

Amazon Web Service

AWS Overview

What is Amazon Web Services?

Welcome to AWS

- ◆ Amazon Web Services
- ◆ The most broadly adopted cloud platform
- ◆ Offering over 200 fully featured services
- ◆ Largest community of customers and partners
- ◆ Who is using AWS?
 - ◆ Fastest-growing startups
 - ◆ Largest enterprises
 - ◆ Leading government agencies
- ◆ Global and distributed cloud infrastructure
 - ◆ 27 geographic regions
 - ◆ 87 Availability Zones



Core AWS Services



Amazon
EC2



AWS
Lambda



Amazon
VPC



Amazon
Route 53



Amazon S3



Amazon
EBS



Auto
Scaling



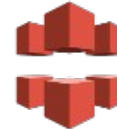
Amazon
Elastic
Container
Service



AWS Direct
Connect



Elastic
Load
Balancing



Amazon
CloudFront



Amazon
SQS



Amazon
Elastic
Container
Registry



Amazon
Cloud Watch



Key
Management
Service



Amazon
DynamoDB



Amazon Elastic
File System



Amazon
SNS



AWS
Identity and
Access
Management



Cloud Trail



AWS
Directory
Services



Amazon
ElastiCache



Amazon
Redshift



Amazon
RDS



The image shows three interlocking gears of different sizes and colors. The top gear is grey and labeled 'OPS'. The middle gear is blue and labeled 'SEC'. The bottom gear is green and labeled 'DEV'. A vertical grey bar is on the left side of the image.



