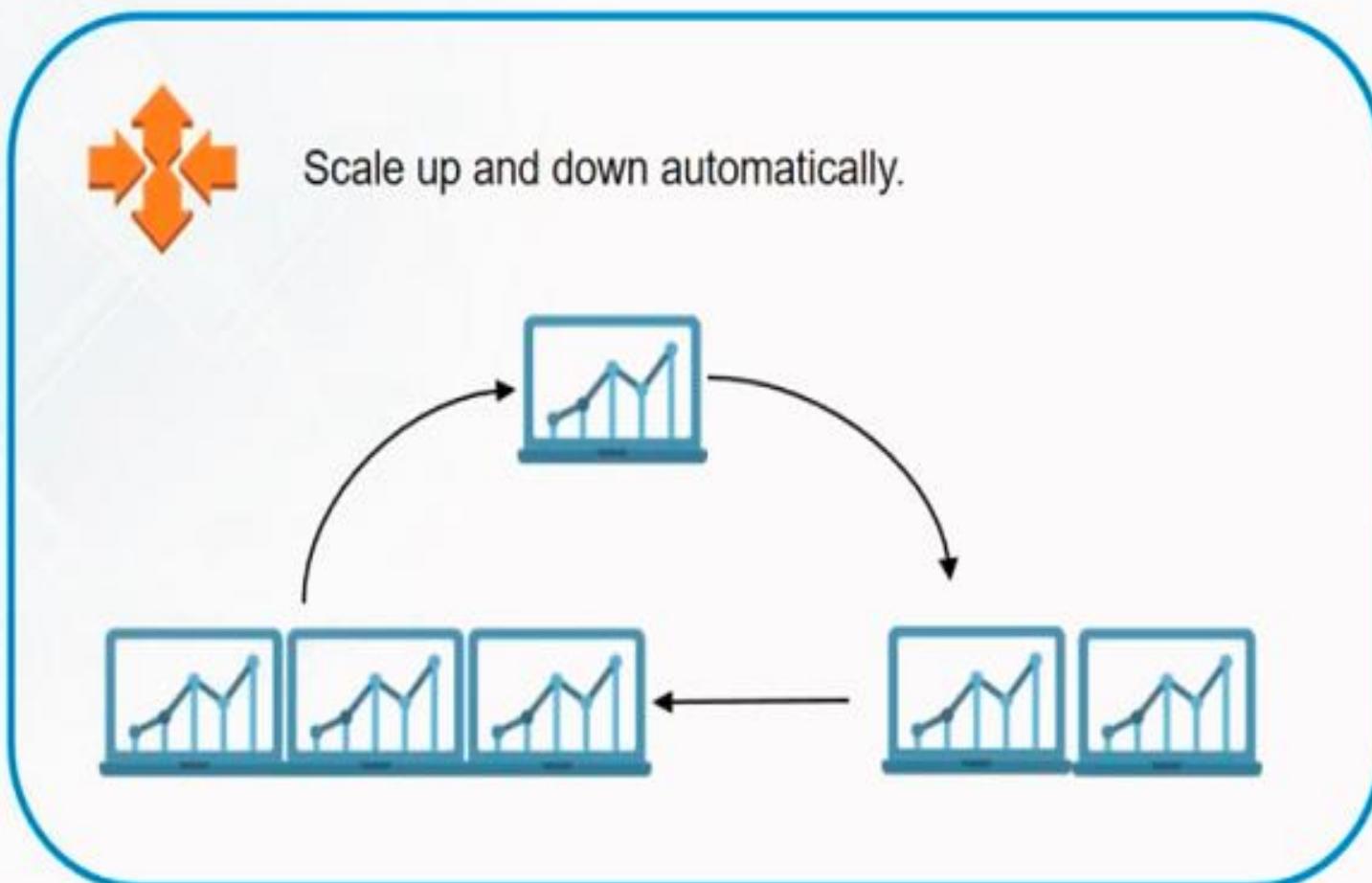
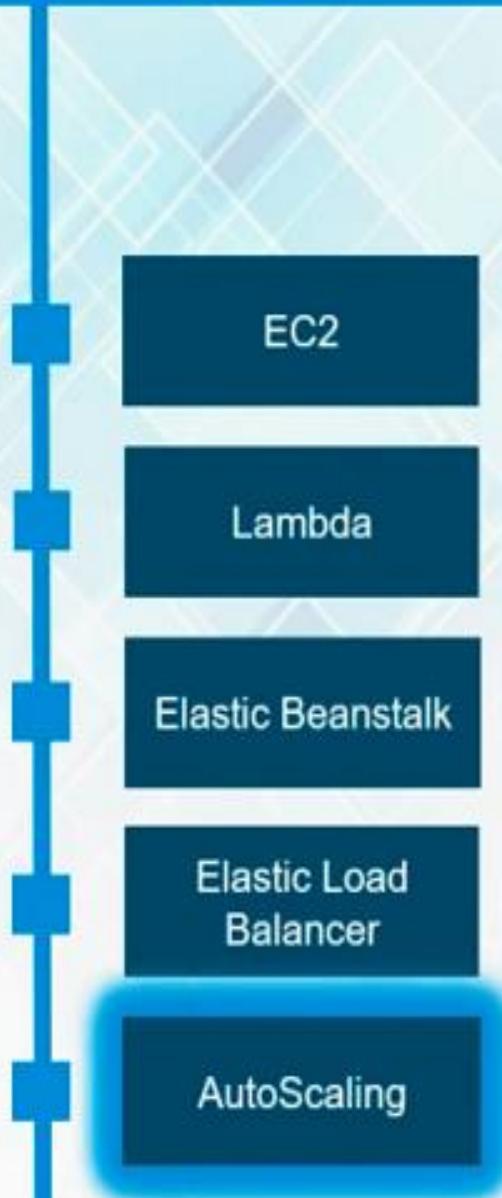
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Distributes the workload on the deployed instances







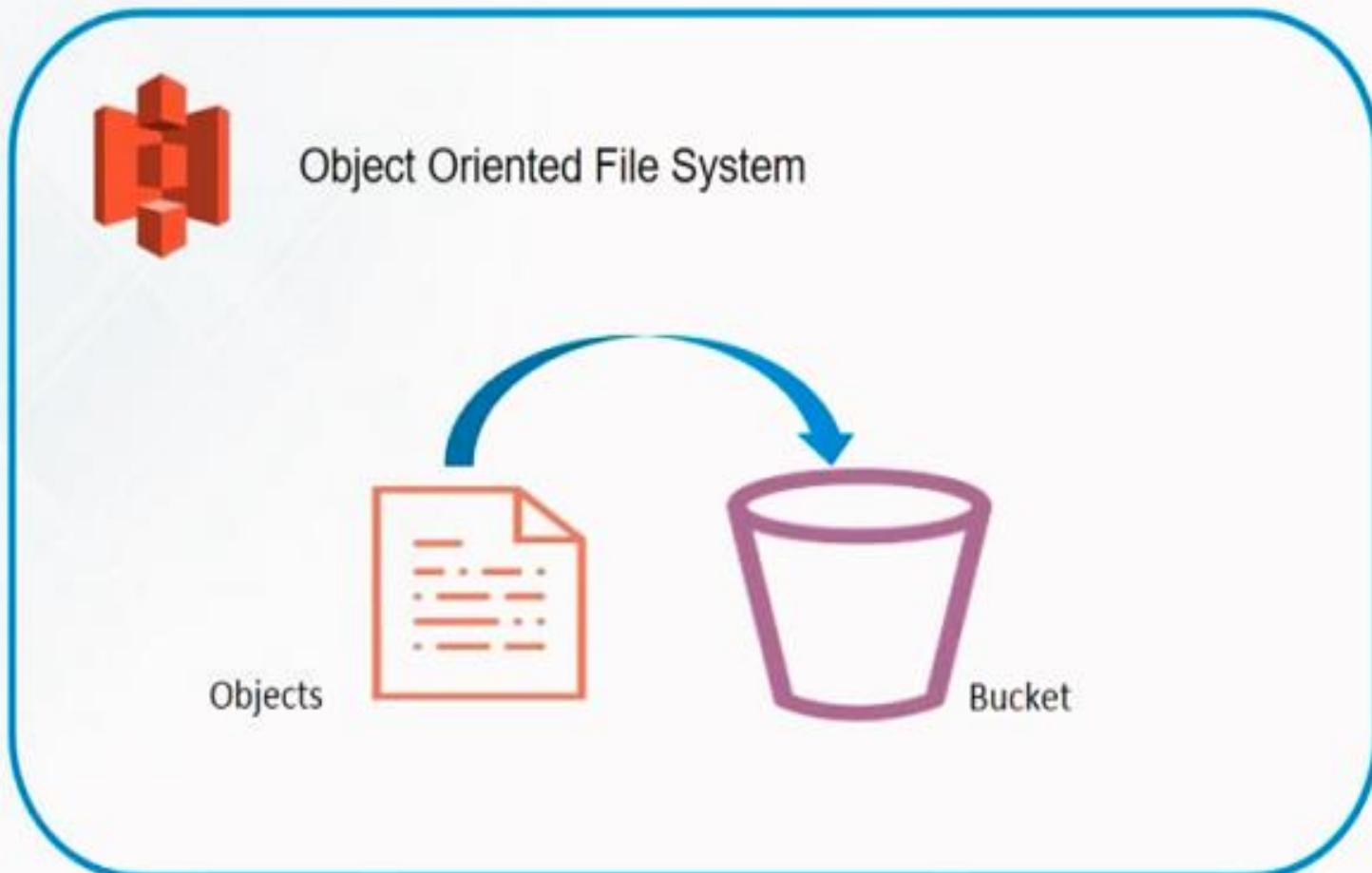
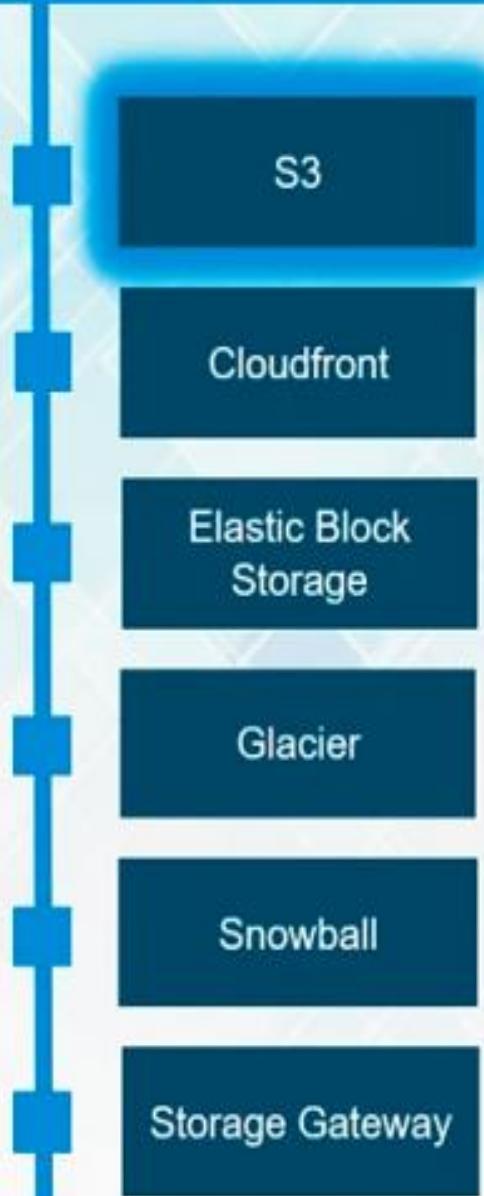
demo

AWS Storage Service

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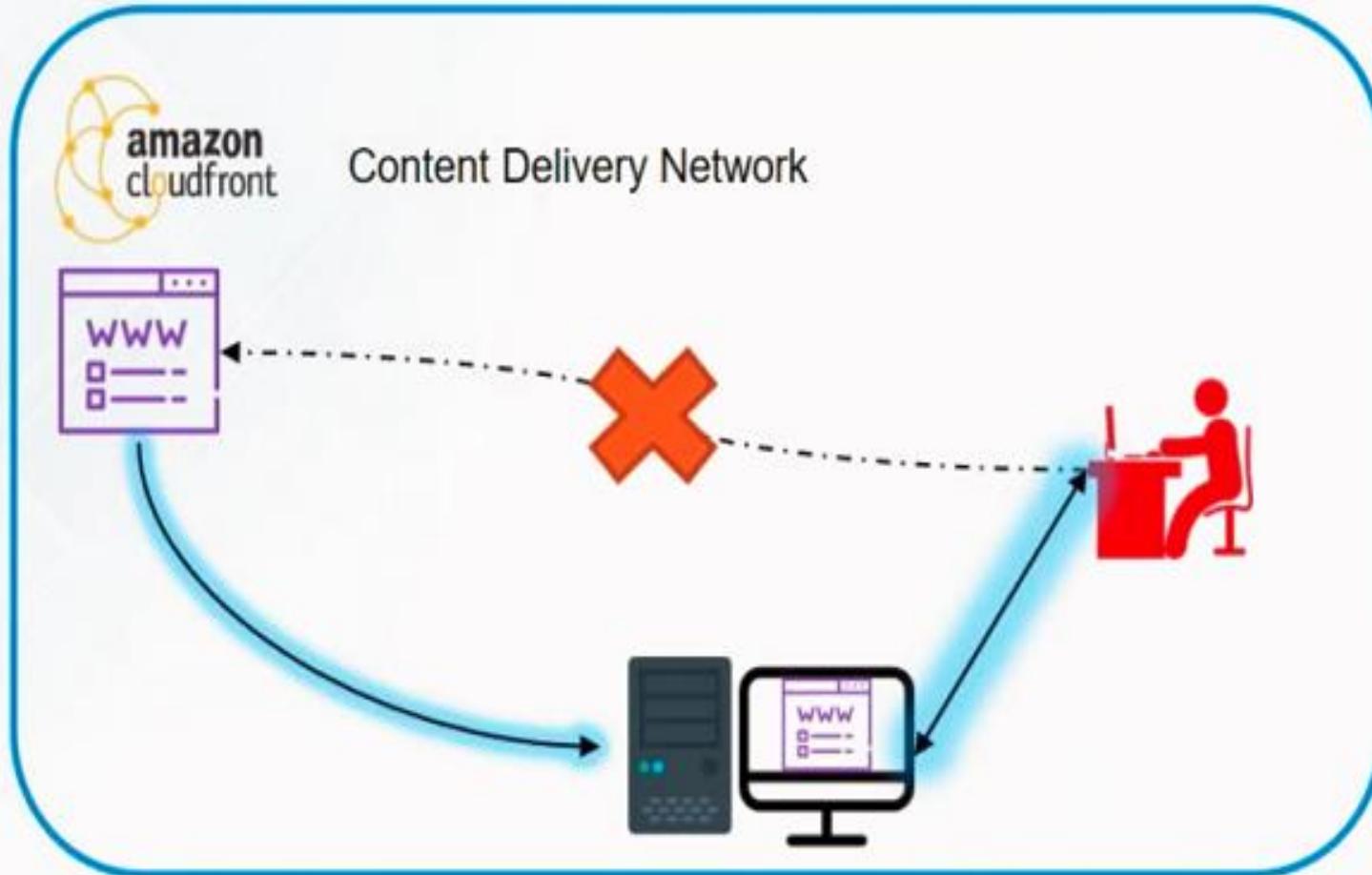
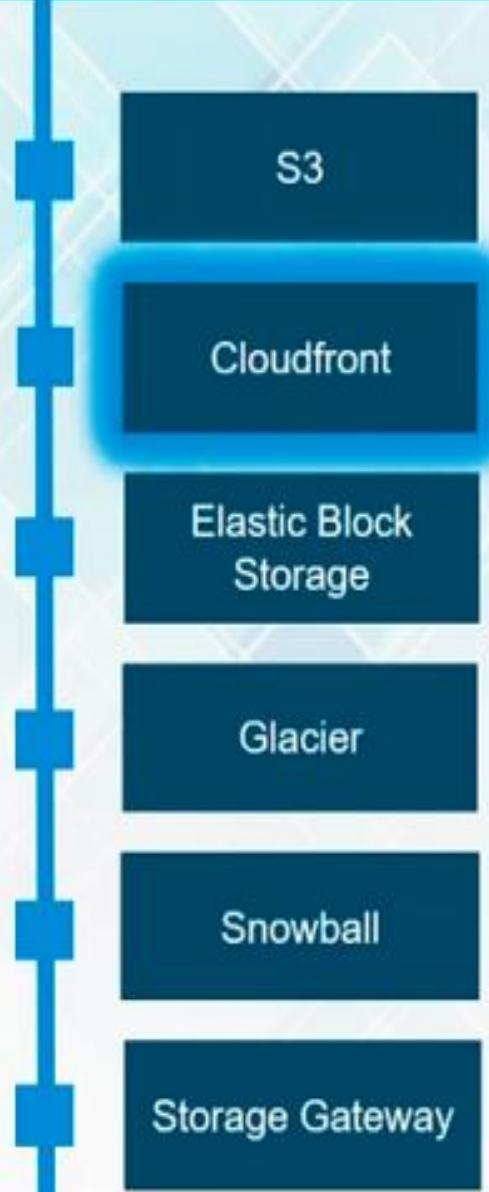
AWS Storage Services

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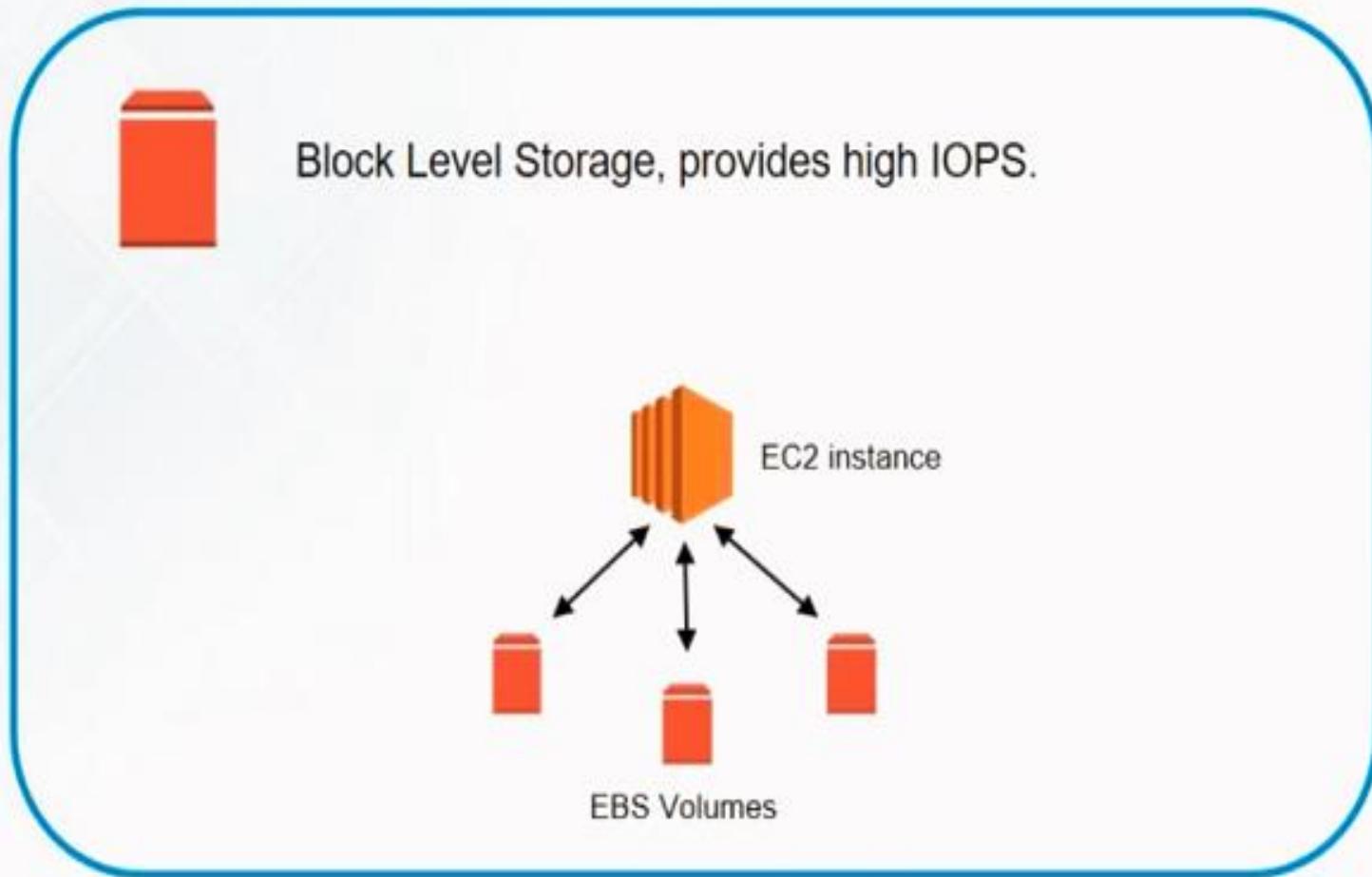
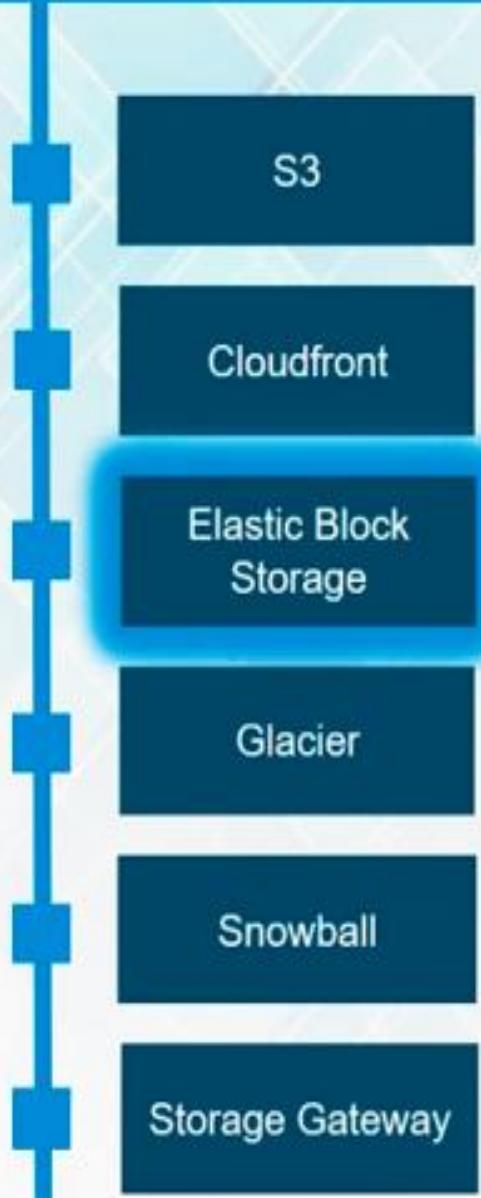
AWS Storage Services

