# Cloud Concepts

## Cloud Benefits

* Fast Global Deployment in Minutes: AWS has regions globally and deployments can be done in minutes.
* Speed to Market with Agility: Faster innovation with AWS allows for faster delivery to customers.
* Discounts from economies of scale: Costs are shared across users and cheap due to economies of scale.
* No upfront cost to running and maintaining data centers: Quickly get an application deployed without thinking about IT infrastructure.
* OpEx in favor of CapEx: Capital Expenditures - are big upfront costs. Operating Expenses are funds to run day-to-day operations. The accounting department will care.
* Elastic Capacity: No need to guess upfront Capacity - pay as you go.

## Authentication

* An identity that is verified.
* Credentials such as username and password.

## Authorization

* Determines which services and resources the identity has access to.
* Permissions are granted via a policy.
* Least Privilege
* Give a user the minimum access required to get the job done.

## Elasticity

* The ability to add or remove resources based on demand.
* Demand based capacity provisioning allows for optimal usage of resources that minimizes waste.
* The ability of a system to automatically expand and contract its resources to meet demand.
* Auto-scaling, dynamic resource allocation
* Cost efficiency by using only the necessary resources.
* To handle variable workloads without manual intervention.

## Scalability

* Scalability is the ability to handle increased workload by repeatedly applying a cost-effective strategy for extending a system’s capacity
* The ability to handle increased load by adding resources.
* Increase capacity, performance management
* Maintains performance under growing demand.
* To ensure systems can grow and handle more traffic or data.

## Fault Tolerance

* Is the property that enables a system to continue operating properly in the event of a failure of one or more faults within some if its components.
* The ability of a system to continue functioning in the event of a failure.
* Resilience, failover
* Minimizes service disruption.
* To ensure business continuity and reliability.

## High Availability

* Property of a system to serve the business without failure over a given period of time.
* Redundancy, and Failovers allow for a system to have longer uptimes.
* Ensures a system is continuously operational and minimizes downtime.
* Uptime, redundancy
* Enhances user experience and reliability.
* To keep services available even during failures.

## Principle of least privilege

* Every program and every user of the system should operate using the least set of privileges necessary to complete the job. Primarily, this principle limits the damage that can result from an accident or error.

## Agility

* AWS Services can help customers innovate faster allowing for reduced time to market.
* The capability to rapidly develop, test, and deploy applications.
* Rapid deployment, flexibility
* Faster time to market and ability to respond to changes quickly.
* To improve responsiveness and adaptability in development and operations.

## Durability

* AWS provides data services that offer long-term data protection and storage.

## Latency

* Time elapsed between a user request and response. Low latency is a good thing.

## Disaster Recovery

* Strategies and processes to recover data and systems after a disaster.
* Backup, restore, business continuity
* Protects against data loss and ensures quick recovery.
* To restore normal operations swiftly after an interruption.

## Resource

* Any component that can be allocated and managed, such as VMs, storage, and databases.
* Compute, storage, network
* Essential building blocks for IT infrastructure.
* To deliver and manage IT services.

## Resource Group

* A collection of resources that share the same lifecycle and permissions.
* Organizational units, management grouping
* Simplifies resource management and monitoring.
* To organize and manage resources efficiently.

## Global Reach

* The capability to deploy and access services globally.
* Worldwide access, multi-region
* Reduces latency and improves user experience worldwide.
* To provide services closer to end-users.

## Economies of Scale

* Cost advantages gained by scaling up production or usage.
* Cost efficiency, bulk pricing
* Reduces costs per unit as usage increases.
* To achieve cost savings through larger operations.

## OpEx (Operating Expenditure)

* Operating expenditure refers to ongoing costs incurred in the day-to-day operations of a business or organization. It includes expenses related to services, utilities, maintenance, and other operational expenses required to run a business.
* Operating expenditure, ongoing costs, operational expenses, day-to-day expenses.
* OpEx allows businesses to manage cash flow more predictably since these expenses occur regularly and are typically easier to budget for. It also enables flexibility in scaling operations up or down as needed without large upfront investments.
* The purpose of operating expenditure is to sustain the operational activities of a business or organization. It covers expenses necessary for maintaining current business operations and supporting ongoing projects or services.

## CapEx (Capital Expenditure)

* Capital expenditure refers to investments made by a company to acquire, upgrade, or maintain physical assets such as property, buildings, equipment, or technology that are expected to provide long-term benefits.
* Capital expenditure, investments, physical assets, long-term benefits.
* CapEx investments are crucial for business growth and expansion. They enable companies to acquire assets that enhance productivity, efficiency, and competitive advantage over the long term. CapEx can also be depreciated or amortized over time, providing tax benefits.
* The purpose of capital expenditure is to acquire assets that contribute to the company's ability to generate revenue, improve operations, or support strategic initiatives. It involves making significant investments to expand capacity, improve infrastructure, or upgrade technology to drive future growth.

## Pay-as-you-go Pricing

* Paying only for the resources and services used.
* Consumption-based billing, on-demand pricing
* Cost efficiency and no upfront costs.
* To align costs with actual usage.

## Penetration Testing

* Simulated cyberattacks to identify vulnerabilities.
* Security testing, ethical hacking
* Improves security posture.
* To find and fix security weaknesses before they are exploited.

## Serverless

* Computing model where the cloud provider manages the infrastructure.
* No server management, event-driven
* Reduces operational overhead.
* To allow developers to focus on code and logic without managing servers.

## Scaling

* The process of increasing or decreasing resources to meet demand.
* Capacity adjustment, performance tuning
* Ensures optimal performance and cost efficiency.
* To handle varying workloads effectively.

### Horizontal Scaling

* Adding more instances of a resource.
* Scaling out, adding instances
* Improves redundancy and load distribution.
* To manage increased traffic and workloads by adding more units.

### Vertical Scaling

* Increasing the capacity of a single resource.
* Scaling up, resource enhancement
* Enhances the performance of existing resources.
* To handle increased load by enhancing existing resource capacity.

## AWS Account

* An entity that enables the use of AWS services.
* AWS subscription, account setup
* Access to AWS resources and services.
* To create and manage AWS resources.

## AWS Console

* Web-based user interface for managing AWS services.
* Web interface, AWS management
* Easy access and management of AWS resources.
* To provide a graphical interface for AWS services.

## Free Tier

* AWS offering free usage of certain services for a limited time or usage limit.
* Free usage, introductory offer
* Cost-free exploration of AWS services.
* To allow users to try AWS services without cost.

## Cloud Computing Models

### IaaS (Infrastructure as a Service)

* Cloud computing model providing virtualized computing resources over the internet.
* Virtual machines, storage
* Flexibility and control over IT resources.
* To provide fundamental computing resources.
* e.g.EC2

### SaaS (Software as a Service)

* Software distribution model where applications are hosted by a service provider.
* Hosted software, on-demand software
* Accessibility and maintenance-free usage.
* To deliver software applications over the internet.
* e.g. Sagemaker

### PaaS (Platform as a Service)

* Cloud computing model providing a platform to develop, run, and manage applications.
* Application development, platform
* Simplifies application development and deployment.
* To provide an environment for application developers.
* e.g. Cloud9

### Operation as Code

* Managing and provisioning computing infrastructure through machine-readable files.
* Infrastructure as code, automation
* Consistency, repeatability, and automation of operations.
* To enable automated, scalable, and reliable infrastructure management.

## Cloud Hosting Models

### Public Cloud

* Shared infrastructure, multi-tenant
* Cloud services offered over the public internet and shared across multiple organizations.
* Cost-effective and scalable.
* To provide cloud resources to multiple customers.
* Fully publicly hosted and managed cloud.

### Private Cloud

* Cloud services used by a single organization, not shared with others.
* Dedicated environment, single-tenant
* Enhanced security and control.
* To provide dedicated cloud resources.
* On-prem virtualization as well as off-prem fully managed private cloud, also with Amazone Outpost

### Hybrid Cloud

* Combination of public and private clouds with orchestration between them.
* Mixed environment, integrated systems
* Flexibility and optimized resource usage.
* To leverage both public and private cloud advantages.
* AWS Direct Connect service connects customer's data center with Amazon.