<https://aws.amazon.com/about-aws/global-infrastructure/>

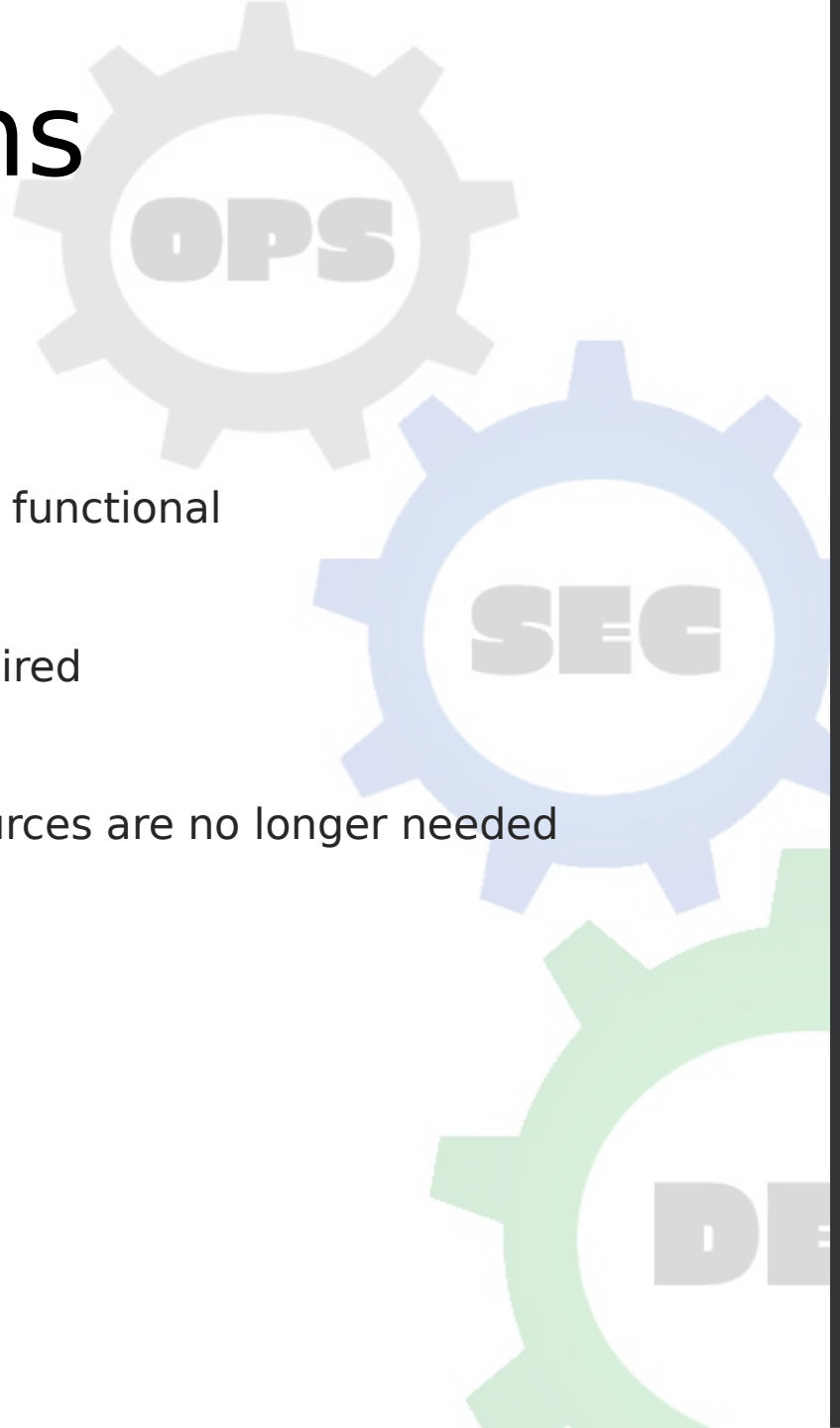
AWS Availability Zones

- ◆ Availability Zone (AZ)
- ◆ One or more discrete data centers
 - Redundant power supply
 - Redundant Networking
 - Interconnected with high-bandwidth and low-latency
 - Fault tolerant
 - Scalable
 - Encrypted Traffic
 - Not more than 100 km (60 miles)

