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ORACLE Gold Partner | Silver Microsoft Partner | DevOps INSTITUTE REGISTERED EDUCATION PARTNER

Introduction to AWS

Getting Help

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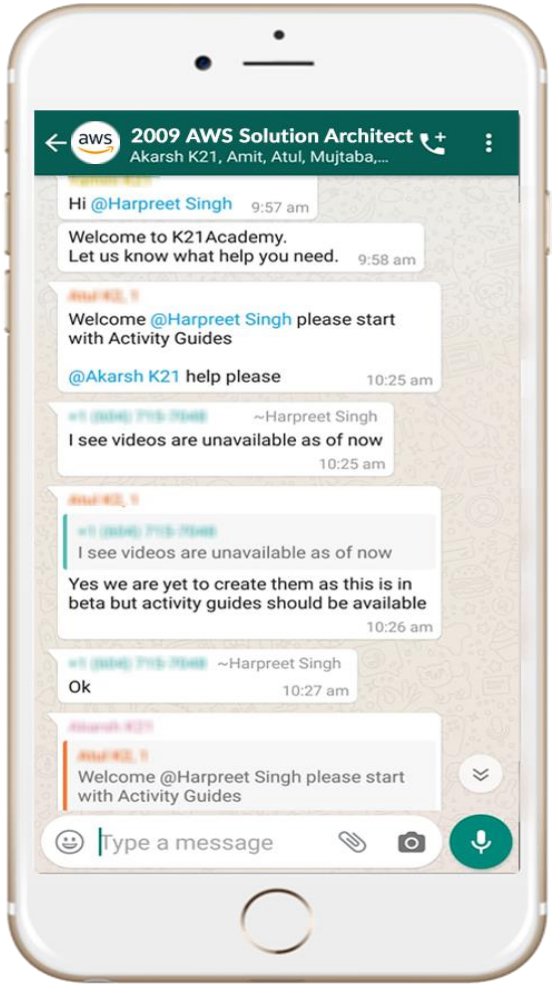
support@k21academy.com

zendesk



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- Ask as Many Questions as you can & make session interactive
- Do Lots of Hands-On
- Learn at your own Pace & Look How Far You have come
- Share you WIN as it will inspire others

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AWS SAA-C02 Module Agenda

Module Agenda

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- Cloud Computing Overview
- Cloud Service Models: IaaS, PaaS, SaaS
- Cloud Deployment Model: Public, Private, Hybrid
- AWS Global Infrastructure: Region, Availability Zones
- AWS Services Overview
- Core Services: IAM, Compute/VM, Storage, Network, Database
- Automation & Config: Cloud Formation, OpsWorks
- Audit & Monitoring: CloudWatch, CloudTrail
- Application Services: SNS, SES, SQS, SWF
- AWS DevOps Tools: CodeCommit, CodeBuild, CodeDeploy, CodePipeline
- AWS Architecture Overview
- How To Access Service

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Overview
Cloud Computing

What Is Cloud Computing

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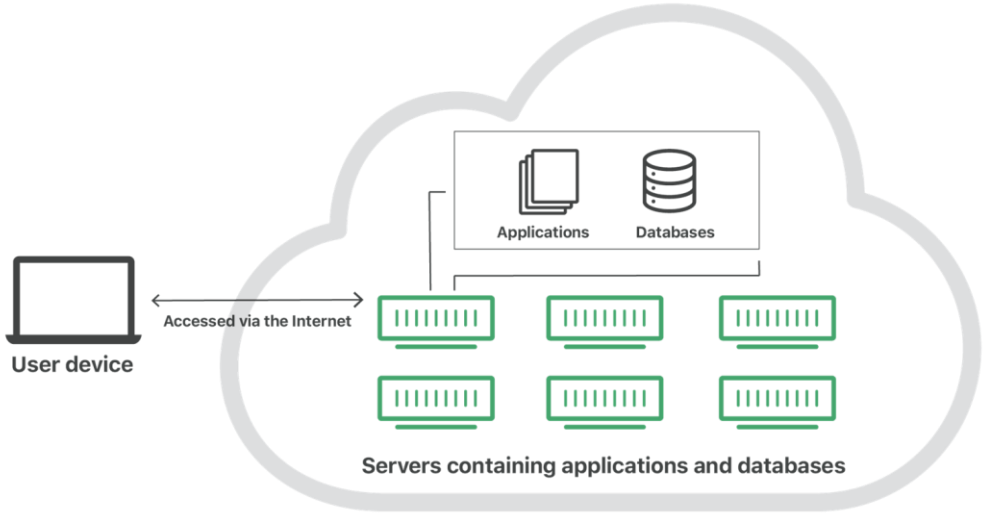
- Cloud computing is the delivery of computing services: servers, storage, databases, networking, tools and software over the Internet.

- Cloud computing enables companies to consume a compute resource, such as a servers, storage or an application, as a utility like water or electricity, rather than having to build and maintain computing infrastructures in house.



Cloud Computing Definition

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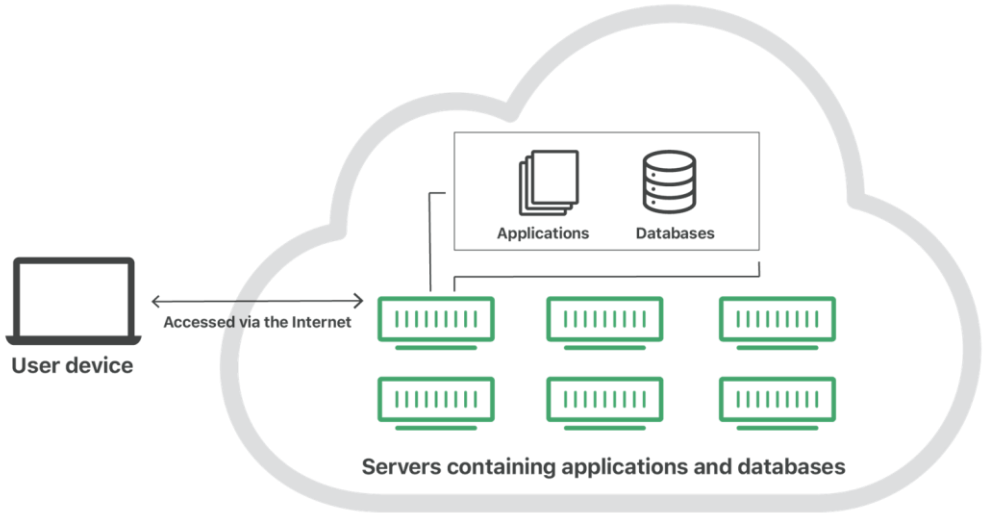
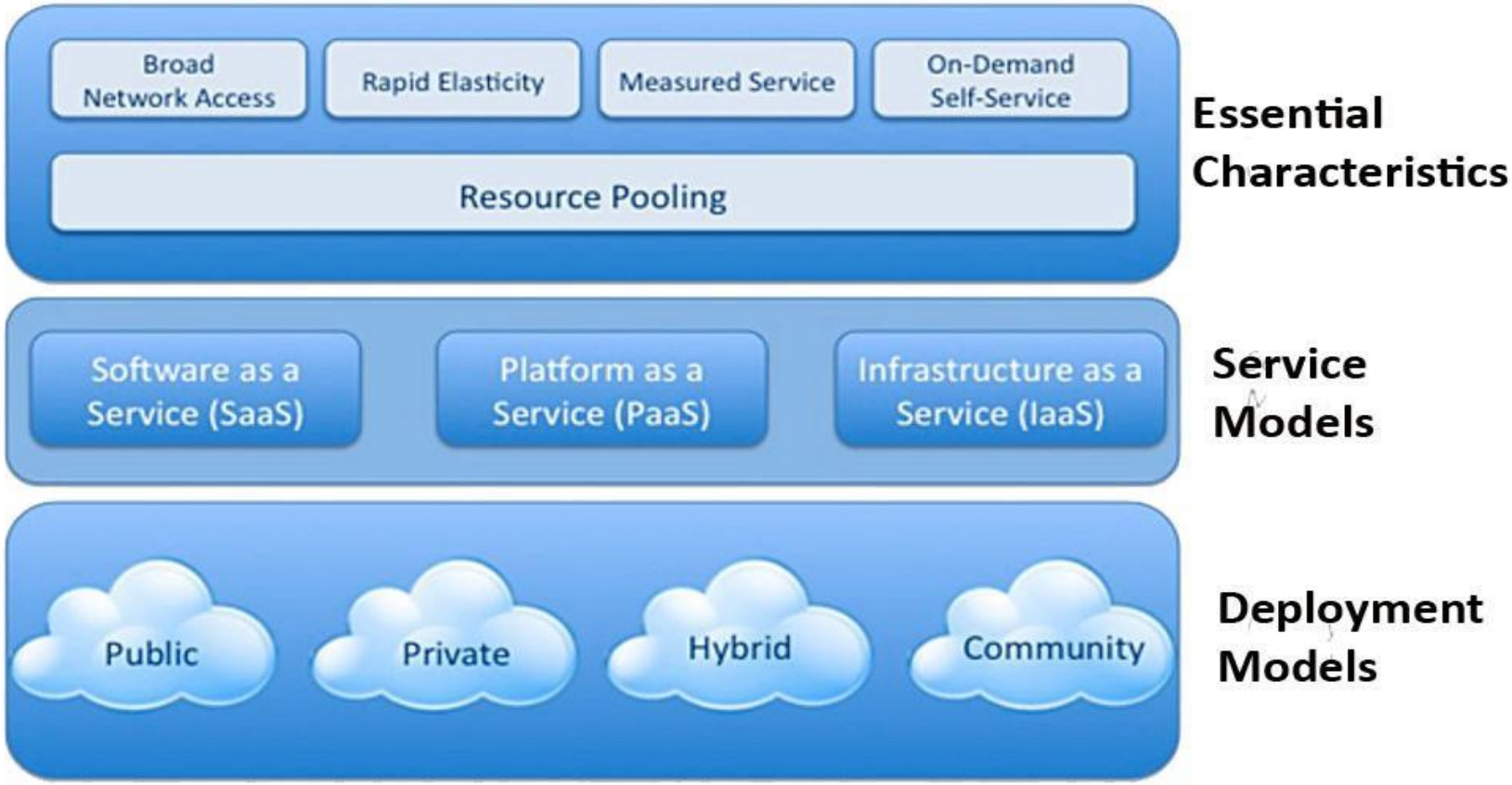
Cloud computing is a model for enabling **convenient**, **on-demand** network access to a **shared pool** of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction.

This cloud model is composed of

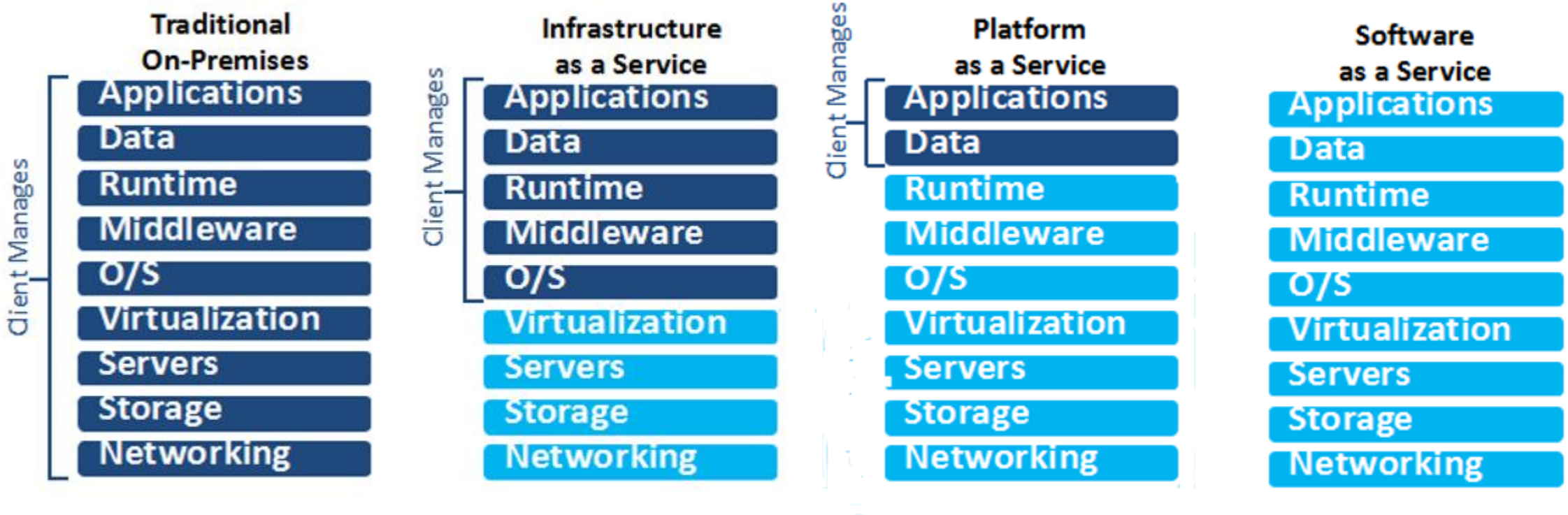
- Five essential characteristics
- Three service models
- Four deployment models.



Cloud Computing Definition



Cloud Service Model



Cloud Deployment Model

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PUBLIC CLOUD

- Offered by third-party providers
- Available to anyone over the public internet
- Scales quickly and convenient

HYBRID CLOUD

- Combination of both public & private cloud
- Shared security responsibility
- Helps maintain tighter controls over sensitive data & processes

PRIVATE CLOUD

- Offered to select users over the internet or a private internal network
- Provides greater security controls
- Requires traditional data center staffing & maintenance

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Introduction To AWS

Market Survey Of AWS

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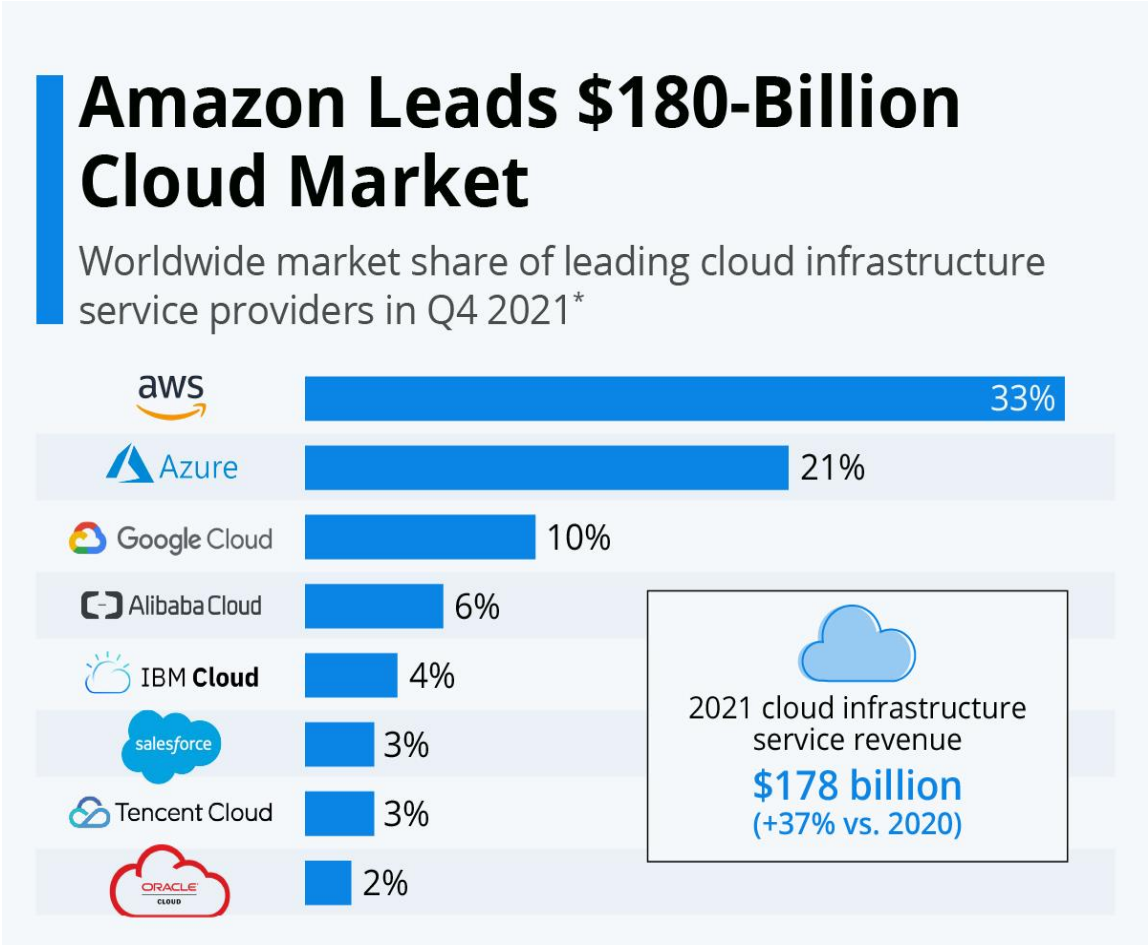

Services: AWS, Azure & GCP

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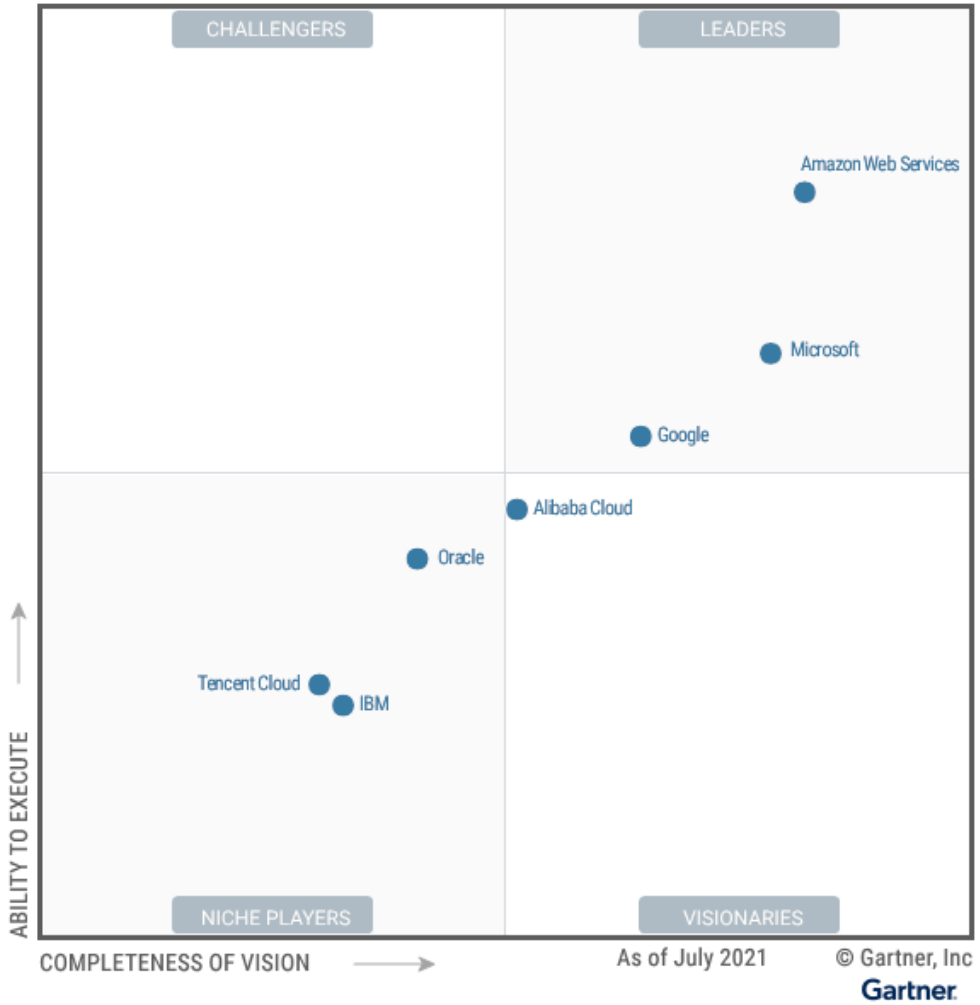
Amazon AWS	Microsoft Azure	GCP
S3	Blob Storage	Storage
EC2	Virtual Machines	Compute Engine
EC2 Container Service	Container Service	Kubernetes Engine
Elastic Beanstalk	Azure App service	App Engine
DynamoDB	Cosmos DB	Cloud Datastore
RDS	SQL Database	BigQuery
Lambda	Azure Functions	Cloud Functions

Why AWS

- Gartner August' 20 magic quadrant for Cloud Infra, AWS is the leader in the Cloud Computing market.
- Gartner says, AWS is the most mature, enterprise-ready provider, with the deepest capabilities for governing a large number of users and resources.
- AWS dominates the public cloud market with a 47.1% market share.
- AWS is the most popular public cloud infra platform, comprising 41.5% of workloads.
- AWS certification is fast becoming the must have certificates for any IT professional working with Cloud.