# Architecture

## Design Practice

### Automation

* AWS CloudFormation
* AWS OpsWorks
* AWS Systems Manager
* AWS Lambda
* AWS CodePipeline
* AWS CodeDeploy

### Architecture optimization

* AWS Trusted Advisor
* AWS Compute Optimizer
* AWS Cost Explorer

### Loose Coupling

* Amazon Simple Queue Service (SQS)
* Amazon Simple Notification Service (SNS)
* AWS Step Functions

### Design for Failure

* Amazon Route 53
* Amazon S3 (with versioning and cross-region replication)
* AWS Elastic Load Balancing (ELB)
* AWS Auto Scaling
* AWS Backup

### Decoupling

* Amazon SQS
* Amazon SNS
* AWS EventBridge

## AWS Well-Architected Framework (WAF)

### Operational Excellence

* AWS CloudFormation
* AWS Systems Manager
* AWS CloudTrail
* Amazon CloudWatch
* AWS Config
* AWS OpsWorks
* AWS Service Catalog
* AWS X-Ray

### Security

* AWS Identity and Access Management (IAM)
* AWS Key Management Service (KMS)
* AWS Shield
* AWS WAF
* Amazon GuardDuty
* AWS Secrets Manager
* Amazon Macie
* AWS Artifact

### Reliability

* Amazon Route 53
* AWS Elastic Load Balancing (ELB)
* AWS Auto Scaling
* Amazon S3 (with versioning and cross-region replication)
* Amazon RDS
* AWS Backup
* AWS CloudFormation
* AWS Trusted Advisor

### Performance Efficiency

* AWS Lambda
* Amazon EC2 Auto Scaling
* Amazon CloudFront
* Amazon RDS Performance Insights
* AWS Compute Optimizer
* AWS Global Accelerator
* AWS Elastic Beanstalk
* AWS Fargate

### Cost Optimization

* AWS Cost Explorer
* AWS Budgets
* AWS Trusted Advisor
* Amazon EC2 Spot Instances
* AWS Savings Plans
* AWS Compute Optimizer
* AWS Reserved Instances
* AWS Cost and Usage Report

## AWS Cloud Adoption Framework (CAF)

### Business Perspective

* AWS Cost Explorer
* AWS Budgets
* AWS Trusted Advisor
* AWS Cost and Usage Report
* AWS Marketplace

### People Perspective

* AWS IAM
* AWS Single Sign-On (SSO)
* AWS Directory Service
* AWS Certification
* AWS Training and Certification

### Governance Perspective

* AWS Organizations
* AWS Control Tower
* AWS Config
* AWS CloudTrail
* AWS Service Catalog

### Platform Perspective

* AWS CloudFormation
* AWS Elastic Beanstalk
* Amazon EC2
* AWS Lambda
* Amazon RDS
* AWS Fargate

### Security Perspective

* AWS Identity and Access Management (IAM)
* AWS Key Management Service (KMS)
* AWS Shield
* AWS WAF
* Amazon GuardDuty
* AWS Secrets Manager
* Amazon Macie
* AWS Artifact

### Operations Perspective

* AWS CloudFormation
* AWS Systems Manager
* Amazon CloudWatch
* AWS Config
* AWS OpsWorks
* AWS Service Catalog
* AWS X-Ray

# AWS Shared Responsibility

## AWS Responsibilities:

* AWS is responsible for the physical security of data centers, hardware management, network infrastructure, and environmental controls of physical AWS data centers.
* They also handle network security, hardware and software management, and provide managed services like Amazon RDS, AWS Lambda, Amazon DynamoDB, and Amazon S3.

## Customer’s Responsibilities:

* Customers are responsible for service and communications protection, including zone security, providing a key for Amazon S3 client-side encryption, and configuration of an Amazon EC2 instance.
* They also handle application security, client-side data, managing the VPC network access control lists, encrypting data in transit and at rest, and compliance management.

## Shared Responsibilities:

* Both AWS and customers share responsibilities in patch management, configuration management, awareness & training, and security configuration of services.
* For instance, in Amazon EC2, AWS manages the infrastructure, while customers configure security groups and network ACLs.

## Company’s Responsibilities:

* The company is responsible for strategic decision-making, internal policies and procedures, training and development, and business continuity planning.
* They manage multiple AWS accounts, automate infrastructure deployment and policy enforcement, provide resources for employee training, and automate the setup of disaster recovery environments.

# Services

## Analytics

### Amazon Athena

* **Description:** Interactive query service to analyze data in Amazon S3 using SQL.
* **Advantages/Benefits:** Serverless, pay-as-you-go, interactive query service using standard SQL.
* **Cost:** $5 per TB scanned
* **One Word:** Query
* **Keywords:** Interactive query service, SQL, S3

### AWS Data Exchange

* **Description:** Service for subscribing to third-party data in the cloud.
* **Advantages/Benefits:** Simplifies finding, subscribing to, and using third-party data in the cloud.
* **Cost:** Subscription cost varies
* **One Word:** Marketplace
* **Keywords:** Secure data exchange, subscriptions, data providers

### Amazon EMR

* **Description:** Managed cluster platform for big data processing using Hadoop and Spark.
* **Advantages/Benefits:** Easy to process vast amounts of data across dynamically scalable Amazon EC2 instances.
* **Cost:** Per second billing for EC2, EBS, and other services used
* **One Word:** Hadoop
* **Keywords:** Managed Hadoop framework, big data processing, Spark, Hadoop, HBase

### AWS Glue

* **Description:** Fully managed ETL service for preparing data for analytics.
* **Advantages/Benefits:** Serverless ETL service that makes it easy to prepare and load data for analytics.
* **Cost:** $0.44 per DPU-Hour
* **One Word:** ETL
* **Keywords:** ETL service, data integration, catalog

### Amazon Kinesis

* **Description:** Platform for real-time data streaming and analytics.
* **Advantages/Benefits:** Real-time processing of streaming data at scale.
* **Cost:** $0.015 per shard hour
* **One Word:** Streaming
* **Keywords:** Real-time data streaming, data ingestion, analytics

### Amazon Managed Streaming for Apache Kafka (Amazon MSK)

* **Description:** Managed service for Apache Kafka to build and run streaming applications.
* **Advantages/Benefits:** Fully managed service to build and run applications that use Apache Kafka.
* **Cost:** $0.21 per broker instance hour
* **One Word:** Kafka
* **Keywords:** Managed Kafka service, streaming, data processing

### Amazon OpenSearch Service

* **Description:** Managed service for deploying, operating, and scaling OpenSearch/Elasticsearch clusters.
* **Advantages/Benefits:** Fully managed service to deploy, secure, and run OpenSearch and ELK (Elasticsearch, Logstash, Kibana) stacks.
* **Cost:** $0.058 per instance hour
* **One Word:** Search
* **Keywords:** Search, analytics, Elasticsearch, OpenSearch

### Amazon QuickSight

* **Description:** Business intelligence service for creating visualizations and dashboards.
* **Advantages/Benefits:** Fast, cloud-powered business intelligence service for easy-to-understand insights.
* **Cost:** $9 per user per month
* **One Word:** BI
* **Keywords:** Business intelligence, data visualization, analytics

### Amazon Redshift

* **Description:** Fully managed data warehouse service for big data analytics.
* **Advantages/Benefits:** Fast, fully managed data warehouse that makes it simple and cost-effective to analyze all your data.
* **Cost:** $0.25 per DC2.Large instance hour
* **One Word:** Warehouse
* **Keywords:** Data warehouse, analytics, SQL

## Application Integration

### Amazon EventBridge

* **Description:** Serverless event bus for integrating applications using events.
* **Advantages/Benefits:** Serverless event bus to connect application data from your apps, integrated SaaS apps, and AWS services.
* **Cost:** $1 per million events
* **One Word:** Events
* **Keywords:** Event bus, event-driven architecture, serverless

### Amazon Simple Notification Service (Amazon SNS)

* **Description:** Managed service for sending notifications from the cloud.
* **Advantages/Benefits:** Fully managed pub/sub messaging service with high throughput, flexibility, and reliability.
* **Cost:** $0.50 per million publishes
* **One Word:** Notify
* **Keywords:** Messaging, pub/sub, notifications, notification when cost threshold is reached

### Amazon Simple Queue Service (Amazon SQS)

* **Description:** Fully managed message queuing service for decoupling components.
* **Advantages/Benefits:** Fully managed message queuing service that enables decoupling and scaling microservices, distributed systems, and serverless applications.
* **Cost:** $0.40 per million requests
* **One Word:** Queue
* **Keywords:** Managed message queues, decoupling, scaling

### AWS Step Functions

* **Description:** Service for coordinating components of distributed applications using visual workflows.
* **Advantages/Benefits:** Serverless orchestration service for complex workflows with easy integration and error handling.
* **Cost:** $0.025 per 1,000 state transitions
* **One Word:** Workflow
* **Keywords:** Workflow orchestration, serverless, state machines

## Business Applications

### Amazon Connect

* **Description:** Cloud-based contact center service for customer engagement.
* **Advantages/Benefits:** Easy-to-use, omnichannel cloud contact center that scales to support businesses of all sizes.
* **Cost:** $0.018 per minute for voice usage
* **One Word:** Contact
* **Keywords:** Cloud contact center, customer service

### Amazon Simple Email Service (Amazon SES)

* **Description:** Service for sending email from within applications.
* **Advantages/Benefits:** Cost-effective, flexible, and scalable email sending service for businesses and developers.
* **Cost:** $0.10 per 1,000 emails sent
* **One Word:** Email
* **Keywords:** Email sending service, transactional, marketing

## Cloud Financial Management

### AWS Billing Conductor

* **Description:** Customizable billing service for AWS usage.
* **Advantages/Benefits:** Customize your billing data and create billing reports based on your organization's unique requirements.
* **Cost:** $0.01 per custom line item
* **One Word:** Billing
* **Keywords:** Billing management, chargebacks, cost allocation

### AWS Budgets

* **Description:** Service for setting custom cost and usage budgets in AWS.
* **Advantages/Benefits:** Set custom cost and usage budgets and receive alerts when they exceed thresholds.
* **Cost:** $0.02 per budget per month
* **One Word:** Budget
* **Keywords:** Budget tracking, cost management, alerts, notification when cost threshold is reached