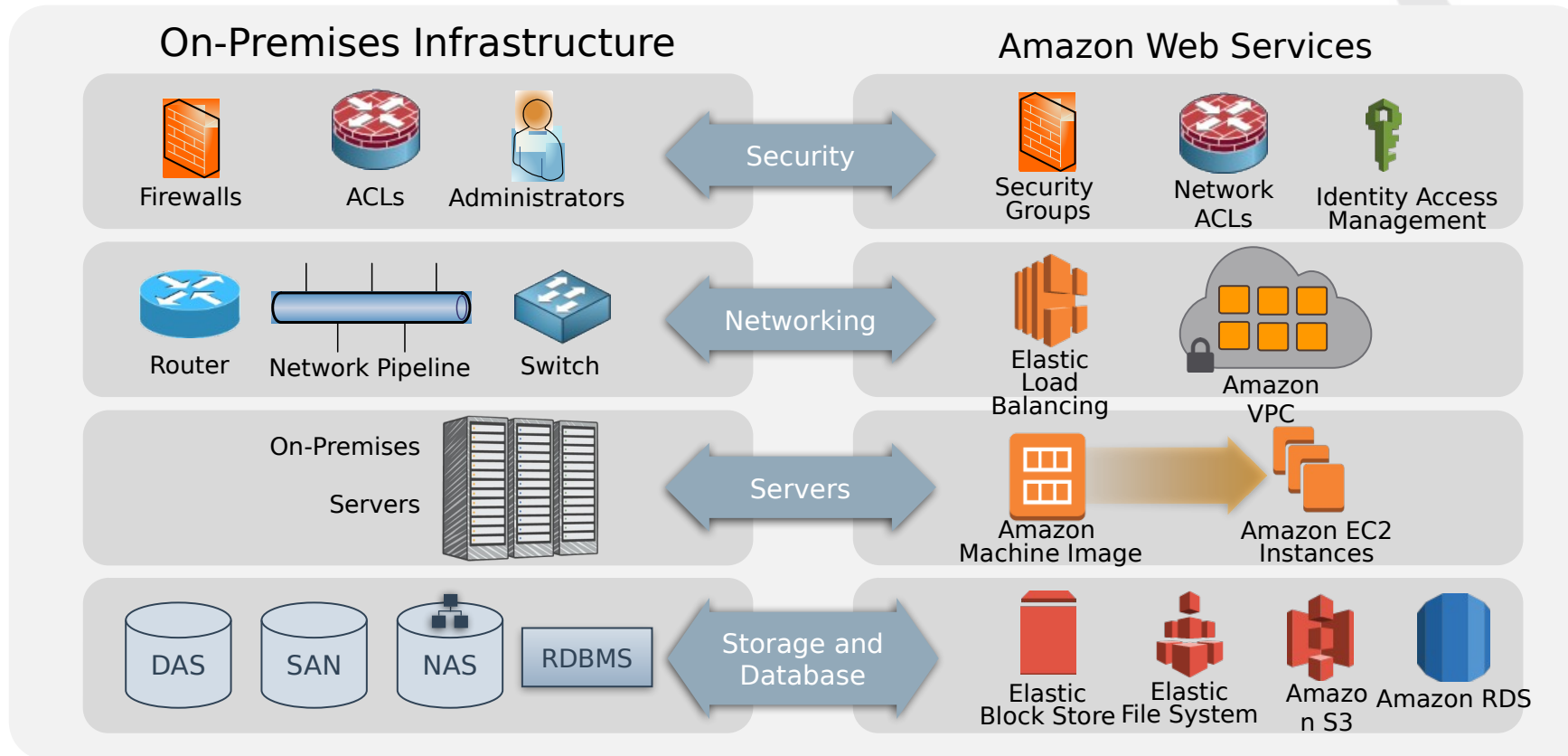


Important AWS Definitions

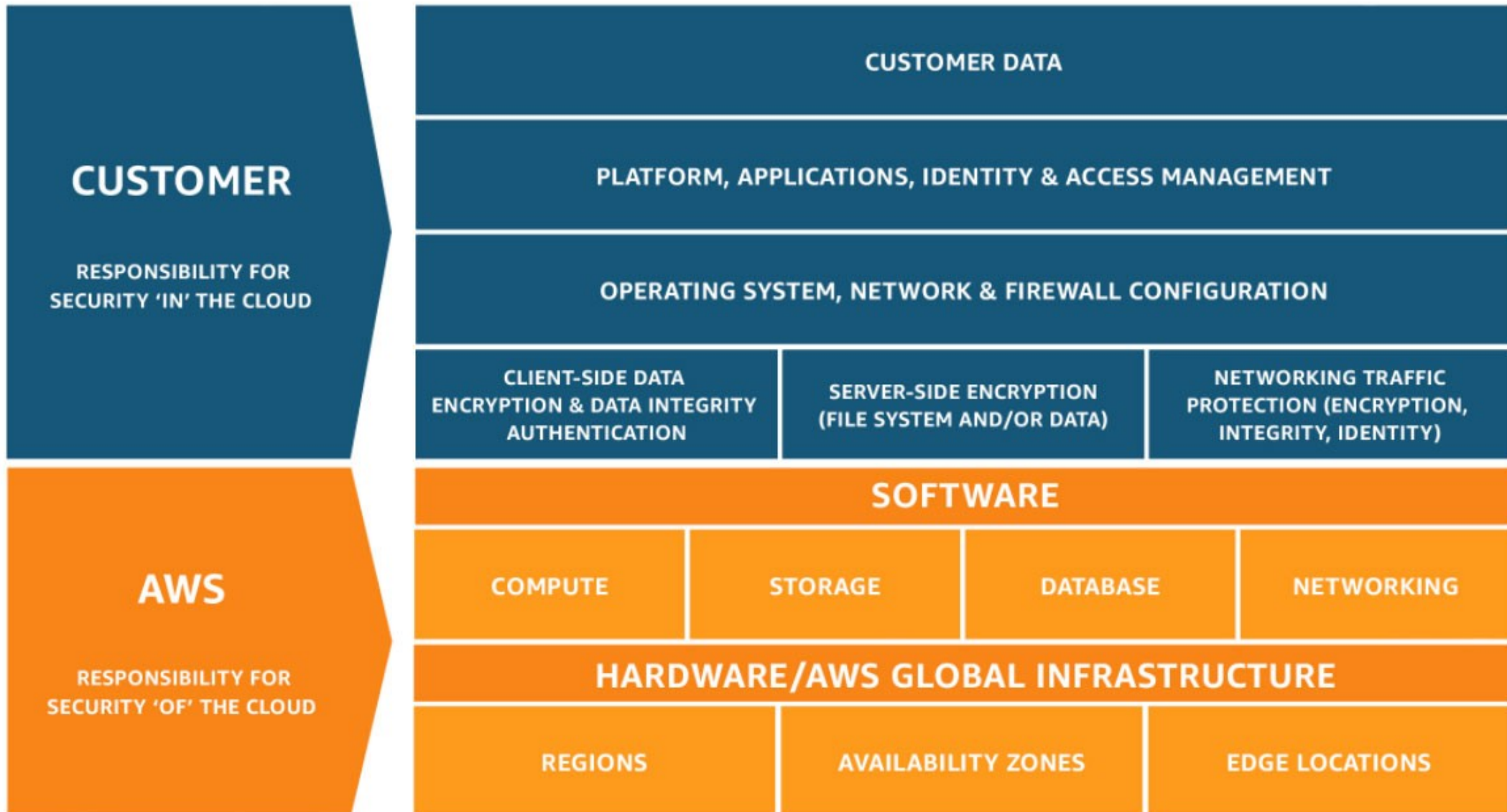
- ◆ High Availability
 - ◆ Accessible when you need it
- ◆ Fault Tolerance
 - ◆ Ability to withstand a certain amount of failure and still remain functional
- ◆ Scalability
 - ◆ Ability to easily grow in size, capacity, and/or scope when required
- ◆ Elasticity (Elastic):
 - ◆ Ability to grow when required and to reduce in size when resources are no longer needed



