

AWS Certified Cloud Practitioner (CLF-C01)

▼ Foundations of Cloud Computing

▼ Understanding Cloud Computing

[aws-overview.pdf](#)

Exam Tips

- EC2 and Lambda are compute services.

▼ Exploring the Advantages of Cloud Computing

Big of 6

- Go global in minutes
 - You can deploy your applications around the world at the click of a button.
- Stop spending money running and maintaining data centers
 - You can focus on building your applications instead of managing hardware
- Benefit from massive economies of scale
 - Volume discounts are passed on to you, which provides lower pay-as-you-go prices.
- Increase speed and agility
 - The provided services allow you to innovate more quickly and deliver your applications faster.
- Stop guessing capacity

- Your capacity is matched exactly for you demand.
- Trade capital expense for variable expense
 - You pay for what you use instead of making huge upfront investments.

Other Benefits

- High Availability
 - Highly available systems are designed to operate continuously without failure for a long time. These systems avoid loss of service by reducing or managing failures.
- Elasticity
 - With elasticity, you don't have to plan ahead of time how much capacity you need. You can provision only what you need, and then grow and shrink based on demand.
- Agility
 - The cloud gives you increased agility. All the services to help you innovate faster, giving you speed to market.
- Durability
 - Durability is all about long-term data protection. This means your data will remain intact without corruption.

CapEx vs OpEx

- Capital Expenditures (CapEx):
 - CapEx are upfront purchases toward fixed assets.
- Operating Expenses (OpEx):
 - Operating expenses are funds used to run day-to-day operations.

Exam Tips

- Understand the 6 advantages
- Understand the cloud terminology

- High availability, elasticity, agility, and durability.

▼ Reviewing Cloud Computing and Deployment Models

Cloud Computing Models

- **Infrastructure as a Service (IaaS):**
 - Building Blocks: Fundamental building blocks that can be rented.
 - Web Hosting: Monthly subscription to have, a hosting company serve your website.
- **Software as a Service (SaaS):**
 - Complete Application: Using a complete application, on demand that someone offers to users.
 - Email Provider: Your personal email that you access through a web browser is SaaS.
- **Platform as a Service (PaaS):**
 - Used by Developers: Develop software using web-based tools without worrying about the underlying infrastructure.
 - Storefront Website: Tools provided to build a storefront application that runs on another company servers.

Cloud Deployment Models

- **Private Cloud:**
 - “On-premises”
 - Exists in your internal data centers
 - Doesn’t offer the advantages of cloud computing
- **Public Cloud:**
 - You aren’t responsible for the physical hardware
 - Provides all the advantages of cloud computing

- Hybrid Cloud:
 - Highly sensitive data stored locally
 - Web application runs on AWS
 - AWS provides tools so they talk to each other

Exam Tips

- Know the computing models
- Know the deployment models

▼ Leveraging the AWS Global Infrastructure

Regions

- A Region is a **physical location**
- AWS logically groups its Regions into **geographic locations**
- Region Characteristics:
 - Fully independent and Isolated: if one region is impacted, the others will not be.
 - Resource and Service Specific: Regions are isolated, and resources aren't automatically replicated across them

Availability Zones

- Availability Zones (AZs) consist of one or more physically separated data centers, each with redundant power, networking, and connectivity, housed in separate facilities.
- Characteristics of AZs
 - Physically separated
 - Connected through low-latency links
 - Fault tolerant
 - Allows for high availability

Review

- **Region:** A Region is a physical host in the real world that contains AZs
 - A region is a collection of AZs
 - You should set up resources in Regions closest your users
 - Most resources are tied a specific Region
- **AZ:** An AZ is a collection of one or more data centers
 - An AZ contains the servers you are renting, and its where you deploy your applications
 - An AZ is associated with a single Region
- **Edge Location:** An edge location is used to cache content for speedy delivery.
 - Content delivery network (CDN) and Amazon CloudFront
 - Reduced latency
 - An edge location is like a mini data center, but it doesn't run your main infrastructure like EC2 instances.

▼ Exploring Your Amazon Web Services (AWS) Account

Review

- **Root User:**
 - The root user is automatically created when you open your account
- **The Console:**
 - The console allows access via a web browser.
- **The CLI:**
 - The CLI is a form of programmatic access from a command or terminal window.

▼ Technology

▼ Exploring Compute Services: EC2

Review

- **EC2 Instance:**
 - EC2 allows you to rent and manage virtual servers in the cloud AWS virtual servers are called **instances**.
- **Connectivity:** There are multiple ways to log in to your EC2 instance.
 - AWS Management Console
 - SecureShell (SSH)
 - EC2 Instance Connect
 - AWS Systems Manager
- **Pricing Options:**
 - On-Demand
 - Spot
 - Reserved Instances
 - Dedicated Hosts
 - Saving Plans
- **Features:**
 - **Elastic Load Balancing:** automatically distributes your incoming application traffic across multiple EC2 instances.
 - **EC2 Auto Scaling:** adds or replace EC2 instances automatically across AZs, based on need and changing demand.