### AWS Cost and Usage Report

* **Description:** Detailed AWS usage and cost report service.
* **Advantages/Benefits:** Detailed cost and usage data to analyze and manage AWS spending.
* **Cost:** Free
* **One Word:** Report
* **Keywords:** Cost reports, usage tracking, billing

### AWS Cost Explorer

* **Description:** Tool for visualizing and analyzing AWS costs and usage.
* **Advantages/Benefits:** Visualize, understand, and manage your AWS costs and usage over time.
* **Cost:** Free
* **One Word:** Explorer
* **Keywords:** Cost analysis, optimization, visualization

### AWS Marketplace

* **Description:** Online store for buying and selling software that runs on AWS.
* **Advantages/Benefits:** Curated digital catalog to find, buy, and deploy third-party software.
* **Cost:** Varies by product
* **One Word:** Catalog
* **Keywords:** Software procurement, third-party solutions, SaaS

## Compute

### AWS Batch

* **Description:** Service for running batch computing workloads on AWS.
* **Advantages/Benefits:** Fully managed service to efficiently run hundreds to thousands of batch computing jobs.
* **Cost:** $0.10 per vCPU hour
* **One Word:** Batch
* **Keywords:** Batch processing, job scheduling, resource management

### Amazon EC2

* **Description:** Scalable virtual server service for running applications.
* **Advantages/Benefits:** Scalable compute capacity in the cloud, with complete control over your computing resources.
* **Cost:** $0.0116 per On-Demand t4g.nano instance hour
* **One Word:** Compute
* **Keywords:** Virtual servers, scalable computing capacity, instances

### AWS Elastic Beanstalk

* **Description:** Service for deploying and scaling web applications and services.
* **Advantages/Benefits:** Easy-to-use service for deploying and scaling web applications and services.
* **Cost:** No additional charge (pay for underlying resources)
* **One Word:** Platform
* **Keywords:** Application deployment, scaling, PaaS

### Amazon Lightsail

* **Description:** Simplified cloud service for building applications and websites.
* **Advantages/Benefits:** Simplified cloud platform for managing small, lightweight workloads.
* **Cost:** $3.50 per month for the basic plan
* **One Word:** Simple
* **Keywords:** Simple cloud hosting, virtual servers, containers

### AWS Local Zones

* **Description:** Extend AWS Regions with low-latency access to compute and storage services.
* **Advantages/Benefits:** Extend AWS infrastructure to locations closer to end-users for low-latency applications.
* **Cost:** Same as EC2 instances
* **One Word:** Zones
* **Keywords:** Low-latency, edge computing, local data processing, hybrid architecture

### AWS Outposts

* **Description:** Bring AWS infrastructure and services to on-premises locations.
* **Advantages/Benefits:** Fully managed service that extends AWS infrastructure, services, APIs, and tools to any datacenter or on-premises facility.
* **Cost:** $7,366 per month for 1U servers
* **One Word:** Hybrid
* **Keywords:** On-premises AWS, hybrid cloud, consistent infrastructure, hybrid architecture

### AWS Wavelength

* **Description:** Brings AWS services to the edge of the 5G network for ultra-low latency.
* **Advantages/Benefits:** Deliver ultra-low latency applications for 5G devices by deploying compute and storage at the edge of 5G networks.
* **Cost:** Varies based on service and location
* **One Word:** Edge
* **Keywords:** Edge computing, ultra-low latency, 5G, hybrid architecture

### AMI

* **Description:** Templates used to create virtual machines within AWS.
* **Cost:** Generally free; charges may apply for storage and data transfer.
* **Advantages/Benefits:** Enables quick provisioning of EC2 instances with pre-configured software.
* Keyword: Virtualization, EC2, Templates, disaster recovery.
* **One Word:** Pre-configured software

## Containers

### Amazon Elastic Container Registry (Amazon ECR)

* **Description:** Managed Docker container registry service.
* **Advantages/Benefits:** Fully managed Docker container registry for easy management and deployment of container images.
* **Cost:** $0.10 per GB per month for standard storage
* **One Word:** Registry
* **Keywords:** Container registry, Docker images, secure storage

### Amazon Elastic Container Service (Amazon ECS)

* **Description:** Scalable container orchestration service for Docker containers.
* **Advantages/Benefits:** Highly scalable, fast, container management service that makes it easy to run, stop, and manage Docker containers on a cluster.
* **Cost:** No additional charge (pay for underlying resources)
* **One Word:** Containers
* **Keywords:** Container orchestration, Docker, microservices, hybrid architecture

### Amazon Elastic Kubernetes Service (Amazon EKS)

* **Description:** Managed Kubernetes service for running Kubernetes on AWS.
* **Advantages/Benefits:** Managed Kubernetes service to run Kubernetes without needing to manage the Kubernetes infrastructure.
* **Cost:** $0.10 per hour per cluster
* **One Word:** Kubernetes
* **Keywords:** Managed Kubernetes, container orchestration, hybrid architecture

## Customer Engagement

### AWS Activate for Startups

* **Description:** Program offering resources for startups to build on AWS.
* **Advantages/Benefits:** Provides startups with resources, credits, and support to build and grow their businesses on AWS.
* **Cost:** Free
* **One Word:** Startups
* **Keywords:** Startup support, resources, credits

### AWS IQ

* **Description:** Connects AWS customers with certified AWS experts for project work.
* **Advantages/Benefits:** Connect with certified AWS experts for on-demand project work.
* **Cost:** Varies by expert's rate
* **One Word:** Experts
* **Keywords:** Expert consulting, AWS professionals, on-demand

### AWS Managed Services (AMS)

* **Description:** Offers ongoing management of AWS infrastructure.
* Provides ongoing management of AWS infrastructure so you can focus on your applications.
* AWS Systems Manager: Operations hub for AWS resources.
* AWS Config: Track configuration changes and compliance within AWS environments.
* AWS CloudFormation: Automate resource provisioning with infrastructure as code.
* **Advantages/Benefits:** Operational management of your AWS infrastructure according to AWS best practices.
* **Cost:** Custom pricing
* **One Word:** Managed
* **Keywords:** Managed operations, infrastructure management

### AWS Support

* **Description:** Service for technical support and troubleshooting on AWS.
* **Advantages/Benefits:** Various support plans providing guidance, tools, and technology to improve outcomes for AWS projects.
* **Cost:** Basic support is free; premium support starts at $29 per month
* **One Word:** Support
* **Keywords:** Technical support, troubleshooting, guidance

## Database

### Amazon Aurora

* **Description:** MySQL and PostgreSQL-compatible relational database service.
* **Advantages/Benefits:** High-performance, highly scalable, and cost-effective relational database compatible with MySQL and PostgreSQL.
* **Cost:** $0.10 per GB per month
* **One Word:** Database
* **Keywords:** Managed relational database, MySQL, PostgreSQL, OLTP, PostgreSQL + OLTP, MySQL + OLTP

### Amazon DynamoDB

* **Description:** Fully managed NoSQL database service.
* **Advantages/Benefits:** Fully managed NoSQL database service with single-digit millisecond performance.
* **Cost:** $1.25 per WCU and RCU
* **One Word:** NoSQL
* **Keywords:** NoSQL database, key-value store, fully managed, OLTP, Key-Value database

### Amazon MemoryDB for Redis

* **Description:** Redis-compatible, fully managed in-memory database service.
* **Advantages/Benefits:** Redis-compatible, in-memory database service optimized for critical applications needing sub-millisecond latency.
* **Cost:** $0.047 per node hour
* **One Word:** Redis
* **Keywords:** Managed Redis service, in-memory database

### Amazon Neptune

* **Description:** Fully managed graph database service.
* **Advantages/Benefits:** Fast, reliable, fully managed graph database service to build and run applications that work with highly connected datasets.
* **Cost:** $0.098 per instance hour
* **One Word:** Graph
* **Keywords:** Graph database, RDF, SPARQL

### Amazon RDS

* **Description:** Managed relational database service supporting multiple database engines.
* **Advantages/Benefits:** Easy to set up, operate, and scale a relational database in the cloud with automated backup and patching.
* **Cost:** $0.016 per hour for db.t4g.micro instance
* **One Word:** Relational
* **Keywords:** Relational database service, managed DBs, multi-engine, OLTP, PostgreSQL + OLTP, MySQL + OLTP

## Developer Tools

### AWS AppConfig

* **Description:** Service for deploying application configurations.
* **Advantages/Benefits:** Rapidly deploy application configuration changes to minimize risk and improve efficiency.
* **Cost:** $0.0008 per configuration deployment
* **One Word:** Configuration
* **Keywords:** Configuration management, application settings

### AWS CLI

* **Description:** Command-line interface for managing AWS services.
* **Advantages/Benefits:** Unified tool to manage your AWS services from the command line.
* **Cost:** Free
* **One Word:** Command
* **Keywords:** Command-line interface, AWS services management

### AWS Cloud9

* **Description:** Integrated development environment for writing, running, and debugging code.
* **Advantages/Benefits:** Cloud-based integrated development environment (IDE) that lets you write, run, and debug code with just a browser.
* **Cost:** $1.60 per instance hour
* **One Word:** IDE
* **Keywords:** Cloud-based IDE, development environment