AWS vs On-Premises



Shared Responsibility Model



**Create Personal Free
Tier AWS Account**

Free Tier

- ◆ Free AWS resources
 - For learning
 - For proof of concepts
 - For small projects
- ◆ Offers
 - 12 Months Free
 - Always free
 - Free Tries
- ◆ Credit or Debit card
 - Free tier services (up to their limits) are not charged
 - Everything else is charged



Budget Alert

- ◆ Create an budget (e.g. 10\$ per month)
- ◆ Configure alert (e.g. 80% of your budget)



Interacting with AWS Services

AWS Console

- ◆ Users can use their browsers to access AWS
- ◆ Web Application
- ◆ Mobile version is also available



AWS CLI

- ◆ Command Line Interface (CLI)
- ◆ Command line access for admins and advanced users



AWS APIs and AWS SDK

- ◆ Programming access to manage AWS services
- ◆ Application Programming Interfaces (Web Services)
- ◆ Software Development Kit
 - Wrapper of the APIs
 - Available for many languages
 - Python, GO, JavaScript, .NET, etc.



Other tools

- ◆ Many tools integrate and interact with AWS
- ◆ Example
 - Terraform
 - Ansible



Elastic Cloud Computing (EC2)

Elastic Cloud Computing (EC2)

- ◆ Virtual Machine like experience in AWS
- ◆ Scalable computing capacity
- ◆ Foundation for many other services
- ◆ One of the first AWS services