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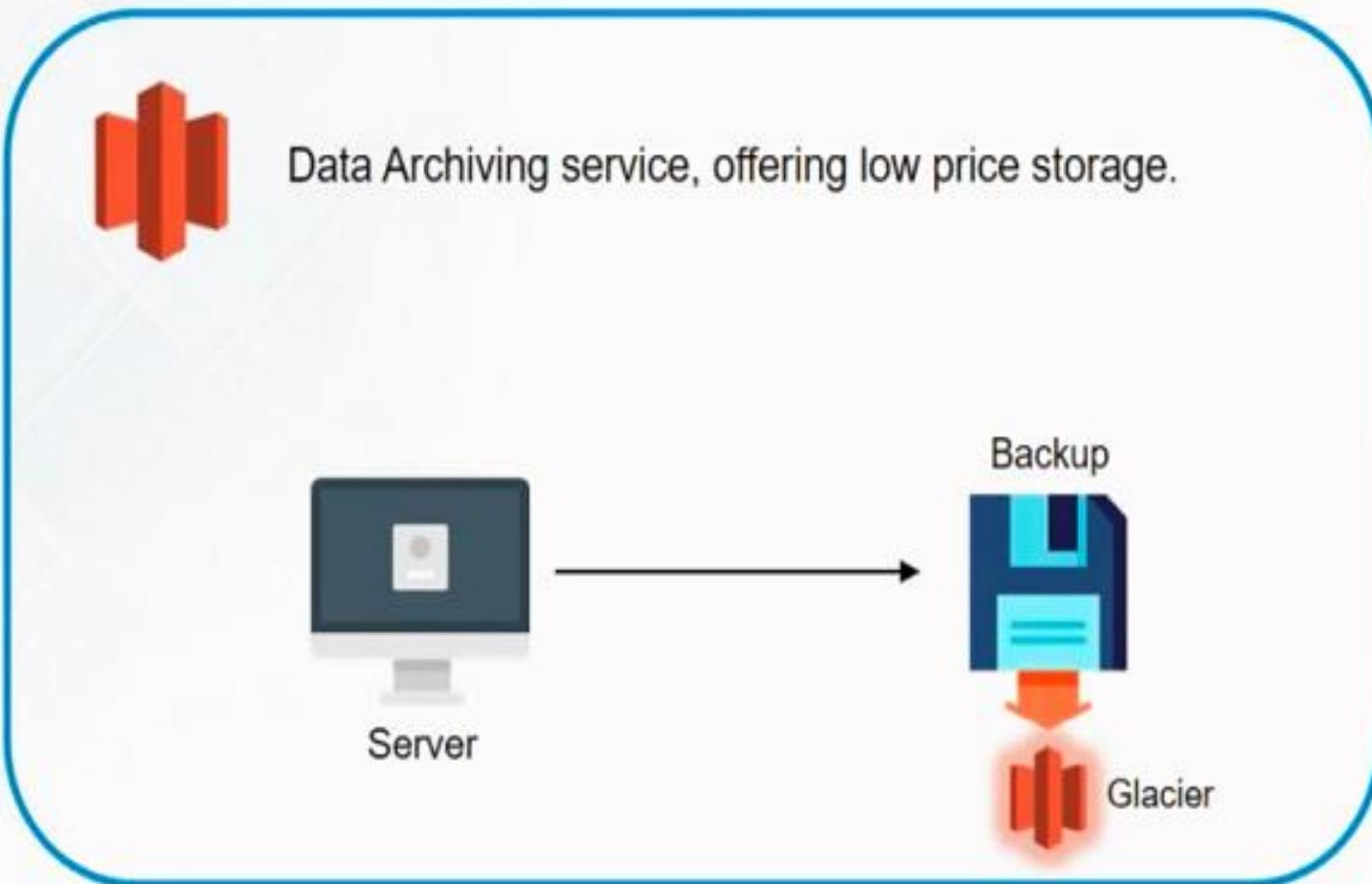
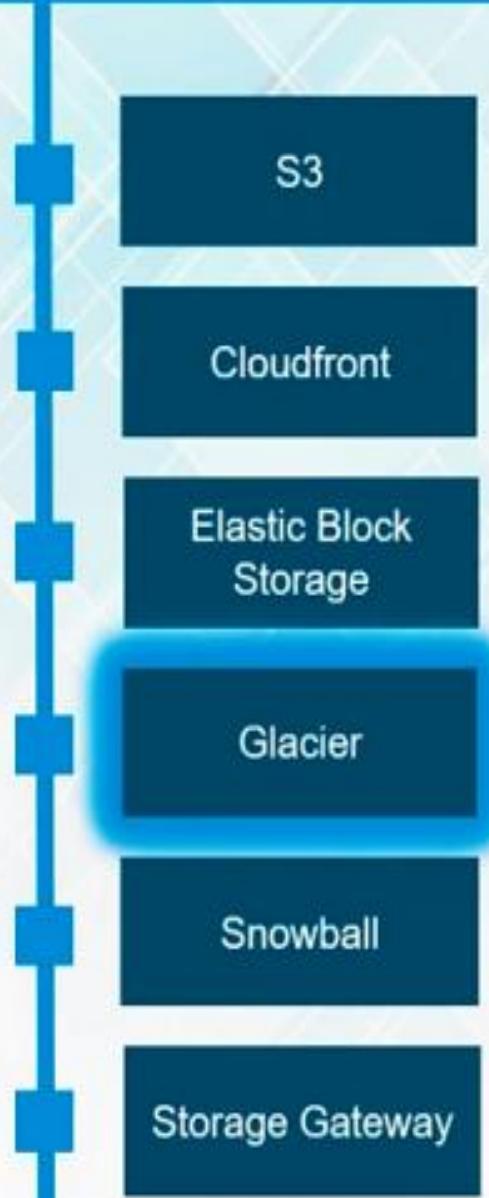
AWS Storage Services

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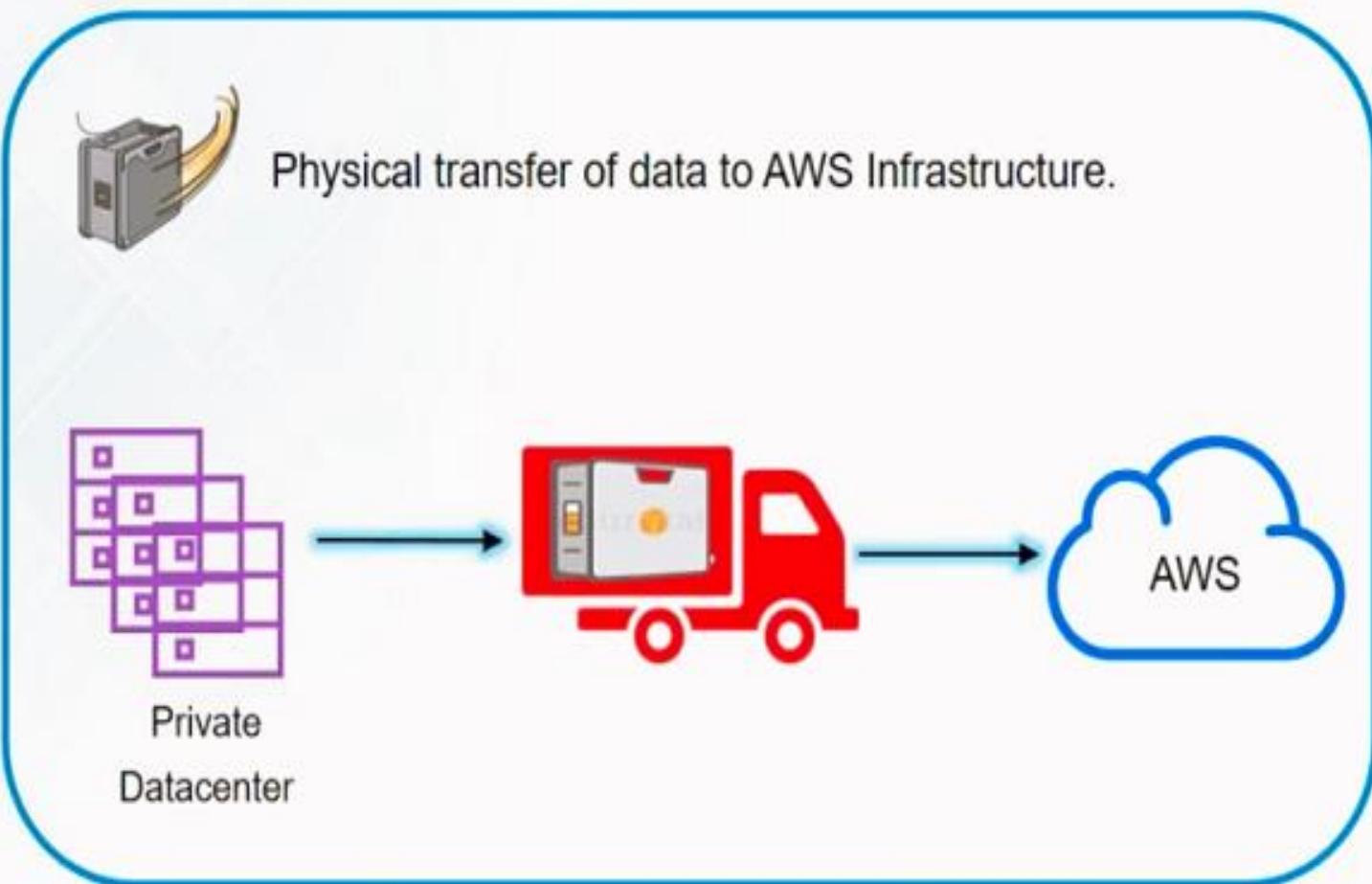
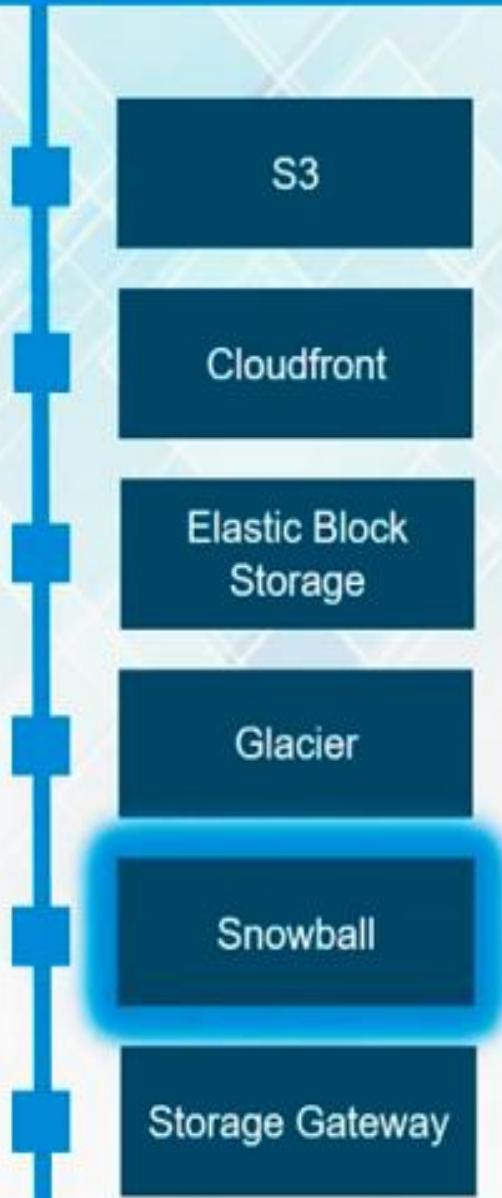
AWS Storage Services

AWS by Chinna



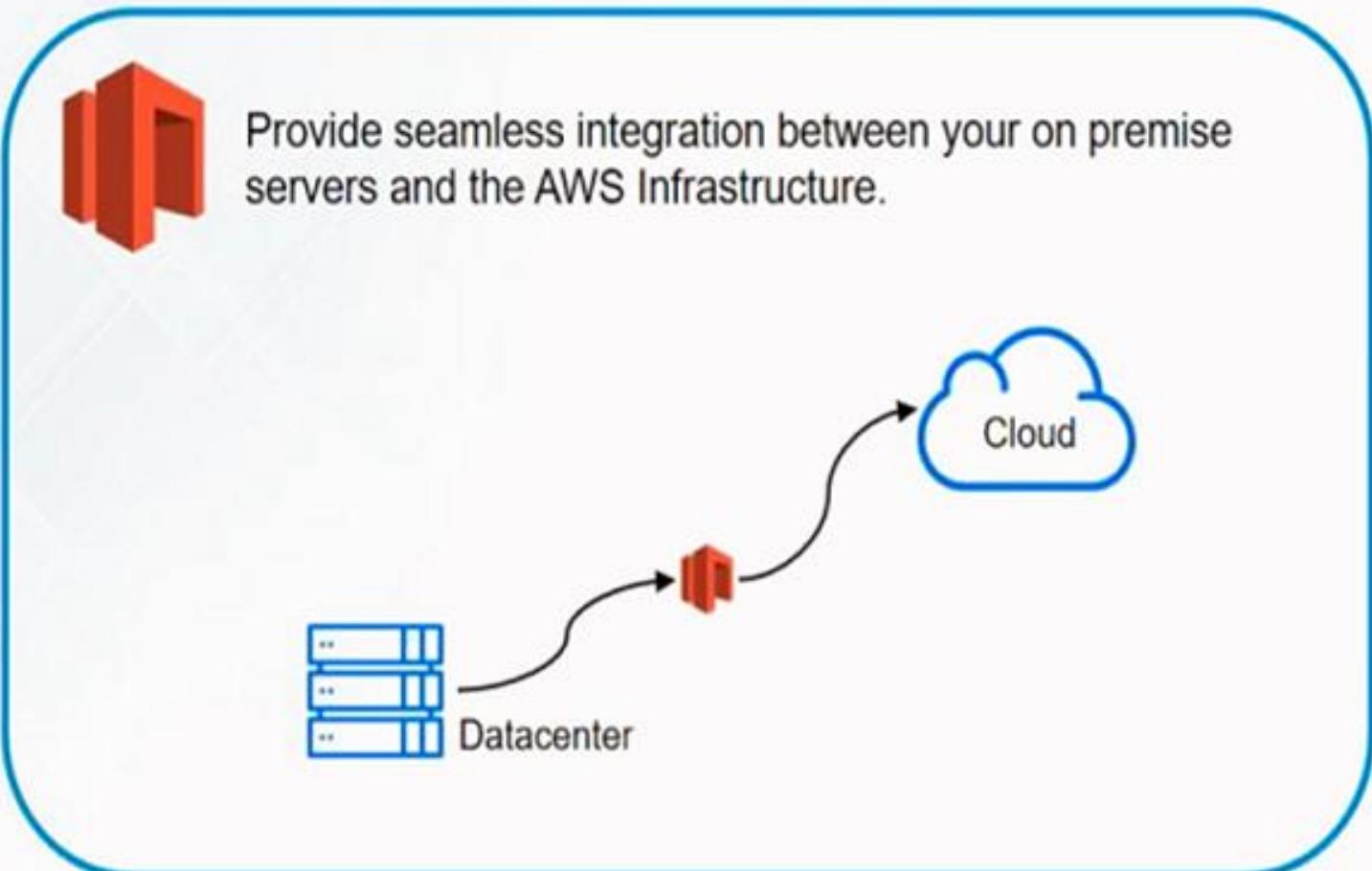
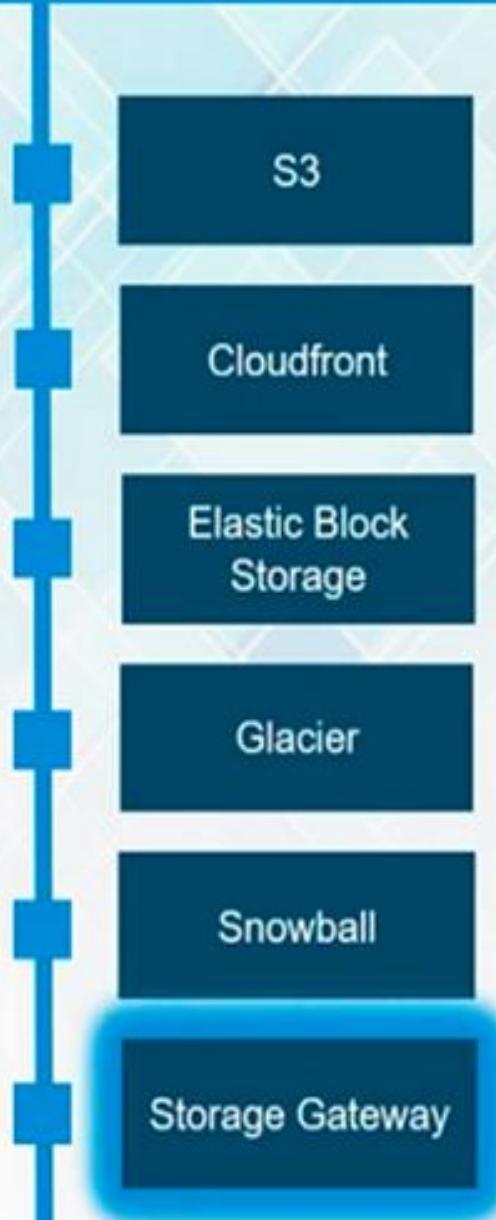
AWS Storage Services