▼ Exploring Compute Services: Lambda

Review

- **Lambda:**
 - Lambda is a serverless compute service that lets you run code without managing servers

- **Features:**
 - **Language Support:** Supports popular programming languages.
 - **Author Code:** You author code using your favorite development environment or via the console.

▼ Exploring Compute Services: Additional Compute Services

Review

- **Fargate:**
 - Fargate is a serverless compute engine for containers
- **Lightsail:**
 - Lightsail allows you to quickly launch all the resources you need for small projects
- **Outposts:**
 - Outposts allows to run cloud services in your internal data center
- **Batch:**
 - Batch allows you to process large workload in smaller chunks (batches).

▼ Leveraging Storage Services: S3

Review

- **S3:**
 - S3 is an object storage service with several classes.
 - S3 Standard
 - S3 Intelligent-Tiering
 - S3 Standard-Infrequent Access (IA)
 - S3 One Zone-Infrequent Access (IA)
 - S3 Glacier

- S3 Glacier Deep Archive
- S3 Outposts

▼ Leveraging Storage Services: S3 in Action

Review

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▼ Leveraging Storage Services: Additional Storage Services

Review

- EC2 Storage
 - Elastic Block Store (EBS)
 - Instance Store
 - Instance store volumes are ephemeral or temporary.
 - Elastic File System (EFS)
 - EFS only support Linux file systems. (Like Dropbox or Google Drive)
- Storage Gateway
 - Storage Gateway is a hybrid storage service that connects on-premises and cloud data.
 - Storage Gateway supports hybrid models.
- AWS Backup
 - AWS Backup help you manage data backups across multiple AWS services.

▼ Understanding Content Delivery Services

Review

- CloudFront
 - CloudFront is a CDN that delivers data and applications globally with low latency.
 - CloudFront allows for global distribution of content.
 - CloudFront has security features like DDoS protection and geo-restriction.
- Global Accelerator
 - Global Accelerator sends your users through the AWS global network when accessing your content, speeding up delivery.
 - Global Accelerator provides low latency
- S3 Transfer Acceleration
 - S3 Transfer Acceleration improves content uploads and downloads to from S3 buckets.
 - S3 Transfer Acceleration provides fast transfer of files over long distances.

▼ Understanding Networking Services: VPC and Subcomponents

Review

- VPC and Subcomponents
 - VPC is a foundational service that allows you to create a secure private network in the AWS cloud where you launch your resources.
 - Internet gateway allows traffic to the public internet and peering connects 2 VPCs together.

▼ Understanding Networking Services: Additional Networking Services

Review

- Route 53

- (The name for our service (Route 53) comes from the fact that **DNS servers respond to queries on port 53 and provide answers that route end users to your applications on the Internet.**)
- Route 53 is a DNS service that routes users to applications.
 - Route 53 performs health checks on AWS resources and supports a hybrid model.
- Direct Connect
 - Direct connect is a dedicated physical network connection from your on-premises data center to AWS.
 - Direct Connect supports a hybrid model.
- Site-to-Site VPN
 - Site-to-Site VPN creates a secure connection between your internal networks and your AWS VPCs.
 - Site-to-Site VPN supports a hybrid model. Review components such as virtual private gateway and customer gateway.
- API Gateway
 - API Gateway allows you to build and manage APIs.

▼ Utilizing Databases

Review

- RDS
 - RDS is a service that makes it easy to launch and manage relational databases.
 - RDS is only for relational databases. Don't forget the supported database engines: Amazon Aurora, PostgreSQL, MySQL, MariaDB, Oracle Database, and SQL Server.
- Aurora
 - Aurora is a relational database compatible with MySQL and PostgreSQL that was created by AWS.

- Aurora only supports PostgreSQL and MySQL.
- DynamoDB
 - DynamoDB is fully managed NoSQL key-value and document database.
 - DynamoDB is a NoSQL database.
- Neptune
 - Neptune is a fully managed graph database that supports highly connected datasets.
 - Neptune helps you create social media graphs.
- ElastiCache
 - ElastiCache is a fully managed in-memory datastore compatible with Redis or Memcached.
 - ElastiCache is an in-memory datastore.
- DocumentDB
 - DocumentDC is a fully managed document database that supports MongoDB.
 - DocumentDB supports MongoDB.

▼ Exploring Migration and Transfer Services

Review

- DMS
 - DMS helps you to migrate databases to or within AWS.
- SMS
 - SMS allows you to migrate on-premises servers to AWS.
- Snow Family
 - The Snow Family allows you to transfer large amounts of on-premises data to AWS using a physical device.
 - Snowball Edge: Services natively supported Snowball Edge, like EC2 and Lambda.