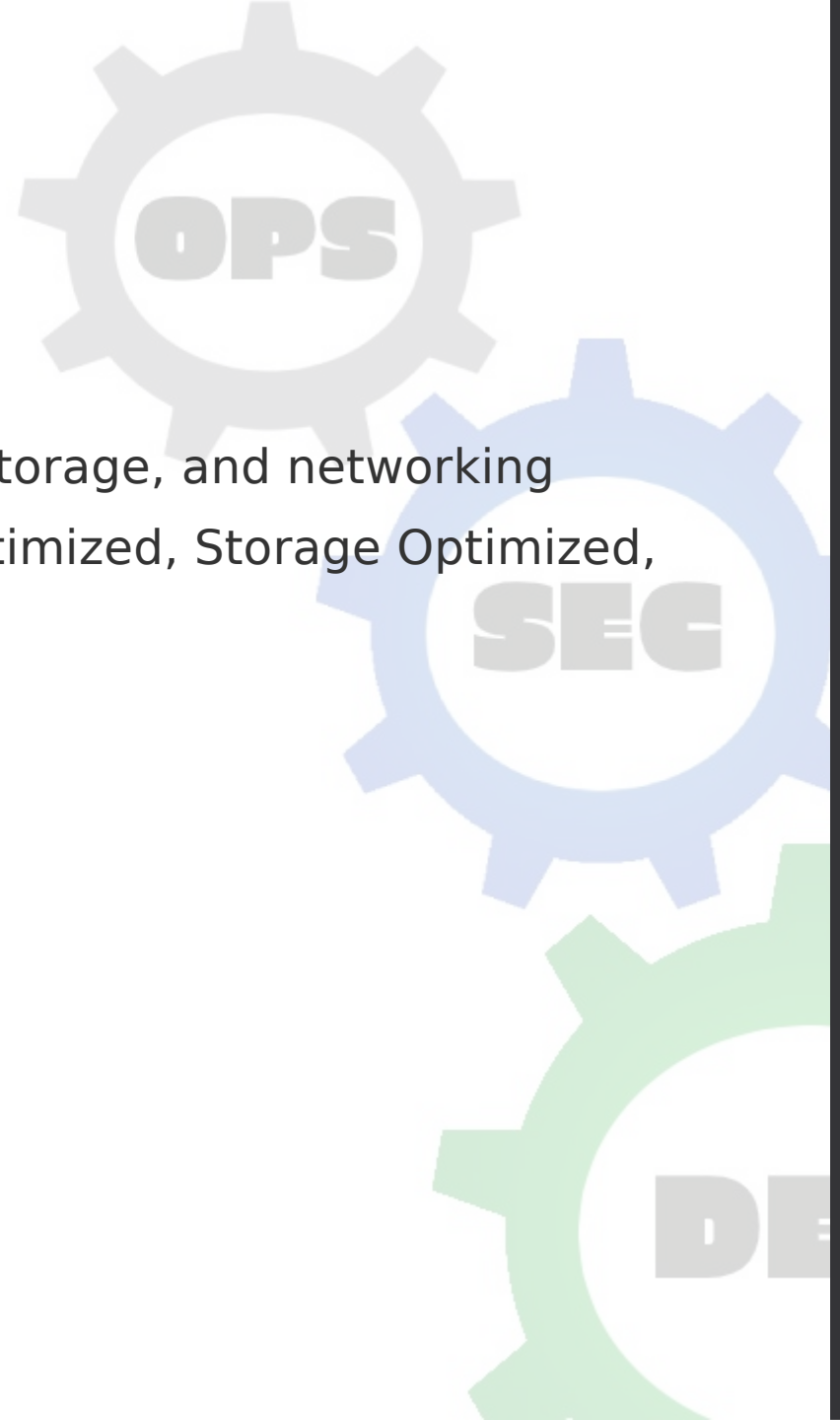
Core Concepts in EC2

◆ Instance Type

- Wide selection to fit different use cases
- Comprise varying combinations of CPU, memory, storage, and networking
- General Purpose, Compute Optimized, Memory Optimized, Storage Optimized, etc.

◆ Amazon Machine Image (AMI)

- Template for EC2 instances
- Operating System
- Operating System + Additional Software



Purchase Options (EC2)

- ◆ On-Demand Instances
 - Pay, by the second, for the instances that you launch.
- ◆ Reserved Instances
 - Make commitment to a consistent instance configuration
 - Available for a term of 1 or 3 years.
 - Includes the instance type and region
- ◆ Spot Instances
 - Request unused instances
 - Very cheap
 - Not reliable
- ◆ More...