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AWS Storage Services

AWS by Chinna

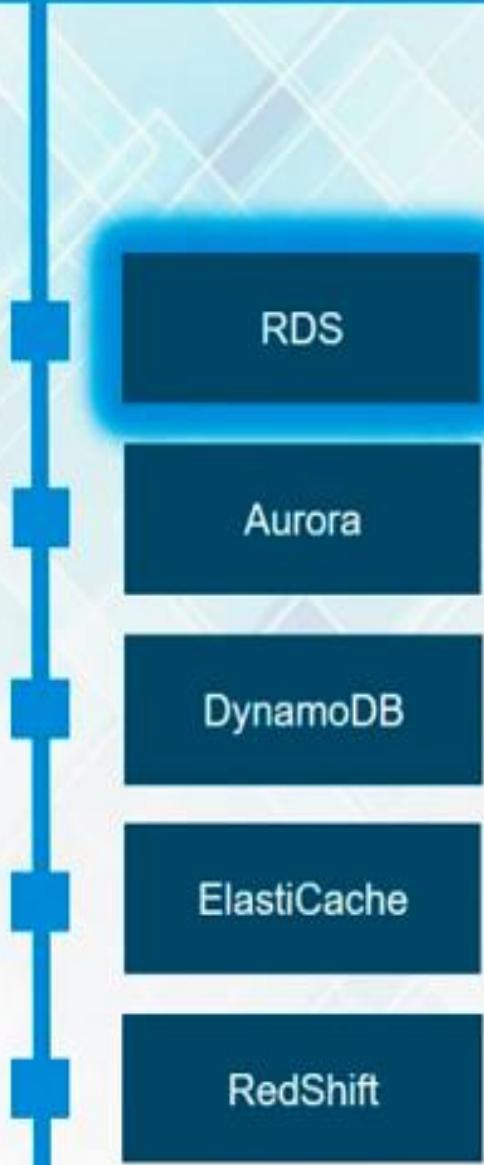


AWS Database Service

INTRODUCTION TO AWS

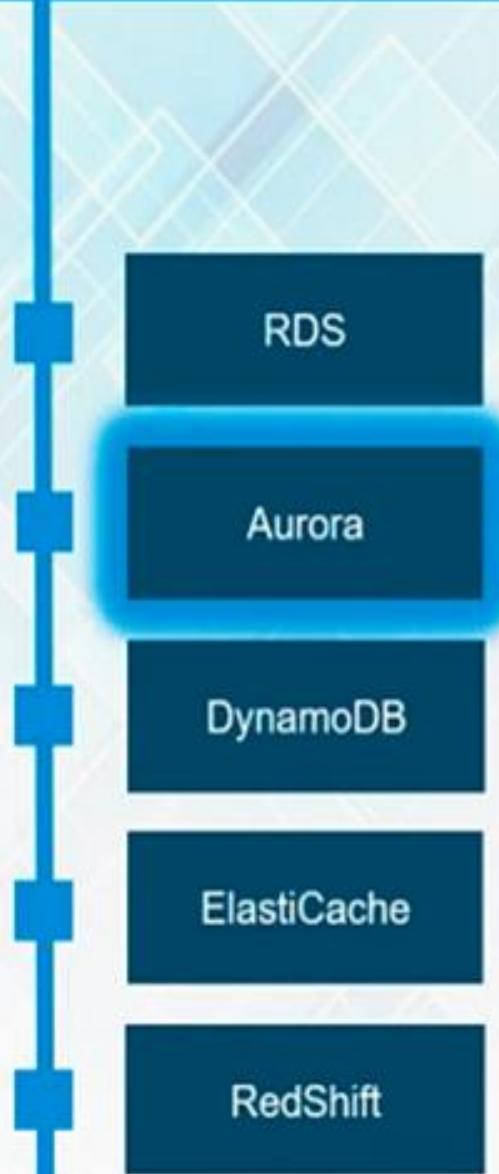
AWS Database Services

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AWS Database Services

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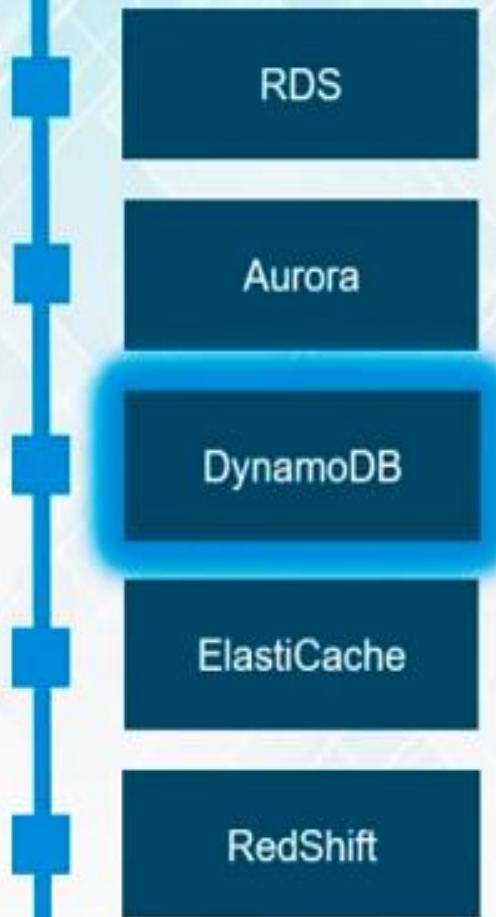
Amazon
Aurora

Based on MySQL, but better performance than MySQL

5X
Faster =

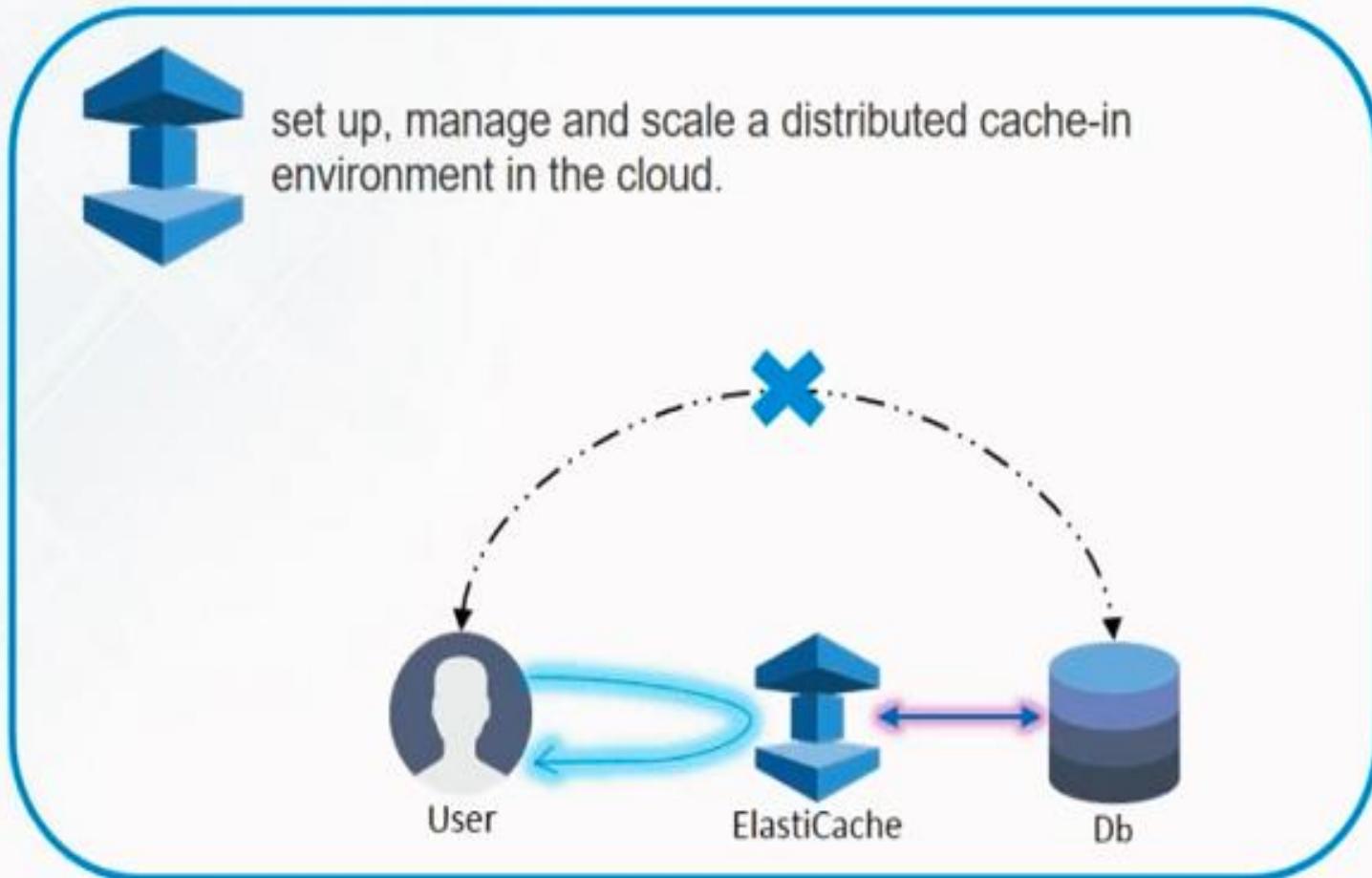
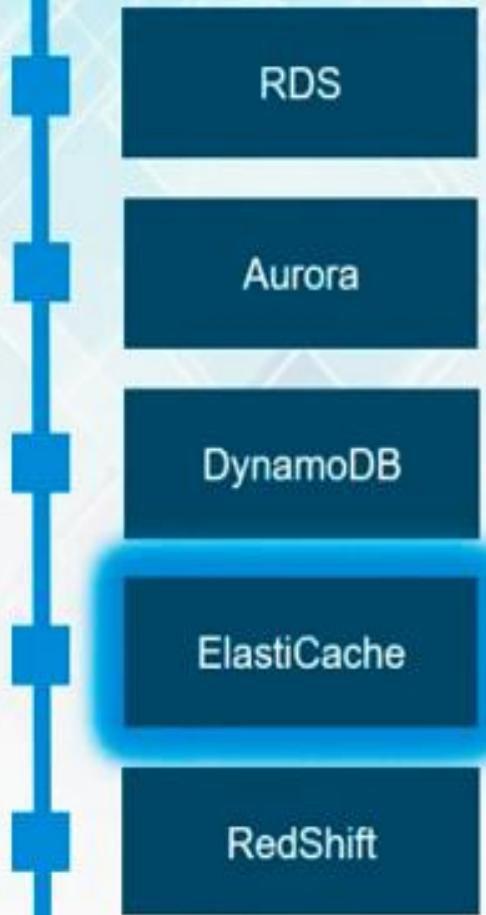
AWS Database Services

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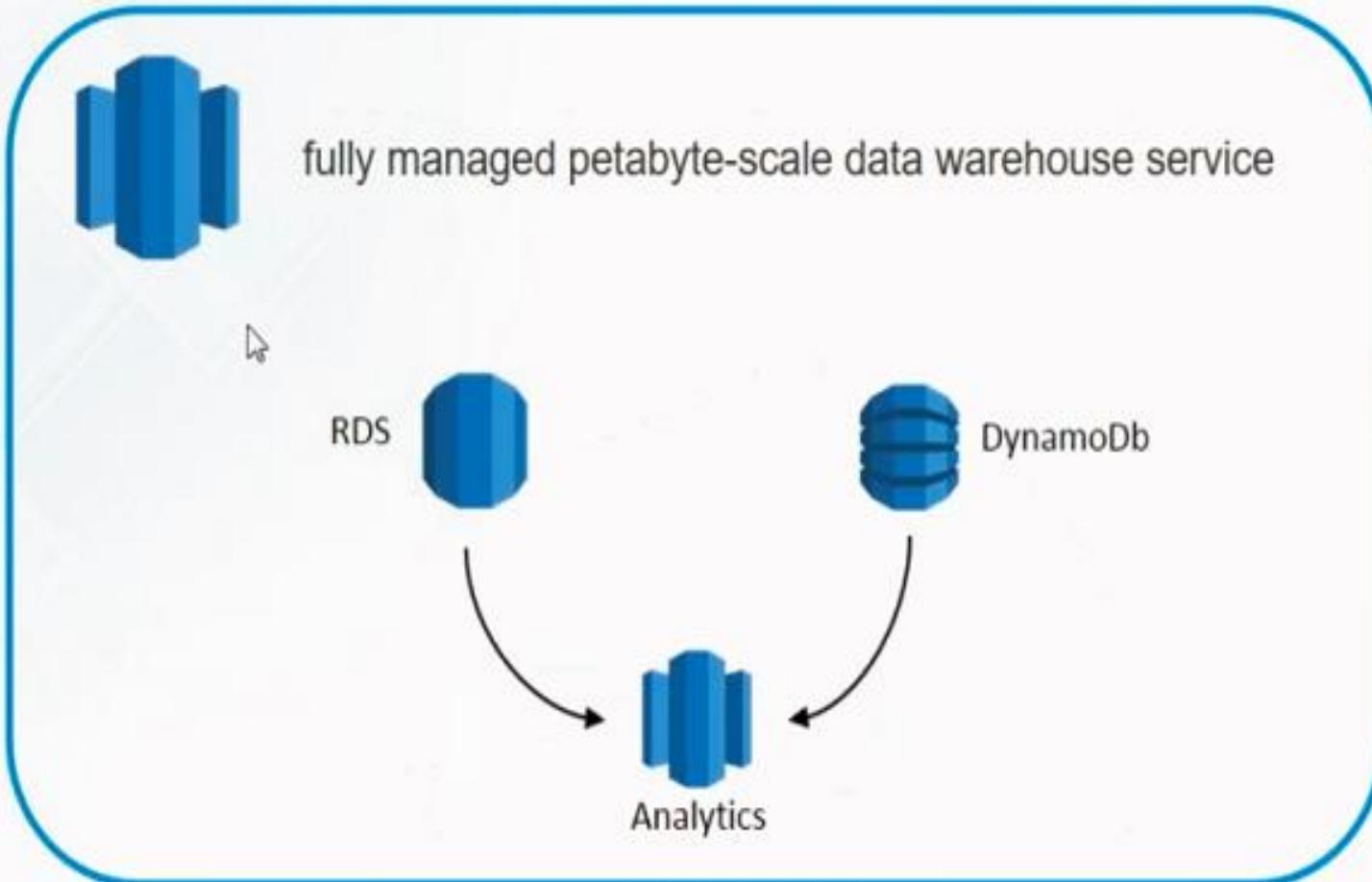
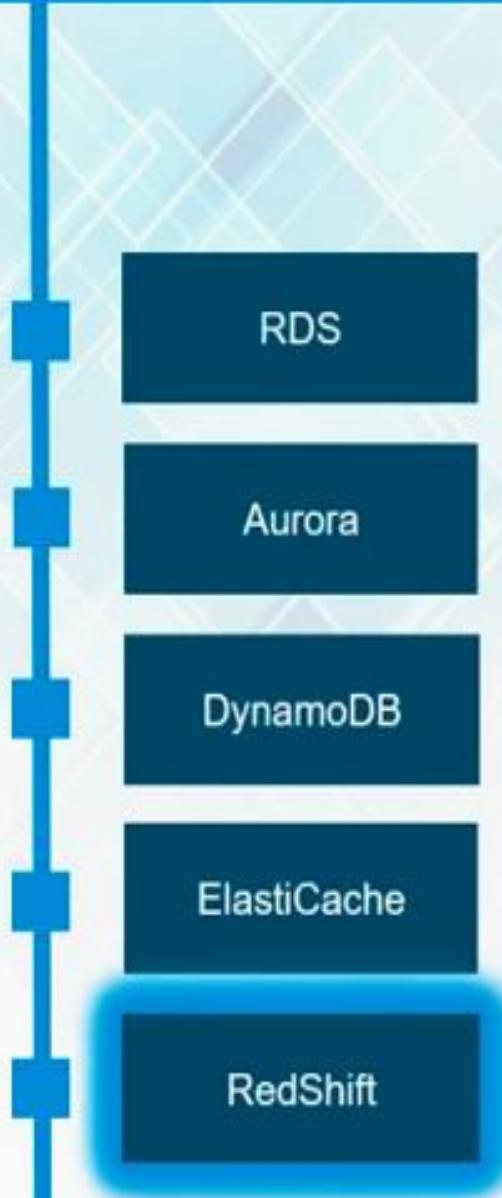
AWS Database Services

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AWS Database Services

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AWS Networking Service

INTRODUCTION TO AWS

AWS Networking Services

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- VPC
- Direct Connect
- Route 53

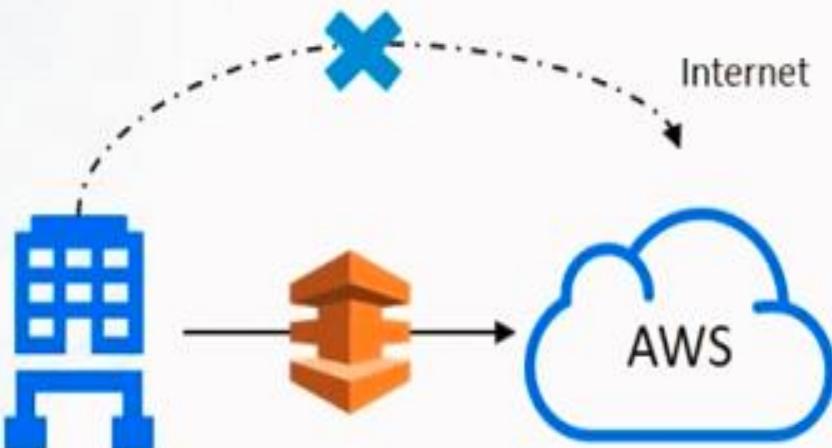


Virtual Network where you launch your AWS resources





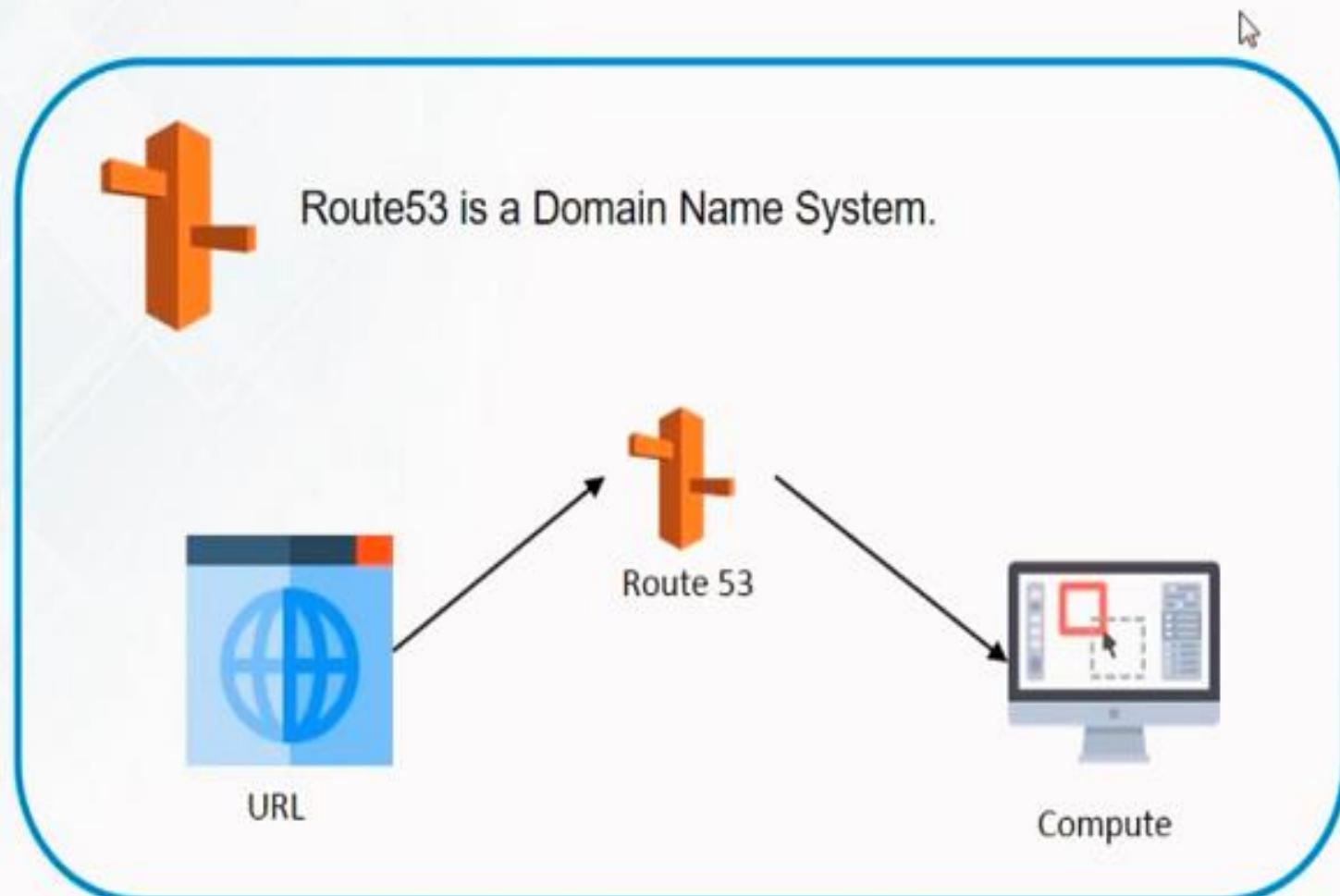
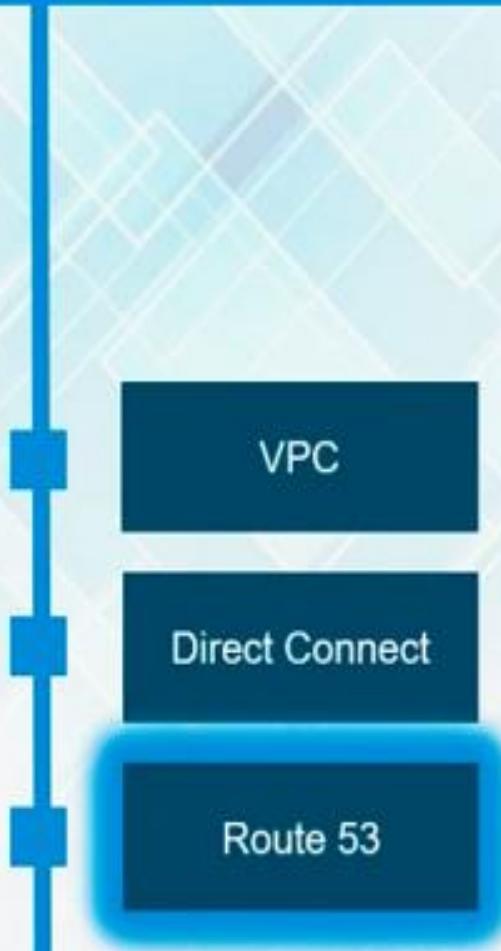
Direct Connect is a leased line using which you can directly connect to the AWS Infrastructure.