### AWS CloudShell

* **Description:** Browser-based shell for managing AWS resources.
* **Advantages/Benefits:** Browser-based shell that provides command-line access to AWS resources.
* **Cost:** Free
* **One Word:** Terminal
* **Keywords:** Browser-based CLI, interactive terminal, command line access

### AWS CodeArtifact

* **Description:** Fully managed artifact repository service.
* **Advantages/Benefits:** Secure, scalable, and cost-effective artifact management for software development.
* **Cost:** $0.10 per GB of storage per month
* **One Word:** Packages
* **Keywords:** Artifact repository, package management

### AWS CodeBuild

* **Description:** Managed build service for compiling source code and running tests.
* **Advantages/Benefits:** Fully managed build service that compiles source code, runs tests, and produces software packages.
* **Cost:** $0.005 per build minute
* **One Word:** Build
* **Keywords:** Continuous integration, build automation

### AWS CodeCommit

* **Description:** Fully managed source control service based on Git.
* **Advantages/Benefits:** Secure, highly scalable, managed source control service that hosts private Git repositories.
* **Cost:** $1 per active user per month
* **One Word:** Repo
* **Keywords:** Source control, Git repository, code collaboration

### AWS CodeDeploy

* **Description:** Service for automating code deployments.
* **Advantages/Benefits:** Automate code deployments to any instance, including Amazon EC2 instances and on-premises servers.
* **Cost:** No additional charge (pay for underlying resources)
* **One Word:** Deploy
* **Keywords:** Automated deployments, application updates

### AWS CodePipeline

* **Description:** Continuous integration and delivery service for fast and reliable application updates.
* **Advantages/Benefits:** Continuous integration and delivery service for fast and reliable application and infrastructure updates.
* **Cost:** $1 per active pipeline per month
* **One Word:** Pipeline
* **Keywords:** Continuous delivery, CI/CD, automation

### AWS CodeStar

* **Description:** Unified interface for managing software development projects on AWS.
* **Advantages/Benefits:** Develop, build, and deploy applications on AWS quickly with a unified user interface.
* **Cost:** No additional charge
* **One Word:** DevOps
* **Keywords:** Development workflow, project management, CI/CD

### AWS X-Ray

* **Description:** Service for analyzing and debugging distributed applications.
* **Advantages/Benefits:** Analyze and debug production, distributed applications, such as those built using a microservices architecture.
* **Cost:** $0.000005 per trace recorded
* **One Word:** Tracing
* **Keywords:** Distributed tracing, debugging, monitoring

## End User Computing

### Amazon AppStream 2.0

* **Description:** Service for streaming desktop applications securely.
* **Advantages/Benefits:** Secure, scalable service for streaming desktop applications to any computer.
* **Cost:** $0.10 per streaming hour
* **One Word:** Stream
* **Keywords:** Application streaming, remote access, virtual desktops

### Amazon WorkSpaces

* **Description:** Managed desktop virtualization service.
* **Advantages/Benefits:** Fully managed, secure Desktop-as-a-Service (DaaS) solution.
* **Cost:** $7.25 per month for basic bundle
* **One Word:** Desktop
* **Keywords:** Managed desktops, VDI, remote work, unrestricted access to specific ports

### Amazon WorkSpaces Web

* **Description:** Managed service for secure web browsing.
* **Advantages/Benefits:** Low-cost, fully managed WorkSpaces service for secure, web-based applications.
* **Cost:** $4 per month per user
* **One Word:** Browser
* **Keywords:** Browser-based access, secure workspaces

## Frontend Web and Mobile

### AWS Amplify

* **Description:** Set of tools and services for building and deploying mobile and web applications.
* **Advantages/Benefits:** Set of tools and services for building scalable mobile and web applications.
* **Cost:** $0.01 per GB stored per month
* **One Word:** WebApp
* **Keywords:** Web and mobile apps, development, hosting

### AWS AppSync

* **Description:** Managed service for developing GraphQL APIs.
* **Advantages/Benefits:** Build data-driven apps with real-time and offline capabilities.
* **Cost:** $4.00 per million query and data modification operations
* **One Word:** Sync
* **Keywords:** GraphQL API, real-time data, serverless backend

### AWS Device Farm

* **Description:** Service for testing mobile and web applications on real devices.
* **Advantages/Benefits:** Fully managed service for testing mobile and web applications on real devices.
* **Cost:** $0.17 per device minute
* **One Word:** Testing
* **Keywords:** App testing, real devices, automated testing

## Internet of Things (IoT)

### AWS IoT Core

* **Description:** Managed cloud service for connecting IoT devices to the cloud.
* **Advantages/Benefits:** Managed cloud platform that lets connected devices easily and securely interact with cloud applications and other devices.
* **Cost:** $1 per million messages
* **One Word:** IoT
* **Keywords:** IoT device connectivity, messaging, data processing

### AWS IoT Greengrass

* **Description:** Software for running local compute, messaging, and data management for IoT devices.
* **Advantages/Benefits:** Extends AWS to edge devices for local data collection, processing, messaging, and execution.
* **Cost:** $0.16 per core hour
* **One Word:** Edge
* **Keywords:** Local processing, edge devices, machine learning

## Machine Learning

### Amazon Comprehend

* **Description:** Natural language processing service for analyzing text.
* **Advantages/Benefits:** Natural language processing (NLP) service that uses machine learning to find insights and relationships in text.
* **Cost:** $0.0001 per unit of text analyzed
* **One Word:** NLP
* **Keywords:** NLP service, text analysis, sentiment analysis

### Amazon Kendra

* **Description:** Enterprise search service powered by machine learning.
* **Advantages/Benefits:** Highly accurate and easy-to-use enterprise search service powered by machine learning.
* **Cost:** $7 per unit per day
* **One Word:** Search
* **Keywords:** Enterprise search, AI-powered, document search

### Amazon Lex

* **Description:** Service for building conversational interfaces using voice and text.
* **Advantages/Benefits:** Build conversational interfaces into any application using voice and text.
* **Cost:** $4 per 1,000 speech requests
* **One Word:** Chatbot
* **Keywords:** Conversational interfaces, chatbots, speech recognition

### Amazon Polly

* **Description:** Service for converting text into natural-sounding speech.
* **Advantages/Benefits:** Turn text into lifelike speech using deep learning.
* **Cost:** $4 per 1 million characters
* **One Word:** TextSpeech
* **Keywords:** Text-to-speech, natural-sounding voices

### Amazon Rekognition

* **Description:** Service for image and video analysis powered by deep learning.
* **Advantages/Benefits:** Analyze images and videos to identify objects, people, text, scenes, and activities.
* **Cost:** $1 per 1,000 images analyzed
* **One Word:** Vision
* **Keywords:** Image and video analysis, facial recognition

### Amazon SageMaker

* **Description:** Service for building, training, and deploying machine learning models.
* **Advantages/Benefits:** Build, train, and deploy machine learning models quickly.
* **Cost:** $0.046 per instance hour for ml.t3.medium notebook instance
* **One Word:** ML
* **Keywords:** Machine learning, model training, deployment

### Amazon Textract

* **Description:** Service for extracting text and data from documents.
* **Advantages/Benefits:** Automatically extract text, handwriting, and data from scanned documents.
* **Cost:** $1.50 per 1,000 pages analyzed
* **One Word:** OCR
* **Keywords:** Text extraction, document processing, OCR

### Amazon Transcribe

* **Description:** Automatic speech recognition service for converting speech to text.
* **Advantages/Benefits:** Automatic speech recognition service that makes it easy to add speech-to-text capability.
* **Cost:** $0.0004 per second
* **One Word:** SpeechText
* **Keywords:** Speech-to-text, audio transcription

### Amazon Translate

* **Description:** Neural machine translation service for translating text.
* **Advantages/Benefits:** Neural machine translation service that provides high-quality and affordable language translation.
* **Cost:** $15 per million characters
* **One Word:** Translate
* **Keywords:** Language translation, real-time translation

## Management and Governance

### AWS Auto Scaling

* **Description:** Service for automatically adjusting capacity to maintain performance and cost.
* **Advantages/Benefits:** Automatically monitors and adjusts computing resources to maintain application availability.
* **Cost:** No additional charge (pay for underlying resources)
* **One Word:** Scaling
* **Keywords:** Automatic scaling, resource management, performance

### AWS CloudFormation

* **Description:** Service for creating and managing AWS infrastructure as code.
* **Advantages/Benefits:** Easily create and manage a collection of related AWS resources, provisioning and updating them in an orderly and predictable fashion.
* **Cost:** $0.0009 per handler operation
* **One Word:** Templates
* **Keywords:** Infrastructure as code, template management

### AWS CloudTrail

* **Description:** Service for logging and monitoring AWS account activity.
* **Advantages/Benefits:** Monitor, log, and retain account activity across your AWS infrastructure.
* **Cost:** $2 per 100,000 management events
* **One Word:** Logs
* **Keywords:** API activity tracking, audit logging, security

### Amazon CloudWatch

* **Description:** Monitoring and observability service for AWS resources and applications.
* **Advantages/Benefits:** Monitoring and observability service for cloud resources and applications.
* **Cost:** $0.30 per custom metric per month
* **One Word:** Monitor
* **Keywords:** Monitoring, observability, metrics, notification when cost threshold is reached