Auto Scaling

- ◆ Maintain EC2 and application availability
- ◆ Automatically add or remove EC2 instances (based on condition)
- ◆ Integrated with Elastic Load Balancing



Simple Storage Service (S3)

Simple Storage Service (S3)

- ◆ Object storage as a Service
- ◆ Store data objects in S3 Bucket
- ◆ High Available (Stores data in multiple AZs)
- ◆ Allow access to objects using URL endpoint
- ◆ Provides different classes for different use cases
- ◆ Can serve static web site content



Simple Queue Service

Simple Queue Service (SQS)

- ◆ Message Queue
- ◆ High Available
- ◆ Fully managed
- ◆ AWS SDK



Simple Notification Service

Simple Notification Service (SQS)

- ◆ Pub/Sub Messaging
- ◆ High Available
- ◆ Fully managed
- ◆ AWS SDK
- ◆ HTTP/EMAIL/SMS



AWS Lambda

AWS Lambda

- ◆ Run functions without provisioning or managing servers
- ◆ Pay only for the compute time you consume
- ◆ No charge when your code is not running



Elastic Container Service

AWS Elastic Container Service (ECS)

The background features three interlocking gears of different sizes and colors. The top gear is light gray and contains the text 'OPS'. The middle gear is light blue and contains the text 'SEC'. The bottom gear is light green and contains the text 'DEV'. The gears are arranged in a descending staircase pattern from top-left to bottom-right.

- ◆ AWS proprietary container orchestration service
- ◆ Eliminates the need to install and manage container orchestration software
- ◆ Supports docker
- ◆ Highly scalable and Highly Available

Elastic Container Registry

AWS Elastic Container Registry (ECR)

- ◆ Fully-managed Docker container registry
- ◆ Eliminates the need to operate your own container registry
- ◆ Highly available and scalable architecture
- ◆ Scaling internally the underlying infrastructure
- ◆ You pay only for
 - The amount of data
 - Data transfer



Elastic Kubernetes Service

AWS Elastic Kubernetes Service

- ◆ Managed Kubernetes (Container Orchestration)
- ◆ Eliminates the need to install and manage Kubernetes
- ◆ Highly scalable and Highly Available



Relational Database Service

Relational Database Service (RDS)

- ◆ Managed relational database service
- ◆ Cost-efficient and resizable capacity
- ◆ Database instance types
 - PostgreSQL
 - MySQL
 - MariaDB
 - OracleDB
 - Microsoft SQL Server
- ◆ Automating time-consuming administration tasks
 - Provisioning
 - Patching
 - Backups



Amazon Aurora

Amazon Aurora

- ◆ Fully managed by Amazon Relational Database Service
- ◆ MySQL and PostgreSQL compatible relational database engine
 - Five times faster than standard MySQL
 - Three times faster than standard PostgreSQL
- ◆ Automates time-consuming administration tasks
 - Provisioning/Scalability
 - High Availability
 - Patching
 - Backups
- ◆ Fault-tolerant and self-healing storage (up to 128TB per DB)
- ◆ Replication across three Azs
- ◆ Aurora Global Database
 - Multi-Region Primary/Secondary setup
 - Zero data loss planned downtime