** Available at limited locations

AWS Networking Services

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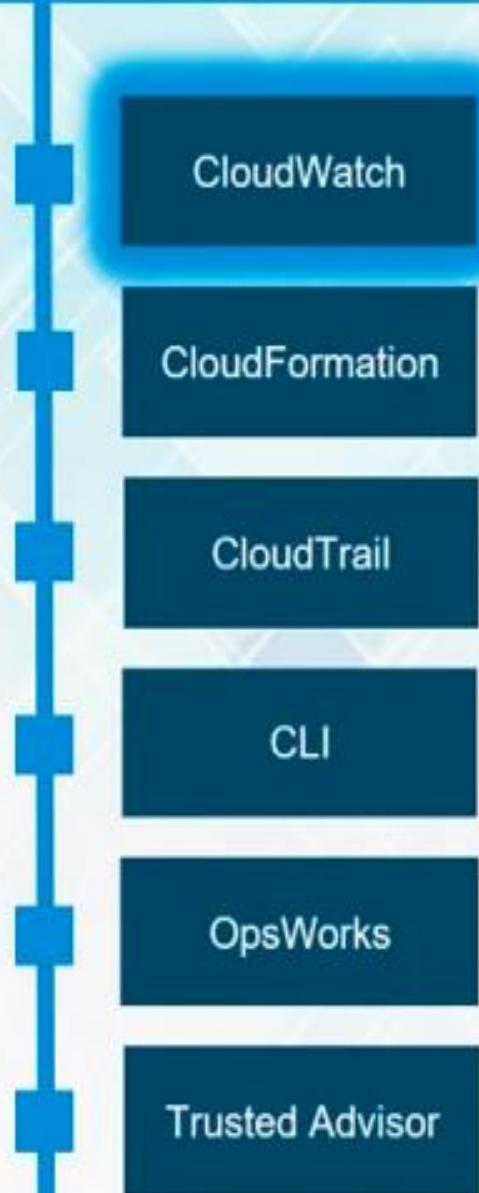


AWS Management Service

INTRODUCTION TO AWS

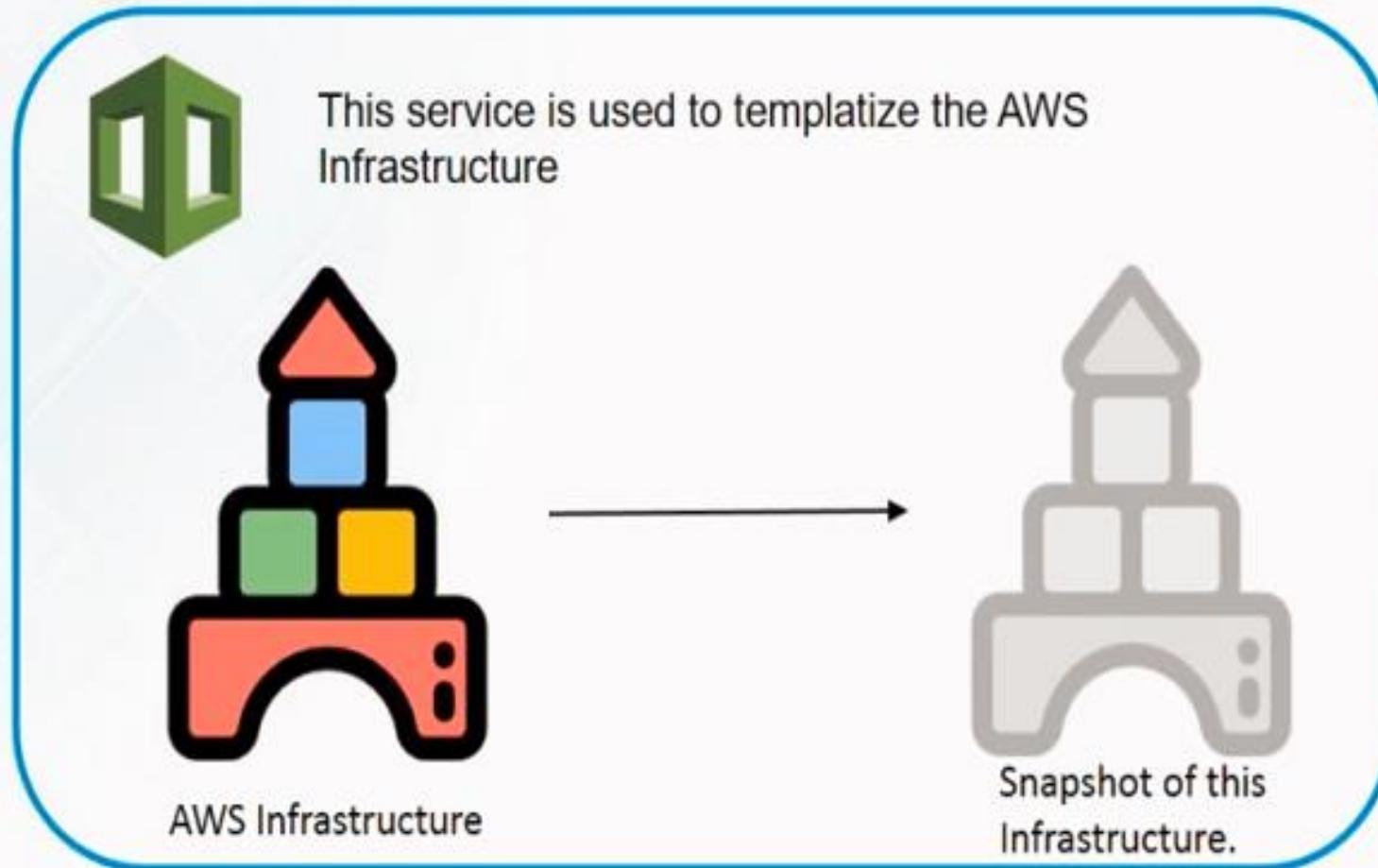
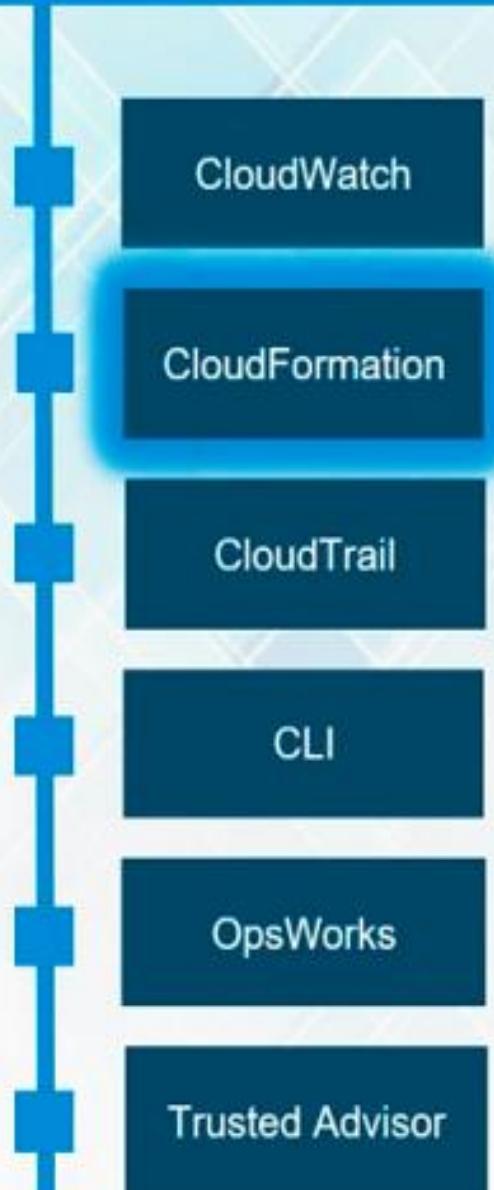
AWS Management Services

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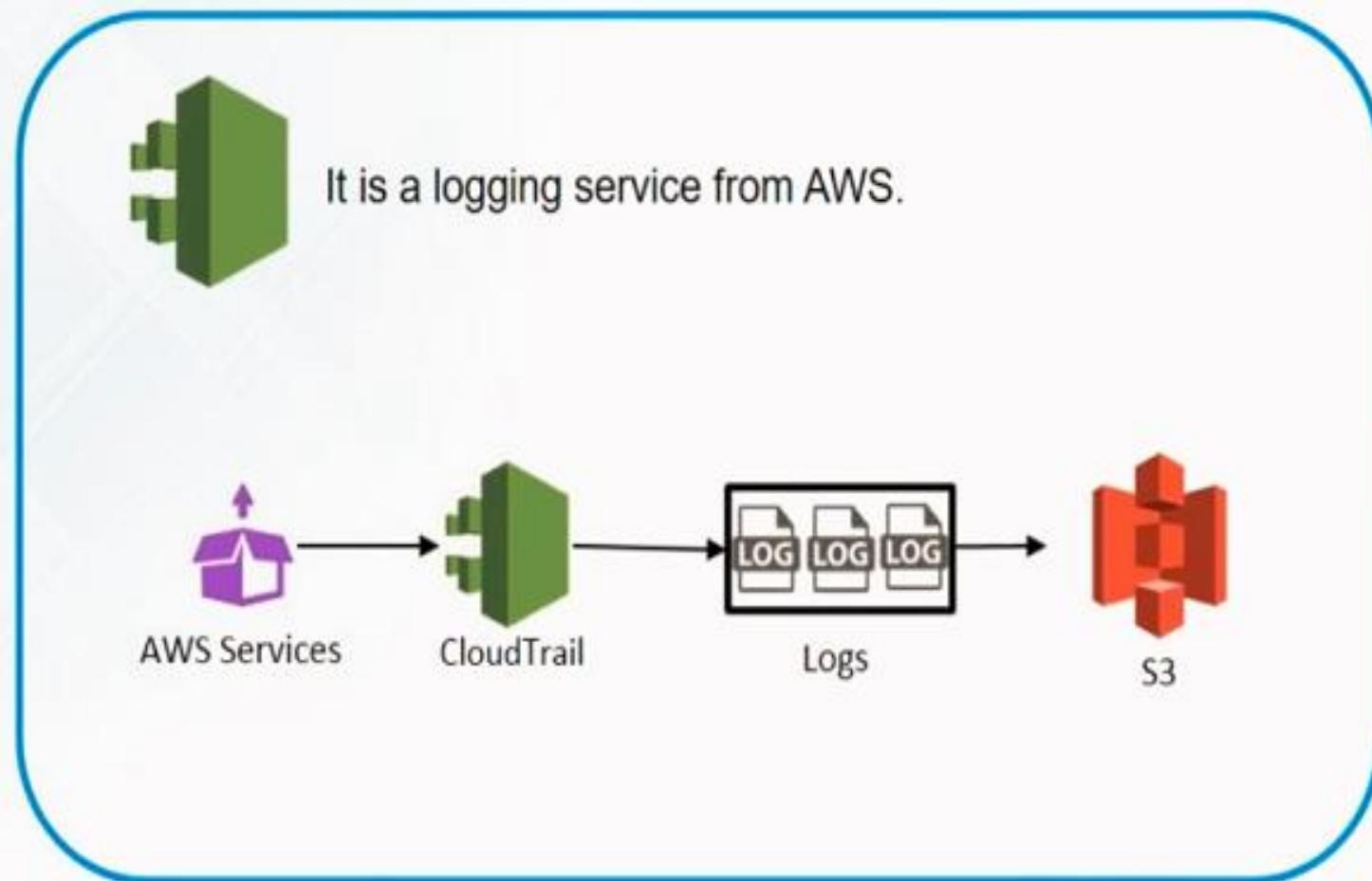
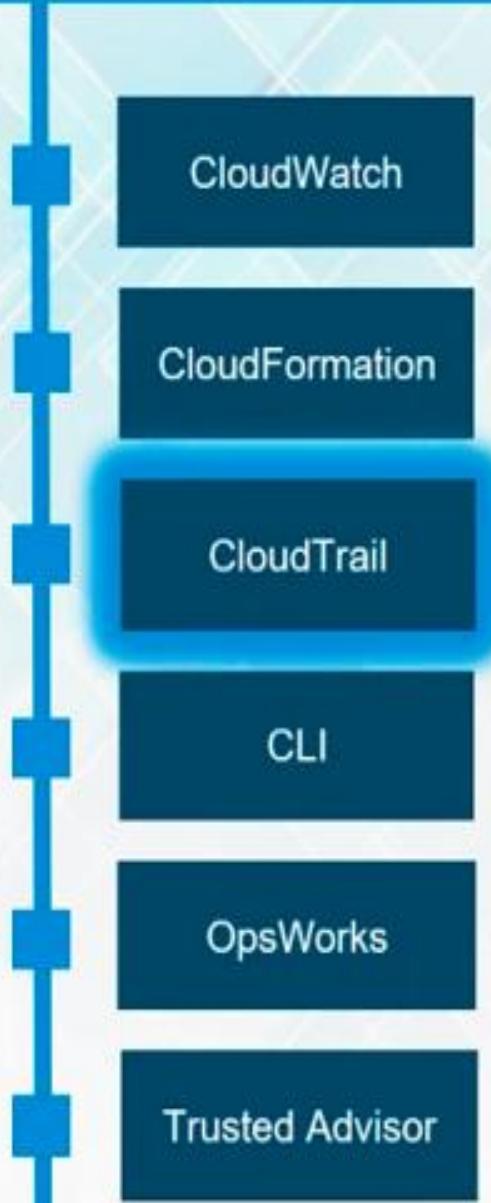
AWS Management Services

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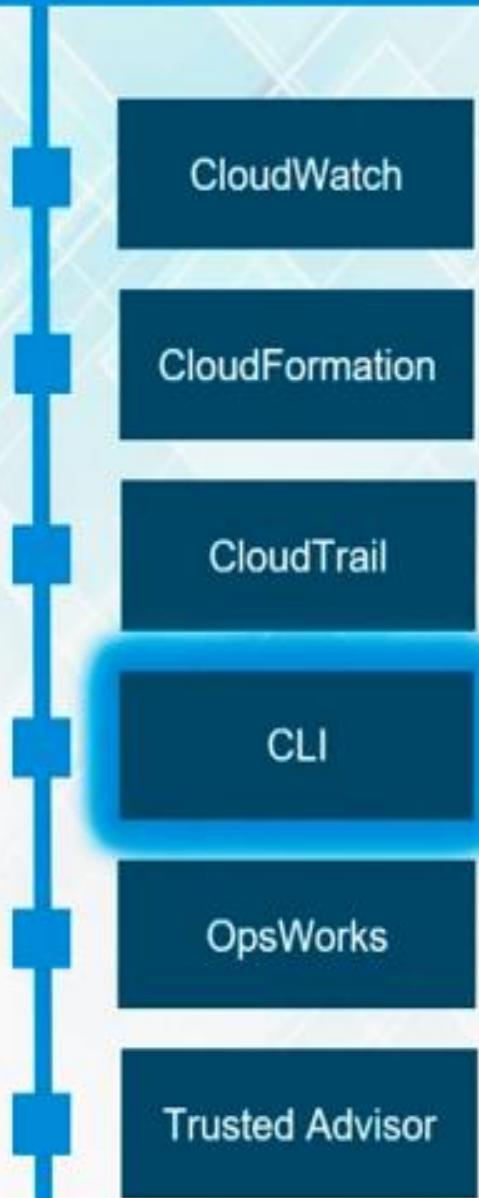
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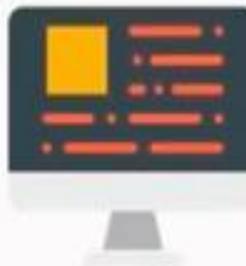