### AWS Compute Optimizer

* **Description:** Recommends optimal AWS resources for workloads.
* **Advantages/Benefits:** Recommends optimal AWS resources for your workloads to reduce costs and improve performance.
* **Cost:** Free
* **One Word:** Optimization
* **Keywords:** Resource optimization, cost efficiency, recommendations

### AWS Config

* **Description:** Service for assessing, auditing, and evaluating configurations of AWS resources.
* **Advantages/Benefits:** Provides AWS resource inventory, configuration history, and configuration change notifications.
* **Cost:** $0.003 per configuration item recorded
* **One Word:** Config
* **Keywords:** Configuration management, compliance auditing

### AWS Control Tower

* **Description:** Service for setting up and governing multi-account AWS environments.
* **Advantages/Benefits:** Simplified way to set up and govern a secure, multi-account AWS environment based on AWS best practices.
* **Cost:** No additional charge (pay for underlying AWS services)
* **One Word:** Governance
* **Keywords:** Multi-account governance, landing zone, automation

### AWS Health Dashboard

* **Description:** Provides alerts and remediation guidance when AWS is experiencing events that may impact customers.
* **Advantages/Benefits:** Provides alerts and remediation guidance when AWS is experiencing events that may impact you.
* **Cost:** Free
* **One Word:** Health
* **Keywords:** Service health, incident tracking, notifications

### AWS Launch Wizard

* **Description:** Service for deploying popular third-party applications following best practices.
* **Advantages/Benefits:** Simplifies the deployment of third-party applications, such as Microsoft SQL Server and SAP, on AWS.
* **Cost:** No additional charge (pay for underlying AWS services)
* **One Word:** Wizard
* **Keywords:** Deployment automation, guided setup, applications

### AWS License Manager

* **Description:** Service for managing software licenses from AWS and other vendors.
* **Advantages/Benefits:** Manage software licenses from different vendors centrally across AWS and your on-premises environments.
* **Cost:** No additional charge
* **One Word:** Licenses
* **Keywords:** License management, compliance, cost optimization

### AWS Management Console

* **Description:** Web-based user interface for managing AWS resources.
* **Advantages/Benefits:** Web-based user interface for managing and interacting with AWS services.
* **Cost:** Free
* **One Word:** Console
* **Keywords:** Web-based interface, service management, cloud resources through a web interface

### AWS Organizations

* **Description:** Service for managing multiple AWS accounts.
* **Advantages/Benefits:** Centrally manage and govern your environment as you grow and scale your AWS resources.
* **Cost:** No additional charge
* **One Word:** Accounts
* **Keywords:** Multi-account management, consolidated billing, governance

### AWS Resource Groups and Tag Editor

* **Description:** Tools for organizing and identifying AWS resources using tags.
* **Advantages/Benefits:** Organize and manage your AWS resources by grouping them using tags.
* **Cost:** Free
* **One Word:** Tags
* **Keywords:** Resource grouping, tagging, management

### AWS Service Catalog

* **Description:** Service for creating and managing catalogs of IT services.
* **Advantages/Benefits:** Create and manage catalogs of IT services that are approved for use on AWS.
* **Cost:** No additional charge
* **One Word:** Catalog
* **Keywords:** Service provisioning, curated catalogs, compliance

### AWS Systems Manager

* **Description:** Service for operational data collection and resource management.
* **Advantages/Benefits:** Unified interface for managing AWS resources and applications.
* **Cost:** No additional charge (pay for underlying AWS services)
* **One Word:** Manage
* **Keywords:** Operational management, automation, monitoring

### AWS Trusted Advisor

* **Description:** Service for optimizing AWS infrastructure based on best practices.
* **Advantages/Benefits:** Provides real-time guidance to help you provision your resources following AWS best practices.
* **Cost:** Basic checks are free; full access requires Business or Enterprise support plan
* **One Word:** Advisor
* **Keywords:** Best practices, cost optimization, security, unrestricted access to specific ports

### AWS Well-Architected Tool

* **Description:** Service for reviewing workloads against best practice recommendations.
* **Advantages/Benefits:** Review and measure your architecture using AWS best practices.
* **Cost:** Free
* **One Word:** Review
* **Keywords:** Architecture review, best practices, recommendations

## Migration and Transfer

### AWS Application Discovery Service

* **Description:** Service for discovering on-premises application inventory.
* **Advantages/Benefits:** Collects and presents configuration, usage, and behavior data from your servers to help plan migration projects.
* **Cost:** $0.01 per server per hour
* **One Word:** Discovery
* **Keywords:** Application inventory, migration planning

### AWS Application Migration Service

* **Description:** Service for migrating applications to AWS.
* **Advantages/Benefits:** Simplifies and expedites server migrations to AWS.
* **Cost:** $0.028 per server per hour
* **One Word:** Migration
* **Keywords:** Lift-and-shift migration, server migration, AWS

### AWS Database Migration Service (AWS DMS)

* **Description:** Service for migrating databases to AWS.
* **Advantages/Benefits:** Migrate databases to AWS easily and securely with minimal downtime.
* **Cost:** $0.048 per replication instance hour
* **One Word:** Database
* **Keywords:** Database migration, replication, heterogeneous

### AWS Migration Hub

* **Description:** Service for tracking migration projects across AWS and partner solutions.
* **Advantages/Benefits:** Track and manage application migrations to AWS from one central location.
* **Cost:** No additional charge (pay for underlying AWS services)
* **One Word:** Hub
* **Keywords:** Migration tracking, management, dashboard

### AWS Schema Conversion Tool (AWS SCT)

* **Description:** Tool for converting database schemas to AWS database engines.
* **Advantages/Benefits:** Convert your commercial database schemas to open-source engines or AWS-native services.
* **Cost:** Free
* **One Word:** Conversion
* **Keywords:** Database schema conversion, migration, cross-platform

### AWS Snow Family

* **Description:** Services for physical data transport and edge computing.
* **Advantages/Benefits:** Physical devices to transfer large amounts of data in and out of AWS.
* **Cost:** $200 per job plus $15 per day for Snowball Edge
* **One Word:** Transfer
* **Keywords:** Data transfer, edge computing, rugged devices

### AWS Transfer Family

* **Description:** Managed file transfer services supporting SFTP, FTPS, and FTP.
* **Advantages/Benefits:** Securely transfer files directly into and out of Amazon S3 using SFTP, FTPS, and FTP.
* **Cost:** $0.30 per hour for server endpoints
* **One Word:** Transfer
* **Keywords:** Managed file transfers, FTP/SFTP, secure data exchange

## Networking and Content Delivery

### Amazon API Gateway

* **Description:** Service for creating, deploying, and managing APIs.
* **Advantages/Benefits:** Create, publish, maintain, monitor, and secure APIs at any scale.
* **Cost:** $3.50 per million API calls
* **One Word:** API
* **Keywords:** API management, REST APIs, WebSocket APIs

### Amazon CloudFront

* **Description:** Content delivery network service for fast distribution of data globally.
* **Advantages/Benefits:** Fast content delivery network (CDN) service that securely delivers data, videos, applications, and APIs.
* **Cost:** $0.085 per GB for the first 10 TB data transfer
* **One Word:** CDN
* **Keywords:** Content delivery network, low latency, edge locations

### AWS Direct Connect

* **Description:** Service for establishing dedicated network connections to AWS.
* **Advantages/Benefits:** Establish a dedicated network connection from your premises to AWS.
* **Cost:** $0.30 per port hour
* **One Word:** Connect
* **Keywords:** Dedicated network connection, high bandwidth, secure, VPC Connectivity

### PrivateLink

* **Description:** Securely access AWS services and third-party applications within your VPC without using public IPs.
* **Advantages/Benefits:** Secure, private access to AWS services
* **Cost:** Pay for data processing per GB and endpoint
* **One Word:** Private
* **Keywords:** Secure access, private endpoint, VPC, create private connection

## AWS Global Accelerator

* **Description:** Service for improving availability and performance of applications with global users.
* **Advantages/Benefits:** Improve the availability and performance of your applications with global users.
* **Cost:** $0.025 per accelerator hour
* **One Word:** Accelerator
* **Keywords:** Network optimization, low latency, traffic management

### Amazon Route 53

* **Description:** Scalable DNS and domain name registration service.
* **Advantages/Benefits:** Highly available and scalable cloud DNS web service.
* **Cost:** $0.50 per hosted zone per month
* **One Word:** DNS
* **Keywords:** DNS service, domain registration, routing

### Amazon VPC

* **Description:** Virtual network service for securely isolating AWS resources.
* **Advantages/Benefits:** Provision logically isolated sections of the AWS cloud where you can launch AWS resources in a virtual network.
* **Cost:** $0.05 per VPN connection per hour
* **One Word:** Network
* **Keywords:** Virtual network, isolated cloud resources, subnets

#### VPC Peering

* **Description:** Private network connection between two VPCs within AWS.
* **Cost:** Free for data transfer; standard VPC charges apply.
* **Advantages/Benefits:** Enables seamless communication and resource sharing between VPCs.
* **One Word:** Connectivity
* **Keywords:** Private networking, inter-VPC communication, no data transfer costs

#### VPC Endpoint

* **Description:** Enables private connectivity to AWS services without requiring an internet gateway.
* **Cost:** No additional charges for using endpoints; standard data transfer rates apply.
* **Advantages/Benefits:** Enhances security by keeping traffic within the AWS network and reduces latency.
* **One Word:** Security
* **Keywords:** Private access, AWS services integration, secure connectivity