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Global Infrastructure

AWS Global Infrastructure

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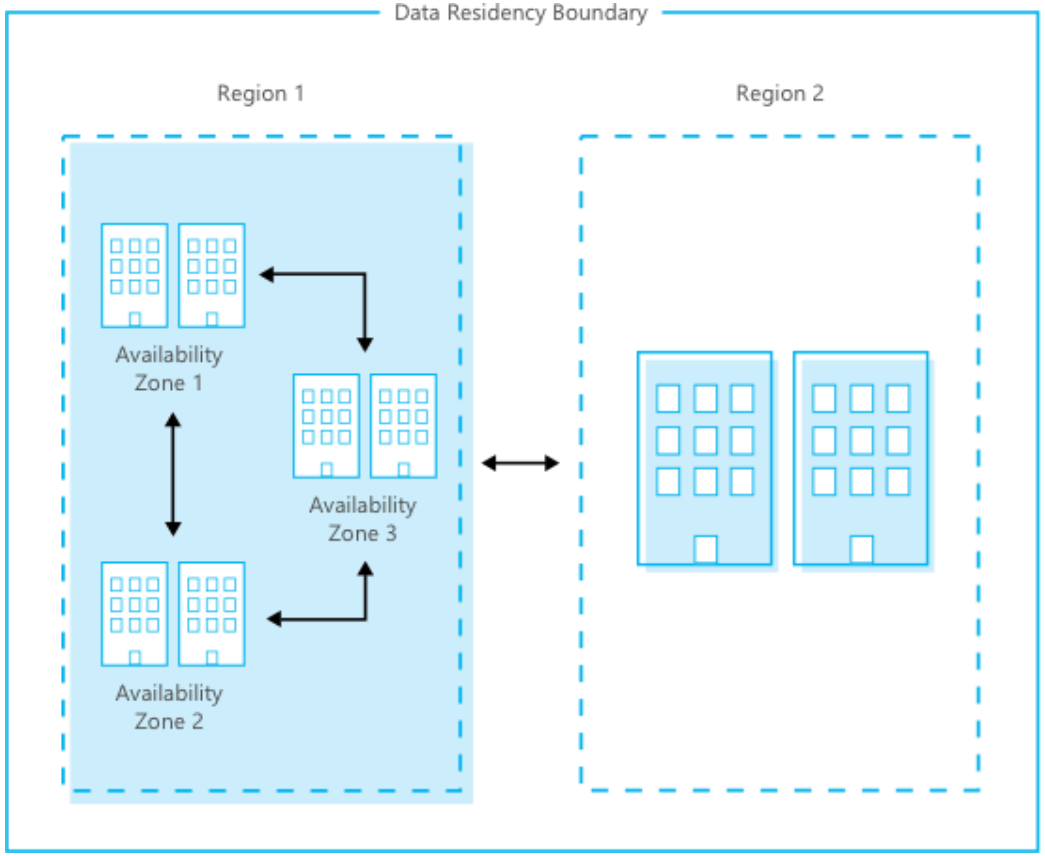
AWS Global Infrastructure Consists of:

- Regions

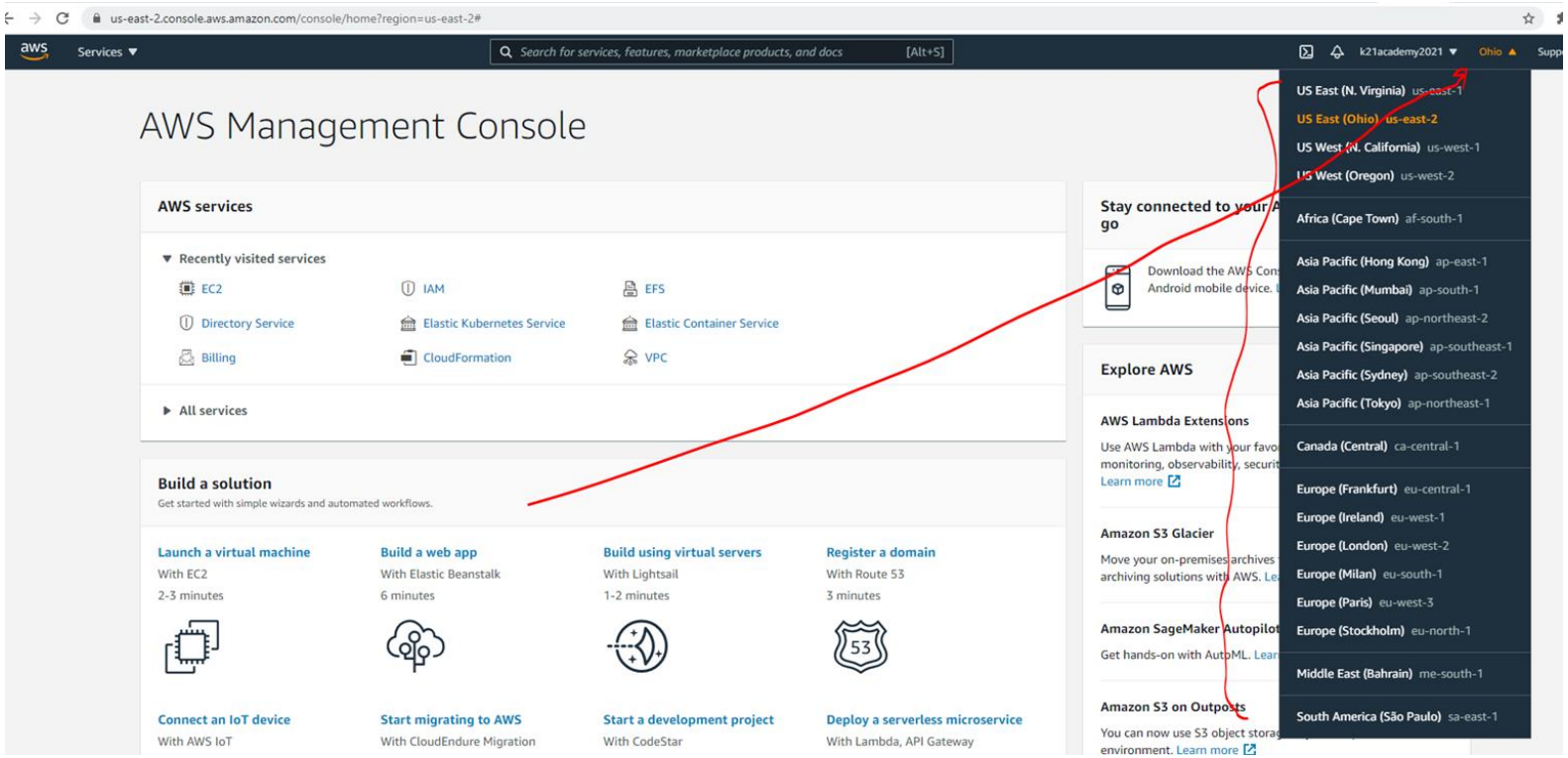
  &

- Availability Zones

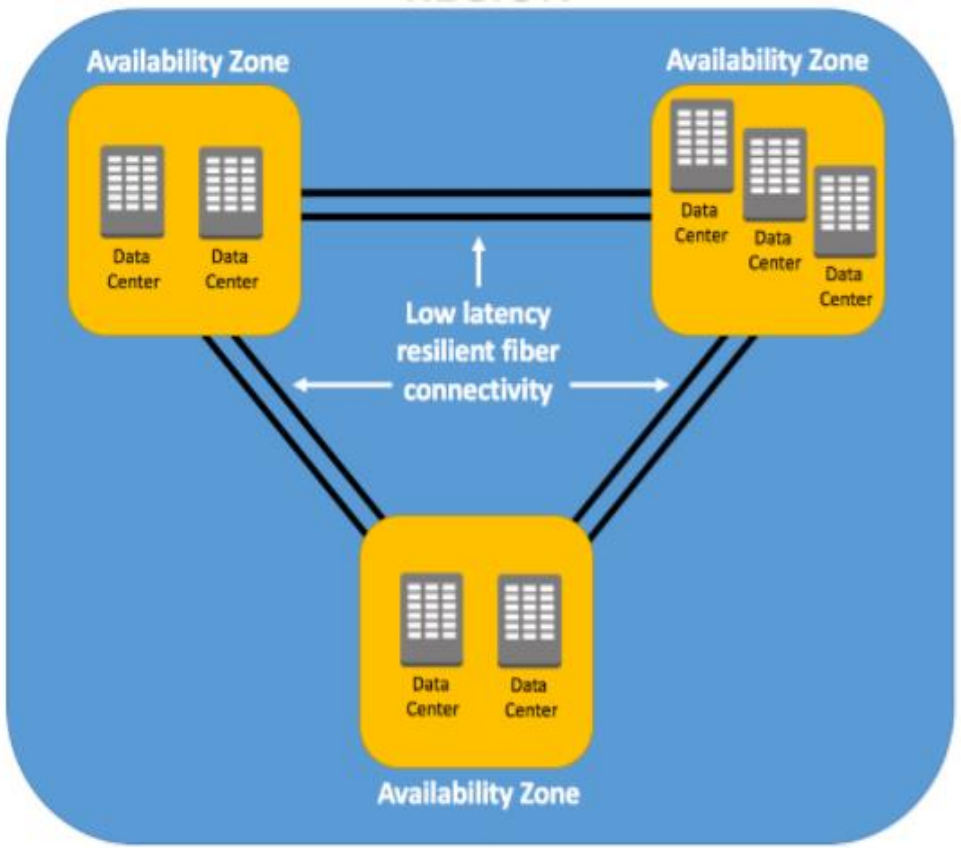


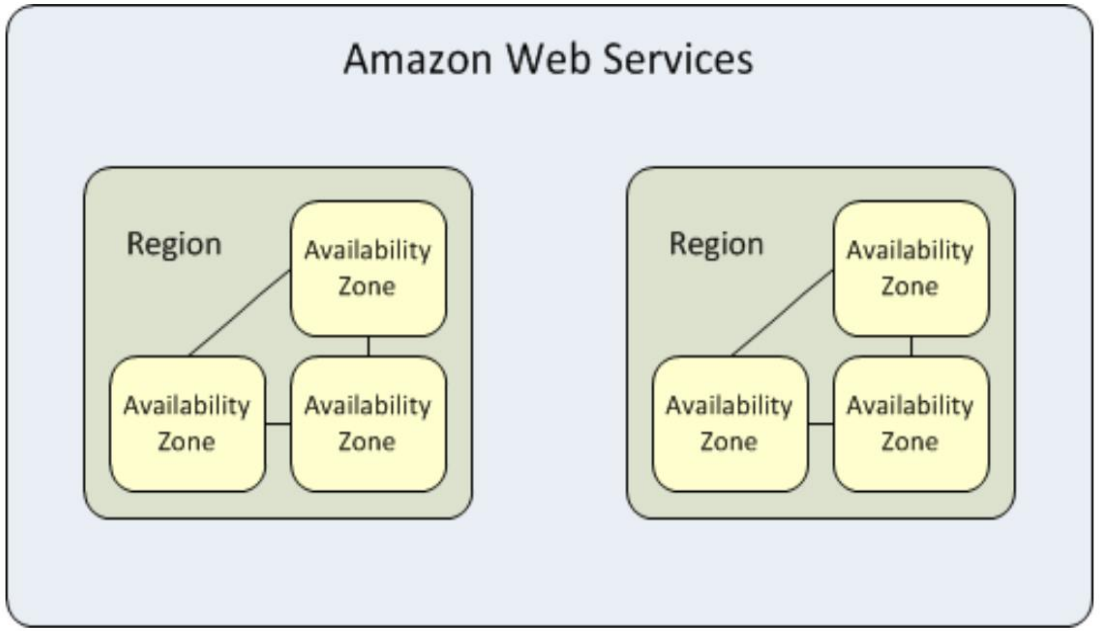
AWS Region

Choosing Region



AWS Zones





Choosing Zone

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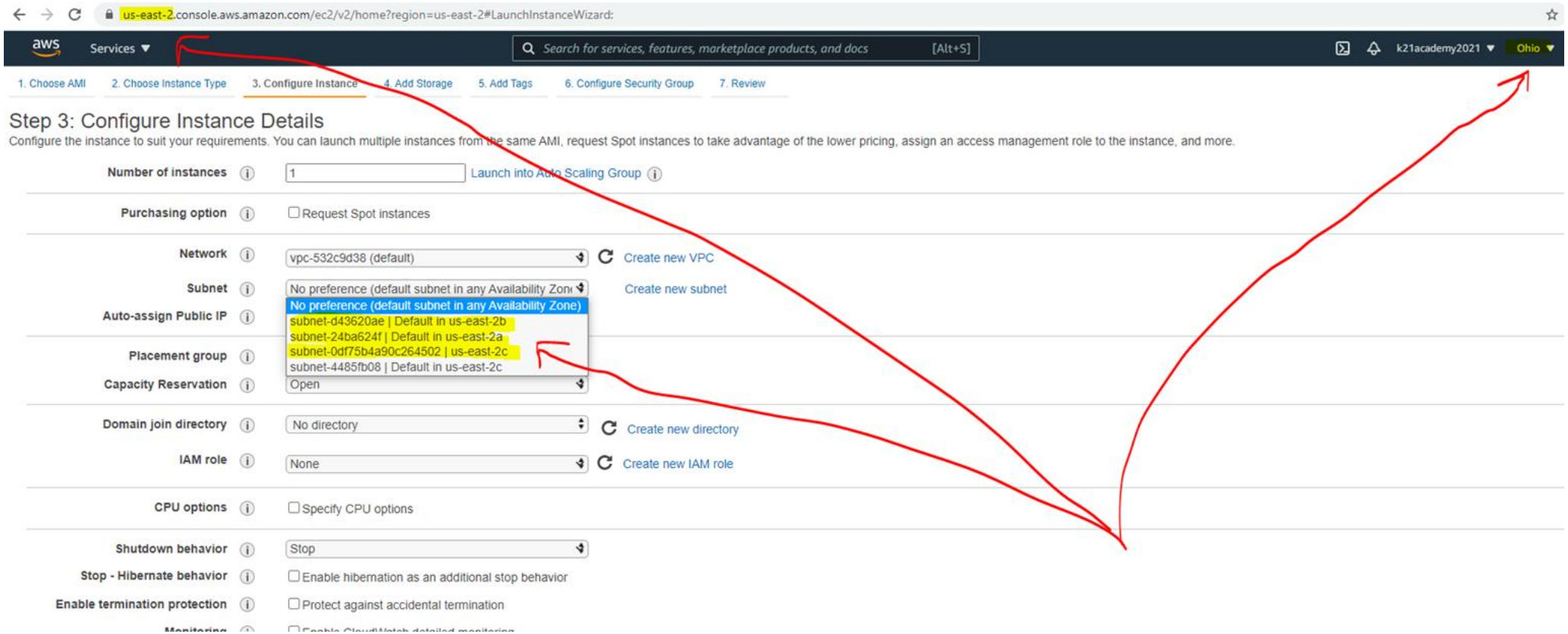

AWS Global Infrastructure

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With millions of active customers and tens of thousands of partners globally, AWS has the largest and most dynamic ecosystem. Customers across virtually every industry and of every size, including start-ups, enterprises, and public sector organizations, are running every imaginable use case on AWS.

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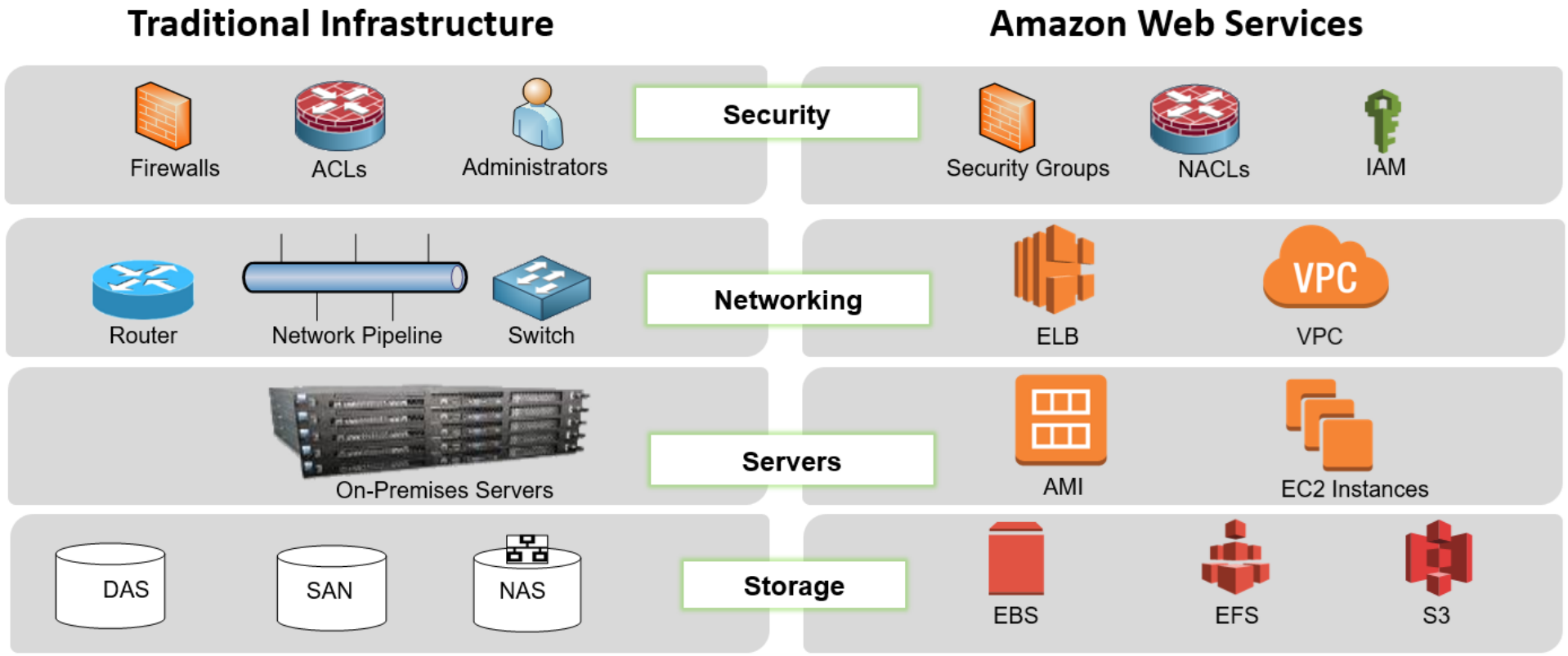
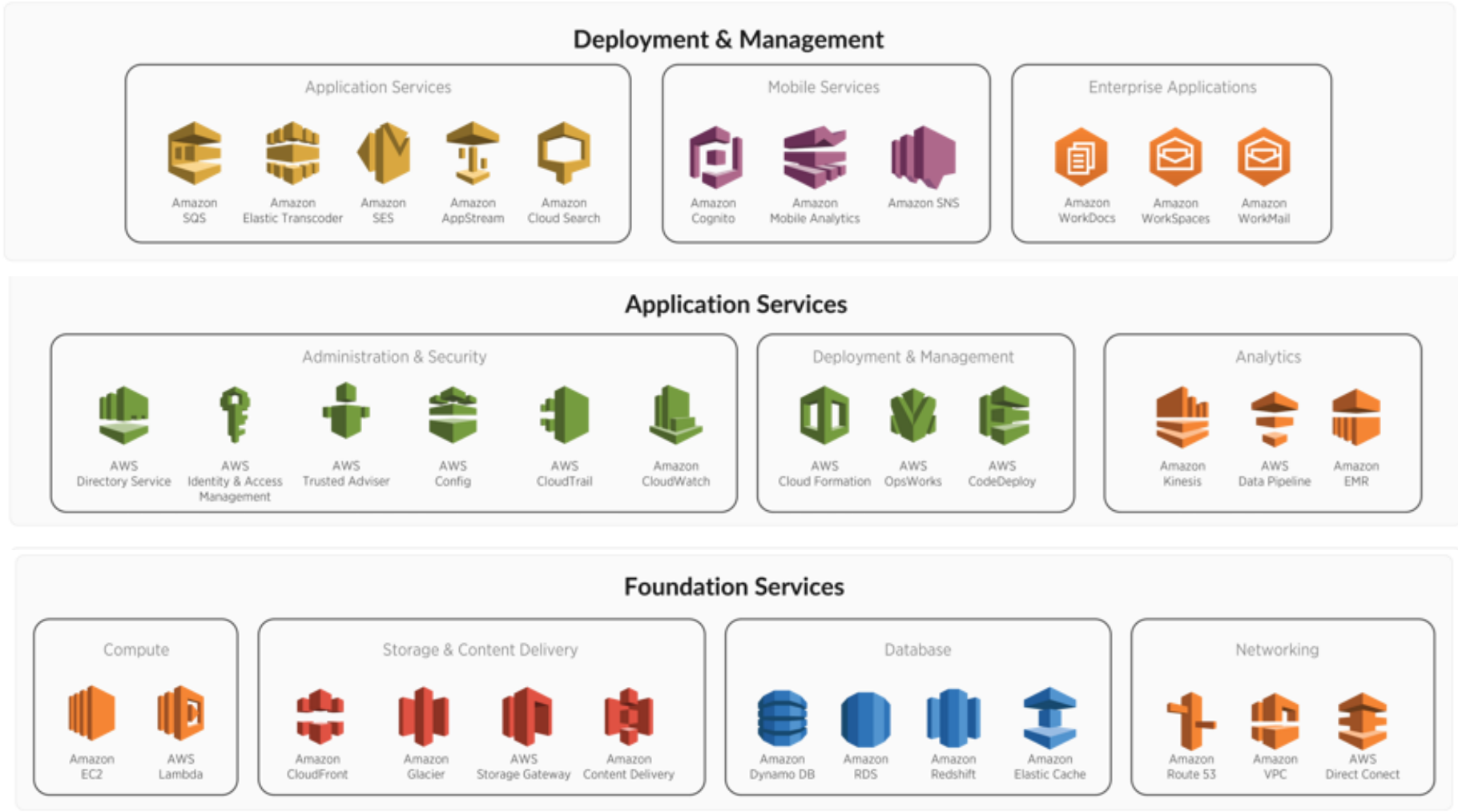
AWS Services