AWS Management Services

AWS by Chinna



CLI is a command line tool which is a replacement to the GUI of AWS



GUI

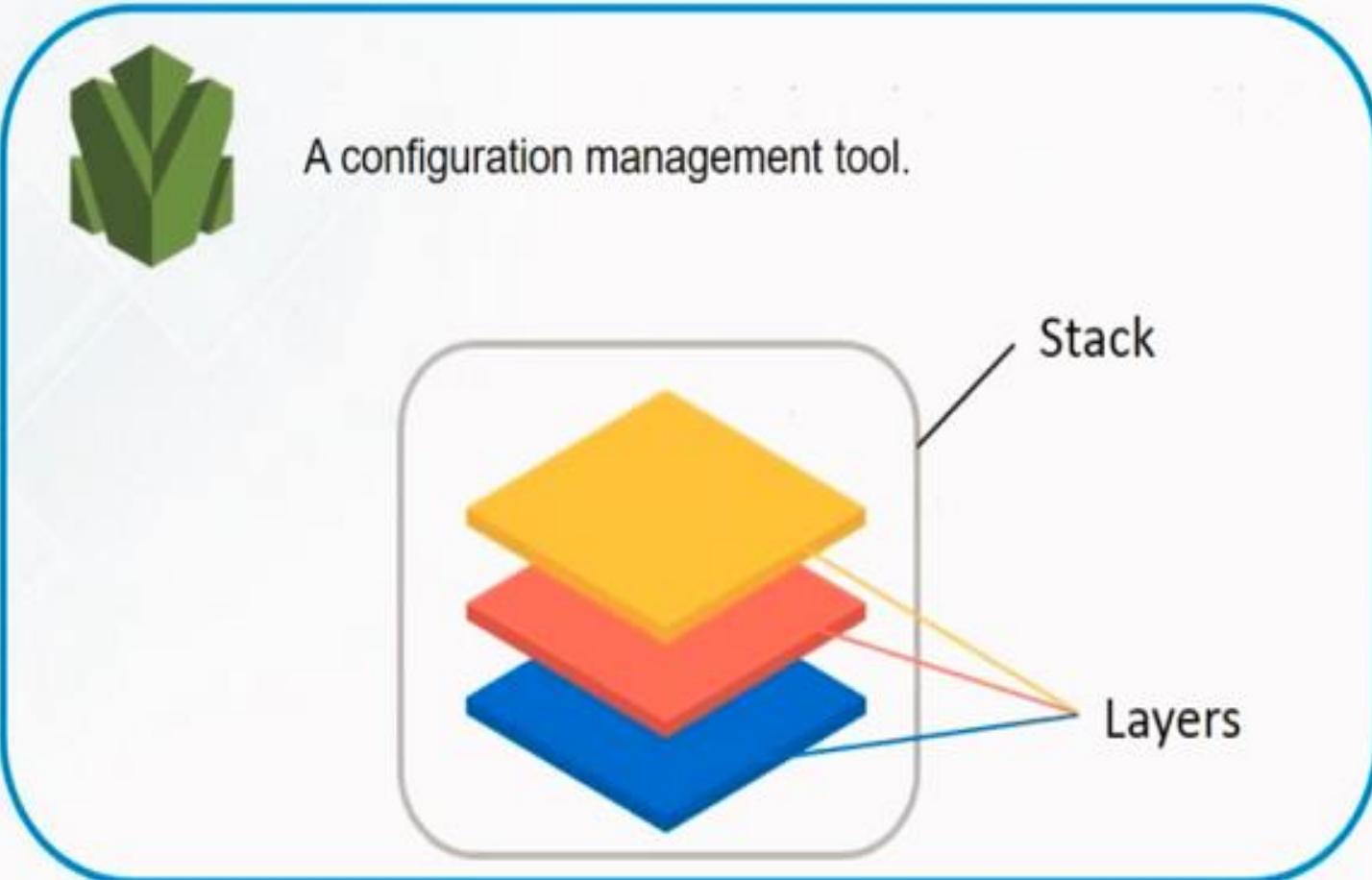
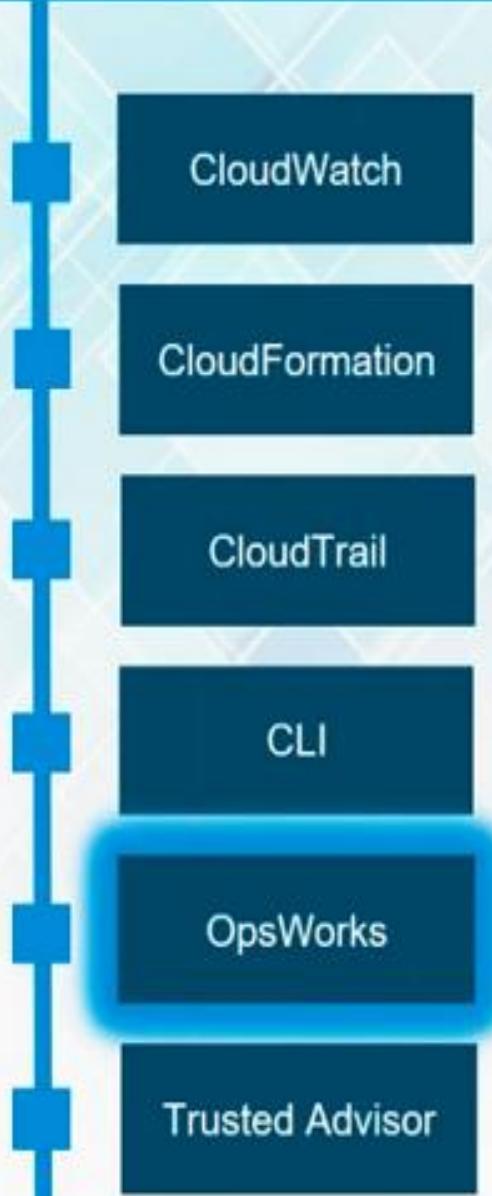


V/S

Command Line

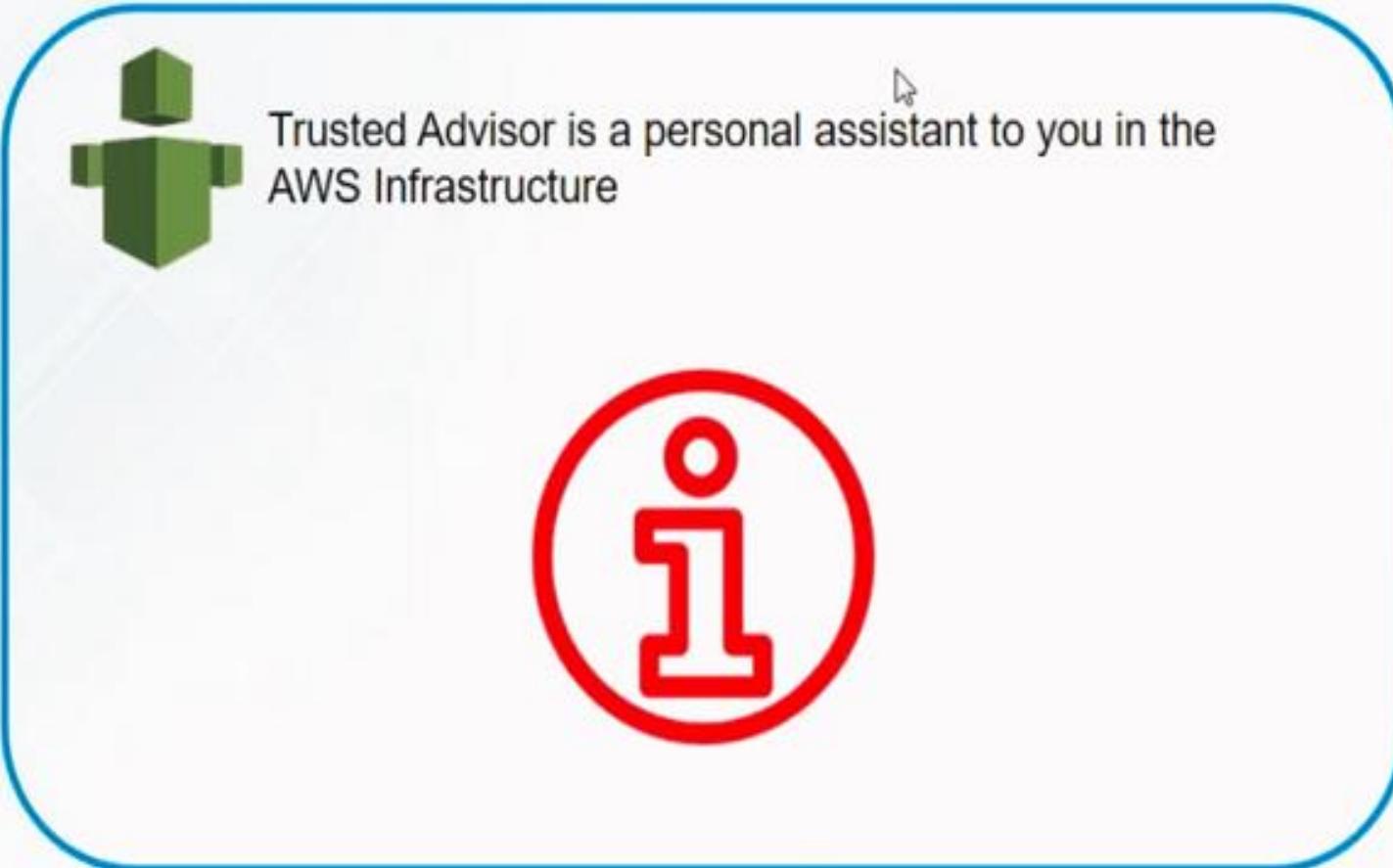
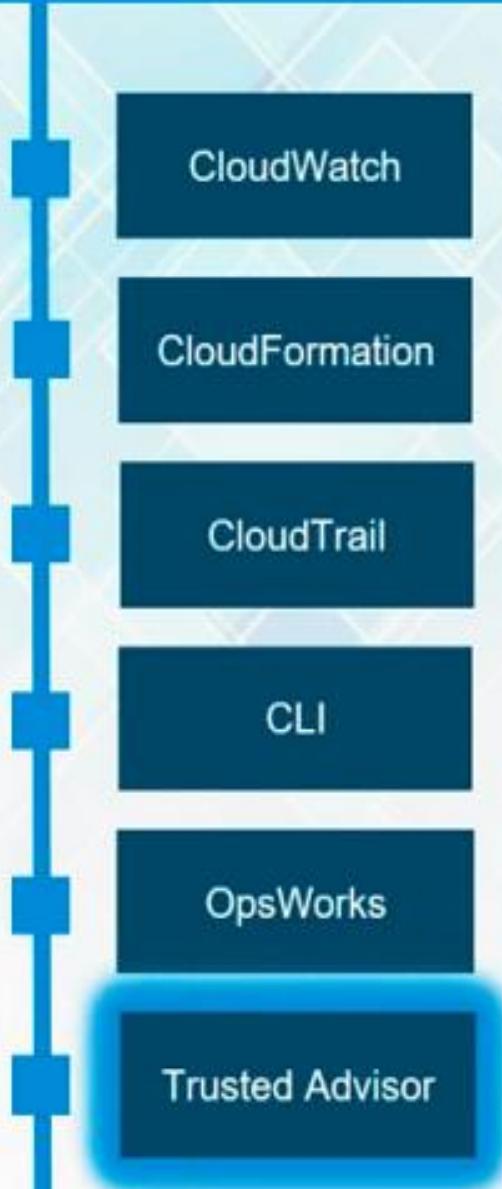
AWS Management Services

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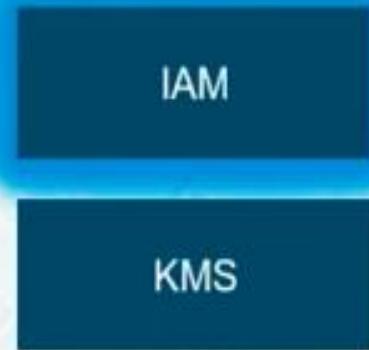
AWS Management Services

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AWS Security Service

INTRODUCTION TO AWS

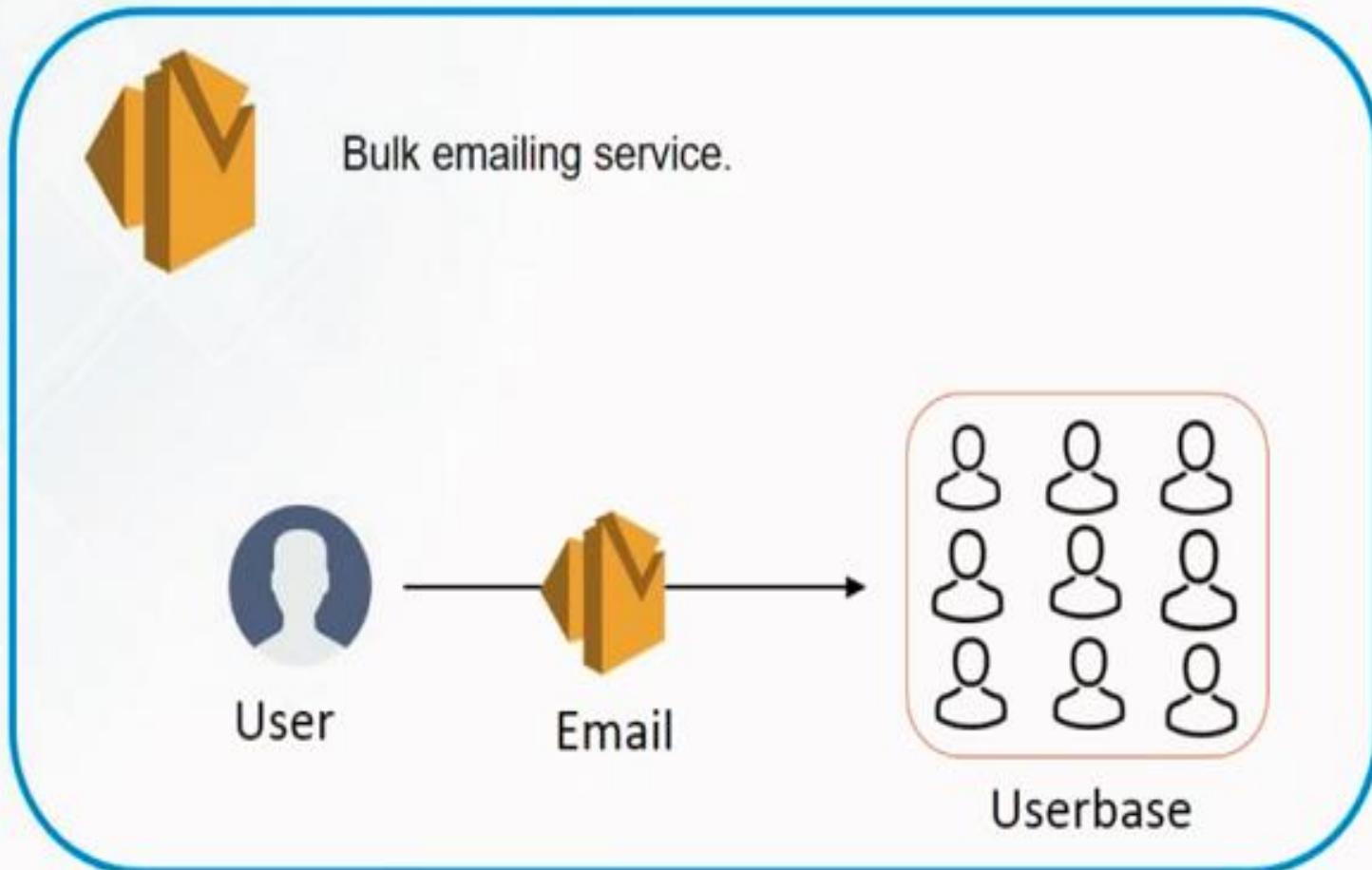


AWS Application Service

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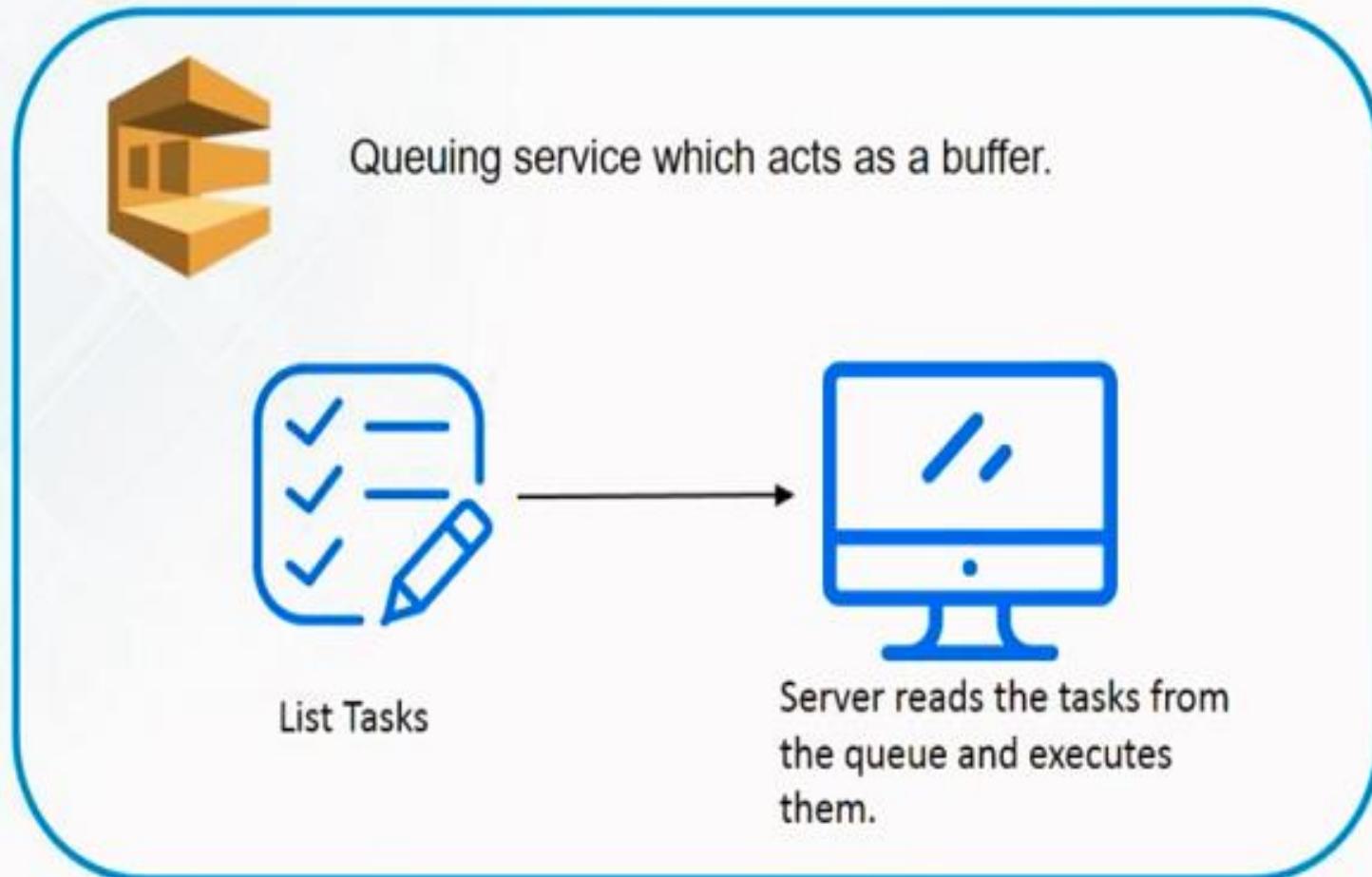
AWS Application Services