### AWS VPN

* **Description:** Service for establishing secure connections to AWS networks.
* **Advantages/Benefits:** Securely connect your on-premises network or client devices to AWS.
* **Cost:** $0.05 per connection per hour
* **One Word:** VPN
* **Keywords:** Secure connection, remote access, site-to-site

#### Site-to-Site VPN

* **Description:** Establishes encrypted connections between on-premises networks and AWS.
* **Cost:** Usage-based pricing for data transfer and connection hours.
* **Advantages/Benefits:** Extends on-premises network securely into AWS cloud, facilitating hybrid cloud setups.
* **One Word:** Connectivity
* **Keywords:** VPN, secure connection, hybrid cloud integration

### Transit Gateway

* **Description:** Hub for connecting multiple VPCs and on-premises networks, simplifying network architecture.
* **Cost:** Hourly rate based on attachment and data processing charges.
* **Advantages/Benefits:** Centralizes network management, improves scalability, and simplifies connectivity.
* **One Word:** Scalability
* **Keywords:** Centralized network hub, VPC and on-premises integration, scalable

## Security, Identity, and Compliance

### AWS Artifact

* **Description:** Portal for accessing AWS compliance reports and agreements.
* **Advantages/Benefits:** Central resource for compliance-related information and documentation.
* **Cost:** Free
* **One Word:** Compliance
* **Keywords:** Compliance reports, agreements, audit, Security related questions that AWS receives

### AWS Audit Manager

* **Description:** Service for continuously auditing AWS usage to simplify risk assessment.
* **Advantages/Benefits:** Simplify auditing by automating the collection of evidence.
* **Cost:** $0.60 per resource per assessment
* **One Word:** Audit
* **Keywords:** Audit automation, compliance management, reporting

### AWS Certificate Manager (ACM)

* **Description:** Service for provisioning, managing, and deploying SSL/TLS certificates.
* **Advantages/Benefits:** Provision, manage, and deploy SSL/TLS certificates for use with AWS services.
* **Cost:** Free for public certificates
* **One Word:** Certificates
* **Keywords:** SSL/TLS certificates, managed renewals, security

### AWS CloudHSM

* **Description:** Hardware security module service for key management.
* **Advantages/Benefits:** Manage your own encryption keys using dedicated hardware security modules (HSMs).
* **Cost:** $1.60 per hour
* **One Word:** HSM
* **Keywords:** Hardware security module, key management, encryption

### Amazon Cognito

* **Description:** Service for adding user sign-up, sign-in, and access control to web and mobile apps.
* **Advantages/Benefits:** Add user sign-up, sign-in, and access control to your web and mobile apps quickly and easily.
* **Cost:** $0.0055 per MAU
* **One Word:** Auth
* **Keywords:** User authentication, identity management, secure sign-in

### Amazon Detective

* **Description:** Service for investigating potential security issues or suspicious activities.
* **Advantages/Benefits:** Analyze and visualize security data to rapidly get to the root cause of potential security issues.
* **Cost:** $2 per GB analyzed
* **One Word:** Investigation
* **Keywords:** Security investigations, threat analysis, root cause

### AWS Directory Service

* **Description:** Managed service for connecting AWS resources with existing on-premises directories.
* **Advantages/Benefits:** Managed Microsoft Active Directory in the AWS Cloud.
* **Cost:** $0.24 per hour for Standard Edition
* **One Word:** Directory
* **Keywords:** Managed directory, AD integration, authentication

### AWS Firewall Manager

* **Description:** Service for managing firewall rules across multiple AWS accounts.
* **Advantages/Benefits:** Centrally configure and manage firewall rules across your accounts and applications.
* **Cost:** $100 per policy per region per month
* **One Word:** Firewall
* **Keywords:** Firewall policy management, security rules, compliance

### Amazon GuardDuty

* **Description:** Threat detection service that continuously monitors for malicious activity.
* **Advantages/Benefits:** Intelligent threat detection to protect your AWS accounts and workloads.
* **Cost:** $1 per million events processed
* **One Word:** Security
* **Keywords:** Threat detection, continuous monitoring, security

### AWS Identity and Access Management (IAM)

* **Description:** Service for managing access to AWS services and resources securely.
* **Advantages/Benefits:** Securely manage access to AWS services and resources for your users.
* **Cost:** Free
* **One Word:** Identity
* **Keywords:** Access control, user permissions, security, rotating user credentials

### AWS IAM Identity Center (AWS Single Sign-On)

* **Description:** Centralized single sign-on service for AWS applications and third-party applications.
* **Advantages/Benefits:** Centralized access to multiple AWS accounts and applications using a single sign-on (SSO).
* **Cost:** Free
* **One Word:** SSO
* **Keywords:** Centralized identity, SSO, user management

### Amazon Inspector

* **Description:** Automated security assessment service for AWS applications.
* **Advantages/Benefits:** Automated security assessment service to help improve the security and compliance of applications deployed on AWS.
* **Cost:** $0.30 per instance per assessment
* **One Word:** Inspector
* **Keywords:** Security assessment, vulnerability scanning, compliance

### AWS Key Management Service (AWS KMS)

* **Description:** Managed service for creating and controlling encryption keys.
* **Advantages/Benefits:** Easily create and manage cryptographic keys and control their use across a wide range of AWS services and in your applications.
* **Cost:** $1 per key per month
* **One Word:** Keys
* **Keywords:** Encryption, key management, data protection

### Amazon Macie

* **Description:** Data security service for discovering and protecting sensitive data.
* **Advantages/Benefits:** Fully managed data security and privacy service using machine learning to discover, monitor, and protect sensitive data.
* **Cost:** $1 per GB of data processed
* **One Word:** DLP
* **Keywords:** Data security, sensitive data detection, PII

### AWS Network Firewall

* **Description:** Managed firewall service for VPCs.
* **Advantages/Benefits:** Deploy essential network protections for all your Amazon VPCs.
* **Cost:** $0.395 per hour per firewall
* **One Word:** Network
* **Keywords:** Network protection, traffic filtering, security

### AWS Resource Access Manager (AWS RAM)

* **Description:** Service for sharing AWS resources across accounts.
* **Advantages/Benefits:** Share AWS resources with other AWS accounts or within your AWS Organization.
* **Cost:** Free
* **One Word:** Access
* **Keywords:** Resource sharing, cross-account access, management

### AWS Secrets Manager

* **Description:** Service for managing secrets like database credentials and API keys.
* **Advantages/Benefits:** Protect and manage access to secrets (such as database credentials and API keys) needed to access applications, services, and IT resources.
* **Cost:** $0.40 per secret per month
* **One Word:** Secrets
* **Keywords:** Secret management, credentials, encryption, rotating user credentials

### AWS Security Hub

* **Description:** Service for managing security alerts and automating compliance checks.
* **Advantages/Benefits:** Central security service to manage security alerts and automate compliance checks.
* **Cost:** $0.0010 per compliance check
* **One Word:** Security
* **Keywords:** Security posture management, compliance, monitoring

### AWS Shield

* **Description:** Managed DDoS protection service for applications running on AWS.
* **Advantages/Benefits:** Managed DDoS protection service to safeguard web applications running on AWS.
* **Cost:** Advanced protection starts at $3,000 per month
* **One Word:** DDoS
* **Keywords:** DDoS protection, automatic mitigation, security

### AWS WAF

* **Description:** Web application firewall service for protecting applications from common web exploits.
* **Advantages/Benefits:** Protect your web applications from common web exploits and vulnerabilities.
* **Cost:** $5 per web ACL per month plus $0.60 per rule
* **One Word:** WAF
* **Keywords:** Web application firewall, protection, filtering

### Secrets Manager

* **Description:** Securely manage and automatically rotate database credentials, API keys, and other secrets.
* **Advantages/Benefits:** Automated secrets rotation, encryption, access control
* **Cost:** Pay per secret stored and per API request
* **One Word:** Secure
* **Keywords:** Secret management, credentials, encryption

### Security Group

* **Description:** Acts as a virtual firewall for controlling inbound and outbound traffic for AWS resources.
* **Advantages/Benefits:** Provides granular control over traffic to enhance security and protect AWS resources.
* **Cost:** No additional cost, included in the pricing of associated AWS resources.
* **One Word:** Firewall
* **Keywords:** Virtual firewall, inbound/outbound rules, instance-level security, traffic control, VPC, unrestricted access to specific ports.