Amazon DynamoDB

Amazon DynamoDB

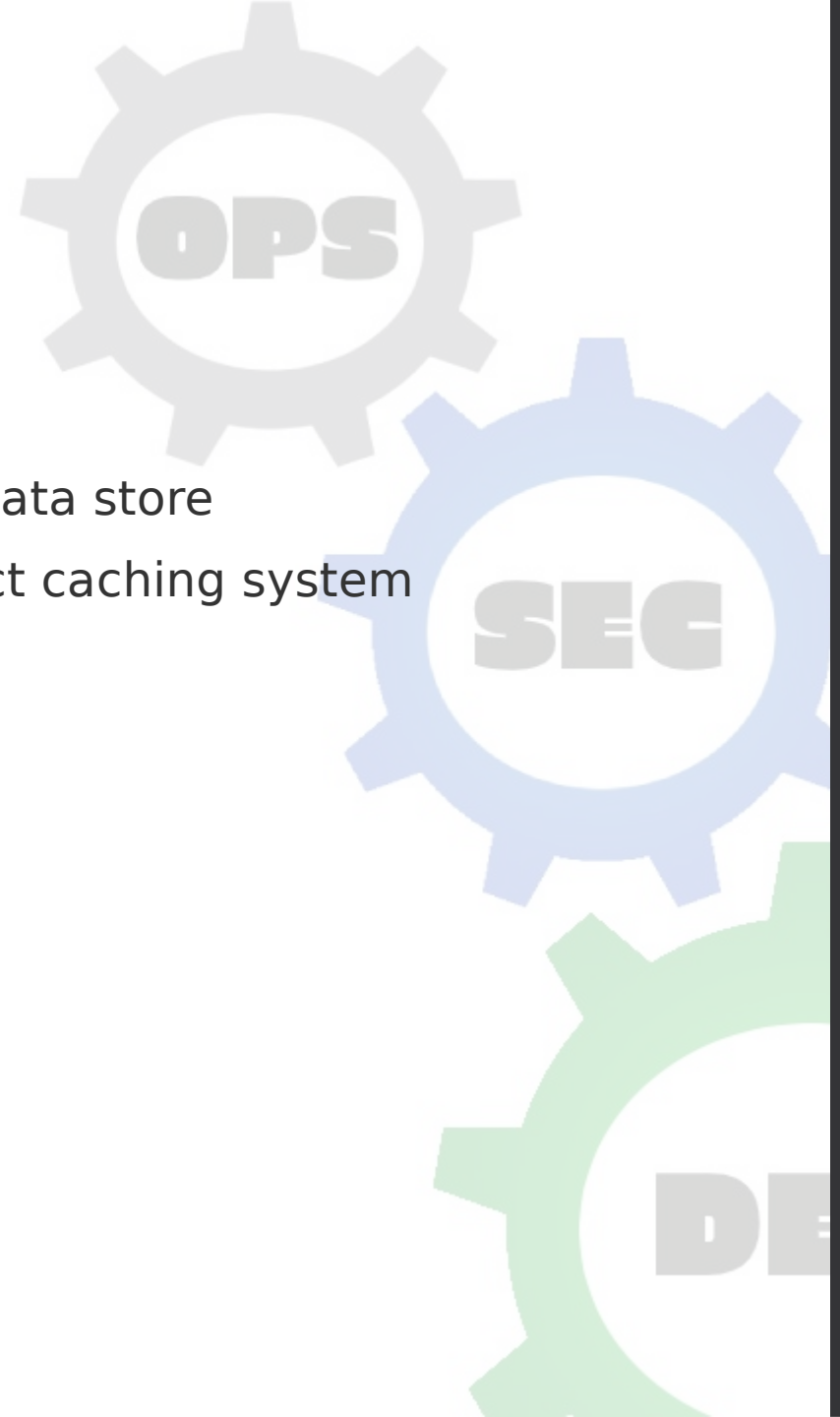
- ◆ Fully managed NoSQL database
- ◆ Key-Value and Document database
- ◆ Multiregion and multimaster
- ◆ Highly Scalable
 - 10 trillion requests per day
 - > 20 million requests per second
- ◆ Automates time-consuming administration tasks
 - Provisioning/Scalability
 - High Availability
 - Patching
 - Backups
- ◆ Used by many innovative companies like Airbnb, Redfin



Amazon Elastic Cache

Amazon Elastic Cache

- ◆ Fully managed in-memory cache service
- ◆ Supports two engines
 - Redis - a fast, open source, in-memory key-value data store
 - Memcached - a fast, open source, in-memory object caching system



Amazon Route53

Amazon Route53

- ◆ Fully managed DNS Service
- ◆ Highly available and scalable
- ◆ Effectively connects to infrastructure running in AWS
 - EC2
 - ELB/ALB
 - S3
- ◆ Health checks
- ◆ Geo DNS
- ◆ More...



Amazon VPC

Virtual Private Cloud (VPC)

- ◆ Virtual network isolation in AWS
- ◆ Provision a logically isolated resources in different VPS
- ◆ Example:
 - Public facing services
 - Backend service
 - Databases
- ◆ Supports IPv4 and IPv6



Elastic Load Balancing (ELB)

Elastic Load Balancing

- ◆ Managed load balancing service
- ◆ Distributes incoming application traffic across multiple targets
- ◆ Supports different targets
 - Amazon EC2 instances
 - Containers
 - IP addresses
- ◆ Types of load balancers
 - Application Load Balancer – Layer 7 - HTTP and HTTPS traffic
 - Network Load Balancer – Layer 4 – TCP traffic
 - Classic Load Balancer – Legacy load balancer for EC2-Classical