AWS by Chinna



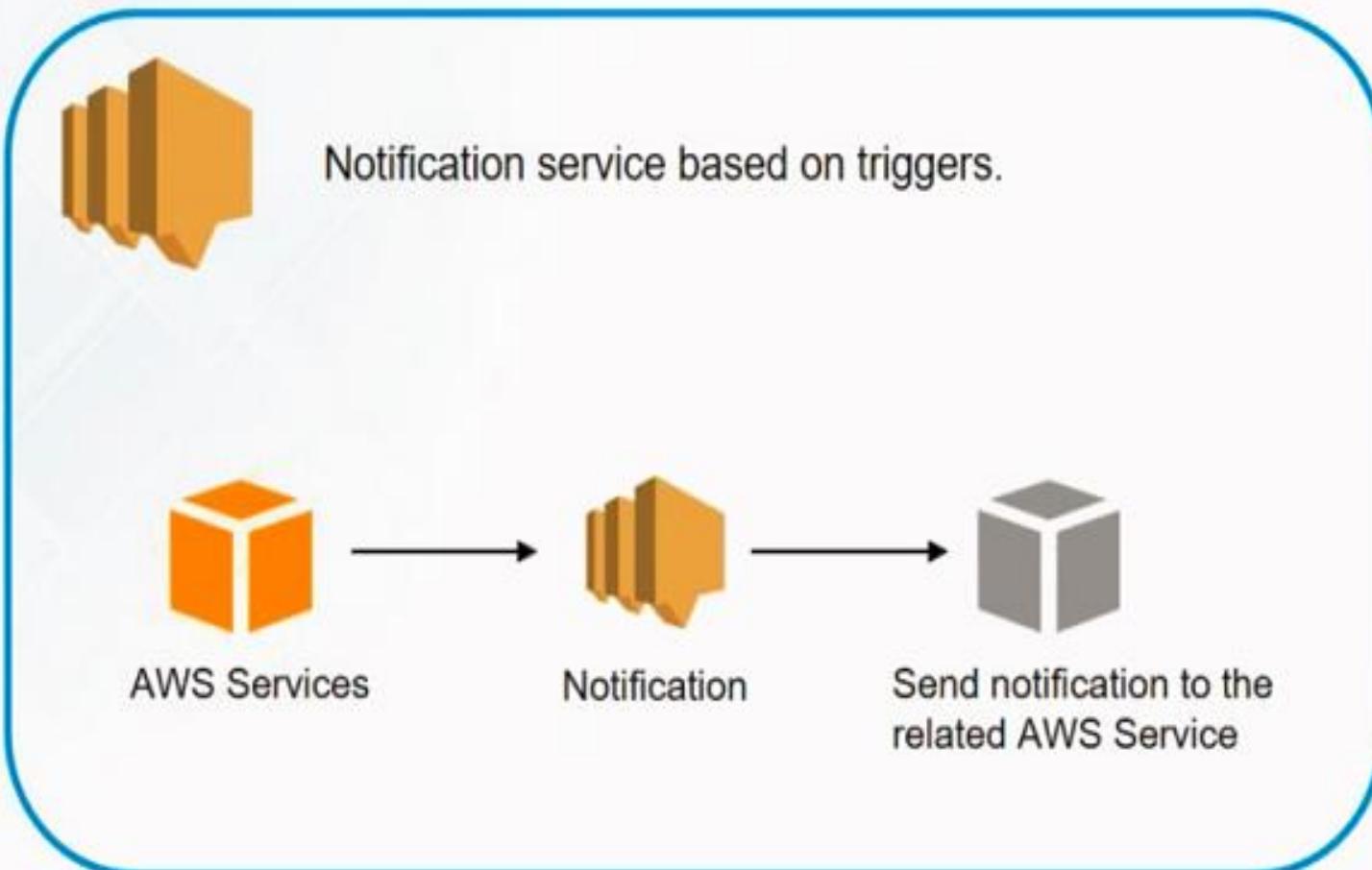
AWS Application Services

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AWS Application Services

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AWS Pricing

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AWS Pricing

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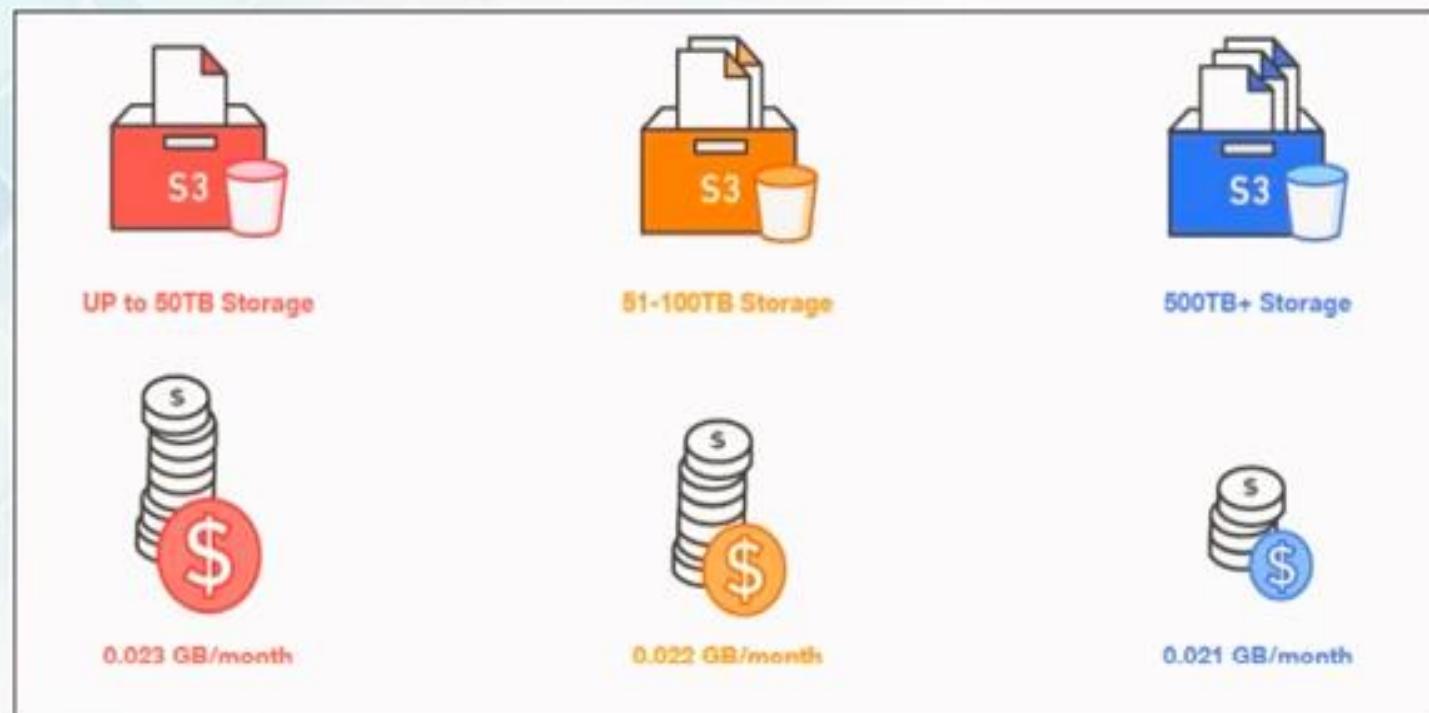
Pay As You Go

AWS offers, pay as you go model, that is you only pay what you use.



Pay less by Using More

It's true. AWS bills you for the hour. The more AWS resources you use, the less the hourly rates become.



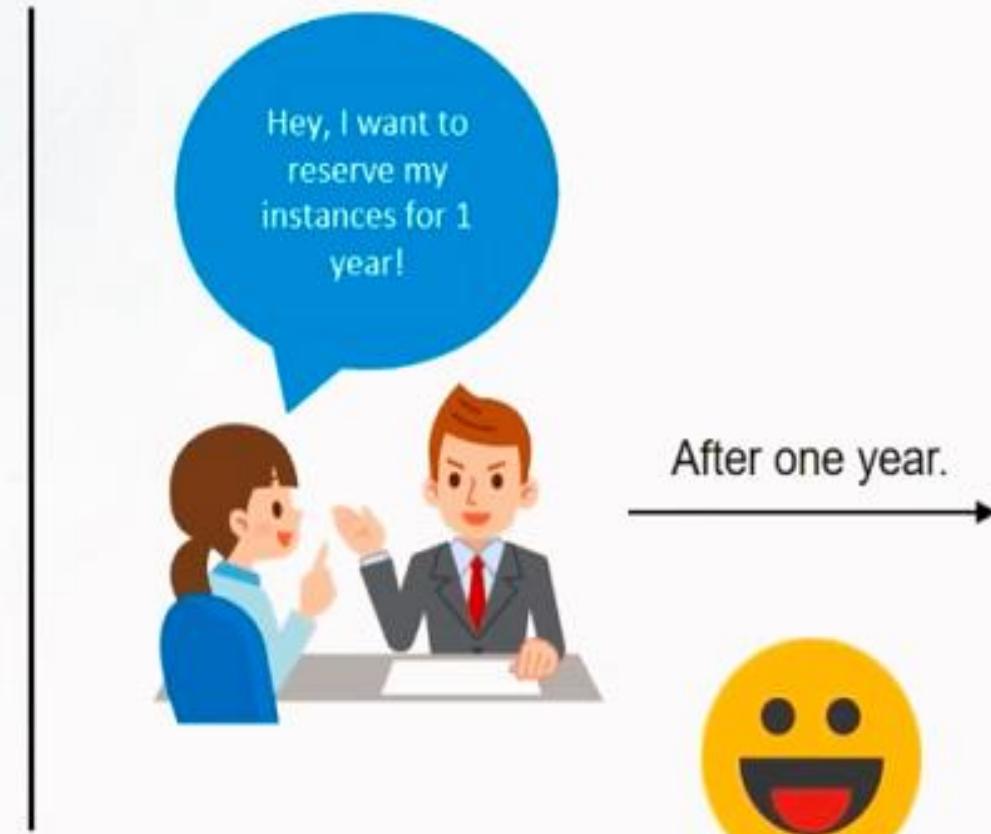
Source: Amazon

AWS Pricing

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Save when you reserve

In services like AWS EC2 and RDS, you have an option of reserving your instances for a specific time frame. You are charged less significantly upto 75% less.



Hosting a Website on AWS

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Use Case

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Enough of theory, let's create an application

You have to host a website, which can be used to upload images. All these images should get displayed on the home page of this application. The application should be highly available and should also autoscale as and when required.



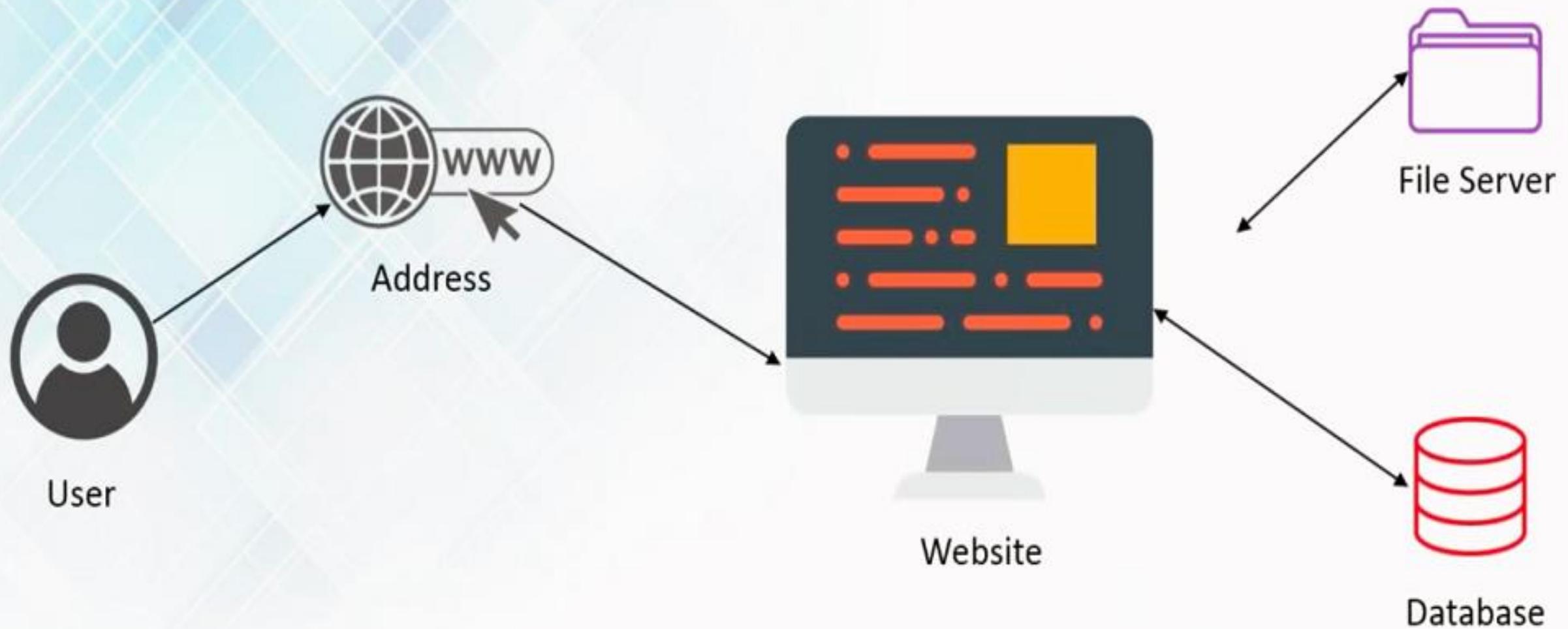
HOSTING



Simple ain't it?

Use Case Architecture

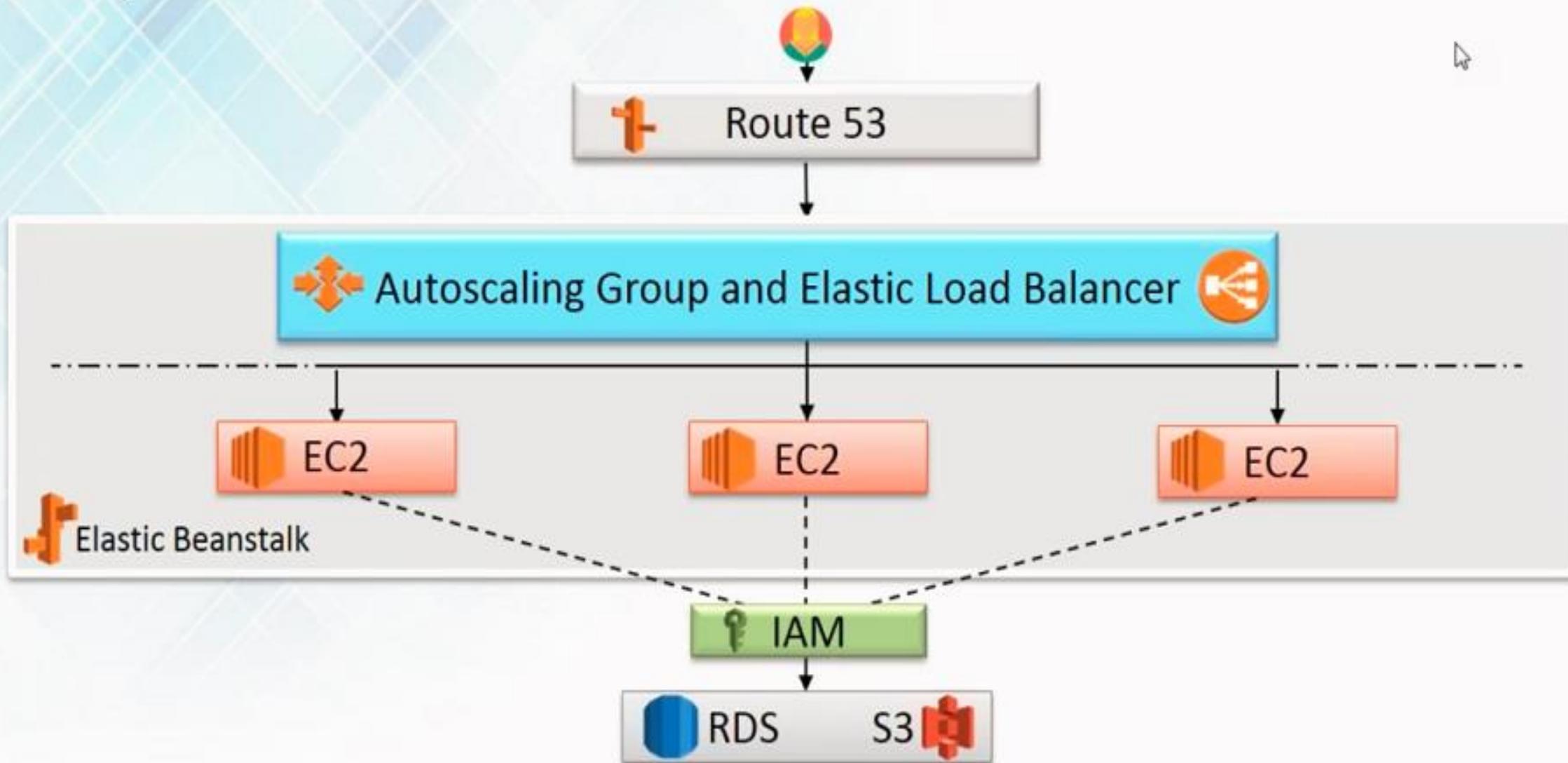
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Use Case Architecture using AWS Services

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So, how will you architect this on AWS?



Azure

INTRODUCTION TO AWS

Microsoft Azure – 17 Regions Worldwide in Mid 2015

Azure
footprint

Data Centers

Regional Partners



Microsoft Azure (Mid 2015)

> 80%

Fortune 500 using Azure

> 300k

Active websites

> 30 TRILLION
storage objects

> 500 MILLION
AAD users

> 3 MILLION
requests/sec

> 13 BILLION
authentication/wk

More than
1,000,000

SQL Databases in Azure

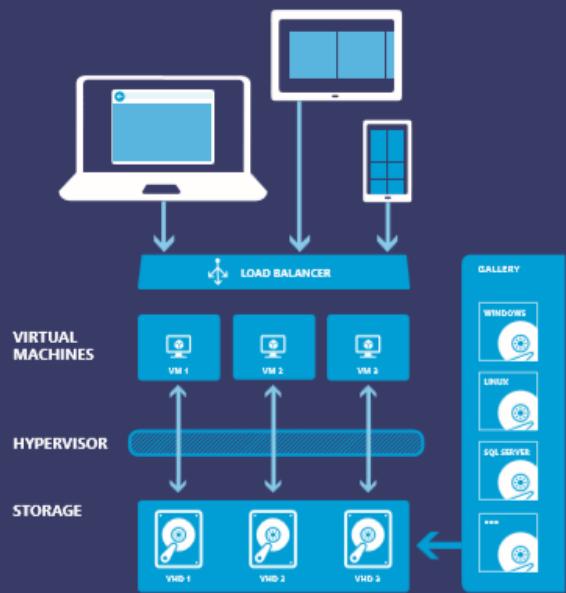
> 1.65

MILLION
Developers registered
with Visual Studio Online



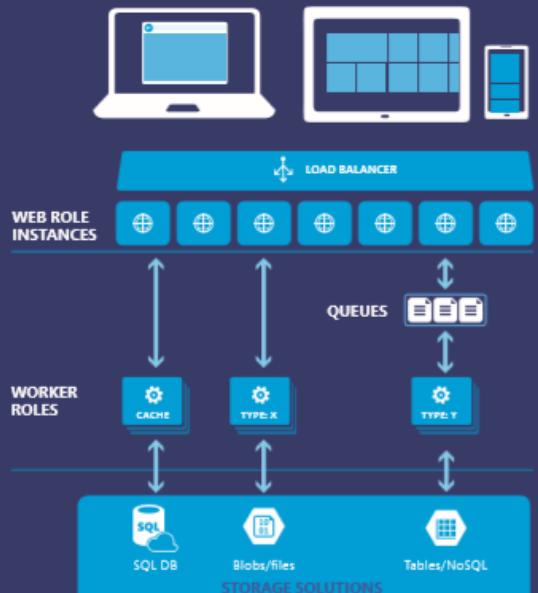
1. Virtual Machines

The basic cloud building block that gives you full access to a virtual machine with persistent storage that you completely own and control. You deploy, manage and architect resilience yourself across collections of VM's. These are most similar to VM's on-premise and are the easiest way to move existing workloads to the cloud.



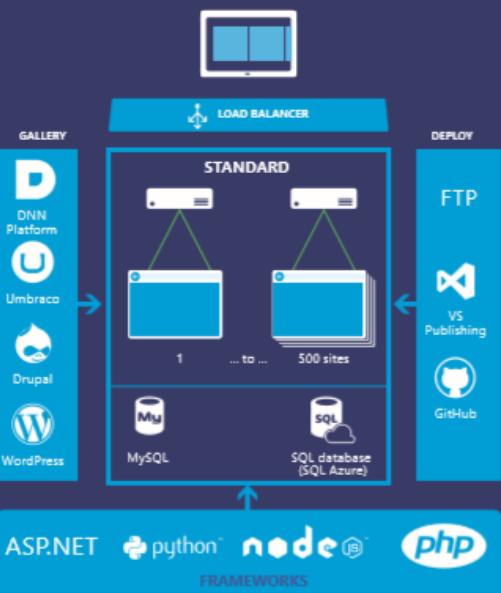
2. Cloud Services

Managed general purpose VM's that you have access to and can do quite low level configuration and deployment of additional software in the VM. VM's are stateless and you need to architect for and store state for your applications outside the VM. The Web Role is simply a worker role with IIS already installed/configured.