## Serverless

### AWS Fargate

* **Description:** Serverless compute engine for containers.
* **Advantages/Benefits:** Serverless compute engine for containers that works with both Amazon ECS and Amazon EKS.
* **Cost:** $0.012453 per vCPU per hour
* **One Word:** Serverless
* **Keywords:** Serverless containers, task management, orchestration

### AWS Lambda

* **Description:** Serverless compute service for running code in response to events.
* **Advantages/Benefits:** Run code without provisioning or managing servers, paying only for the compute time consumed.
* **Cost:** $0.20 per 1 million requests
* **One Word:** Lambda
* **Keywords:** Serverless computing, event-driven, function execution

## Storage

### AWS Backup

* **Description:** Centralized backup service for AWS services and on-premises environments.
* **Advantages/Benefits:** Centralized backup service to automate and manage backups across AWS services.
* **Cost:** $0.01 per GB stored
* **One Word:** Backup
* **Keywords:** Backup management, automated, cross-service

### Amazon Elastic Block Store (Amazon EBS)

* **Description:** Block storage service for use with Amazon EC2 instances.
* **Advantages/Benefits:** Easy-to-use, high-performance block storage for use with Amazon EC2.
* **Cost:** $0.10 per GB per month for General Purpose SSD
* **One Word:** Block
* **Keywords:** Block storage, volumes, persistent storage

#### Amazon Elastic Block Store (Amazon EBS) Snapshots

* **Description:** Point-in-time backup of Amazon EBS volumes, capturing their entire state.
* **Cost:** Typically charged per GB of data stored in snapshots.
* **Advantages/Benefits:** Enables easy backup and recovery of EBS volumes, facilitates volume migration.
* **One Word:** Backup
* **Keywords:** Data protection, disaster recovery, volume migration

### Amazon Elastic File System (Amazon EFS)

* **Description:** Fully managed file storage service for EC2 instances.
* **Advantages/Benefits:** Fully managed, scalable file storage that is accessible from multiple EC2 instances.
* **Cost:** $0.30 per GB per month for Standard storage
* **One Word:** File
* **Keywords:** Scalable file storage, shared access, NFS

### AWS Elastic Disaster Recovery

* **Description:** Service for minimizing downtime and data loss with disaster recovery.
* **Advantages/Benefits:** Minimize downtime and data loss with fast, reliable recovery of physical, virtual, and cloud-based servers.
* **Cost:** $0.028 per source server per hour
* **One Word:** Recovery
* **Keywords:** Disaster recovery, failover, replication

### Amazon FSx

* **Description:** Managed file storage for Windows, Lustre, and NetApp ONTAP.
* **Advantages/Benefits:** Launch, run, and scale feature-rich and high-performance file systems with just a few clicks.
* **Cost:** $0.138 per GB per month for Windows file server
* **One Word:** FSx
* **Keywords:** Managed file systems, Windows, Lustre

### Amazon S3

* **Description:** Object storage service for storing and retrieving any amount of data.
* **Advantages/Benefits:** Scalable, durable, and secure object storage service for any amount of data.
* **Cost:** $0.023 per GB per month for Standard storage
* **One Word:** Object
* **Keywords:** Object storage, scalability, durability

### Amazon S3 Glacier

* **Description:** Low-cost storage service for data archiving and long-term backup.
* **Advantages/Benefits:** Secure, durable, and extremely low-cost cloud storage service for data archiving and long-term backup.
* **Cost:** $0.004 per GB per month
* **One Word:** Archive
* **Keywords:** Cold storage, archival, cost-effective

### AWS Storage Gateway

* **Description:** Hybrid storage service for on-premises and cloud integration.
* **Advantages/Benefits:** Hybrid cloud storage service to seamlessly integrate on-premises environments with the AWS cloud.
* **Cost:** $0.01 per GB per month
* **One Word:** Gateway
* **Keywords:** Hybrid storage, cloud integration, data transfer, hybrid architecture

# Support Plan

## Basic

* Free tier offering 24/7 access to customer service, AWS documentation, and whitepapers.
* It provides essential support resources for general account and billing questions.

## Developer

* Costs $29 per month, designed for development and testing.
* It provides best practices guidance, client-side diagnostic tools, and support for development and testing environments.

## Business

* Costs $100 per month, designed for production workloads.
* It offers 24/7 access to technical support, architectural guidance, and a full set of AWS Trusted Advisor checks.
* Operational support

## Enterprise

* Costs $15k per month, designed for mission-critical production workloads.
* It includes a dedicated Technical Account Manager (TAM), proactive support, and strategic guidance for enterprise customers.

## On-Ramp Support

* A new tier of support designed for large businesses that need a high level of support but do not need full enterprise support.
* It offers 24x7 access to Cloud Support Engineers and a full set of AWS Trusted Advisor checks.

## AWS Professional Services

* AWS Professional Services: Global team of experts to help you achieve your desired business outcomes.
* AWS Service Catalog: Create and manage catalogs of IT services approved for use on AWS.
* AWS Quick Starts: Automated reference deployments for key workloads on AWS.
* AWS Solutions Library: Pre-built solutions to common business problems.

# Teams

## AWS Team

Manages AWS services and resources through the AWS Management Console and AWS CloudFormation, and monitors these resources using Amazon CloudWatch.

## Product Team

Handles continuous integration and delivery through AWS CodePipeline, manages source code with AWS CodeBuild and AWS CodeCommit, automates code deployments with AWS CodeDeploy, and debugs and analyzes application performance with AWS X-Ray. They also manage data, logs, and static assets with Amazon S3, run code in response to events with AWS Lambda, and create, publish, maintain, monitor, and secure APIs with Amazon API Gateway.

## AWS Trust & Safety Team

Ensures continuous monitoring with Amazon GuardDuty, provides DDoS protection with AWS Shield, protects web applications from common web exploits with AWS Web Application Firewall (WAF), discovers and protects sensitive data with Amazon Macie, provides a centralized security view across AWS accounts with AWS Security Hub, and manages user access and encryption keys securely with AWS Identity and Access Management (IAM).

## Concierge Support Team

Manages AWS support cases and resources through the AWS Support Center and provides real-time guidance to help provision resources following best practices with AWS Trusted Advisor.

## Abuse Team

Reports abusive activities using AWS resources with AWS Abuse Reporting, manages and monitors security threats with AWS Security Hub, and enables governance, compliance, and operational and risk auditing of your AWS account with AWS CloudTrail.

## APN Consulting Partner & AWS Partner Network (APN)

Builds successful AWS-based businesses through the AWS Partner Network (APN), creates and manages catalogs of IT services approved for use on AWS with AWS Service Catalog, provides a digital catalog with software listings from independent software vendors with AWS Marketplace, provides resources for training and certifying AWS skills with AWS Training and Certification, and finds consulting and technology partners with AWS Partner Solutions Finder. They also provide a resource hub for APN Partners with AWS Partner Central.

# Categorization

## Snow Family

### Snowcone

* A small, portable, ruggedized device for edge computing and data transfer in challenging environments.
* Portable
* Smallest member holds 8TB of usable storage, collect process

### Snowball

* A petabyte scale data transport solution that uses secure appliances to transfer large amounts of data into and out of AWS.
* Transfer
* 80TB. Cheaper and Snowball Edge used for petabyte scale data migration and has local processing when in a remote environment - supports EC2 and lambda

### Snowmobile

* An exabyte scale data transfer service that uses a secure, ruggedized shipping container to transfer large amounts of data to AWS.
* Extrabyte
* 100PB. Multi-perabyte or exabyte scale. Data loaded to S3 - securely transported with escort vehicle.

## AWS Storage Class

### Standard

* General purpose storage for frequently accessed data.
* General
* Durable 11-9s. 4-9s available.
* The default storage class for frequently accessed data in Amazon S3.
* Frequent access, high durability, high availability
* Offers high durability, availability, and performance for frequently accessed data.
* To store data that requires immediate access and high durability.

### Infrequent Access

* For Long-Lived, Infrequently Accessed, Millisecond access when needed. Durable with 3 9s availability.
* Intelligent Tiering
* Automatically moves data between two access tiers based on changing access patterns.
* Automated
* Unknown or changing access. Standard durability with 3-9s availability
* A storage class that automatically moves data to the most cost-effective access tier based on changing access patterns.
* Cost-effective, automatic tiering, data management
* Optimizes storage costs by automatically moving data between access tiers based on usage.
* To reduce storage costs by dynamically adjusting data placement according to access patterns.

### Standard IA

* Storage for infrequently accessed data that requires rapid access when needed.
* Infrequent
* A storage class for data that is accessed less frequently but requires rapid access when needed.
* Infrequent access, lower cost, rapid retrieval
* Reduces storage costs for infrequently accessed data while maintaining quick retrieval times.
* To store data that is accessed less frequently but still requires high durability and availability.

### OneZone IA

* Low cost storage for infrequently accessed data stored in a single AWS Availability Zone.
* Low-Cost
* Cost 20% less than IA. Use if data is recreatable, infrequent millisecond access, availability is 99.5%.
* A lower-cost storage class for infrequently accessed data stored in a single availability zone.
* Single AZ, infrequent access, lower cost
* Offers cost savings for infrequently accessed data that does not require multiple availability zone redundancy.
* To store infrequently accessed data at lower cost with single availability zone storage.

### Glacier

* Low cost storage for data archival and long term backup with retrieval times ranging from minutes to hours.
* Archive
* Data retrieval options 1-5 minutes, 3-5 hours, 5-12 hours. Multiple AZs. Standard durability. Cheap storage options
* A low-cost storage service for data archiving and long-term backup.
* Archival storage, low cost, long-term backup
* Provides extremely low-cost storage for long-term data archiving.
* To archive infrequently accessed data at a very low cost.