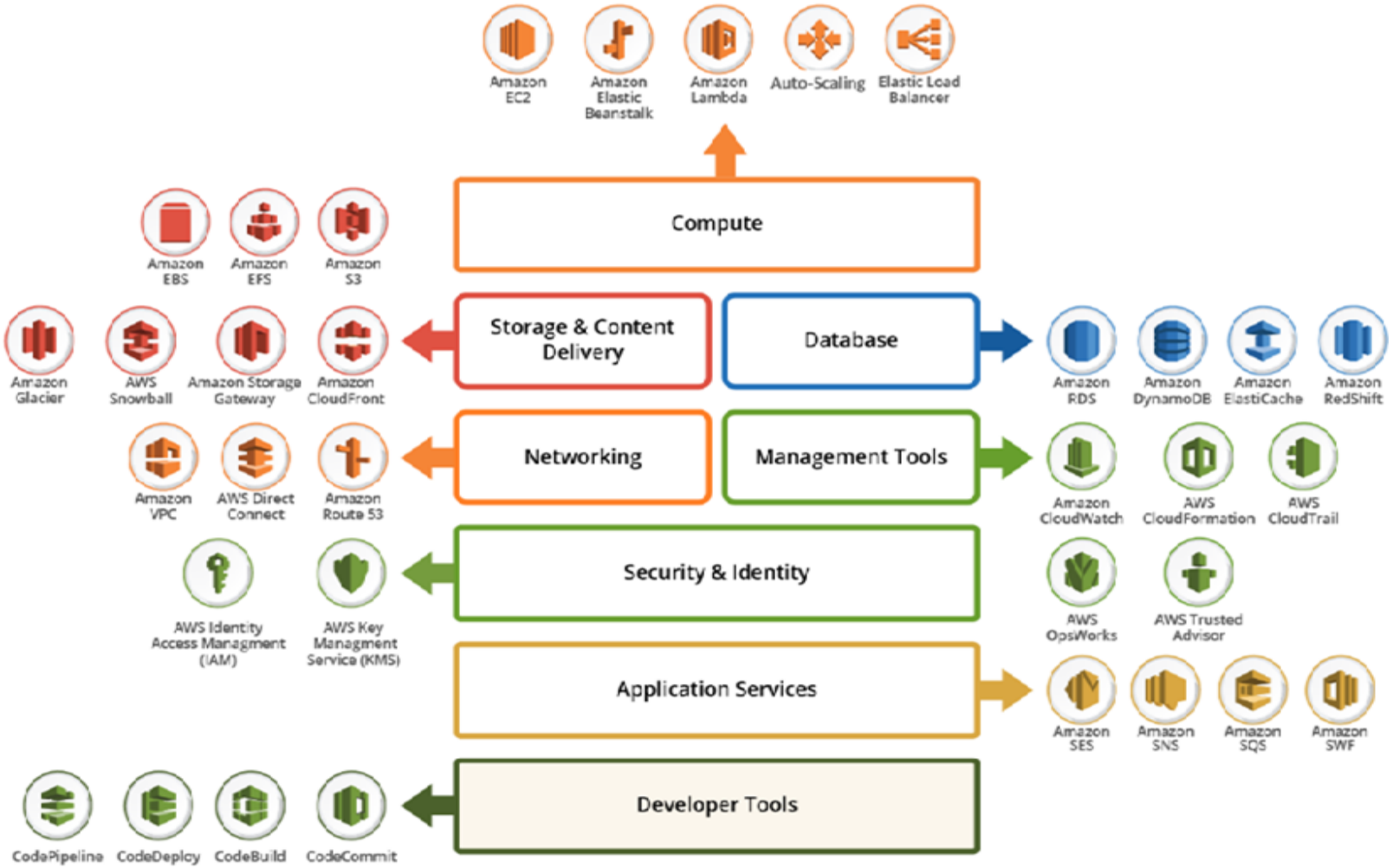
Traditional vs AWS



AWS Services



AWS Services



AWS Services

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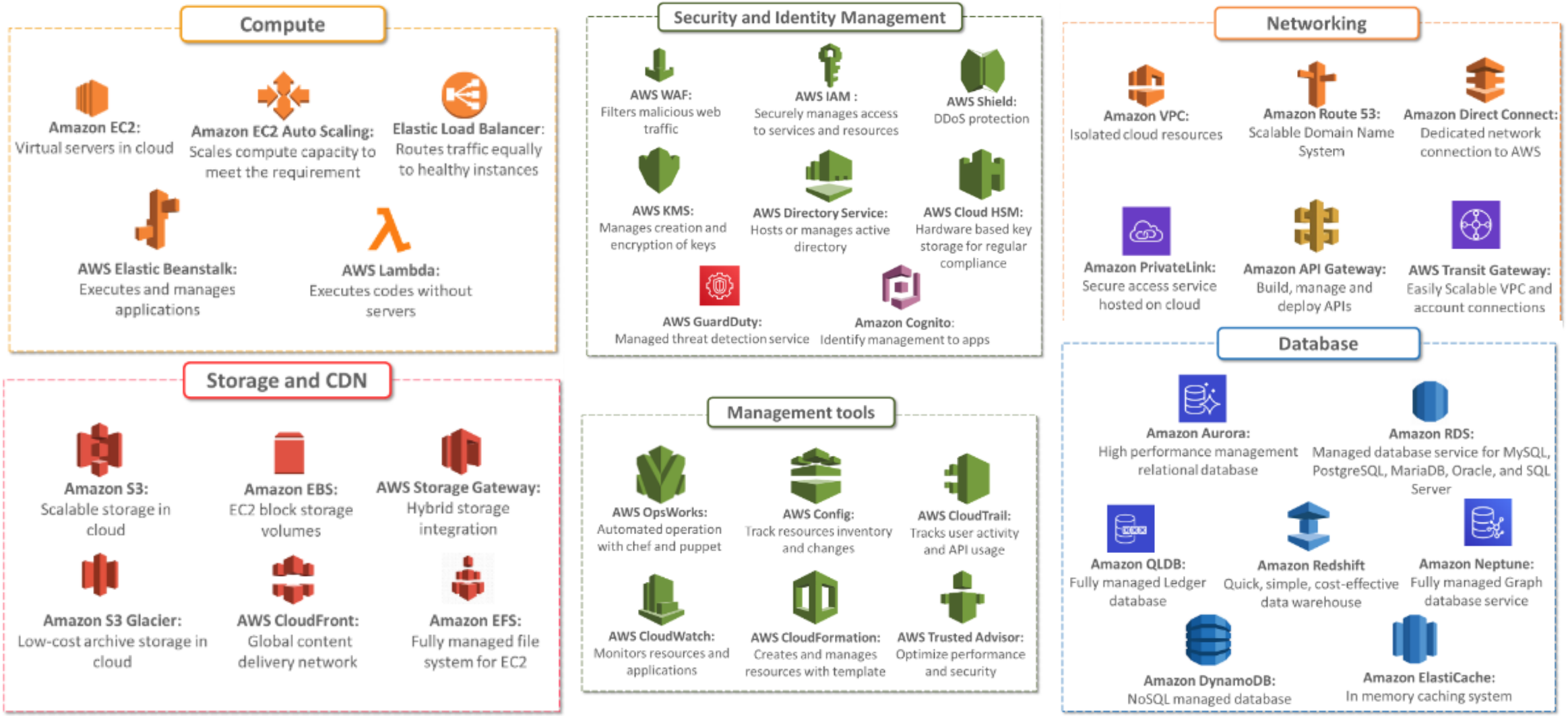

AWS Services

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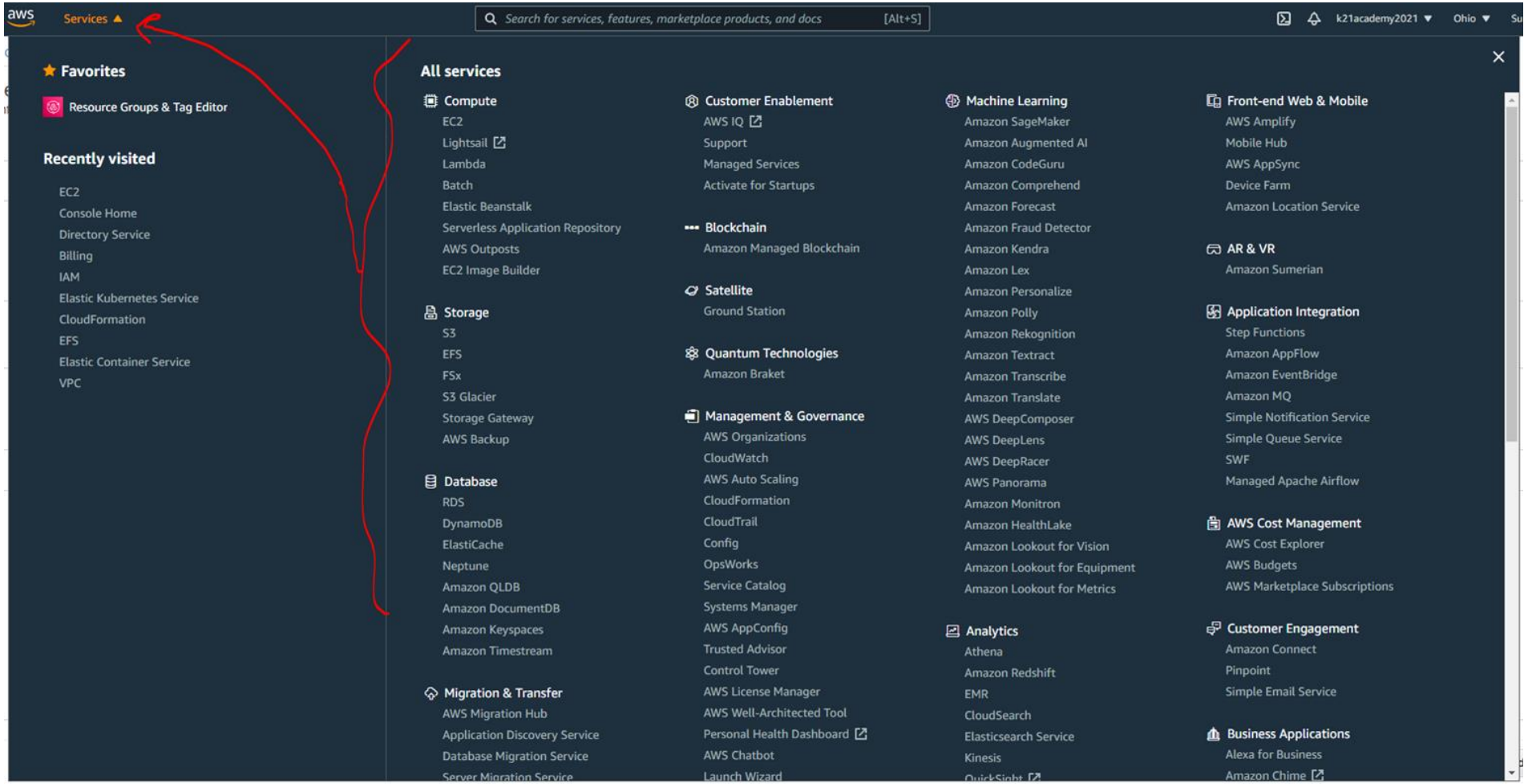

AWS Services

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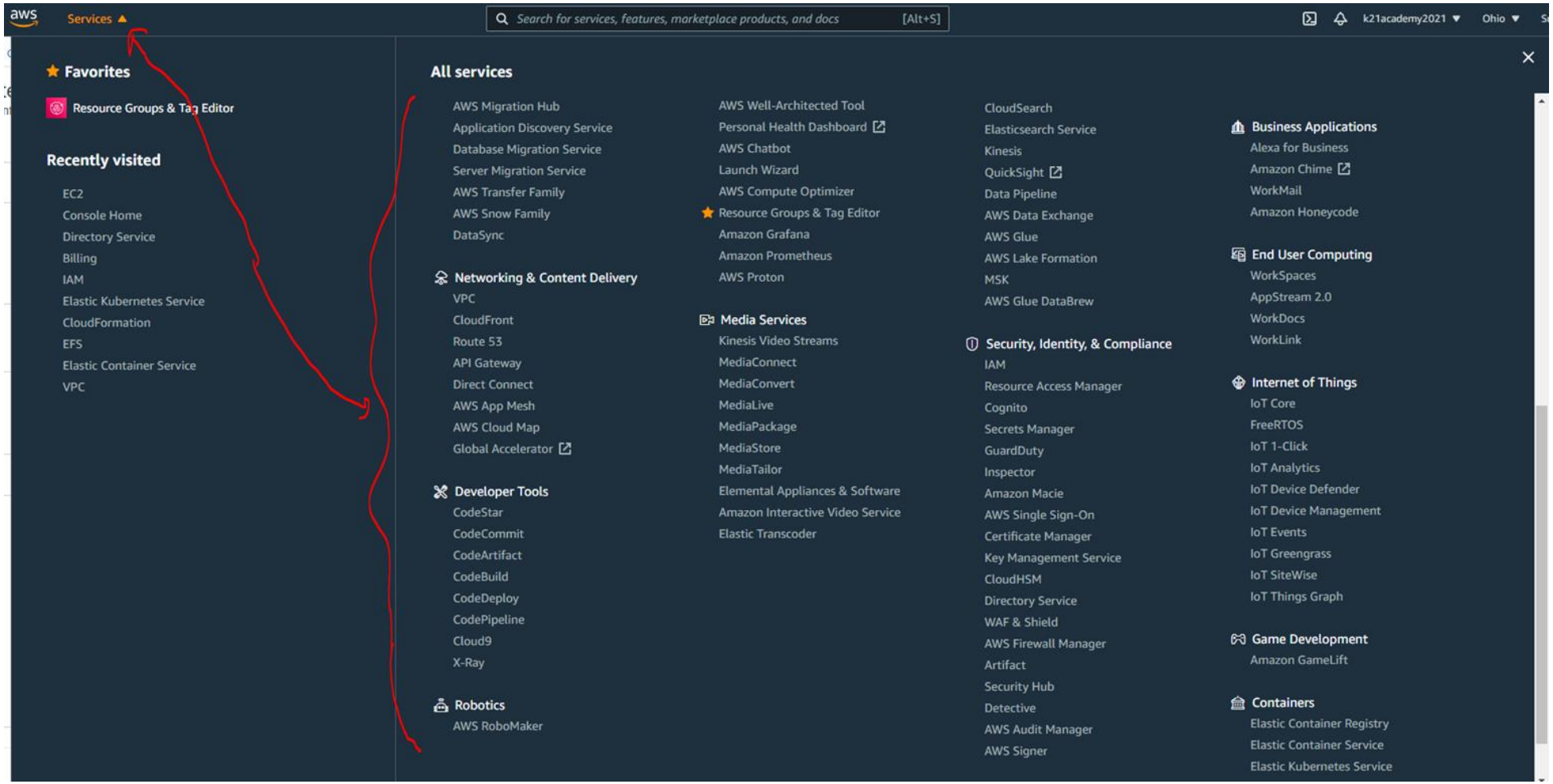

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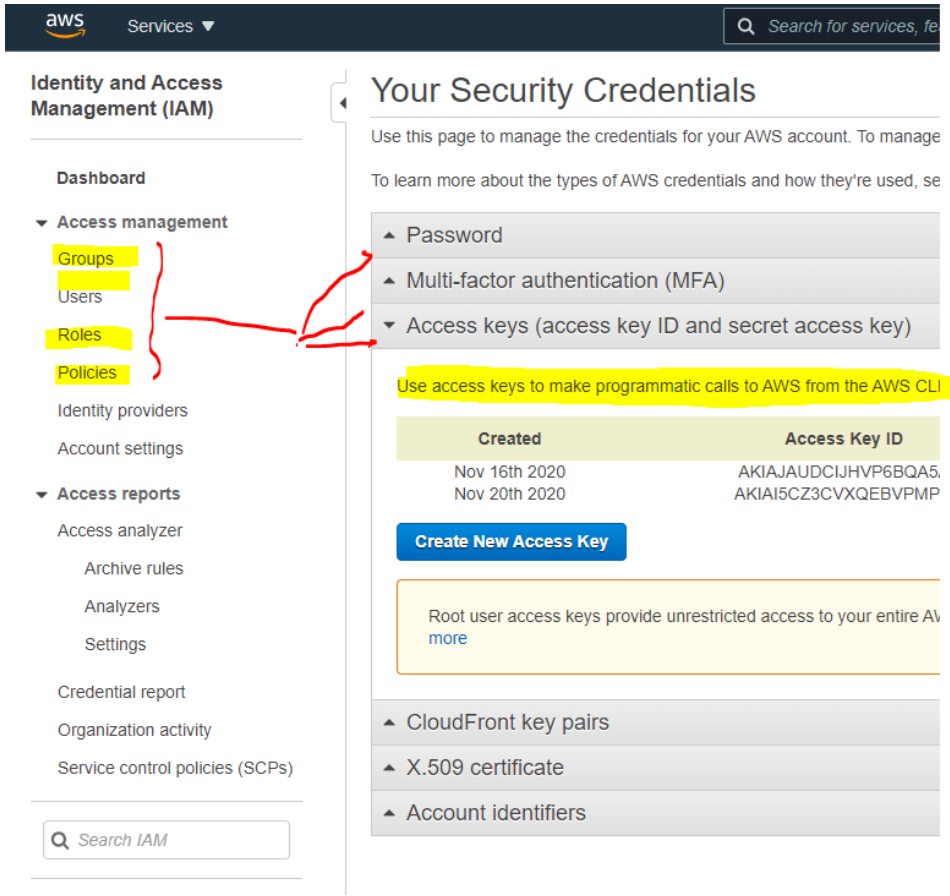
IAM Service

IAM Service



IAM Users, Group, Policy, Role

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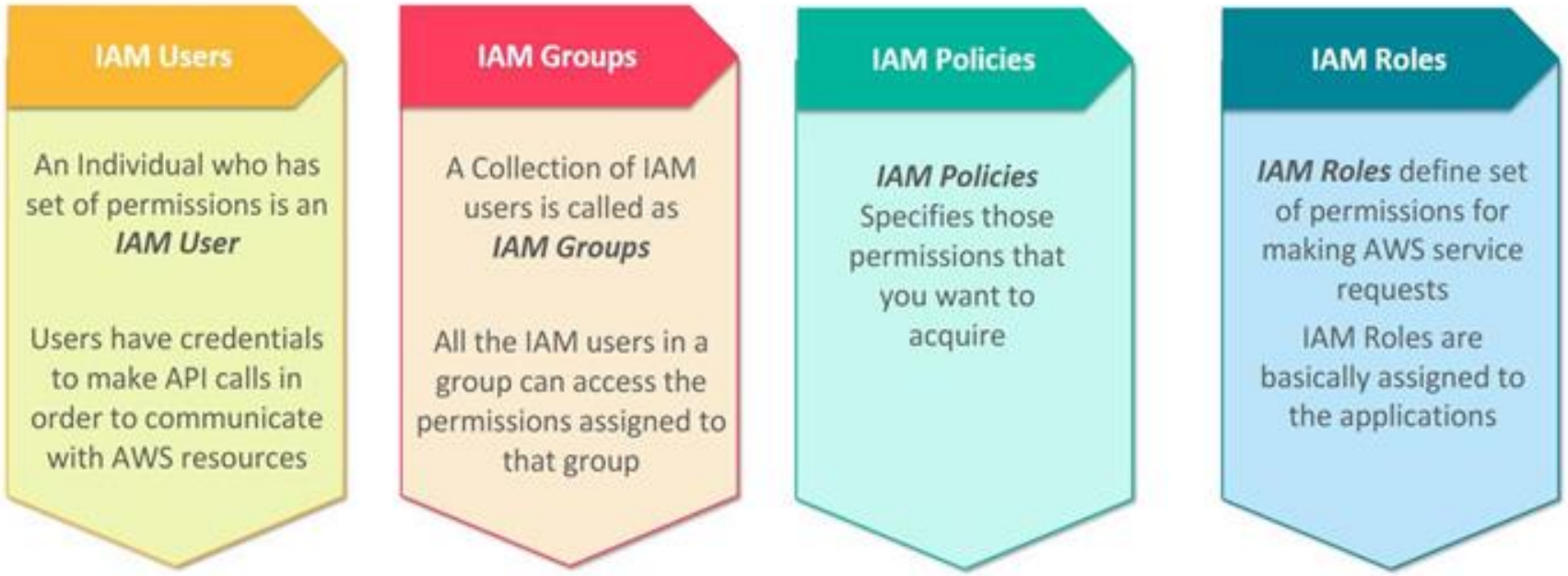
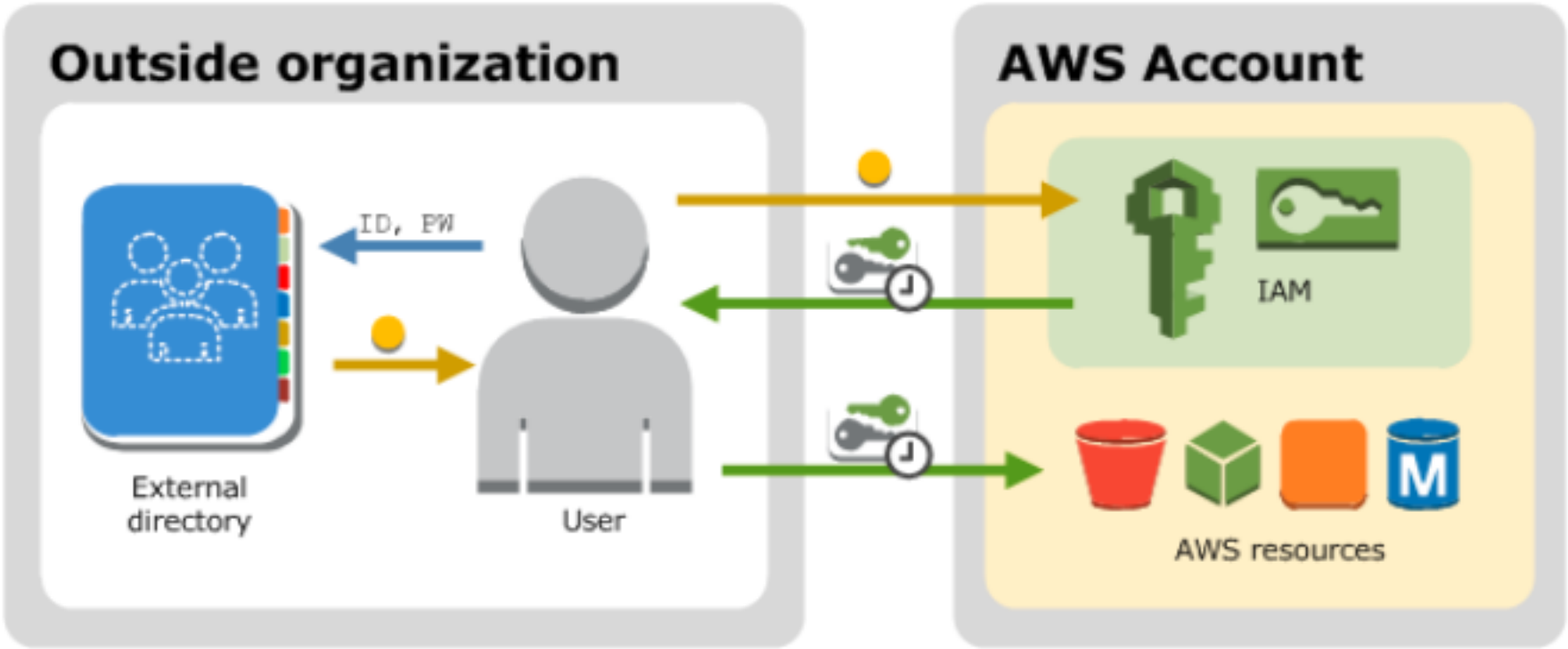
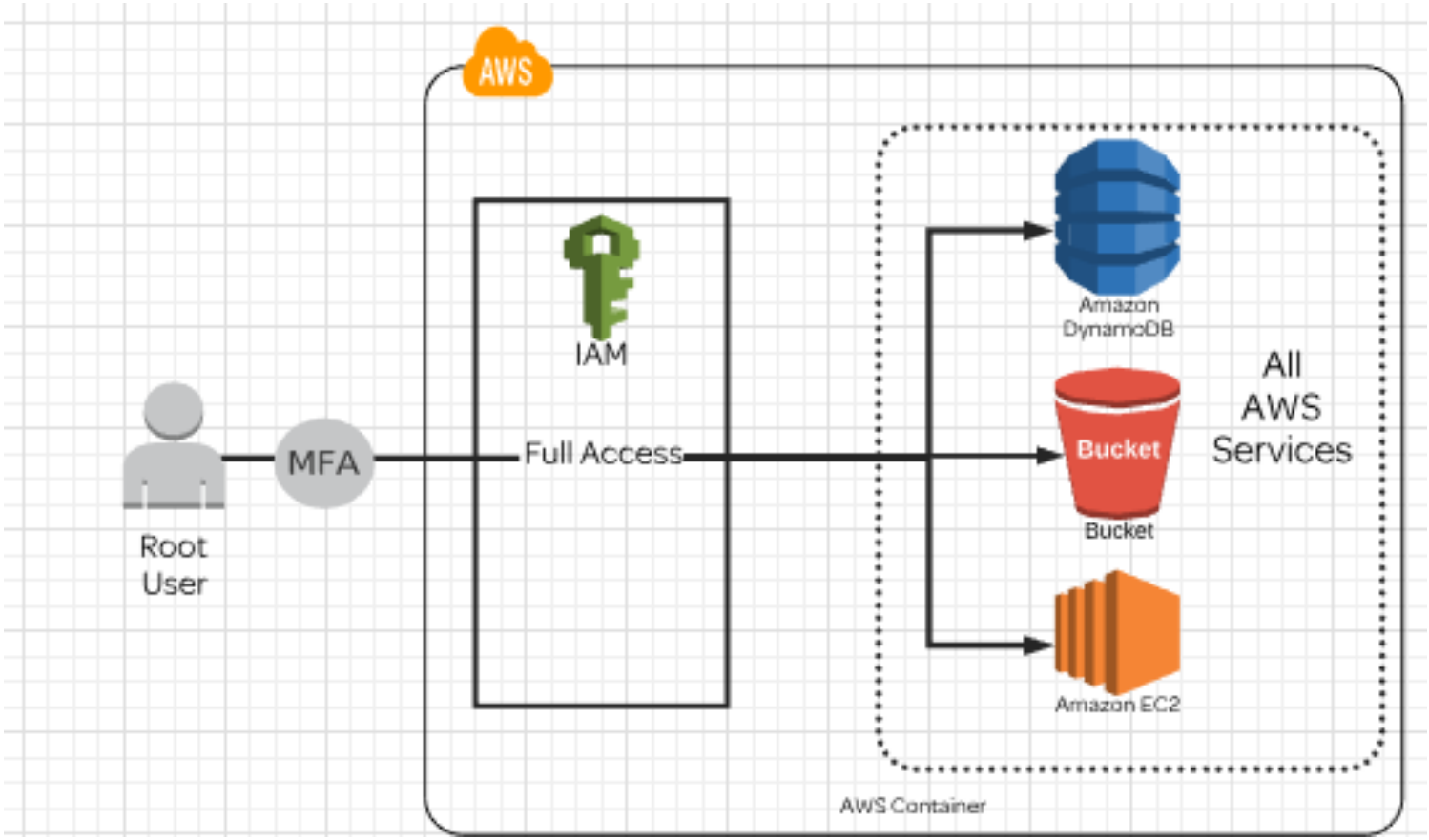