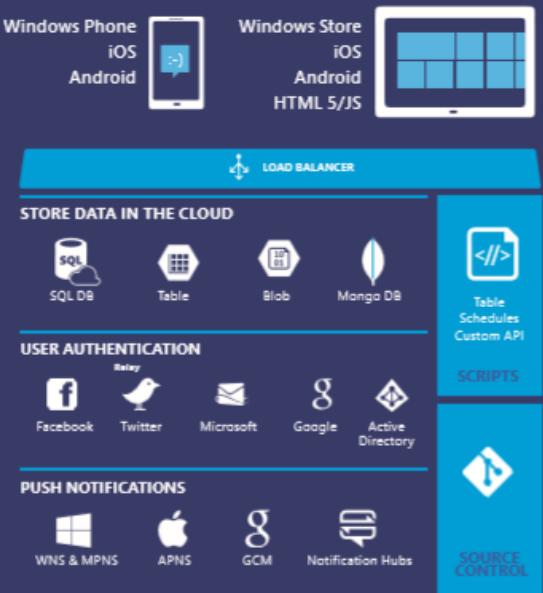
3. Web Sites

For applications that are completely web apps, the underlying VM's are abstracted from you and managed for you. You focus only on your web code and simple or integrated deployment of that code from source control. Choose from the gallery, develop with your framework, and deploy with your source control. Use the data platform of your choice.



4. Mobile Services

Devices need to call a web API to store data and execute business logic and mobile services provides this capability without you needing to worry about the underlying web api infrastructure or even worry about much of the API code to store and retrieve data from your mobile application.

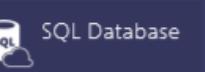


DATA SERVICES



Storage

Provides many options to securely manage data. Accessible via REST API. Blob storage provides up to 100 terabytes per account.



SQL Database

Simple, reliable server backup to the cloud. Configure, monitor, and recover backups to local or Windows Azure storage.



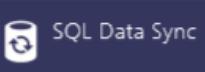
Import Export

Transfer large amounts of file data smoothly into blob storage. Use the management portal or send hard disks to a Windows Azure datacenter.



HDInsight

Based on Apache Hadoop, enables easy provisioning and integration of big data with tools including Microsoft Office and System Center.



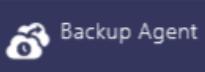
SQL Data Sync

Enables regular and on-demand synchronization between instances of SQL Database and instances of either SQL Server and/or SQL Database.



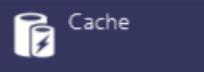
Recovery Services

Easily back up Windows Server using the Hyper-V Recovery Manager. Schedule routing backups and recover files or folders.



Backup Agent

Create a backup schedule for your data using PowerShell cmdlets.



Cache

Helps applications scale and be more responsive under load by keeping data closer to application logic.



Virtual Network

Provision and manage VPNs in Windows Azure and securely link to your on-premises IT infrastructure.



Traffic Manager

Load-balances incoming traffic across multiple services running in the same or different datacenters.

APP SERVICES



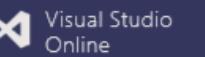
Notification Hubs

Deliver millions of cross-platform push notifications within minutes from any application back-end, on-premises or in the cloud.



Service Bus

Messaging channel for connecting your cloud applications to your on-premises applications, services, and systems.



Visual Studio Online

Host code, plan and track projects, and collaborate with team members to deliver better software.



Media Services

Build workflows to create, manage, and distribute on-demand media and live streaming events.



BizTalk Services

Build EDI services and Enterprise Application Integration (EAI) solutions in the cloud.



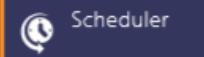
Active Directory

Identity and access management cloud solution: directory services, identity governance, security, and application access management.



Store

Lets you easily find, access, and manage services and data sets, directly from the management portal.



Scheduler

Lets you create jobs that call services in and outside of Windows Azure and lets you specify when and how often those jobs run.



CDN

Delivers high-bandwidth content by caching blobs and static content of compute instances at physical nodes globally.



Multi Factor Authentication

Works with Active Directory to safeguard access to data and applications yet deliver a simple sign-in process.



PaaS - Azure Service Fabric

Battle-hardened for over 5 years

Azure Core Infrastructure

thousands of machines

Azure Document DB

billions transactions /week

Power BI

Azure SQL Database

1.4 million databases

Intune

800k devices

Skype for Business

Hybrid Ops

Event Hubs

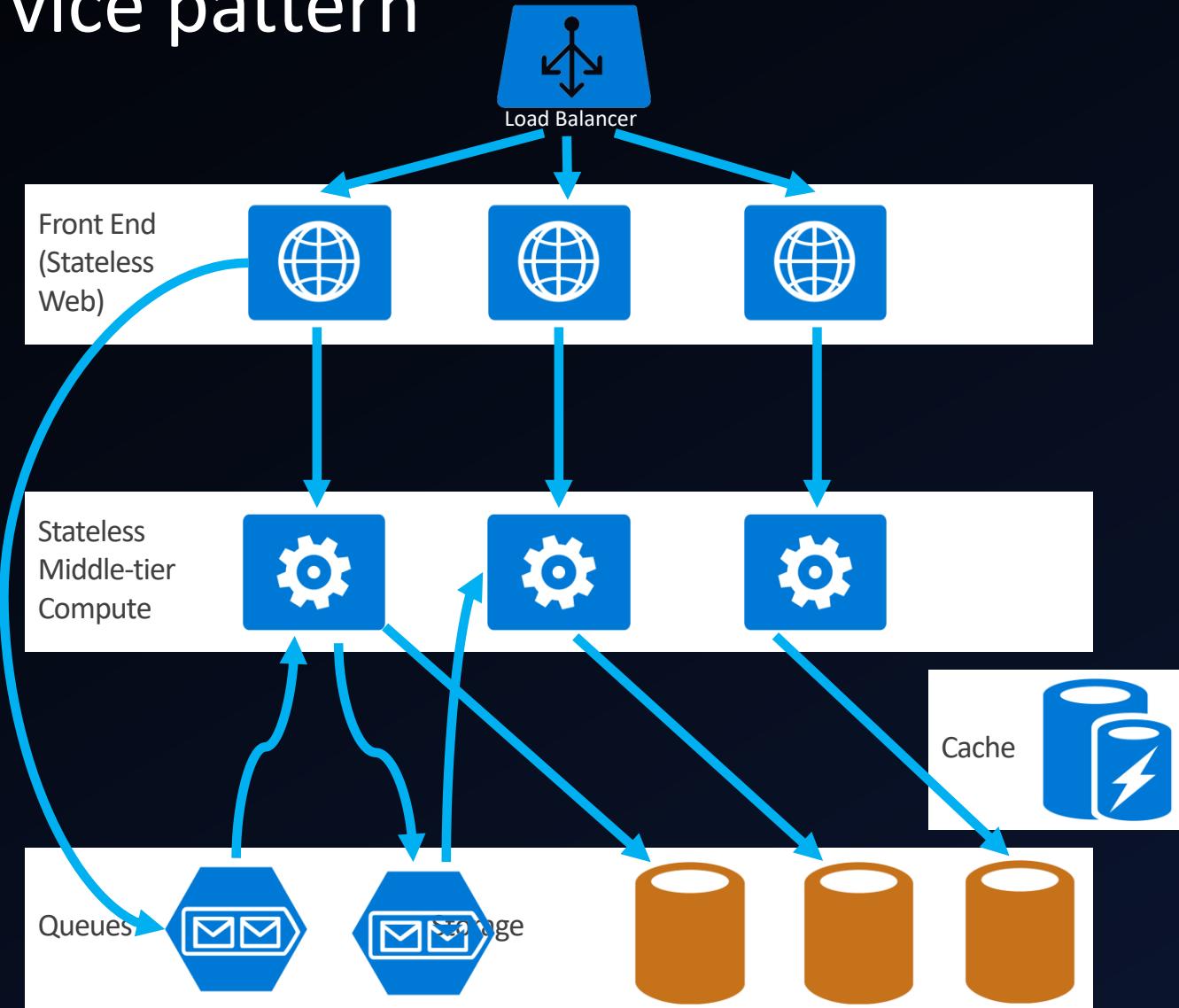
20bn events/day

Bing Cortana

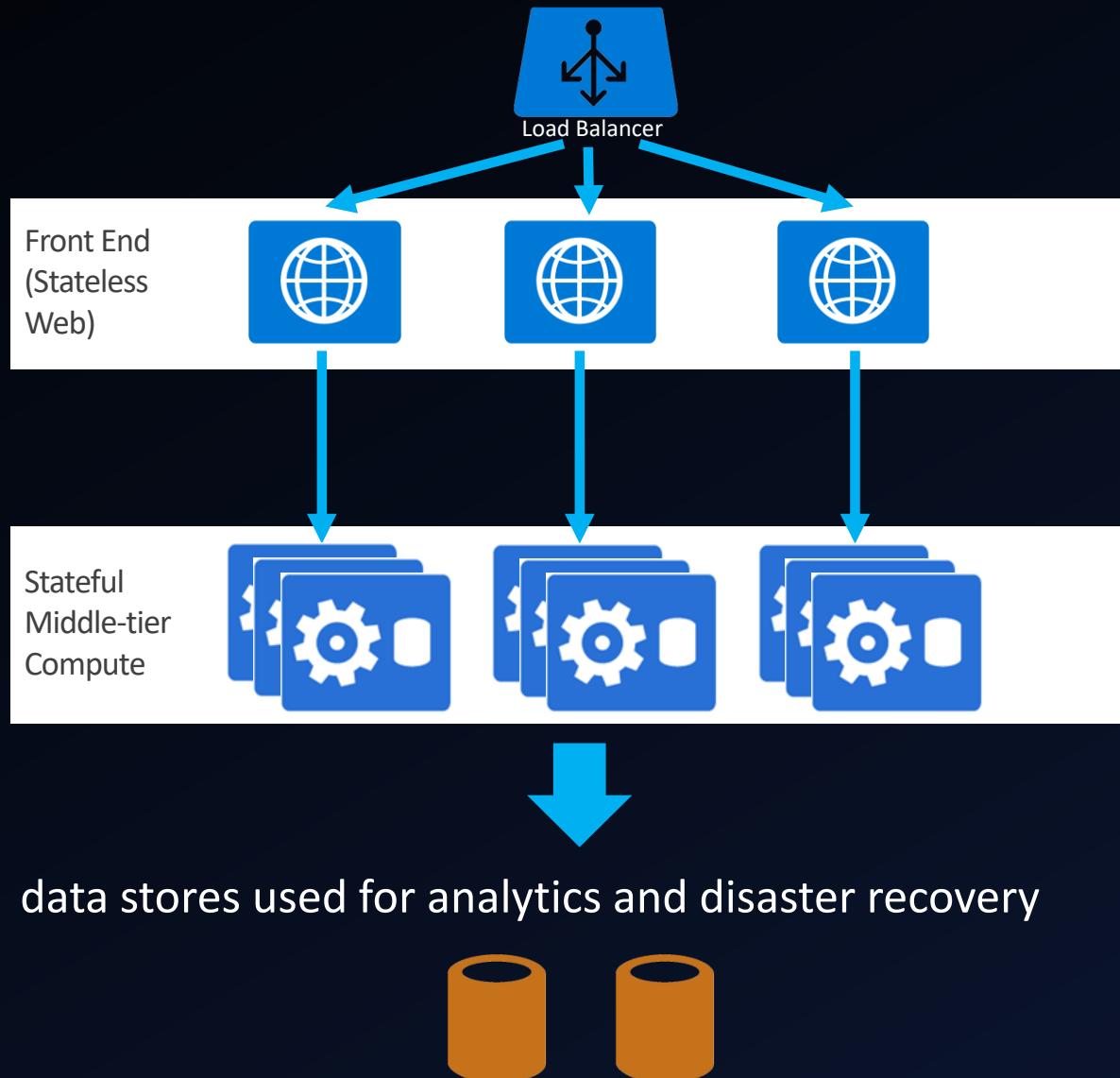
500m evals/sec



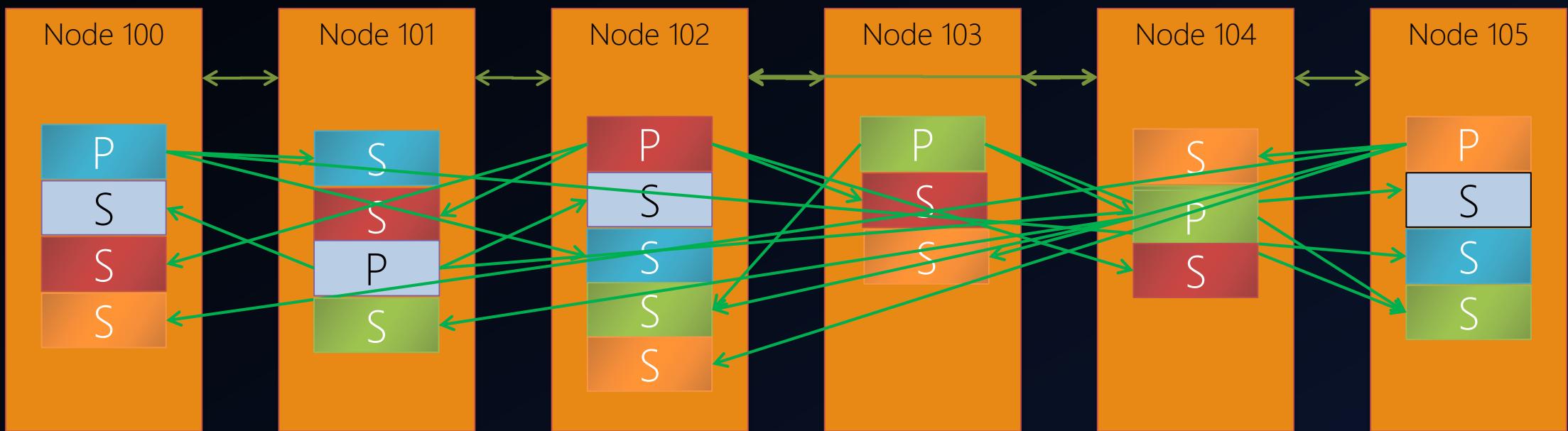
3-Tier service pattern



Stateful services: Simplify design, reduce latency

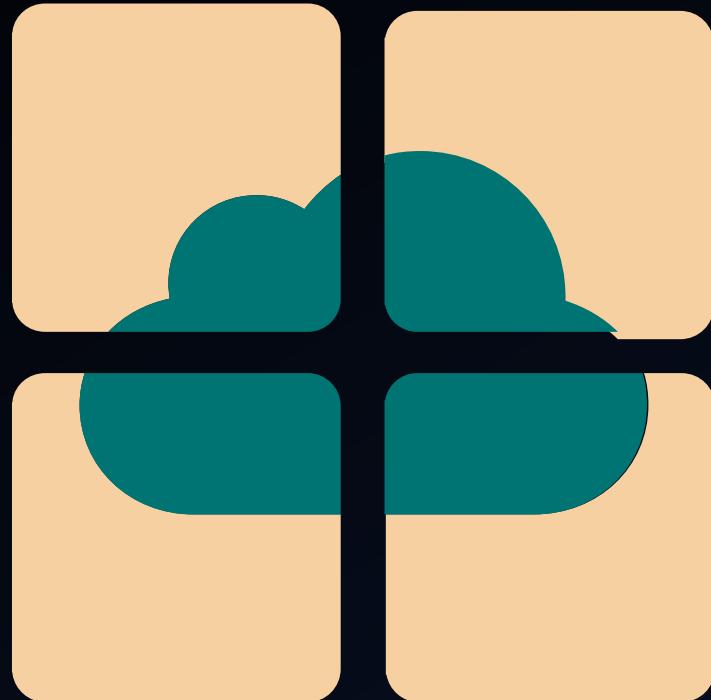


Microservices placement and failover



PaaS - Azure App Service

Azure App Service: One Integrated Offering



Web Apps

Web apps that scale with your business



Logic Apps

Automate business process across SaaS and on-premises



Mobile Apps

Build Mobile apps for any device



API Apps

Easily build and consume APIs in the cloud

Built-in API Connectors



Connectors

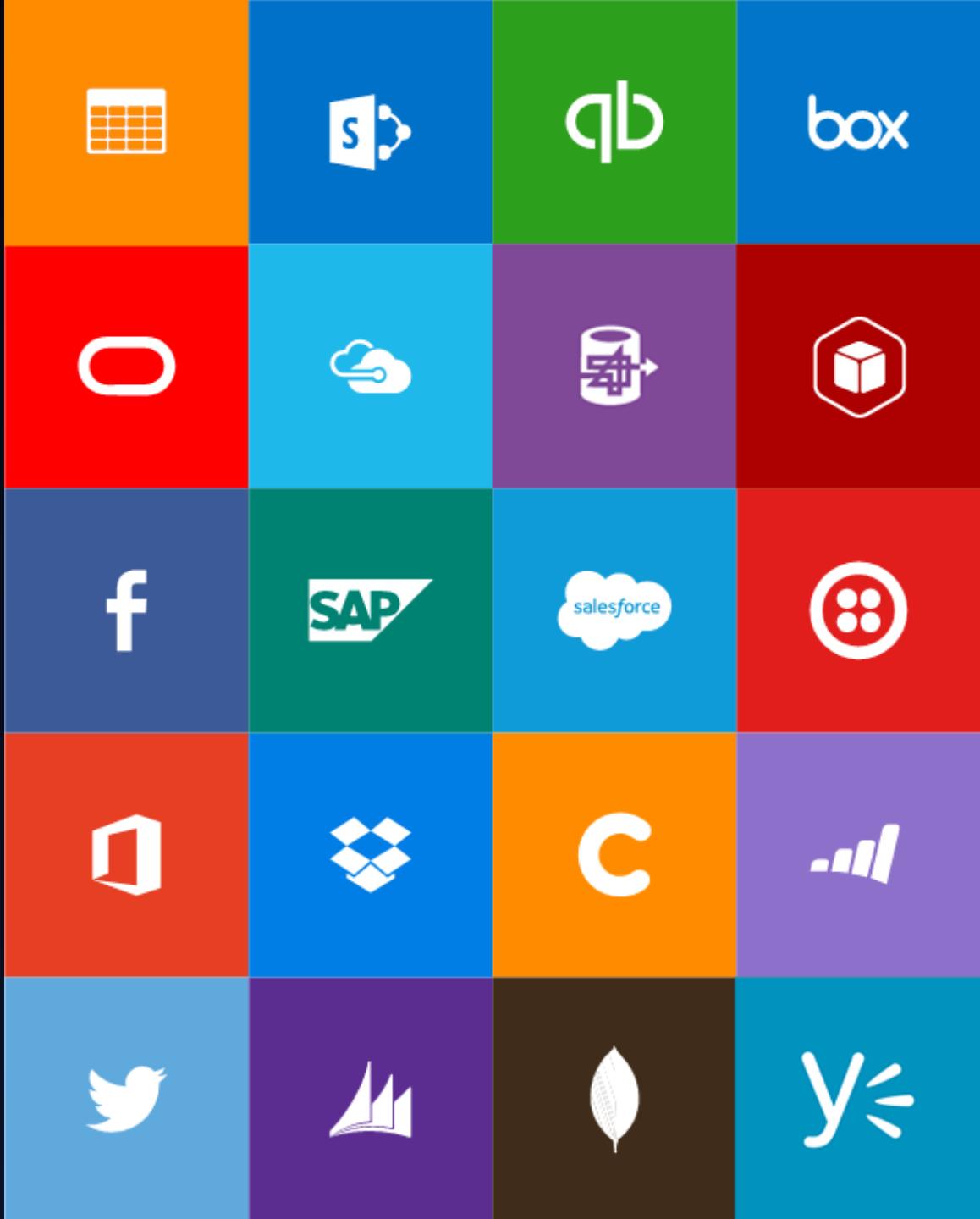
- Box
- Chatter
- Delay
- Dropbox
- Azure HD Insight
- Marketo
- Azure Media Services
- OneDrive
- SharePoint
- SQL Server
- Office 365
- Oracle
- QuickBooks
- SalesForce
- Sugar CRM
- SAP
- Azure Service Bus
- Azure Storage
- Timer / Recurrence
- Twilio
- Twitter
- IBM DB2
- Informix
- Websphere MQ
- Azure Web Jobs
- Yammer
- Dynamics CRM
- Dynamics AX
- Hybrid Connectivity