### Glacier Deep Archive

* Lowest cost storage for long term data retention and compliance, with retrieval times ranging from hours to days.
* Deep
* 12hrs or 48hr retrieval options. Cheapest. Long-term data archivale accessed once or twice a year. No availability - but standard durability.
* The lowest-cost storage class for long-term data archiving that is rarely accessed.
* Deep archive, lowest cost, long-term storage
* Offers the lowest storage cost for data that is rarely accessed and can tolerate longer retrieval times.
* To store long-term archival data at the lowest possible cost.

### Amazon S3 Glacier Vault Lock

* A feature that allows you to easily deploy and enforce compliance controls for individual S3 Glacier vaults with a vault lock policy.
* Compliance, data immutability, vault lock
* Ensures data is immutable and meets compliance requirements with vault lock policies.
* To enforce compliance controls and protect archived data from accidental or malicious deletions.

## AWS S3 Buckets

* Root level 'folders' for file storage
* A container for storing objects in Amazon S3, each with a unique key.
* Data container, object storage, unique key
* Organizes and manages data storage within Amazon S3.
* To provide a scalable container for storing and organizing data objects in Amazon S3.

### S3 Object

* The fundamental entity stored in an S3 bucket, consisting of data and metadata.
* Data entity, object storage, metadata
* Stores individual pieces of data with associated metadata for easy retrieval and management.
* To encapsulate data and metadata for storage and retrieval in Amazon S3.

### Object Durability

### Object Availability

### Object Lifecycle

#### S3 Lifecycle Management

* A feature that automates the transition of objects between different S3 storage classes based on predefined rules.
* Data lifecycle, automated transitions, cost management
* Optimizes storage costs by automatically transitioning data to appropriate storage classes.
* To manage data lifecycle and reduce costs by automating data transitions between storage classes.

#### S3 Object Lifecycle Management

* Similar to S3 Lifecycle Management, it provides fine-grained control over the lifecycle of individual objects in S3.
* Fine-grained lifecycle management, data transitions, cost optimization
* Provides detailed control over the lifecycle policies of individual objects, enhancing data management and cost efficiency.
* To enable detailed lifecycle management for individual S3 objects, optimizing storage costs and data organization.

### Object sharing

### Object versioning

* A feature that keeps multiple versions of an object in an S3 bucket.
* Version control, data protection, object storage
* Protects against accidental deletions and overwrites by maintaining previous versions of objects.
* To enable data protection and recovery by storing multiple versions of objects.

### S3 Replication

* A feature that automatically replicates objects across S3 buckets in different AWS regions.
* Cross-region replication, data redundancy, disaster recovery
* Enhances data durability and availability by replicating objects across regions.
* To improve data redundancy and enable disaster recovery by replicating data across multiple regions.

## AWS RDS Types

### MySQL

* A popular opensource relational database management system.
* Open Source
* RDS offering fully managed MySQL databases.
* MySQL, managed service, relational database
* Simplifies MySQL database management with automated tasks and scalability.
* To provide a scalable and managed MySQL database for applications requiring relational data storage.

### PostgreSQL

* An opensource objectrelational database system known for its reliability and robust feature set.
* Object Relational

### MariaDB

* An opensource fork of MySQL, designed for compatibility and performance improvements.
* Compatibility

### Oracle

* A commercial relational database management system known for its scalability and enterprise features.
* Scalability
* RDS offering fully managed Oracle databases.
* Oracle, managed service, relational database
* Provides automated management of Oracle databases, ensuring high availability and scalability.
* To offer a fully managed Oracle database solution for enterprise applications.

### SQL Server

* A Microsoft developed relational database management system widely used in enterprise applications.
* Enterprise

### RDS Multi AZ

* RDS deployment option that provides high availability and failover support by automatically replicating data across multiple Availability Zones.
* High availability, failover, multi-AZ
* Ensures database availability and durability in case of an Availability Zone failure.
* To provide a resilient and highly available database environment for critical applications.

### Read Replicas in RDS

* RDS feature that creates read-only copies of your database for improved read performance and scalability.
* Read replicas, scalability, performance
* Enhances read-heavy workloads by distributing read traffic across multiple replicas.
* To improve the performance and scalability of read operations for RDS databases.

## AWS EC2 Instances Types

### On-Demand Instance

* **Description:** Pay-as-you-go pricing without long-term commitments.
* **Cost:** Pay for compute capacity by the hour or second with no long-term commitments.
* **Advantages:** Flexibility to scale up or down according to your application's needs without upfront costs.
* **One Word:** Flexibility
* **Key Words:** EC2 with lowest cost

### Spot Instance

* **Description:** Flexible pricing based on unused EC2 capacity, allowing for significant cost savings.
* **Cost:** Up to 90% discount compared to On-Demand pricing, with variable availability and potential interruption.
* **Advantages:** Cost savings for fault-tolerant, flexible applications that can handle interruptions.
* **One Word:** Cost-effective
* **Keywords:** Cost-effective, Variable

### Reserved Instance

* **Description:** Reserved capacity for a lower hourly rate with upfront payment.
* **Cost:** Significant discount (up to 75%) compared to On-Demand pricing, with a one- or three-year commitment.
* **Advantages:** Cost savings for applications with steady-state or predictable usage.
* **One Word:** Commitment
* **Keywords:** Savings, Commitment

### Upfront Reserved Instance

* **Description:** Reserved Instance paid entirely upfront for maximum savings.
* **Cost:** Upfront payment, maximizing savings over term.
* **Advantages/Benefits:** Highest discount rate among Reserved Instance payment options.
* Keyword: Maximize savings, Upfront payment, Discount, Commitment.

### Partial Upfront Reserved Instance

* **Description:** Reserved Instance with partial upfront payment, reducing hourly rate.
* **Cost:** Partial upfront payment, balanced cost savings.
* **Advantages/Benefits:** Balances upfront cost with hourly rate reduction, moderate savings.
* Keyword: Balance, Partial payment, Moderate savings, Commitment.

### Standard Reserved Instance

* **Description:** Traditional Reserved Instance with specific instance commitment.
* **Cost:** Instance configuration commitment, steady-state cost savings.
* **Advantages/Benefits:** Cost savings for predictable, steady-state workloads.
* Keyword: Predictable usage, Specific instance type, Cost-effective.

### Convertible Reserved Instance

* **Description:** Reserved Instance with flexibility to modify instance attributes.
* **Cost:** Flexible instance attribute changes, potential higher discounts.
* **Advantages/Benefits:** Offers flexibility with Reserved Instance pricing benefits.
* Keyword: Flexibility, Modify attributes, Higher discounts.

### Savings Plan

* **Description:** Flexible pricing model offering savings on AWS usage.
* **Cost:** Savings up to 72% off On-Demand prices.
* **Advantages/Benefits:** Flexible commitment across multiple services and regions.
* Keyword: Flexible pricing, Commitment, Savings, Usage commitment.

## IAM Types

### IAM Users

* **Description:** Individuals or applications with specific AWS resource access.
* **Cost:** Free; part of AWS IAM service.
* **Advantages/Benefits:** Granular control over permissions and credentials.
* **One Word:** Identity
* **Keywords:** Access, Permissions, Security, Management

### IAM Groups

* **Description:** Collections of users with shared permissions.
* **Cost:** Free; part of AWS IAM service.
* **Advantages/Benefits:** Simplifies management through centralized permissions.
* **One Word:** Grouping
* **Keywords:** Permissions Management, Efficiency, Access Control

### IAM Roles

* **Description:** Temporary access permissions assigned to users or services.
* **Cost:** Free; part of AWS IAM service.
* **Advantages/Benefits:** Enhances security by reducing long-term credential exposure.
* **One Word:** Temporary
* **Keywords:** Secure Access, Trust Relationships, Least Privilege

### IAM Policies

* **Description:** JSON documents defining permissions for IAM identities.
* **Cost:** Free; part of AWS IAM service.
* **Advantages/Benefits:** Allows precise control and enforcement of access rules.
* **One Word:** Control
* **Keywords:** Access Management, Policy Enforcement, Security

## AWS Network Policies Type

### Simple Routing Policy

* Route 53 routing policy that routes traffic to a single resource.
* Simple routing, single resource, DNS traffic
* Provides straightforward DNS routing to a single endpoint.
* To enable basic DNS routing for directing traffic to a single resource without complex configurations.

### Failover Routing Policy

* Route 53 routing policy that directs traffic to a primary resource unless it becomes unavailable, then redirects to a secondary resource.
* Failover routing, high availability, primary-secondary
* Enhances availability by automatically redirecting traffic to a secondary resource if the primary fails.
* To ensure high availability and resilience by providing automatic failover routing for critical applications.

### Latency Routing Policy

* Route 53 routing policy that routes traffic to the resource with the lowest latency.
* Latency-based routing, DNS traffic, performance optimization
* Optimizes user experience by routing traffic to the lowest-latency endpoint.
* To improve application performance by directing users to the fastest available resource based on latency.

### Weighted Routing Policy

* Route 53 routing policy that routes traffic based on specified weights, distributing traffic across multiple resources.
* Weighted routing, traffic distribution, DNS management
* Allows for controlled distribution of traffic across multiple endpoints.
* To enable traffic balancing and testing of new deployments by distributing DNS traffic according to predefined weights.

# Others

* Enables encryption: Encryption SDK, Database Encryption SDK
* Combination of VPC Connectivity: [Direct Connect + Transit Gateway], [Transit Gateway + Site-to-Site VPN]