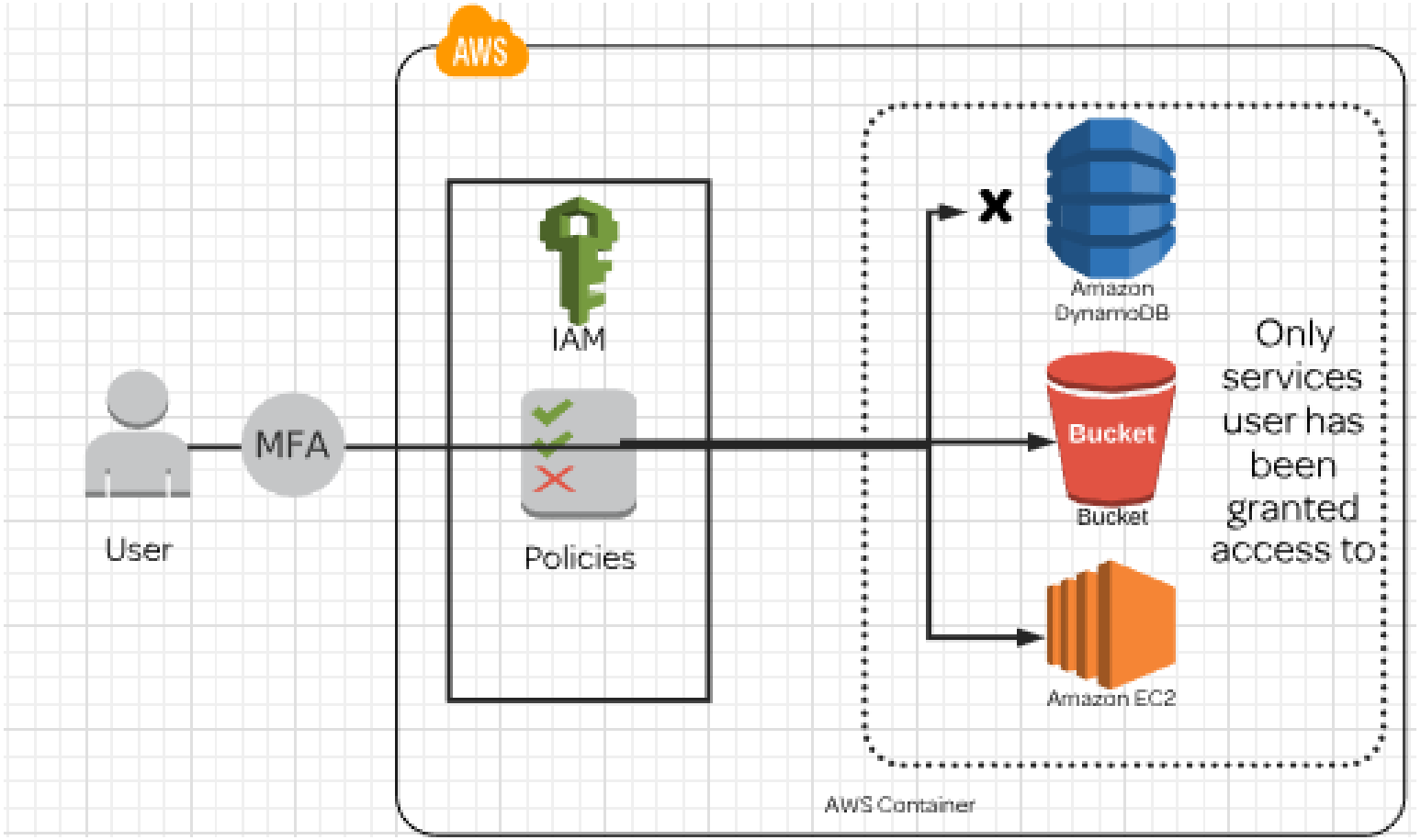
AWS Users



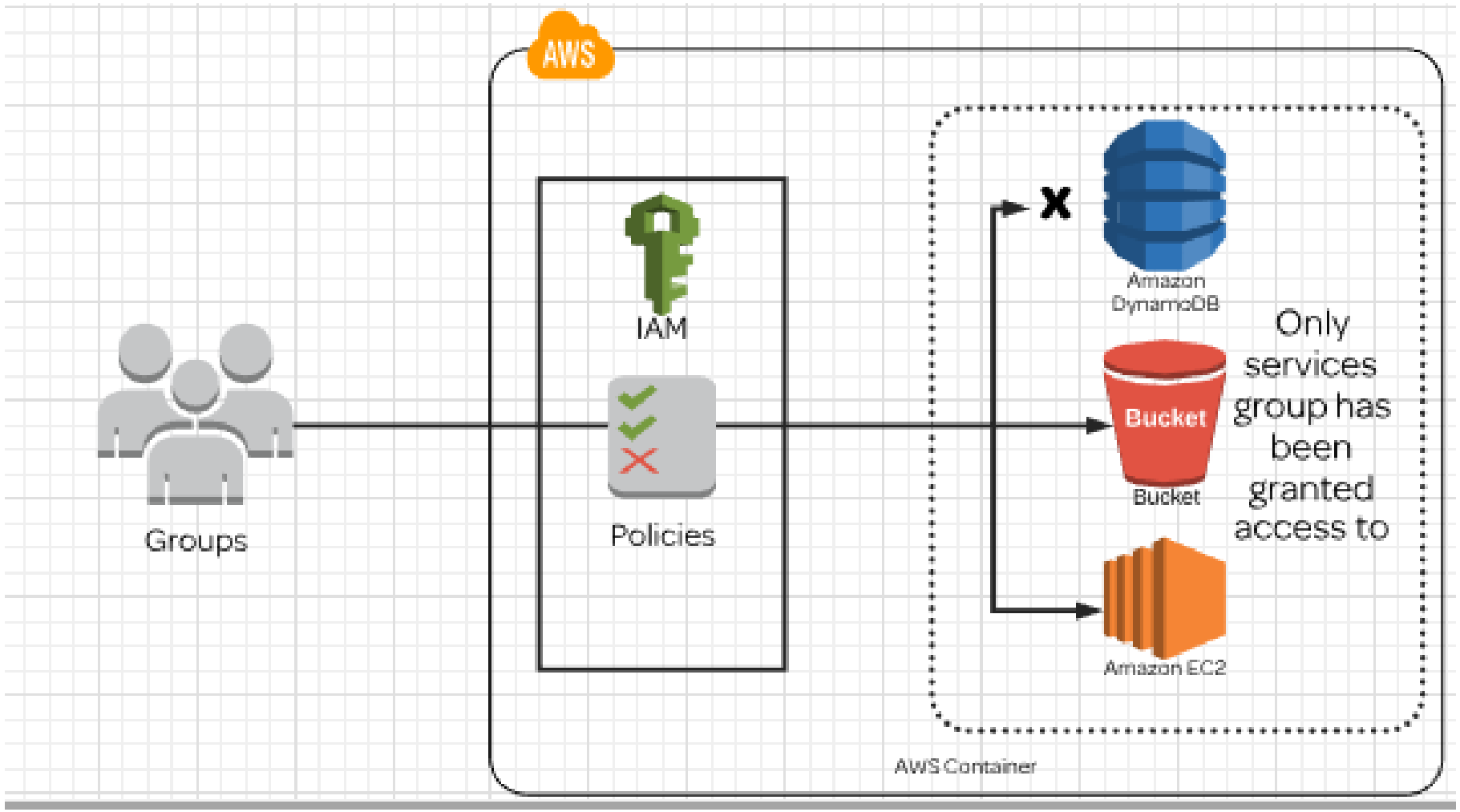
Root USER



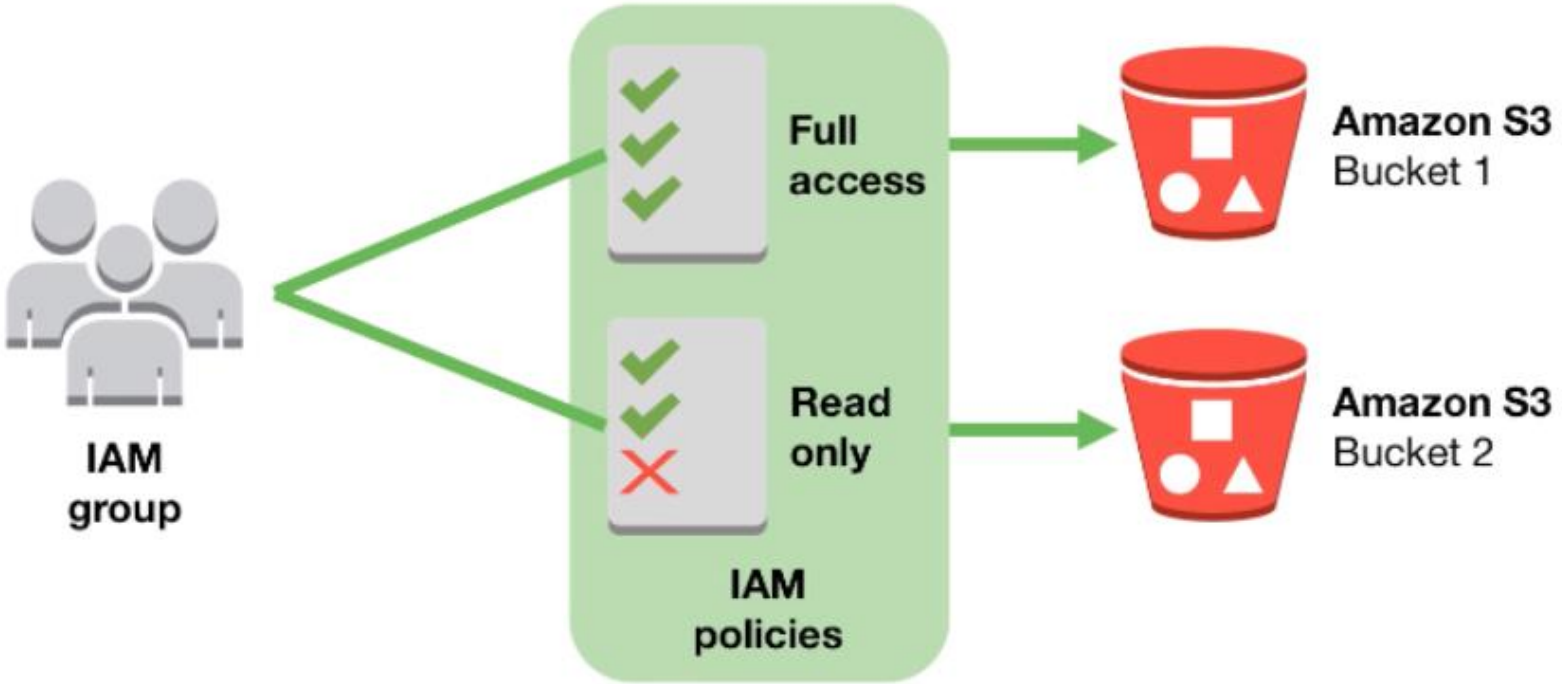
IAM USER



AWS IAM : Group



AWS IAM : Policy (ATZ)



AWS IAM: Role

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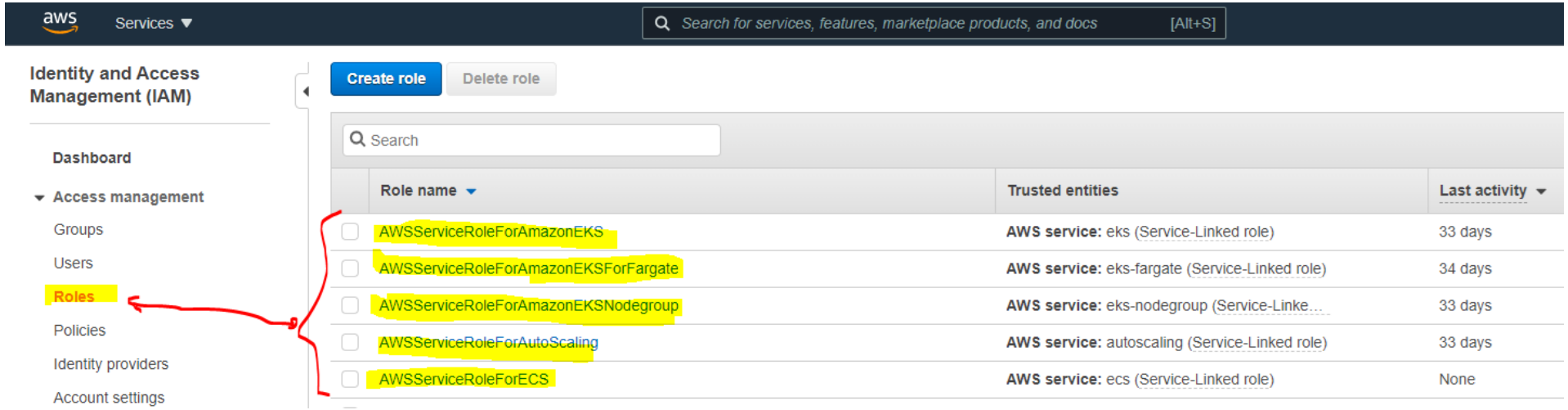
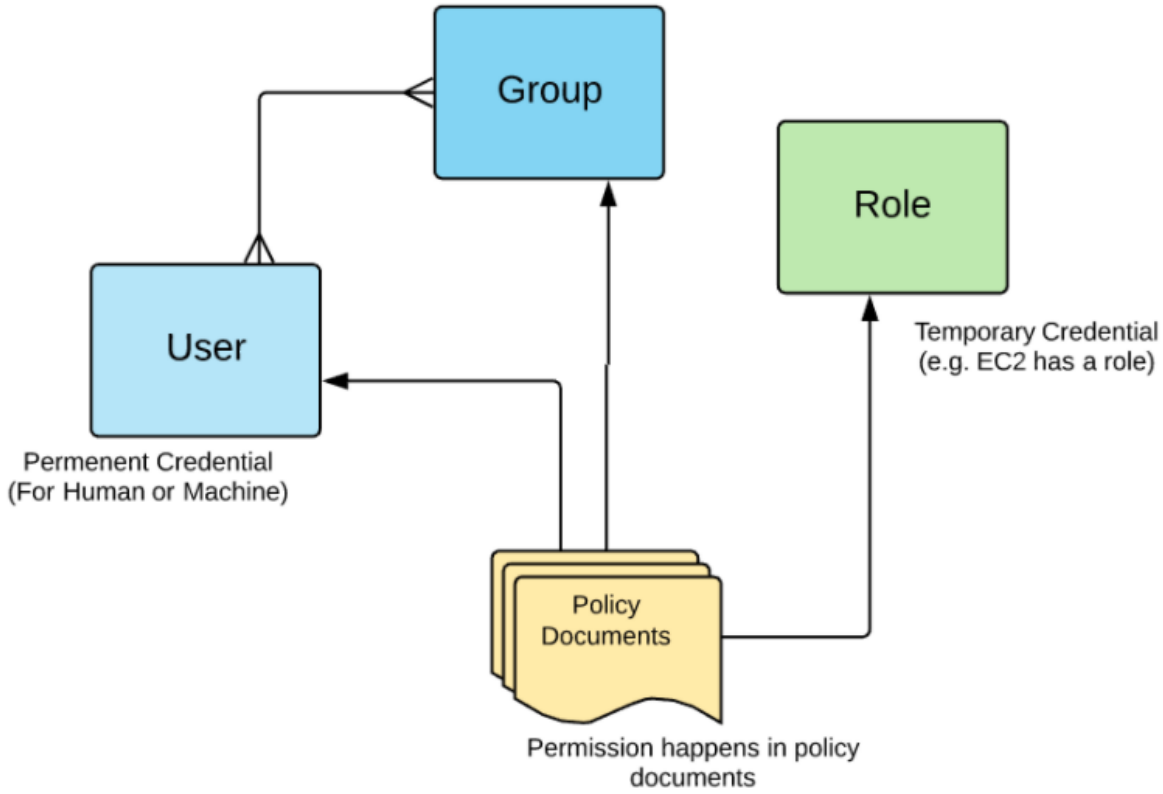
Role

An IAM identity that you can create in your account that has specific permissions. An IAM role has some similarities to an IAM user. Roles and users are both AWS identities with permissions policies that determine what the identity can and cannot do in AWS. However, instead of being uniquely associated with one person, a role is intended to be assumable by anyone who needs it. Also, a role does not have standard long-term credentials such as a password or access keys associated with it. Instead, when you assume a role, it provides you with temporary security credentials for your role session.



IAM: User, Group, Policy, Role



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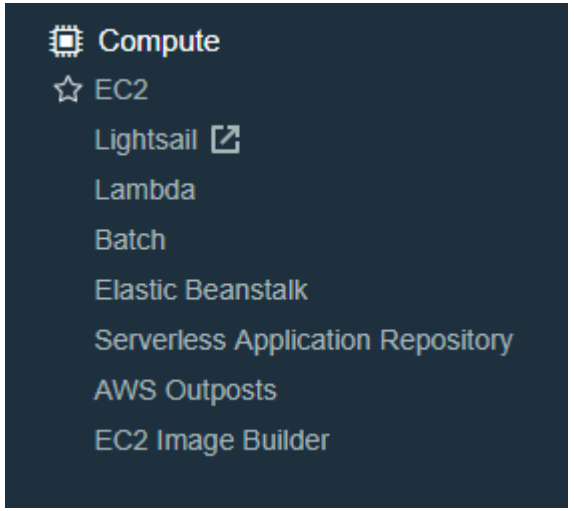
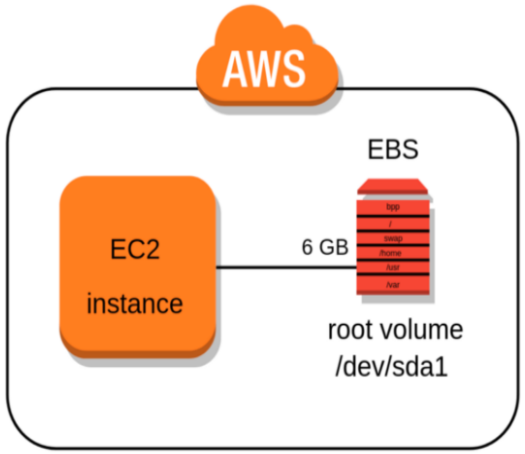
Compute Services

Compute Service



EC2 & Lambda



Amazon Elastic Compute Cloud (Amazon EC2) provides scalable computing capacity in the Amazon Web Services (AWS) Cloud. Using Amazon EC2 eliminates your need to invest in hardware up front, so you can develop and deploy applications faster. You can use Amazon EC2 to launch as many or as few virtual servers as you need, configure security and networking, and manage storage. Amazon EC2 enables you to scale up or down to handle changes in requirements or spikes in popularity, reducing your need to forecast traffic.

Amazon Lambda

AWS Lambda is a serverless compute service that lets you run code without provisioning or managing servers, creating workload-aware cluster scaling logic, maintaining event integrations, or managing runtimes. With Lambda, you can run code for virtually any type of application or backend service - all with zero administration. Just upload your code as a ZIP file or container image, and Lambda automatically and precisely allocates compute execution power and runs your code based on the incoming request or event, for any scale of traffic. You can set up your code to automatically trigger from 140 AWS services or call it directly from any web or mobile app. You can write Lambda functions in your favorite language (Node.js, Python, Go, Java, and more) and use both serverless and container tools, such as AWS SAM or Docker CLI, to build, test, and deploy your functions.

Beanstalk & Lightsail

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AWS Elastic Beanstalk is an easy-to-use service for deploying and scaling web applications and services developed with Java, .NET, PHP, Node.js, Python, Ruby, Go, and Docker on familiar servers such as Apache, Nginx, Passenger, and IIS.