Protocols

- HTTP, HTTPS
- File
- Flat File
- FTP, SFTP
- POP3/IMAP
- SMTP
- SOAP + WCF

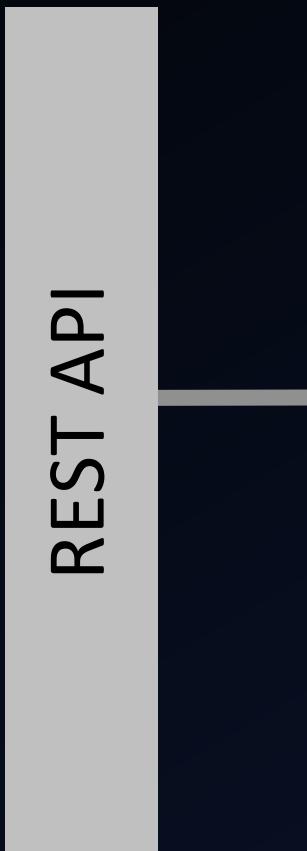
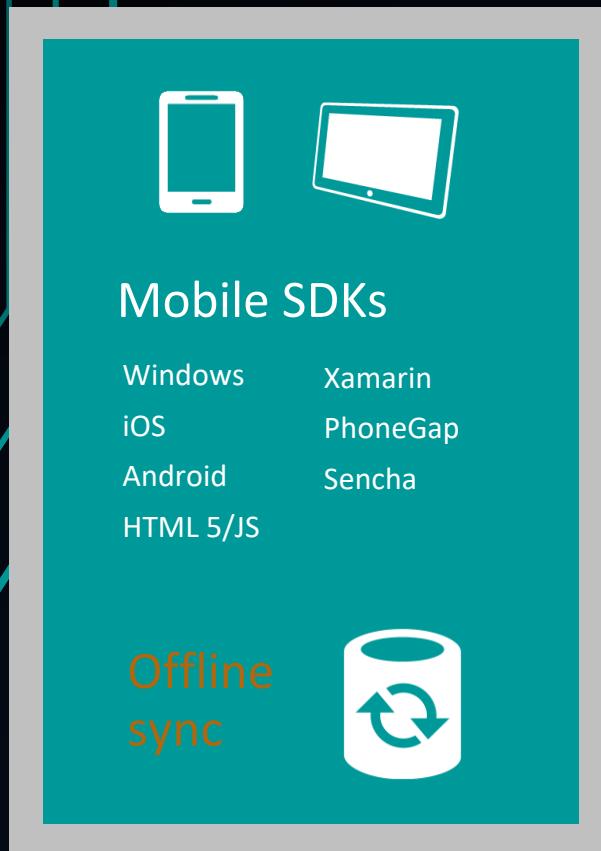
BizTalk Services

- Batching / Debatching
- Validate
- Extract (XPath)
- Transform (+Mapper)
- Convert (XML-JSON)
- Convert (XML-FF)
- X12
- EDIFACT
- AS2
- TPMOM
- Rules Engine



Azure Mobile App

Azure Mobile App



Supported Platforms



Windows 8.x
Windows 10



iOS



Windows
Phone 8/10



Android



HTML5 &
Javascript



Windows Azure



demo

Job Roles in Cloud

INTRODUCTION TO AWS

Job Roles

- On premises
- Cloud Job roles

On premises Job Roles

INTRODUCTION TO AWS

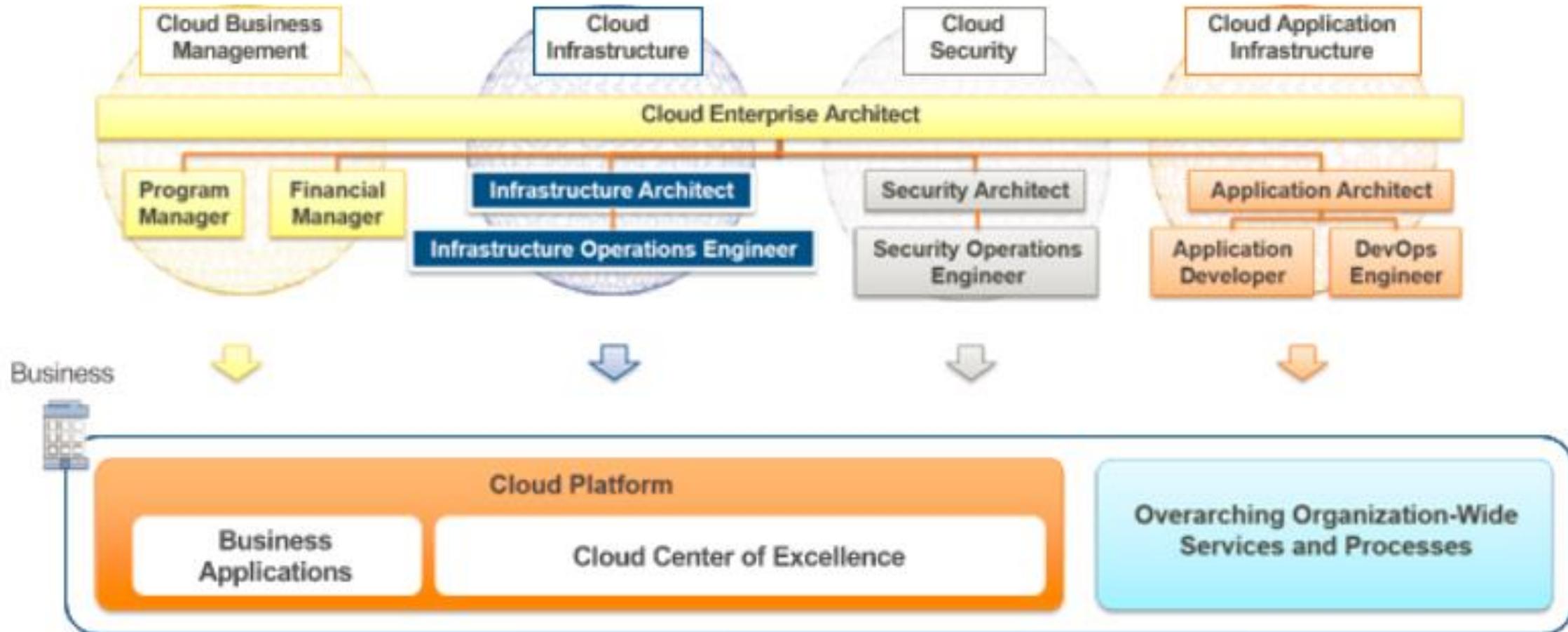
IT Job roles

- Classic On premises IT Job roles
 - Architect
 - System Administrator
 - Application Developer
 - Network Administrator
 - Database Administrator
 - Storage Administrator
 - Security Administrator

Cloud Job Roles

INTRODUCTION TO AWS

Spheres of Responsibility in the AWS Cloud Environment



Common Duties in the Cloud

Duties	Cloud Infrastructure Role	Application Role
Design/validate/expand solution-independent architectures and requirements	Cloud Enterprise Architect	Cloud Enterprise Architect
Design/validate/expand solution-dependent architectures and requirements	Cloud Infrastructure Architect	Cloud Application Architect
Build the infrastructure/application	Cloud Operations Engineer	Application Developer
Specify security requirements	Cloud Security Architect	Cloud Security Architect
Manage, monitor, and enforce security	Security Operations	Security Operations
Build and manage fast and scalable workflows	DevOps Engineer	DevOps Engineer
Design and build automation solutions	DevOps Engineer	DevOps Engineer
Perform cost coding and cost optimization	Financial Manager	Financial Manager
Manage operational teams	Program Manager	Program Manager



Cloud part in DevOps

Manual and Automated Management



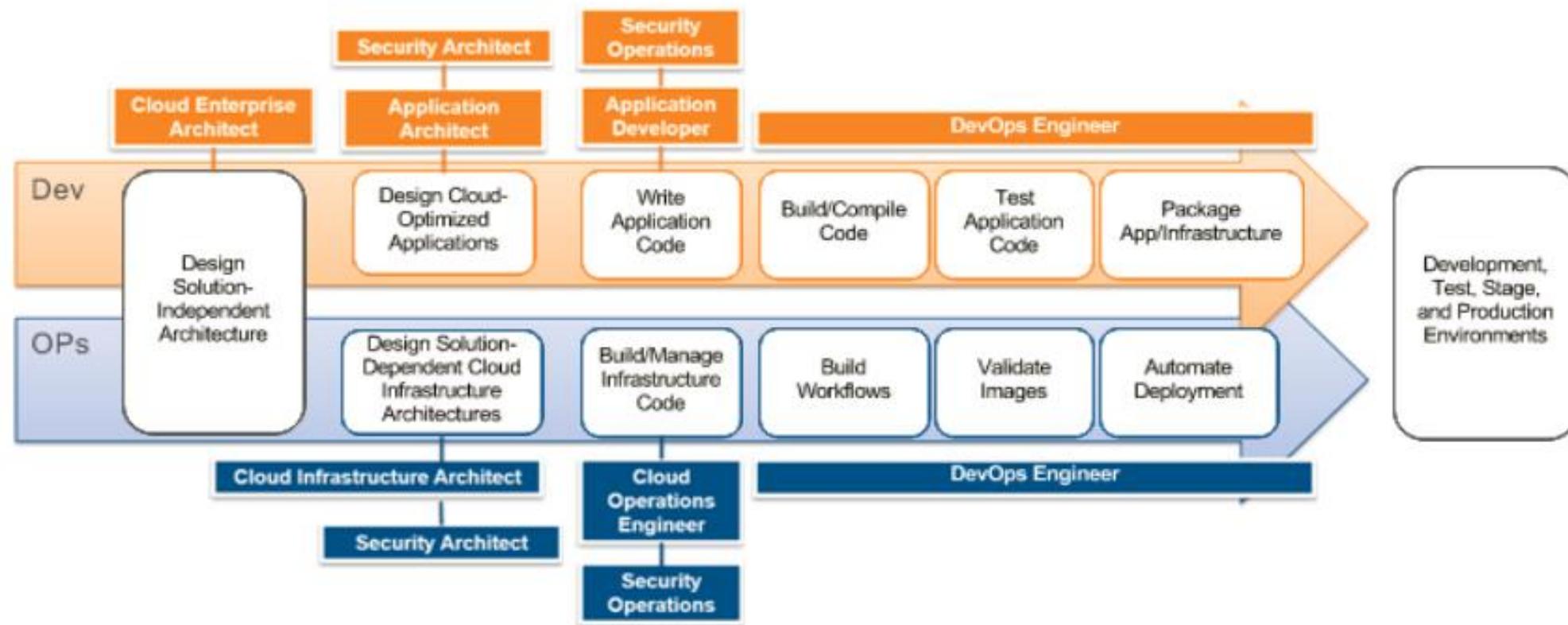
Manually Managing your Environment



Managing Your Environment Using
Infrastructure as Code

Provides a reusable,
maintainable, extensible,
and testable infrastructure

Using the DevOps Model to Develop Applications





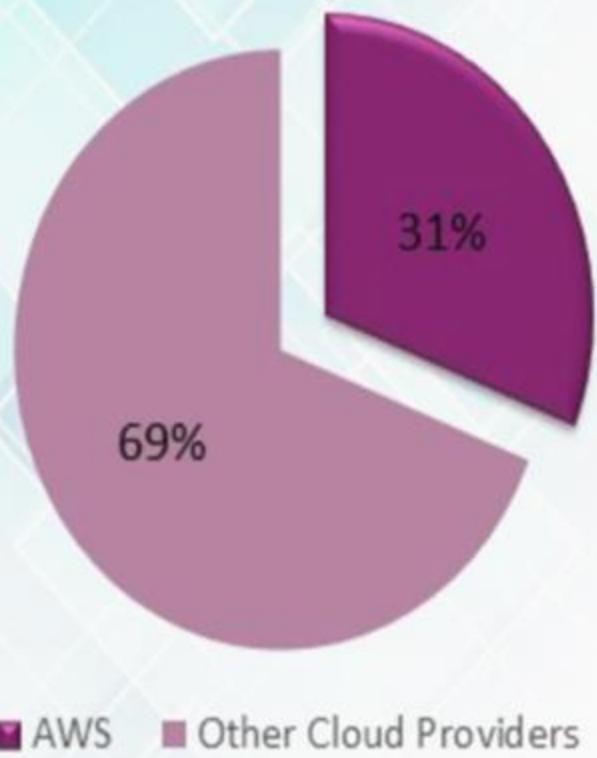
AWS Certification



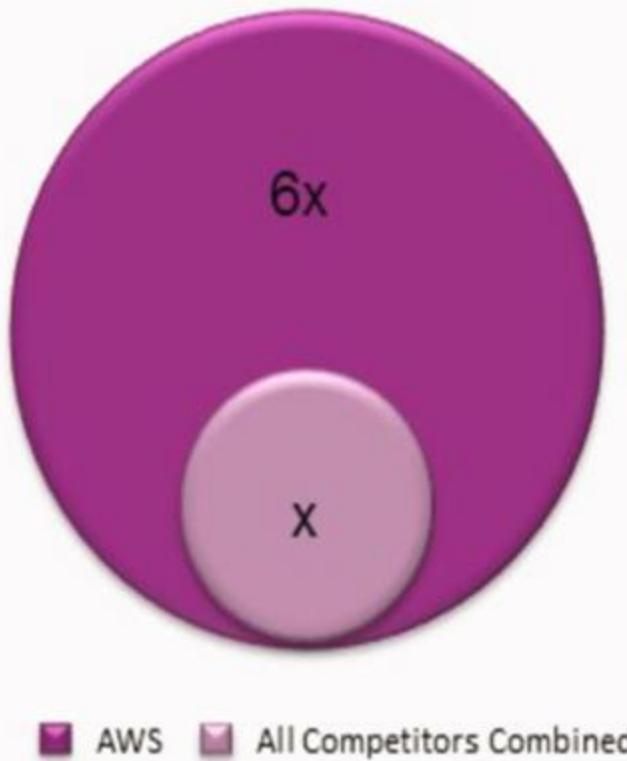
Subscribe

Market Demand for AWS

AWS Global Cloud Computing Market Share

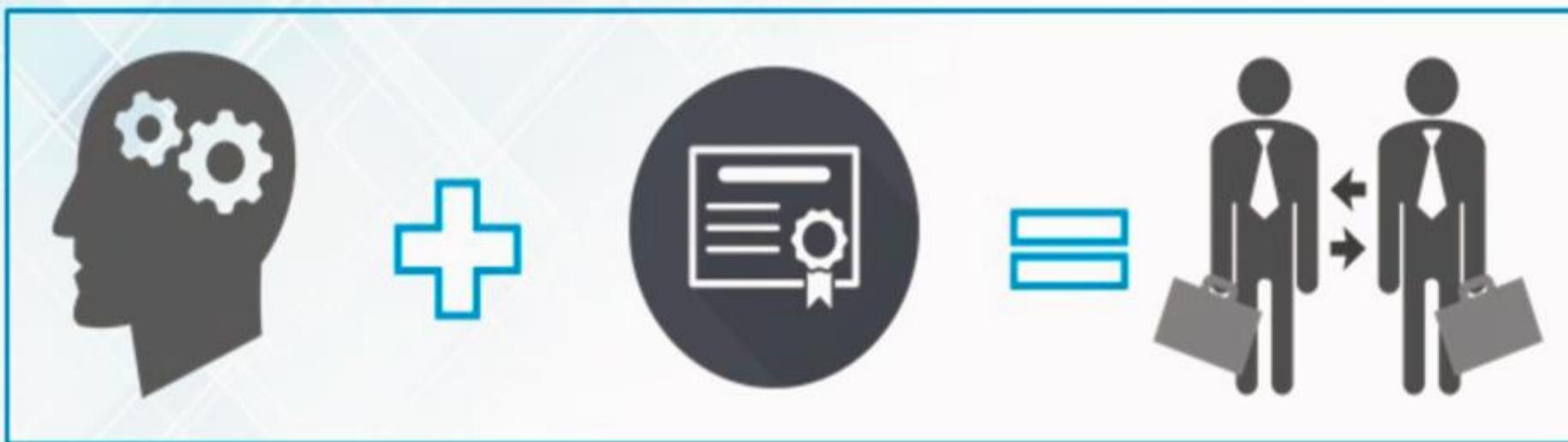


Server Capacity

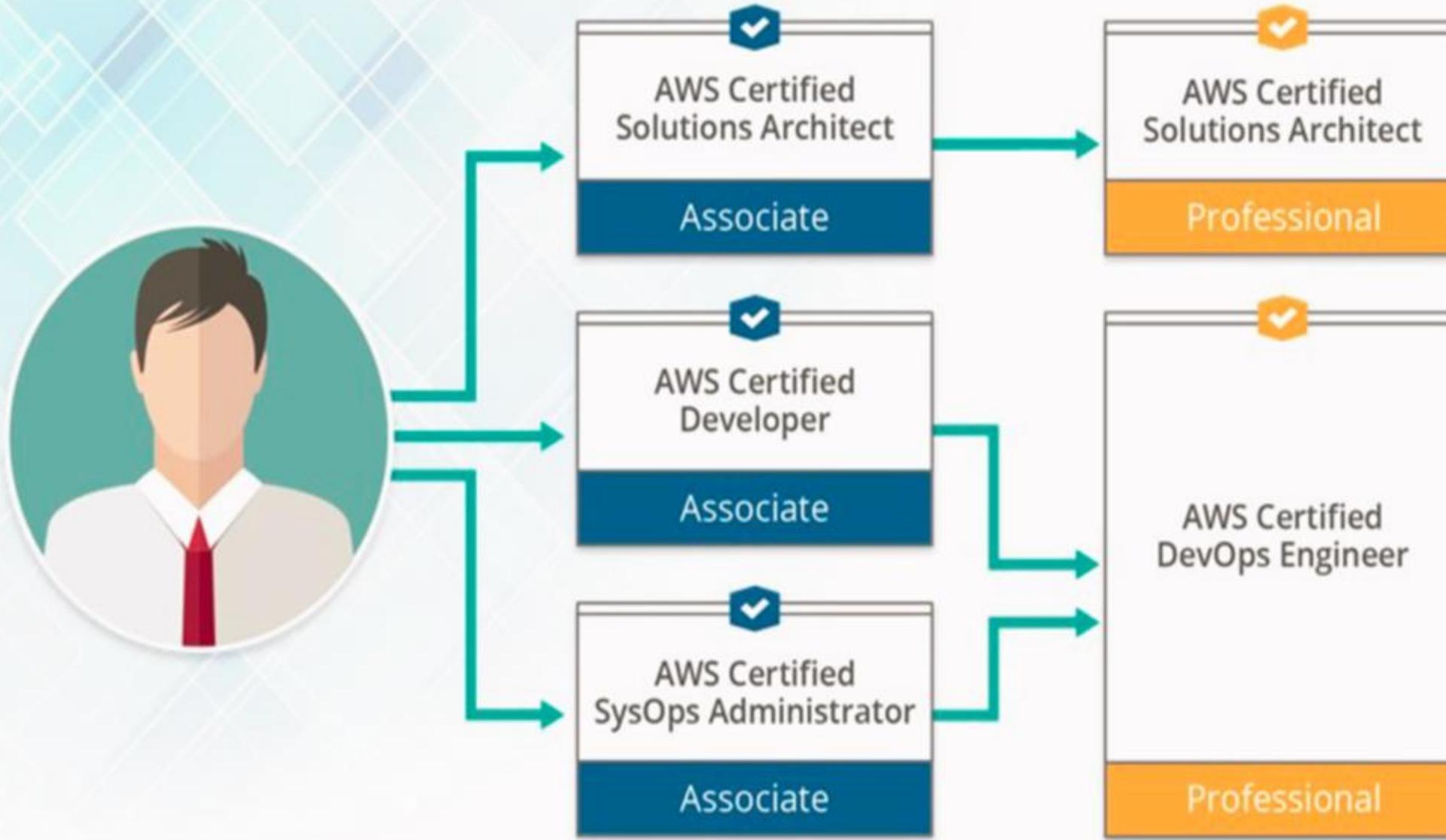


Why AWS Certifications?

- Helps in the screening process.
- It gives your knowledge in the subject recognition.
- Will be recognized by all APNs (AWS Partner Networks), your resume value will increase multifold.
- Acute shortage of AWS certified professionals in the cloud industry!



Types of AWS Certifications





Questions



Queries



Feedback



Thank You