You can simply upload your code and Elastic Beanstalk automatically handles the deployment, from capacity provisioning, load balancing, auto-scaling to application health monitoring. At the same time, you retain full control over the AWS resources powering your application and can access the underlying resources at any time.

Lightsail is an easy-to-use cloud platform that offers you everything needed to build an application or website, plus a cost-effective, monthly plan. Whether you're new to the cloud or looking to get on the cloud quickly with AWS infrastructure you trust, we've got you covered.

ECS, EKS, Fargate

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	 **ECS** (Elastic Container Service)	 **EKS** (Elastic Kubernetes Service)	 **Fargate** (AWS Fargate Service)
Definition	Container Orchestration, Created by AWS	Managed Kubernetes (Open Source) platform by AWS	Container on-demand
Cluster Creation	Requires	Requires	Not Required
Control Plane Cost	0, pay for work nodes	144 $*, Pay for work nodes	Pay for task based on CPU & Memory
Integration	Deeper Integration with other AWS services	Actively working on Integrations	Currently runs on ECS
Usecase	Good for native container architecture	Easy to move on-prem Kubernetes to AWS EKS	Good for workload which runs on duration.

AWS Batch

AWS Batch enables developers, scientists, and engineers to easily and efficiently run hundreds of thousands of batch computing jobs on AWS. AWS Batch dynamically provisions the optimal quantity and type of compute resources (e.g., CPU or memory optimized instances) based on the volume and specific resource requirements of the batch jobs submitted. With AWS Batch, there is no need to install and manage batch computing software or server clusters that you use to run your jobs, allowing you to focus on analyzing results and solving problems. AWS Batch plans, schedules, and executes your batch computing workloads across the full range of AWS compute services and features, such as AWS Fargate, Amazon EC2 and Spot Instances.

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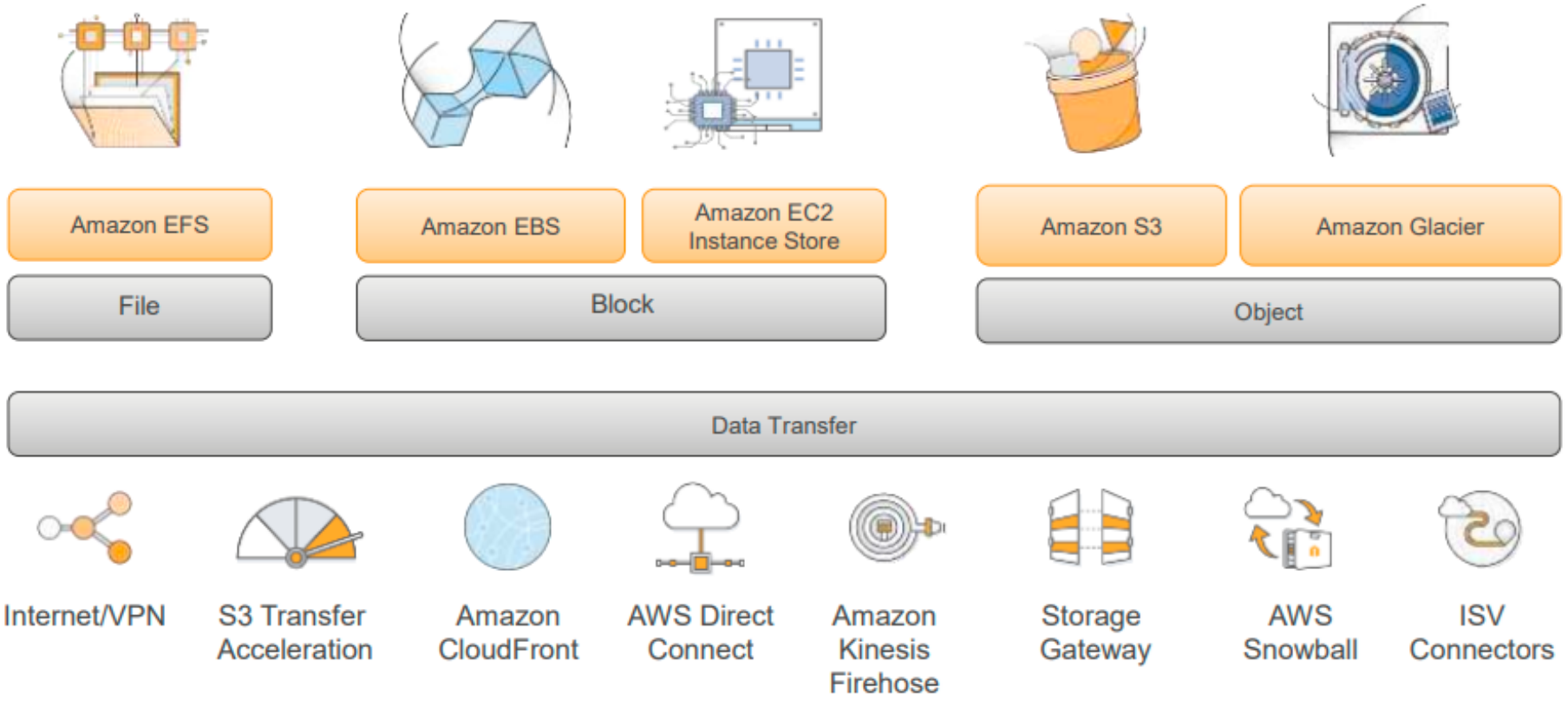
Storage Services

AWS Storage Service



AWS Storage Service

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- **Amazon S3:** Durable Object storage for all types of data.
  Economical Pay as you go, No upfront investment, No commitment.

- **Amazon Glacier:** Archival storage for infrequently accessed data.
  Easy to Use: Self service administration, SDKs for simple integration.

- **Amazon EBS:** Block storage for use with Amazon EC2.
  Reduce risk: Durable and Secure, Avoid risks of physical media handling.

- **Amazon EFS:** File storage for use with Amazon EC2.
  Agility, Scale: Reduce time to market, Focus on your business, not your infrastructure.

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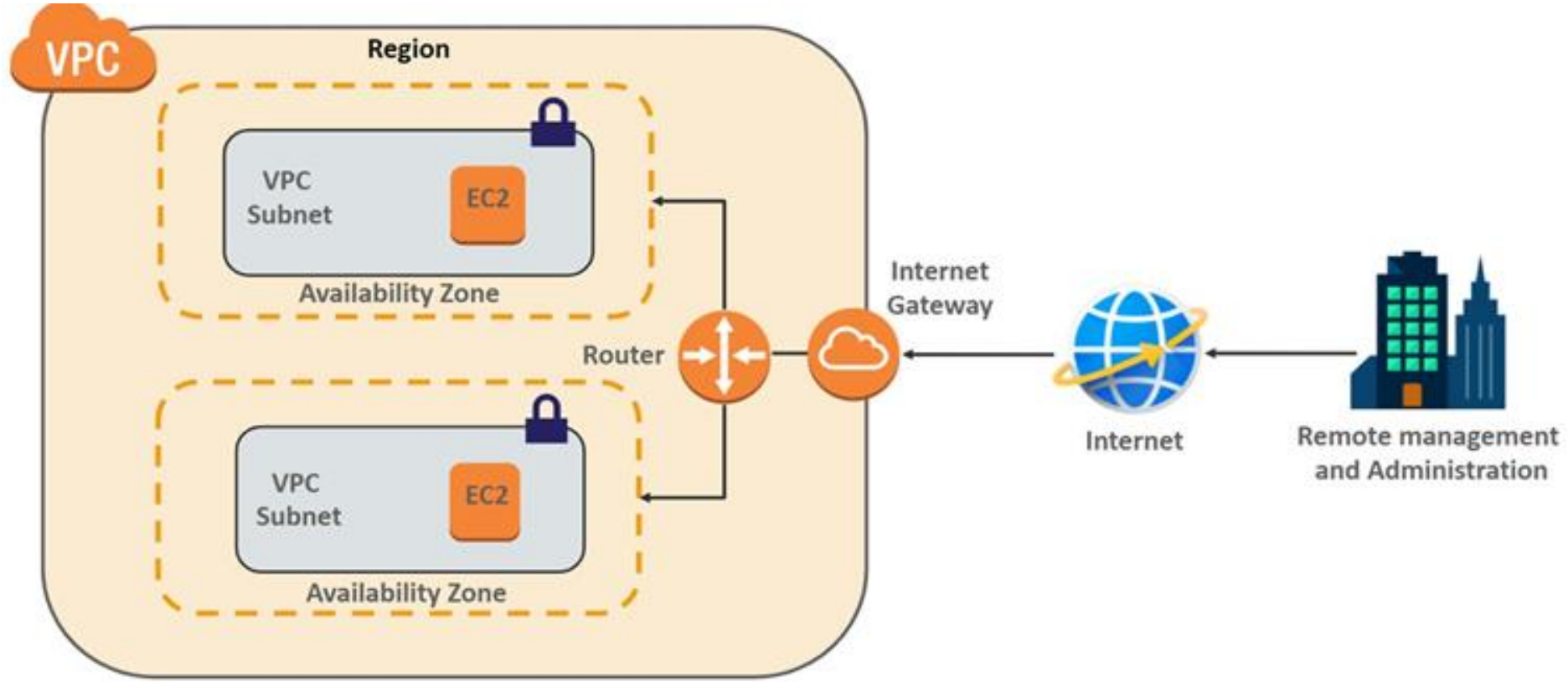
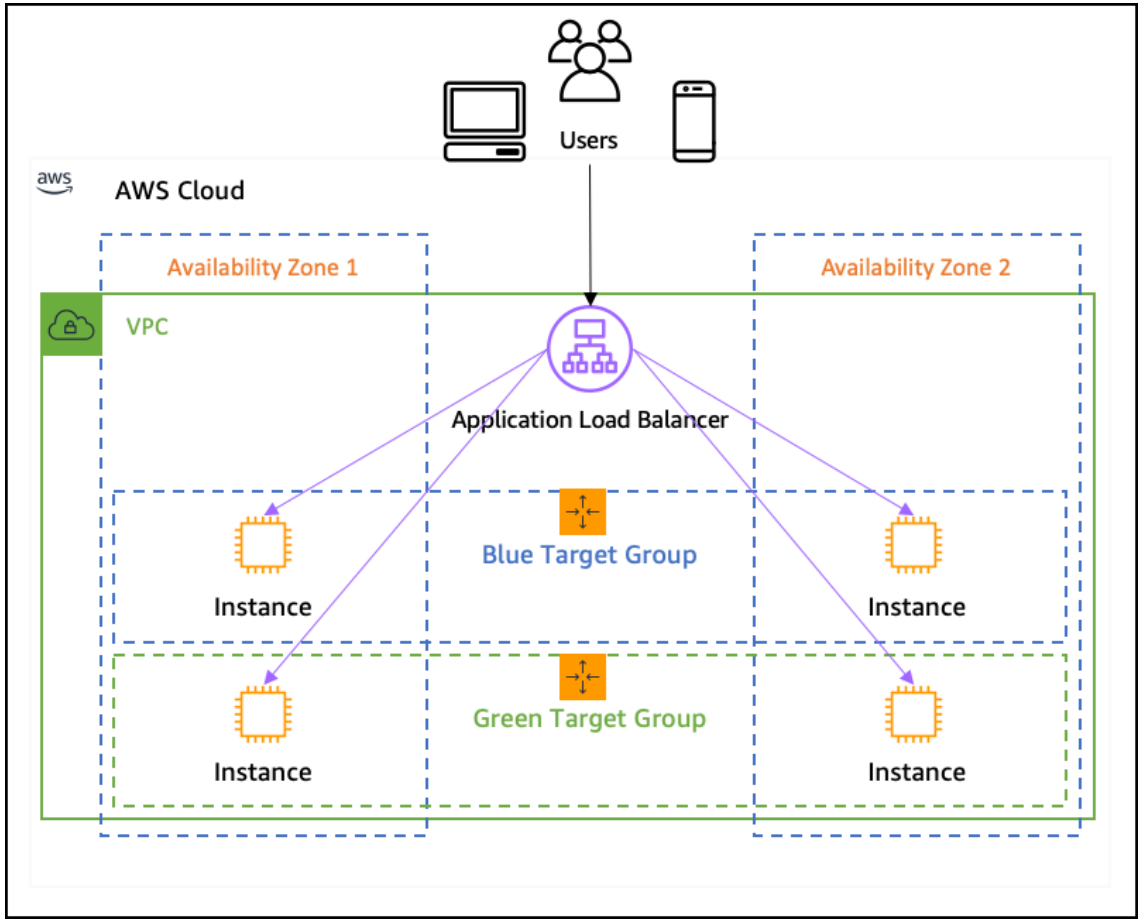
Network Services

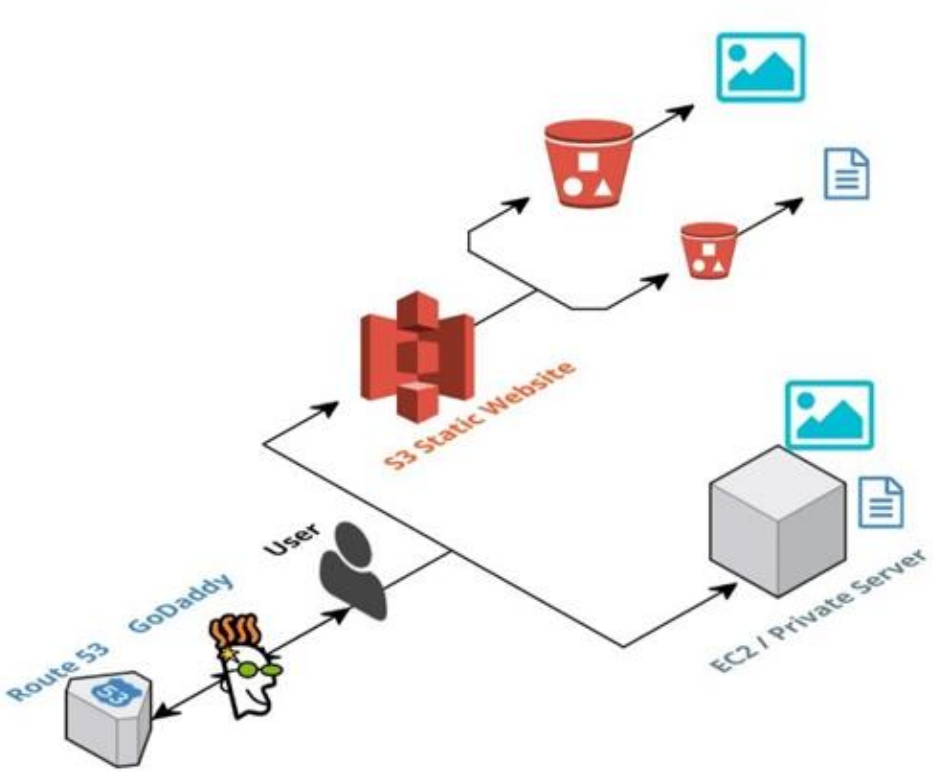
Network: VPC, Subnet, Gateway



Network: Load Balancer



DNS: Route 53



Route 53

EC2 Servers

S3

CDN: CloudFront

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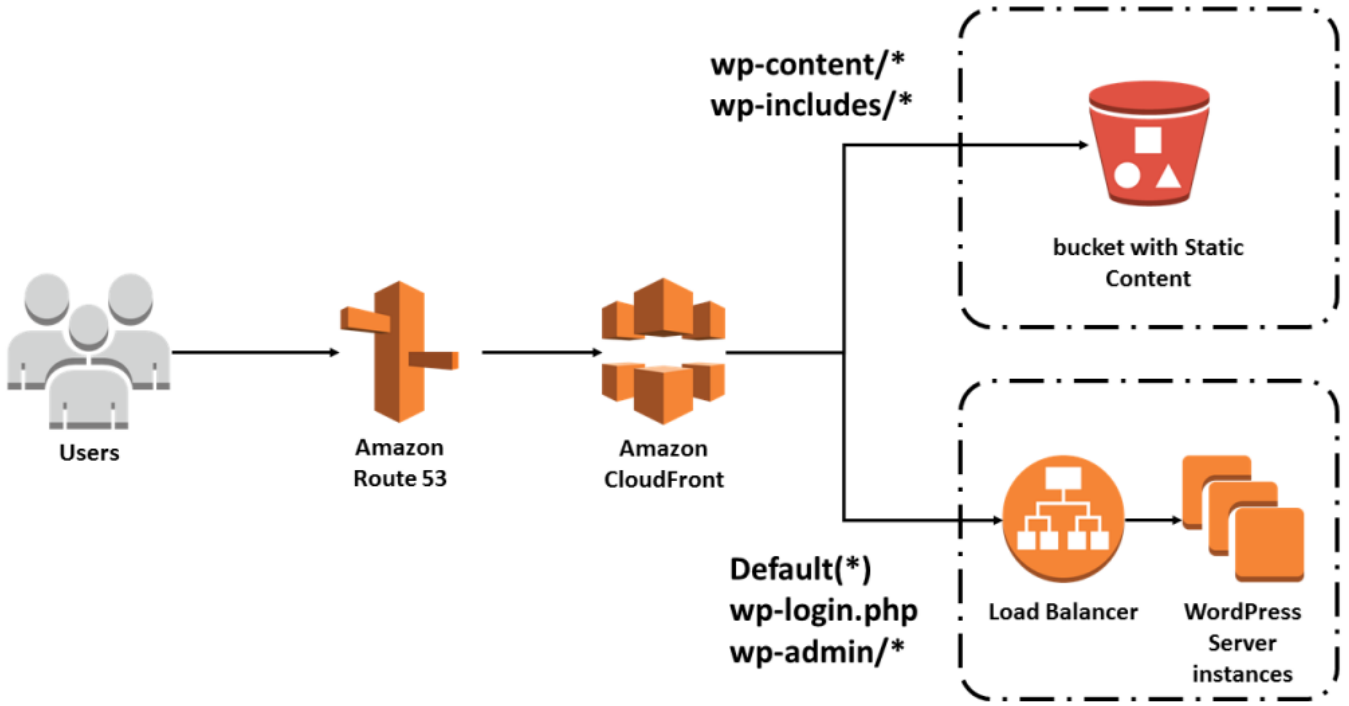
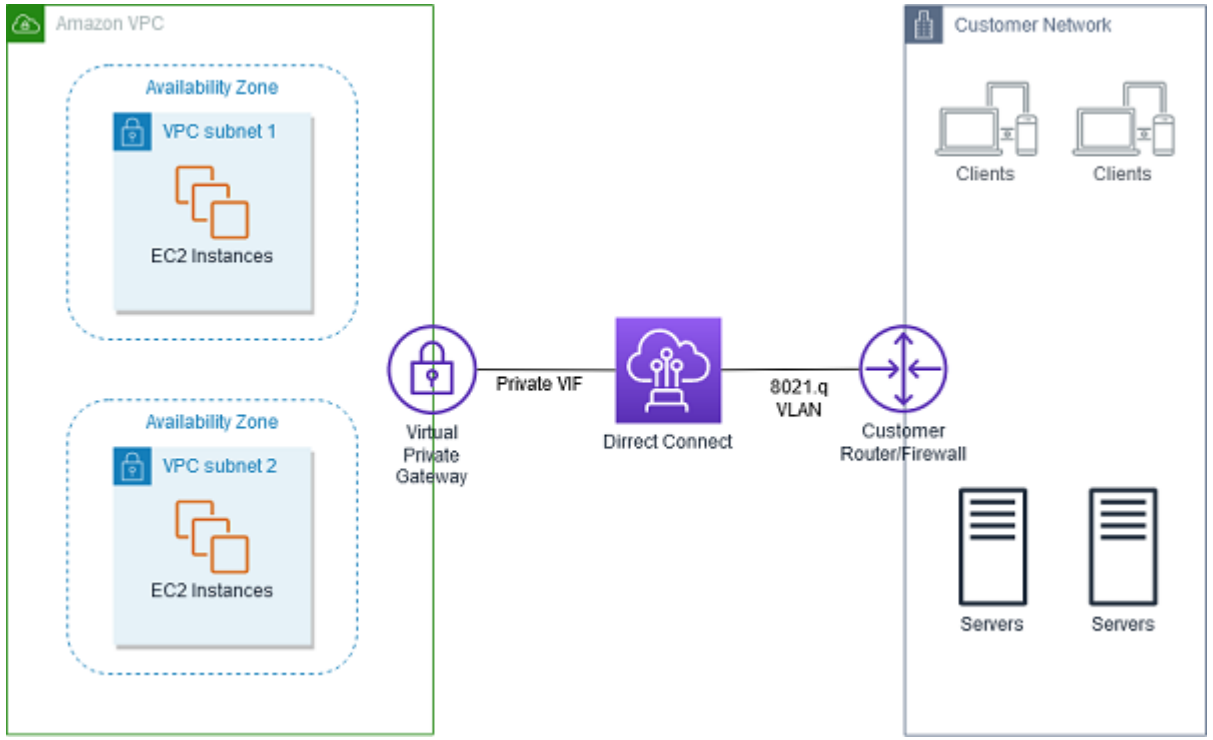
Amazon CloudFront is a fast content delivery network (CDN) service that securely delivers data, videos, applications, and APIs to customers globally with low latency, high transfer speeds, all within a developer-friendly environment.



Direct Connect

AWS Direct Connect is a cloud service solution that makes it easy to establish a dedicated network connection from your premises to AWS. Using AWS Direct Connect, you can establish private connectivity between AWS and your datacenter, office, or colocation environment, which in many cases can reduce your network costs, increase bandwidth throughput, and provide a more consistent network experience than Internet-based connections.



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Database Services

AWS Database Services

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- **Amazon RDS:** Amazon Relational Database Service (OLTP) makes it easy to set up, operate, and scale a relational database in the cloud..
- **Amazon Dynamo DB:** Key-value and document database that delivers single-digit millisecond performance at any scale. It's a fully managed, multiregional, multi-master and durable database.
- **Amazon Redshift:** Redshift (OLAP) makes it simple and cost effective to run high performance queries on petabytes of structured data so that you can build powerful reports and dashboards using your existing business intelligence tools.
- **Amazon Elastic Cache:** Its is a in memory database that provides sub-millisecond latency to power internet-scale real-time applications.
- **Amazon Aurora:** MySQL and PostgreSQL-compatible relational database built for the cloud, that combines the performance and availability of traditional enterprise databases with the simplicity and cost-effectiveness of open source databases.

Amazon RDS

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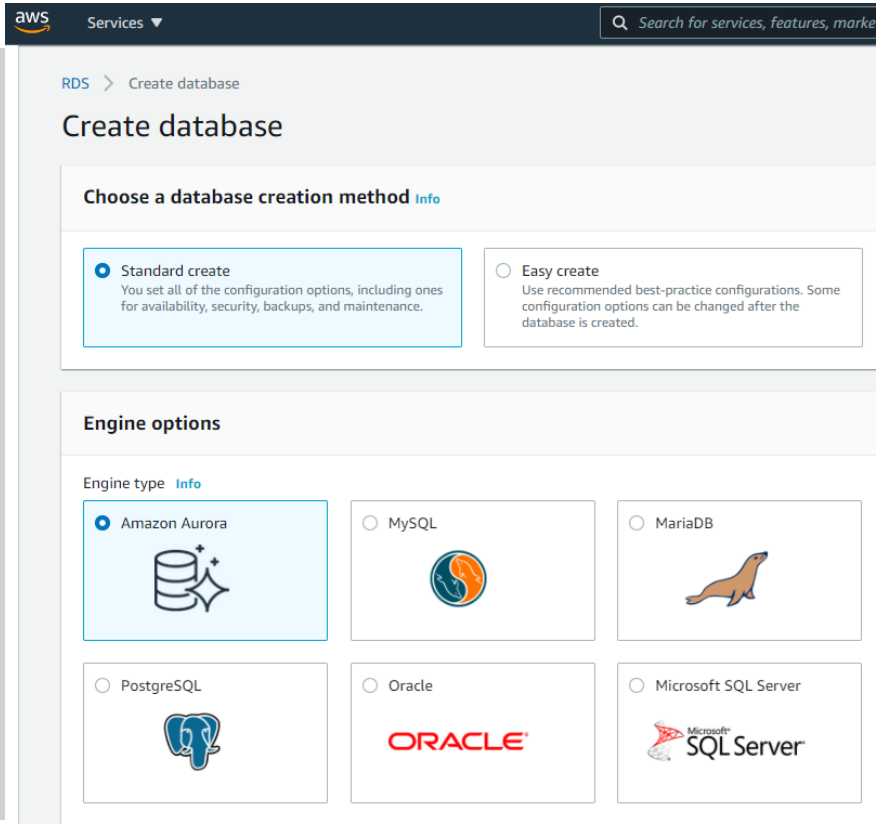

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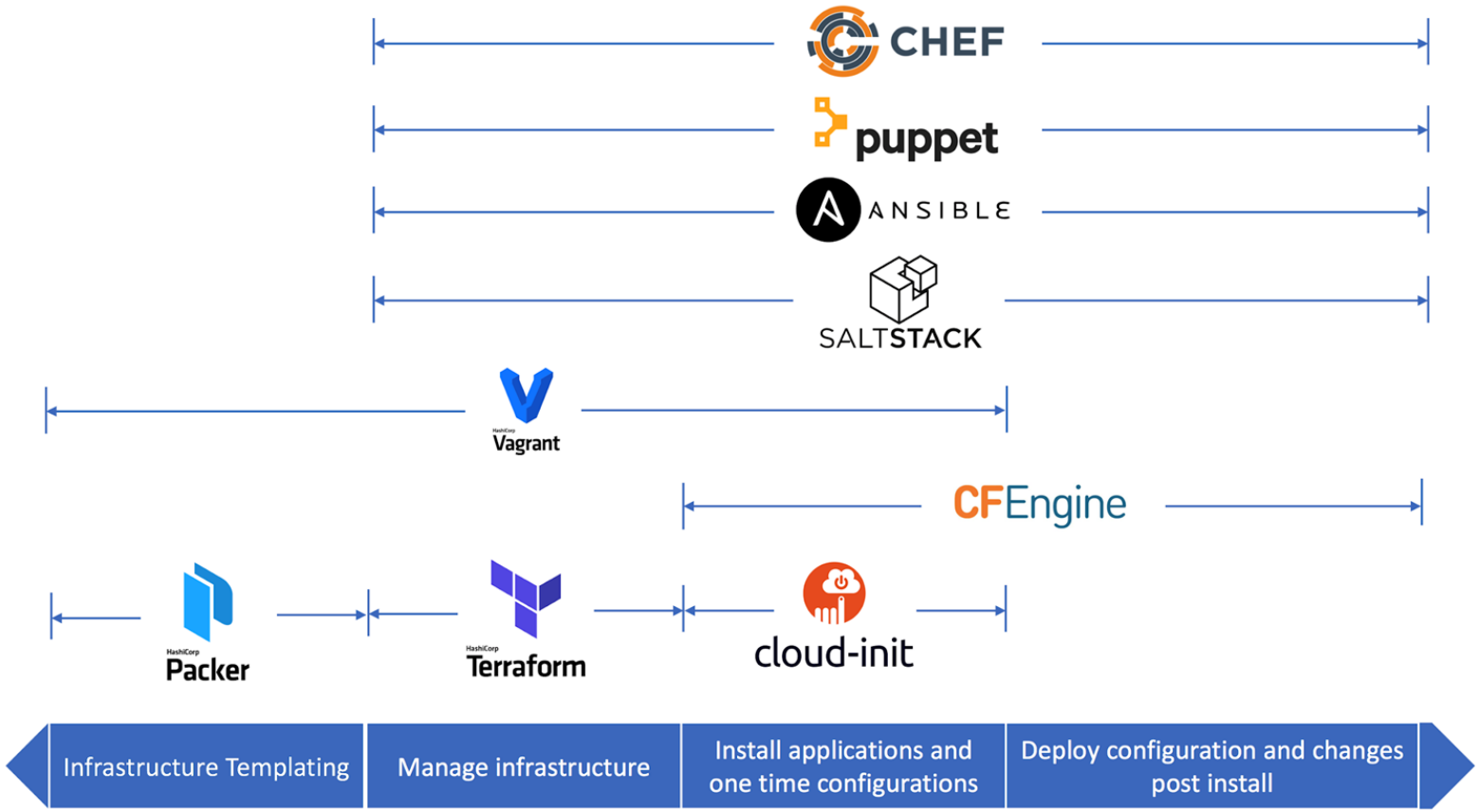
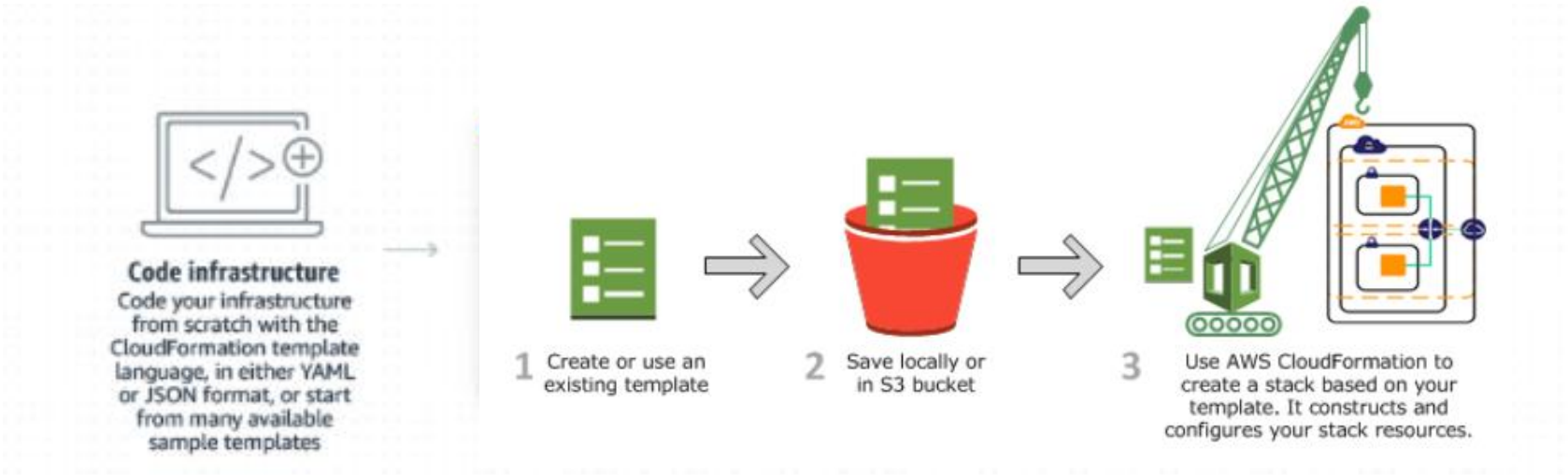
Automation & Configuration Management

IaC Spectrum: Open Source



AWS Cloud Formation

AWS CloudFormation gives you an easy way to model a collection of related AWS and third-party resources, provision them quickly and consistently, and manage them throughout their lifecycles, by treating infrastructure as code. A CloudFormation template describes your desired resources and their dependencies so you can launch and configure them together as a stack. You can use a template to create, update, and delete an entire stack as a single unit, as often as you need to, instead of managing resources individually. You can manage and provision stacks across multiple AWS accounts and AWS Regions.



AWS OpsWorks

AWS OpsWorks is a configuration management service that provides managed instances of Chef and Puppet. Chef and Puppet are automation platforms that allow you to use code to automate the configurations of your servers. OpsWorks lets you use Chef and Puppet to automate how servers are configured, deployed, and managed across your Amazon EC2 instances or on-premises compute environments. OpsWorks has three offerings, AWS Opsworks for Chef Automate, AWS OpsWorks for Puppet Enterprise, and AWS OpsWorks Stacks.

OpsWorks Lifecycle Events

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Setup

- Occurs after a started instance ***complete*** booting
- Includes deploy event
- Used for ***initial installation*** of software & service

Configure

- Occurs when an instance ***enters*** or ***leaves*** online state
- Used to ***ensure*** whether the configuration is ***up-to-date***

Deploy

- Occurs when you run a ***Deploy command***
- Used to ***deploy*** an ***application*** to a set of ***application server instances***

Undeploy

- Occurs when you ***delete*** an app to remove an app from a set of application server instances
- Used to ***remove apps*** from running instances

Shutdown

- Occurs before the associated EC2 instance is actually ***terminated***
- Used to perform ***cleanup tasks*** by running the chef recipes

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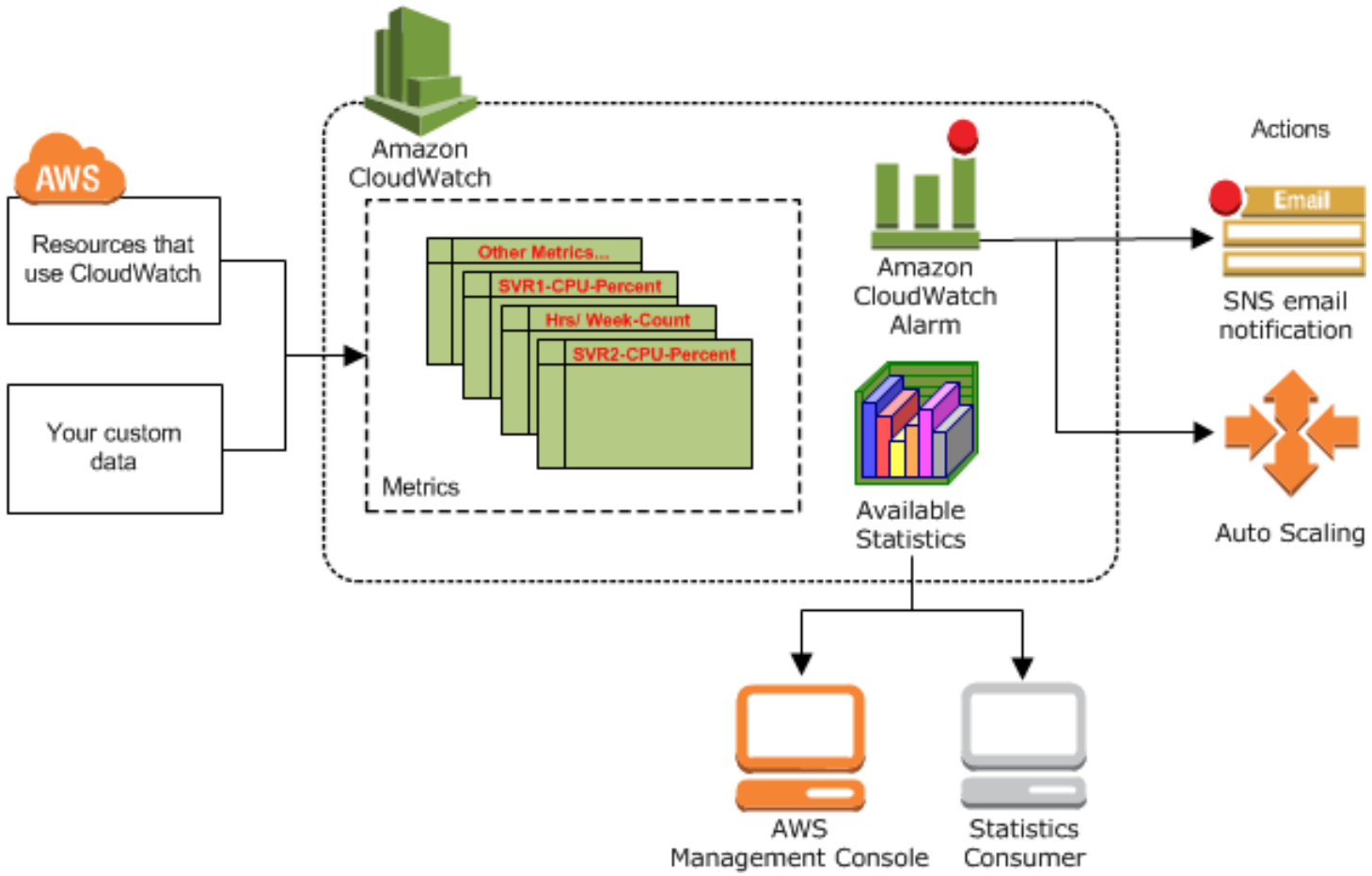
Audit & Monitoring

AWS CloudWatch

Amazon CloudWatch is a monitoring and observability service built for DevOps engineers, developers, site reliability engineers (SREs), and IT managers. CloudWatch provides you with data and actionable insights to monitor your applications, respond to system-wide performance changes, optimize resource utilization, and get a unified view of operational health. CloudWatch collects monitoring and operational data in the form of logs, metrics, and events, providing you with a unified view of AWS resources, applications, and services that run on AWS and on-premises servers. You can use CloudWatch to detect anomalous behavior in your environments, set alarms, visualize logs and metrics side by side, take automated actions, troubleshoot issues, and discover insights to keep your applications running smoothly.

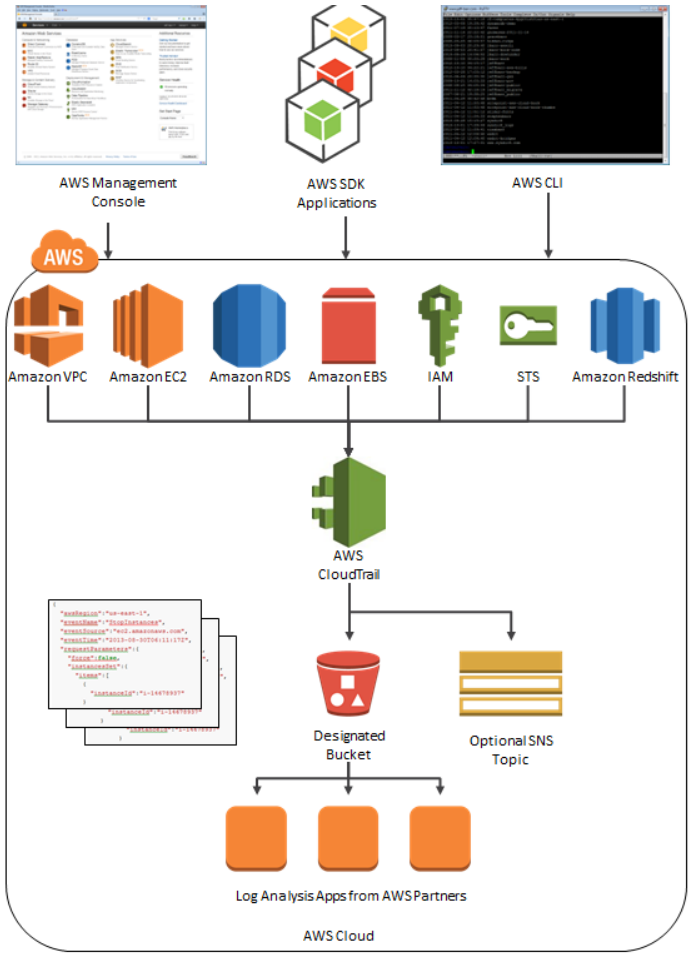
AWS CloudWatch

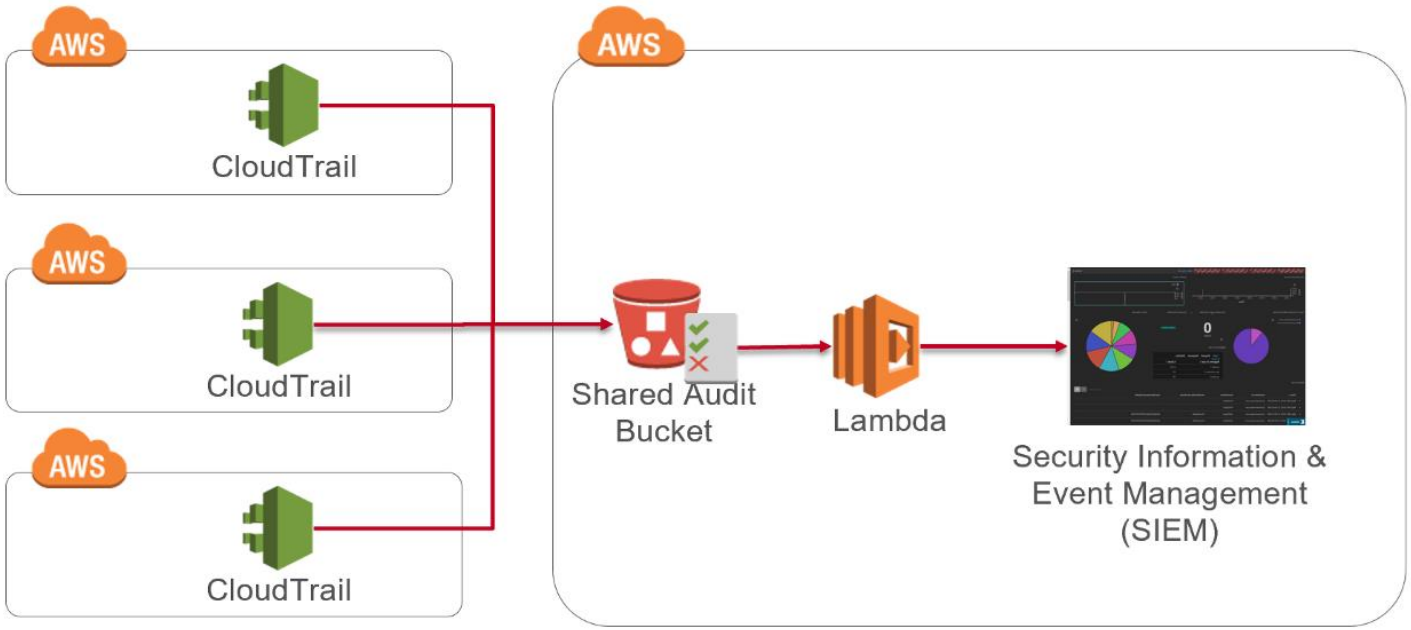


AWS CloudTrail

AWS CloudTrail is a service that enables governance, compliance, operational auditing, and risk auditing of your AWS account. With CloudTrail, you can log, continuously monitor, and retain account activity related to actions across your AWS infrastructure. CloudTrail provides event history of your AWS account activity, including actions taken through the AWS Management Console, AWS SDKs, command line tools, and other AWS services. This event history simplifies security analysis, resource change tracking, and troubleshooting. In addition, you can use CloudTrail to detect unusual activity in your AWS accounts. These capabilities help simplify operational analysis and troubleshooting.

AWS CloudTrail





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SNS, SES, SQS, SWF
Application Services

AWS SNS

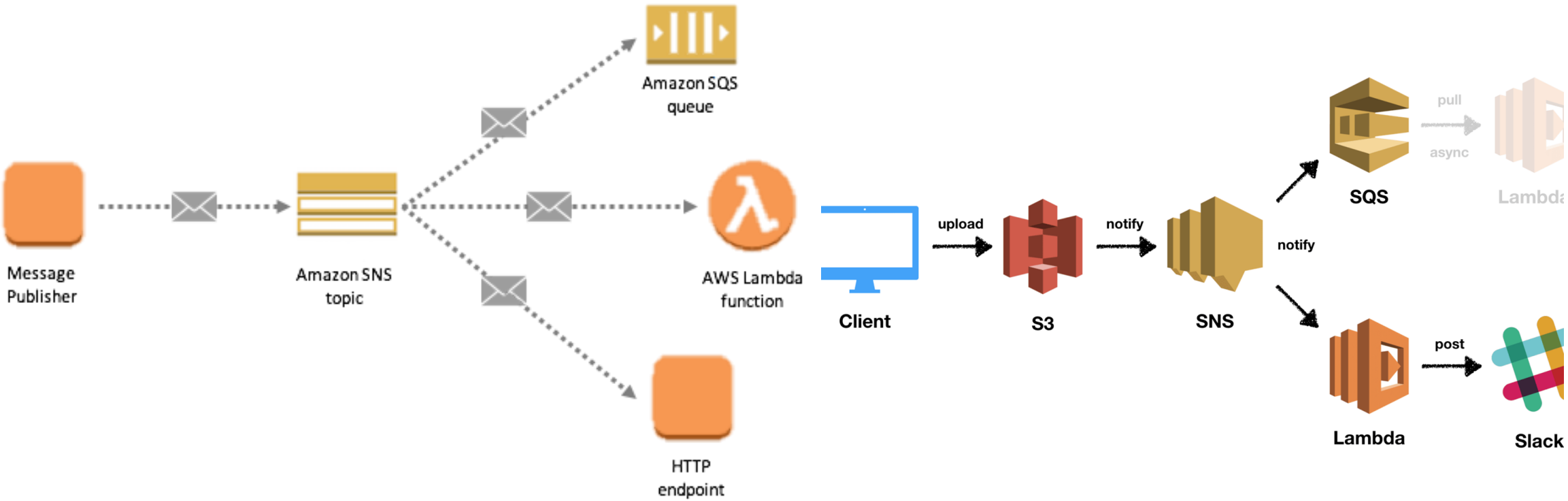
Amazon Simple Notification Service (Amazon SNS) is a fully managed messaging service for both application-to-application (A2A) and application-to-person (A2P) communication.

The A2A pub/sub functionality provides topics for high-throughput, push-based, many-to-many messaging between distributed systems, microservices, and event-driven serverless applications. Using Amazon SNS topics, your publisher systems can fanout messages to a large number of subscriber systems including Amazon SQS queues, AWS Lambda functions and HTTPS endpoints, for parallel processing. The A2P functionality enables you to send messages to users at scale via SMS, mobile push, and email.

AWS SQS

Amazon Simple Queue Service (SQS) is a fully managed message queuing service that enables you to decouple and scale microservices, distributed systems, and serverless applications. SQS eliminates the complexity and overhead associated with managing and operating message oriented middleware, and empowers developers to focus on differentiating work. Using SQS, you can send, store, and receive messages between software components at any volume, without losing messages or requiring other services to be available. Get started with SQS in minutes using the AWS console, Command Line Interface or SDK of your choice, and three simple commands.

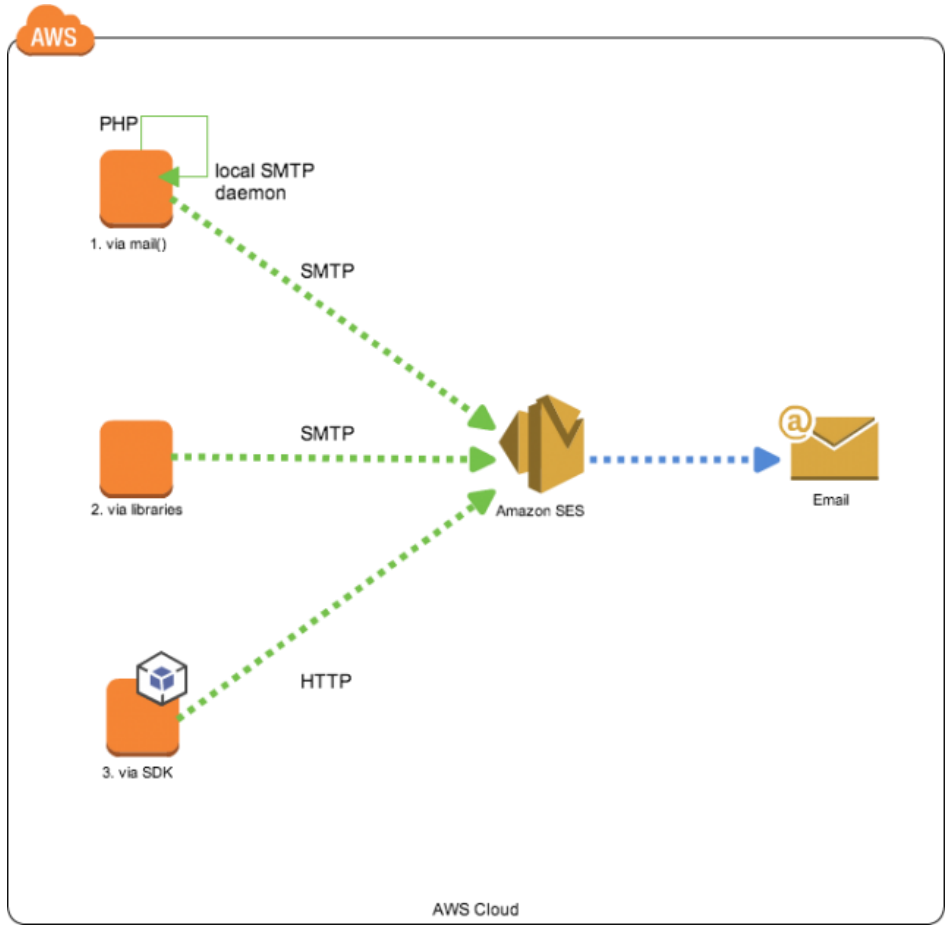
AWS SNS & SQS



AWS SES

Amazon Simple Email Service (SES) is a cost-effective, flexible, and scalable email service that enables developers to send mail from within any application. You can configure Amazon SES quickly to support several email use cases, including transactional, marketing, or mass email communications. Amazon SES's flexible IP deployment and email authentication options help drive higher deliverability and protect sender reputation, while sending analytics measure the impact of each email. With Amazon SES, you can send email securely, globally, and at scale.

AWS SES

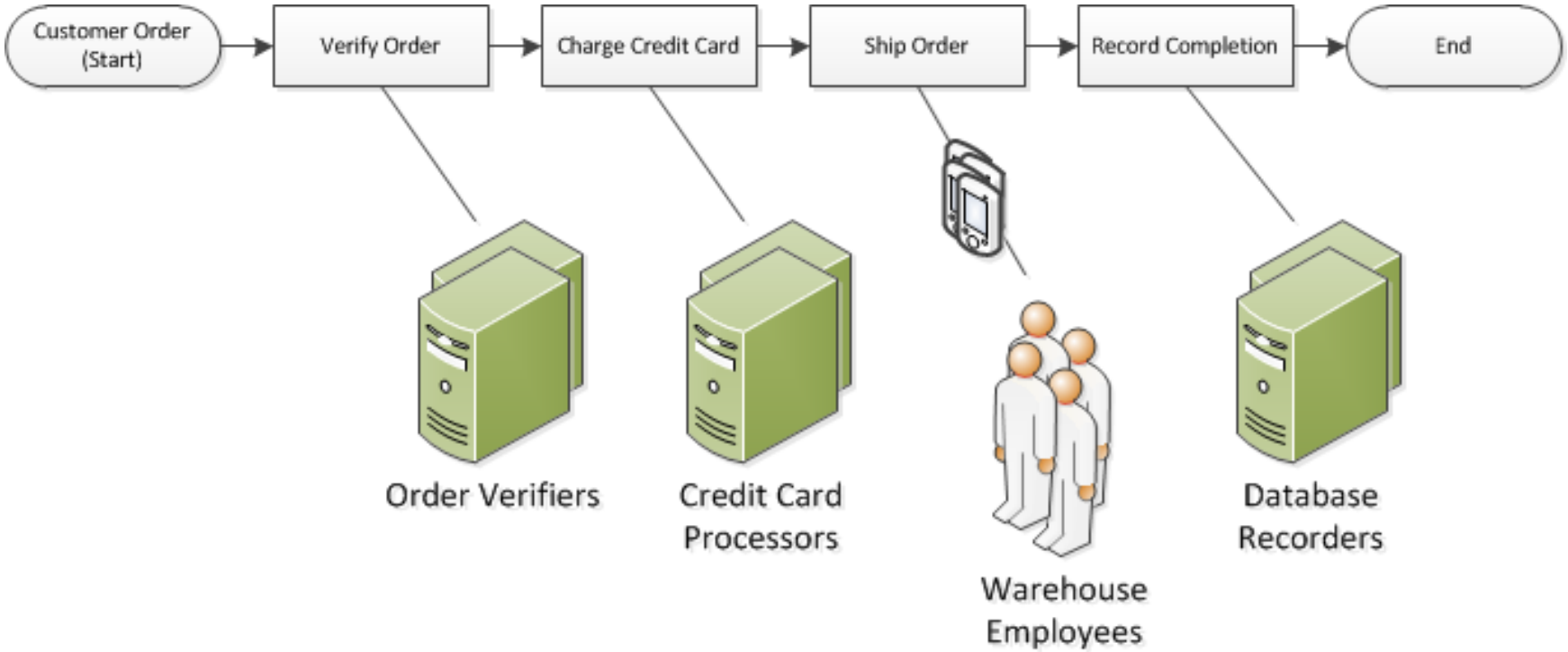


AWS SWF

Amazon SWF helps developers build, run, and scale background jobs that have parallel or sequential steps. You can think of Amazon SWF as a fully-managed state tracker and task coordinator in the Cloud.

If your app's steps take more than 500 milliseconds to complete, you need to track the state of processing, and you need to recover or retry if a task fails, Amazon SWF can help you.

AWS SWF: Use Case



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DevOps Tools

AWS DevOps Tools

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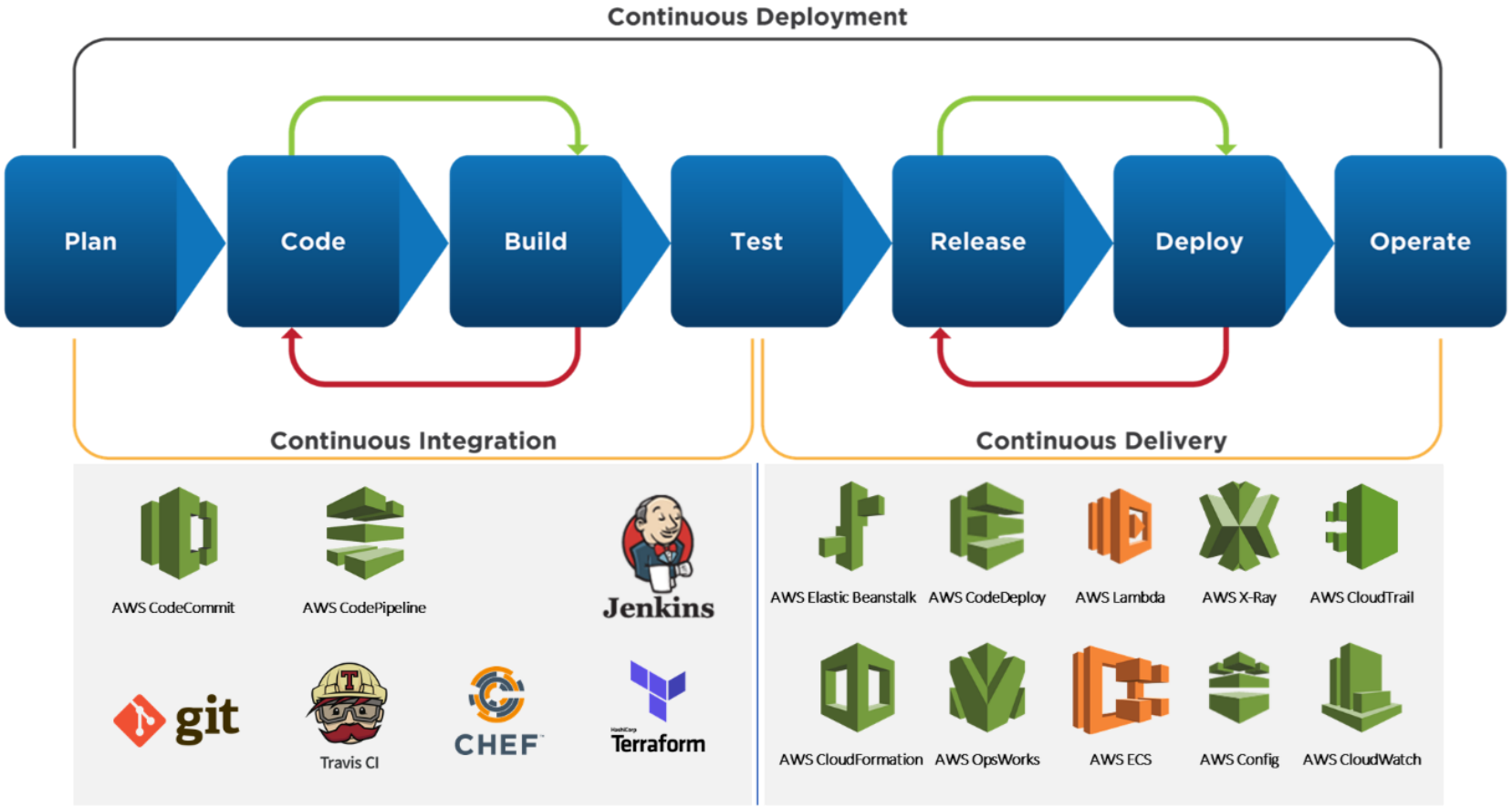

AWS CodeCommit

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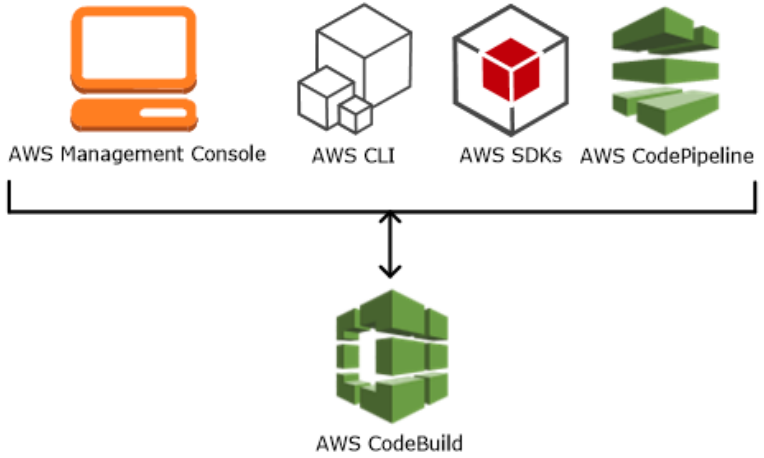
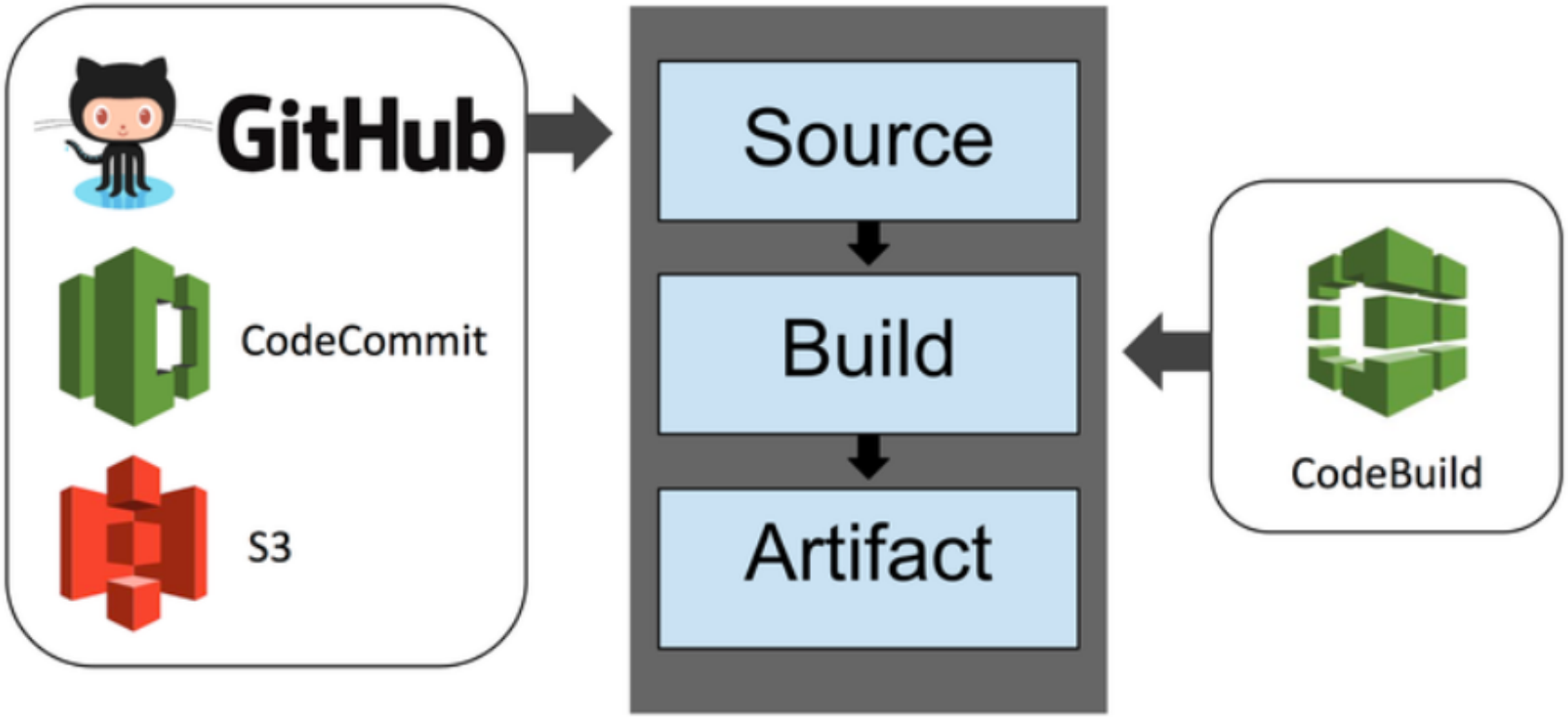
AWS CodeCommit is a fully-managed source control service that hosts secure Git-based repositories. It makes it easy for teams to collaborate on code in a secure and highly scalable ecosystem. CodeCommit eliminates the need to operate your own source control system or worry about scaling its infrastructure. You can use CodeCommit to securely store anything from source code to binaries, and it works seamlessly with your existing Git tools.

AWS CodeBuild

AWS CodeBuild is a fully managed continuous integration service that compiles source code, runs tests, and produces software packages that are ready to deploy. With CodeBuild, you don't need to provision, manage, and scale your own build servers. CodeBuild scales continuously and processes multiple builds concurrently, so your builds are not left waiting in a queue. You can get started quickly by using prepackaged build environments, or you can create custom build environments that use your own build tools. With CodeBuild, you are charged by the minute for the compute resources you use.

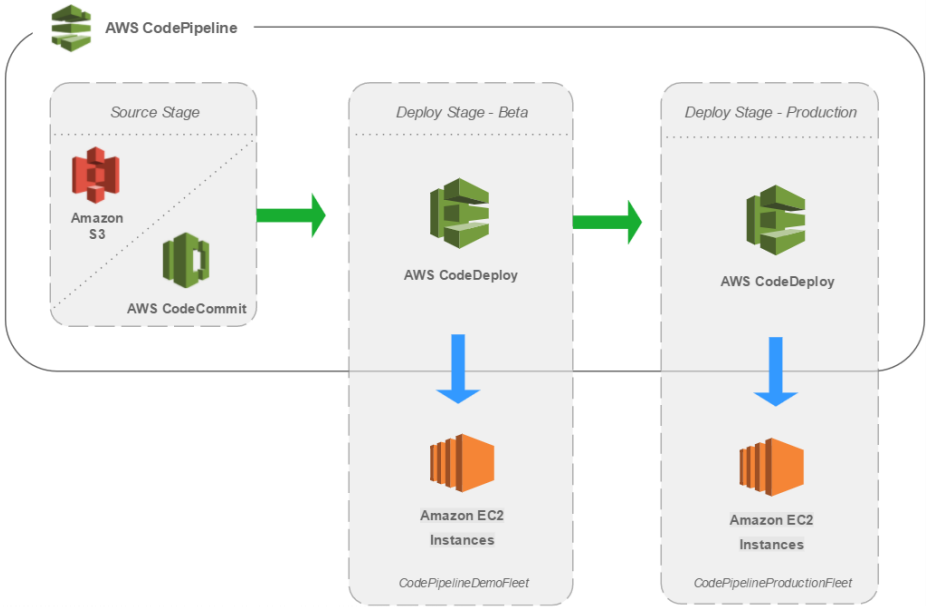


AWS Code Commit + Build



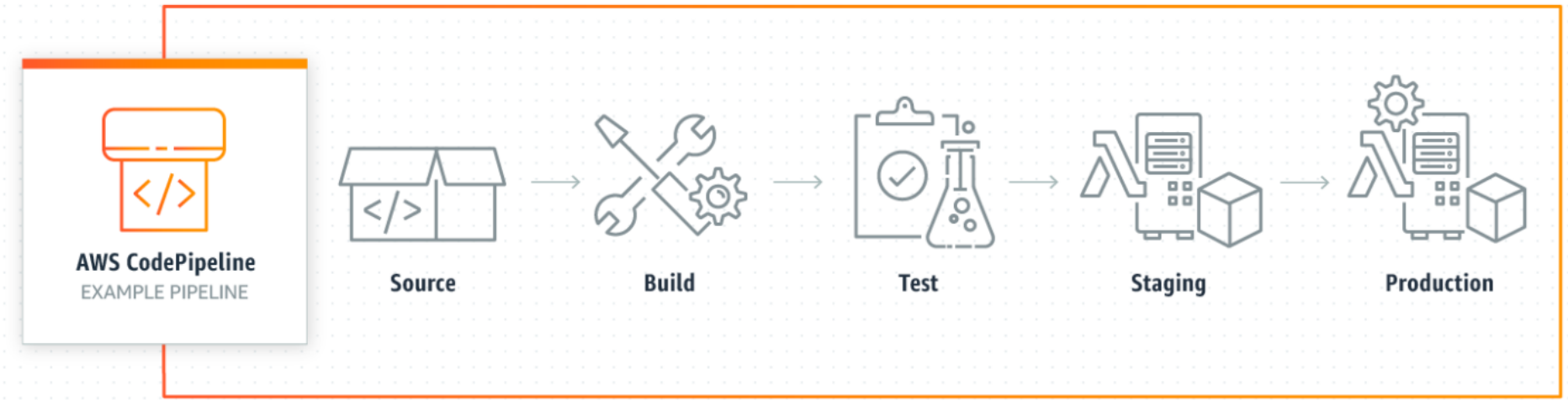
AWS CodeDeploy

AWS CodeDeploy is a fully managed deployment service that automates software deployments to a variety of compute services such as Amazon EC2, AWS Fargate, AWS Lambda, and your on-premises servers. AWS CodeDeploy makes it easier for you to rapidly release new features, helps you avoid downtime during application deployment, and handles the complexity of updating your applications. You can use AWS

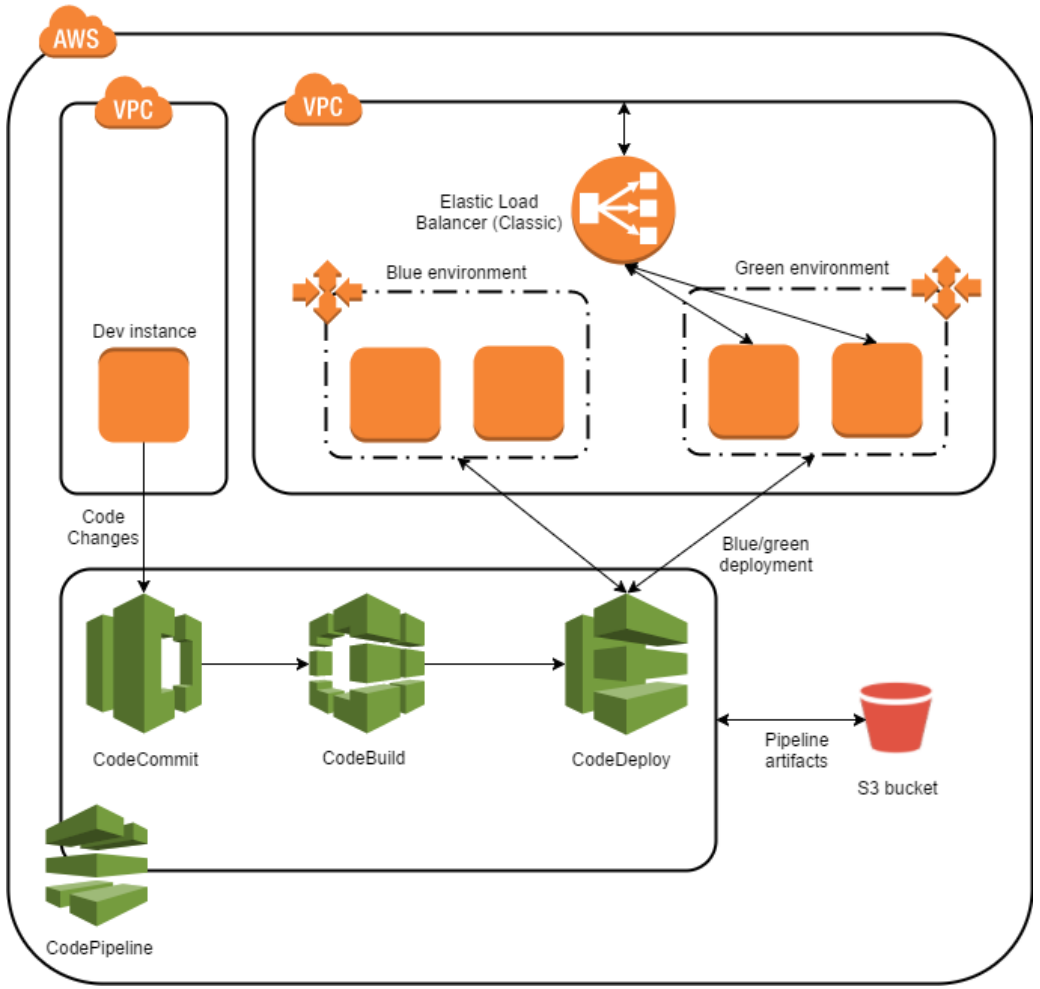


AWS CodePipeline

AWS CodePipeline is a fully managed continuous delivery service that helps you automate your release pipelines for fast and reliable application and infrastructure updates. CodePipeline automates the build, test, and deploy phases of your release process every time there is a code change, based on the release model you define. This enables you to rapidly and reliably deliver features and updates. You can easily integrate AWS



Putting It Together



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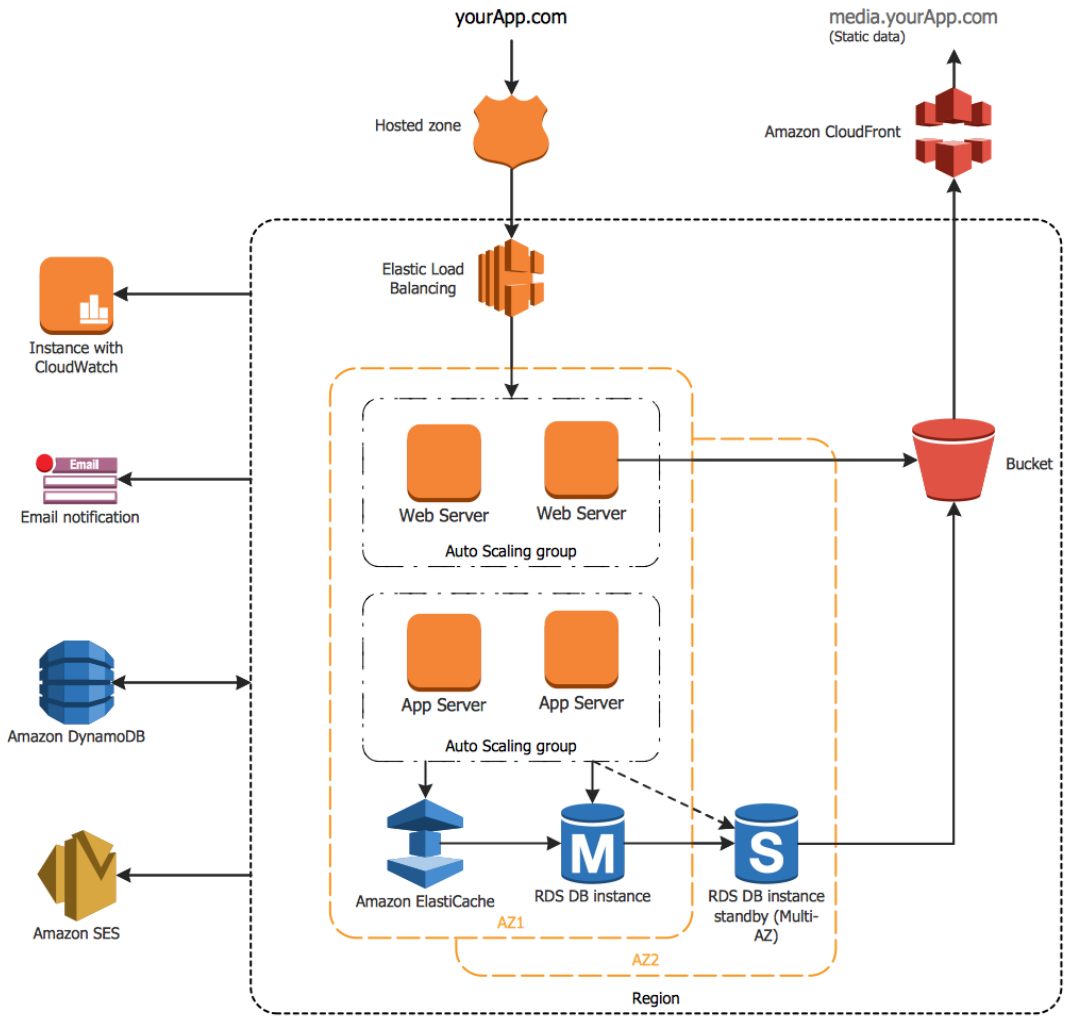
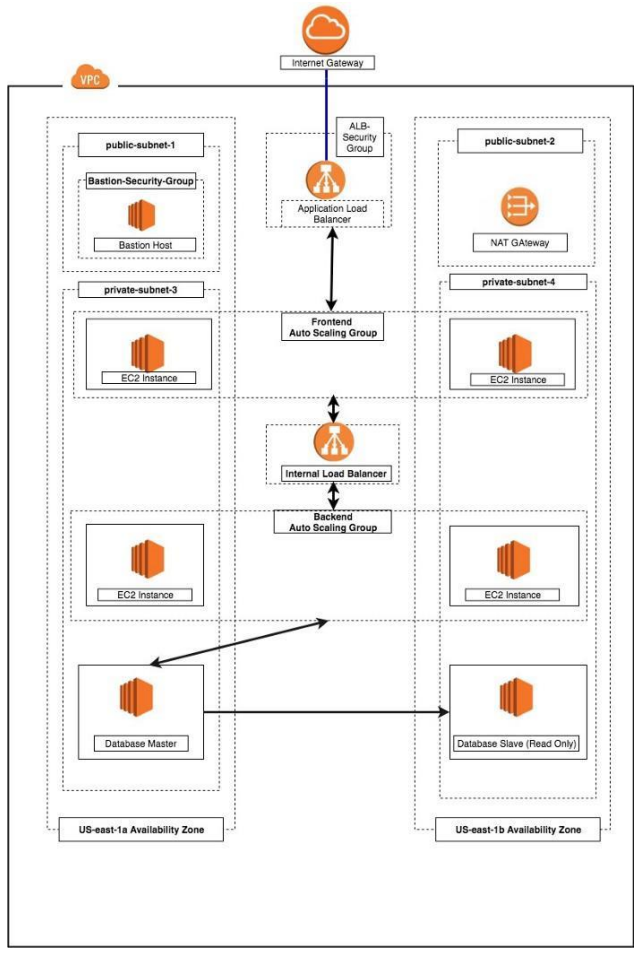
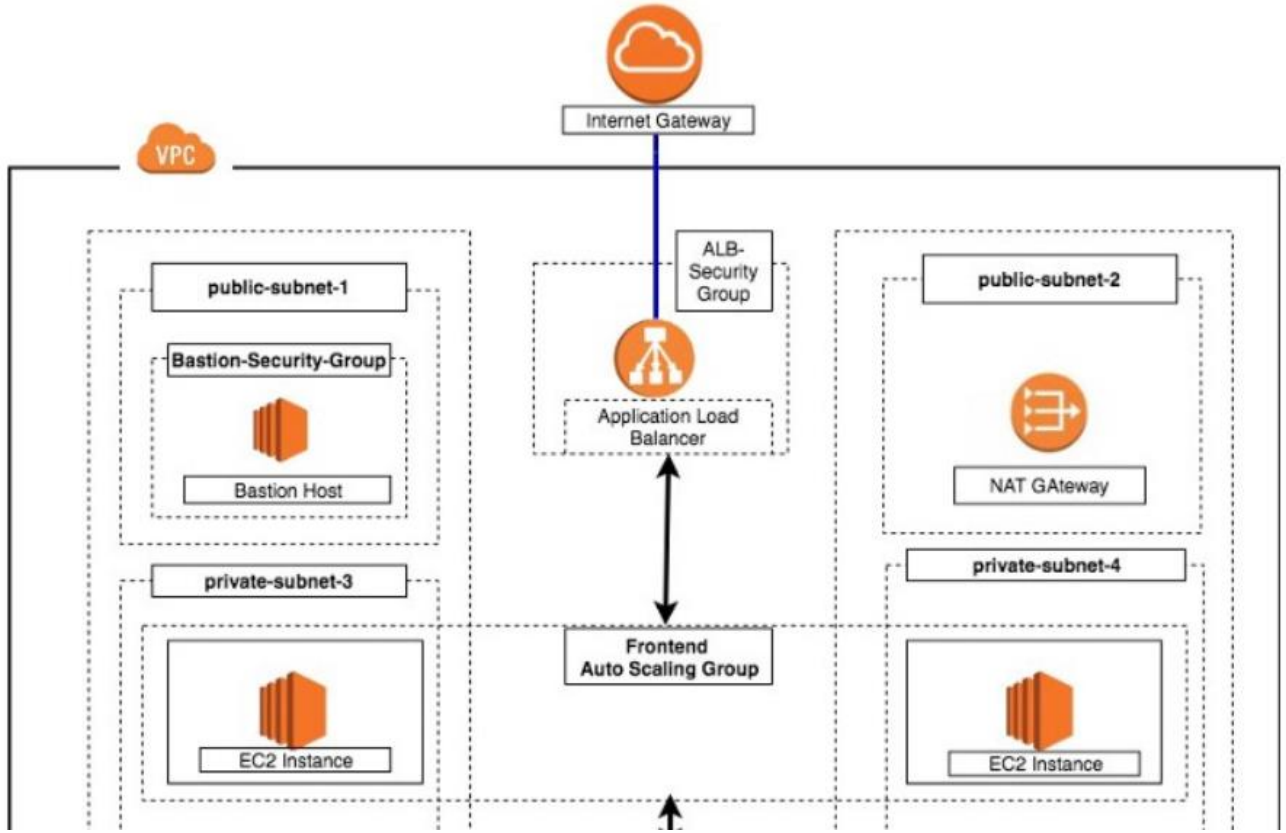
AWS Architecture

Architecture: Web, App, DB Tier

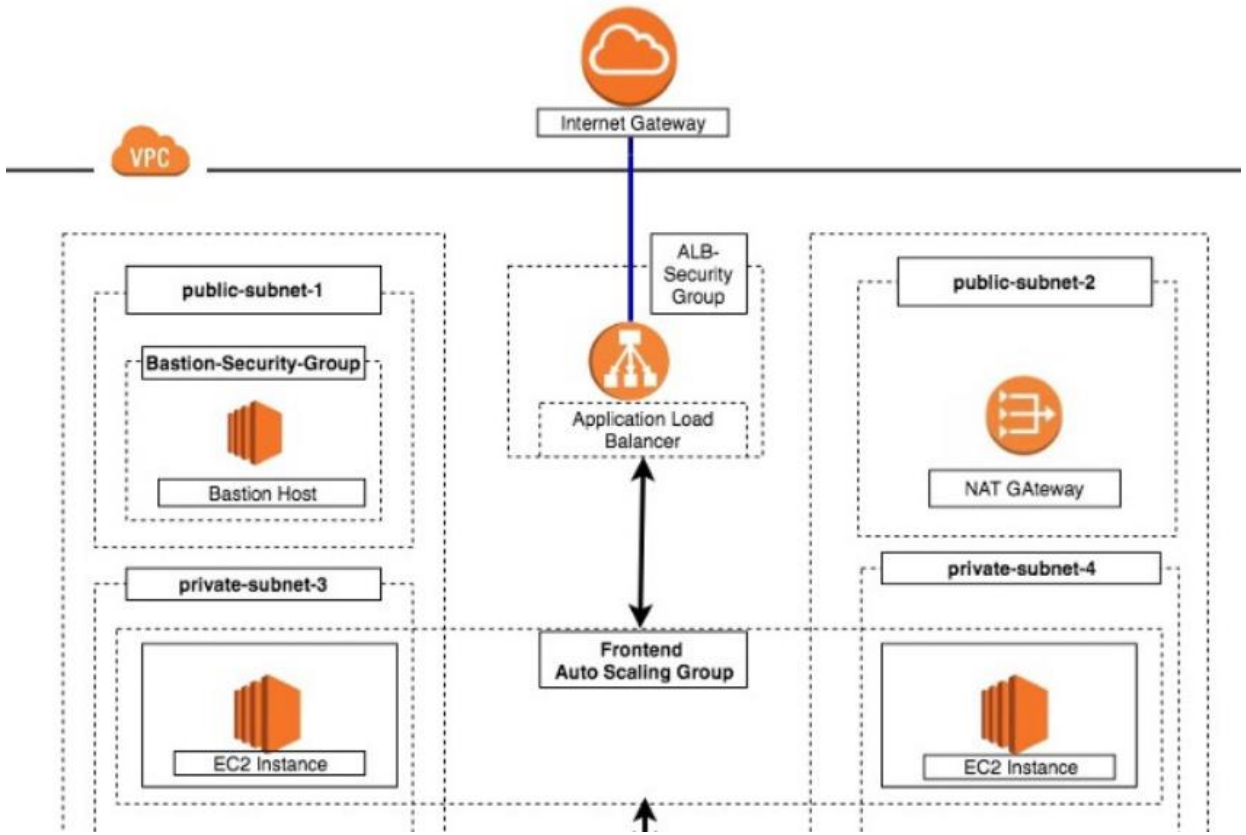


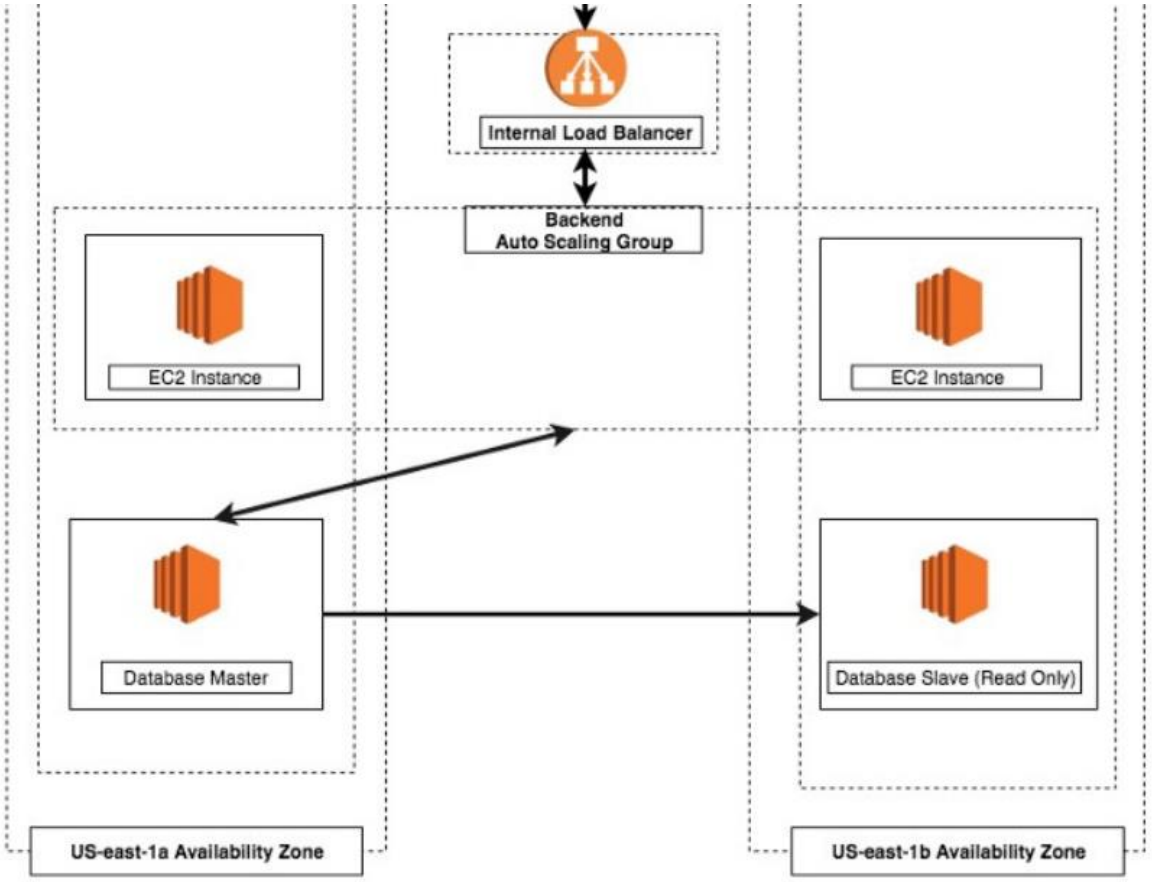
Multi-Tier HA Architecture





Multi-tier Architecture Solution





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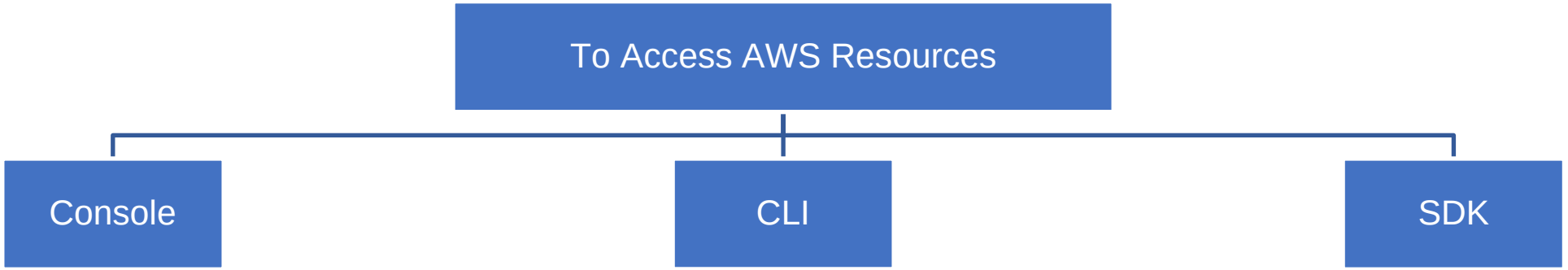
Access Services

Ways to Access AWS Resources



- Simple web-based user interface
- AWS has a different GUI for android and iOS to access some of the services like EC2, DynamoDB, ELB, Beanstalk, CloudWatch and many more

- Tool used to manage AWS resources and automates service management with scripts
- Mac, Linux and Windows OS supports CLI
- AWS SDKs provides an easy to use GUI to access and administer AWS infrastructure

- All major programming languages has compatibility with AWS SDK, including Java, .Net, PHP, Ruby, Python, Go, C++, Node.js and many more

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Lab
Activity Guide

Module on Portal

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Module 1: Introduction To Cloud And AWS

- Presentation : Introduction To AWS
- Lesson 1 : Module & Cloud Overview (06:35 min)
- Lesson 2 : Cloud Service Model IaaS, PaaS, SaaS & Deployment Model Public, Private, Hybrid (08:50 min)
- Lesson 3 : AWS Overview Comparison (05:02 min)
- Lesson 4 : AWS Global Infrastructure Region AZ (08:05 min)
- Lesson 5 : AWS Services (10:19 min)
- Lesson 6 : IAM Users, Groups, Policy, & Roles (10:59 min)
- Lesson 7 : Compute EC2, Lambda, ECS, EKS, & Fargate (08:22)
- Lesson 8 : Storage Service Block Object File S3, EBS, & EFS (07:40 min)
- Lesson 9 : Network Service VPC Subnet Gateway, LB, Route 53 & CDN (09:04)
- Lesson 10 : Database Service RDS, DynamoDB, ElastiCache, RedShift, & Aurora (06:46 min)
- Lesson 11 : Automation Configuration, CloudFormation, & OpsWorks (06:31 min)
- Lesson 12 : Audit And Monitoring CloudWatch, & CloudTrail (04:44 min)
- Lesson 13 : Application Services SNS, SES, SQS, & SWF (10:00 min)
- Lesson 14 : DevOps Tools, CodeCommit, CodeBuild, CodeDeploy, & CodePipeline (09:15 min)
- Lesson 15 : AWS Architecture Overview (06:22 min)
- Lesson 16 : Activity Guide (Lab) Overview & Module Wrap-Up
- FAQ's : AWS Batch 2011 Live Session Day 1

Module 2 : Create Cloud Account, Machine, And Install CLI

- Lesson 0 : Module Overview (03:50 min)
- Lesson 1: Create AWS Free Trial Account (06:51 min)
- Activity Guide (Lab) : Create AWS Free Trial Account
- Lesson 2 : CloudWatch - Create Billings Alarm & Service Limits (07:12 min)
- Activity Guide (Lab) : CloudWatch - Create Billing Alarm & Service Limits
- Atul's Voice Note on AWS Billing
- Lesson 3 : Creating Windows Machine On AWS (16:39 min)
- Activity Guide (Lab) : Creating A Windows EC2 Instance
- Lesson 4 : Creating Linux Machine On AWS (16:22 min)
- Activity Guide (Lab) : Creating A Linux EC2 Instance
- Lesson 5 : Install CLI, GIT, Node JS AND SDK
- Activity Guide (Lab) : How To Use AWS CLI & Setup Git, Node.js & SDK
- Lesson 6 : Module Wrap-Up

Register for Cloud Account

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Register for AWS Free Tier Account
Amazon Web Services
&
Login to AWS Console

[Edition 4]

[Last Update 201202]

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Cloud Watch: Billing Alarm & Limits

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CloudWatch – Create Billings Alarm
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