- Snowball: Snowball transfer petabytes of data and is cheaper than transferring over the internet.
- Snowmobile: Snowmobile is the largest member of the transport family and supports exabyte-scale data.
- DataSync
 - DataSync allows for online data transfer from on-premises to AWS storage services like S3 or EFS.
 - DataSync transfer data online and can be used to replicate data cross-Region or cross-account.

▼ Leveraging Analytics Services

Review

- Redshift
 - Redshift is scalable data warehouse solution.
- Athena
 - Athena is a query service for Amazon S3
- Glue
 - Glue prepares your data for analytics.
- Kinesis
 - Kinesis allows you to analyze data and video streams in real time.
- EMR
 - EMR helps you process large amounts of data.
- Data Pipeline
 - Data Pipeline helps you move data between compute and storage services running either on AWS or on-premises.
- QuickSight
 - QuickSight helps you visualize data using dashboards.

▼ Leveraging Machine Learning Services

Review

- Rekognition
 - Rekognition allows you to automate your image and video analysis.
 - Rekognition processes videos and images.
- Comprehend
 - Comprehend is a natural-language processing (NLP) service that finds relationships in text.
 - Comprehend is used for natural language processing (NLP).
- Polly
 - Polly turns text into speech.
- SageMaker
 - SageMaker helps you build, train, and deploy machine learning models quickly.
- Translate
 - Translate provides language translation.
- Lex
 - Lex helps you build conversational interfaces like chat bots.

▼ Understanding Developer Tools

Review

- Cloud9
 - Cloud9 allows you to write code within an integrated development environment (IDE) from within your web browser.
 - Cloud9 offers an integrated development environment (IDE) that runs inside a web browser.
- CodeCommit

- CodeCommit is a source control system for private Git repositories.
 - CodeCommit offers a service similar to GitHub that works with Git repositories.
- CodeBuild
 - CodeBuild allows you to build and test your application source code.
- CodeDeploy
 - CodeDeploy manages the deployment of code to compute services in the cloud or on-premises.
 - CodeDeploy allows you to deploy an application to servers running on-premises and in the cloud.
- CodePipeline
 - CodePipeline automates the software release process.
 - CodePipeline allows you to implement a CI/CD pipeline.
- X-Ray
 - X-Ray helps you debug production applications.
- CodeStar
 - **CodeStar** helps developers **collaboratively** work on development projects.

▼ Exploring Deployment and Infrastructure Management Services

Review

- CloudFormation
 - CloudFormation allows you to provision AWS resources using Infrastructure as Code (IaC).
 - CloudFormation supports infrastructure automation using Infrastructure as Code (IaC).
- Elastic Beanstalk

- Elastic Beanstalk allows you to deploy web applications and web services to AWS
 - Elastic Beanstalk is only used to deploy applications to the AWS Cloud — it is not used to deploy applications on-premises.
- OpsWorks
 - OpsWorks allows you to use **Chef** or **Puppet** to automate the configuration of your servers and deploy code.
 - OpsWorks can deploy applications on-premises, and it also automates infrastructure management using Chef or Puppet.

▼ Utilizing Messaging and Integration Services: SQS

Review

- Simple Queue Service (SQS)
 - SQS is a message queuing service that allows you to build loosely coupled systems.
 - Messages in queues are processed in FIFO order.
 - Message queues support loose coupling.

▼ Utilizing Messaging and Integration Services: SNS and SES

Review

- Simple Notification Service (SNS)
 - SNS allows you to send emails and text messages from your applications.
 - SNS sends text messages and plain text emails.
- Simple Email Service (SES)
 - SES is an email service that allows you to send richly formatted HTML emails from your application.
 - SES send HTML-formatted emails for marketing campaigns.

▼ Exploring Auditing, Monitoring, and Logging Services

Review

- CloudWatch
 - CloudWatch is a collection of services that help you monitor and observe your cloud resources.
 - CloudWatch Alarms, CloudWatch Logs, CloudWatch Metrics, CloudWatch Events
 - CloudWatch monitor your EC2 instances and notify you when certain events occur.
- CloudTrail
 - CloudTrail tracks user activity and API calls within your account.
 - CloudTrail can track; username, event time and name, IP address, access key , Region, and error code.
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▼ Exploring Additional Services

Review

- Amazon WorkSpaces
 - Amazon WorkSpaces allow you to host virtual desktops in the cloud.
 - WorkSpaces allows you to virtualize desktops.
- Amazon Connect
 - Amazon Connect is a cloud contact center service.
 - Connect allows you to build a help desk in the cloud.

▼ Section Review

Compute

- EC2
 - EC2 allows you to rent and manage virtual servers in the cloud.
- Lambda
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- Fargate
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- Outposts
 - Outposts allows you to run cloud services in your Internal data center.
- Batch
 - Batch allows you to process large workloads in smaller chunks (or batches).

Storage

- S3
 - S3 is a object storage service for the cloud that is highly available.
- EBS
 - EBS is a storage service (called volume) that can be attached to (or removed from) your instance.
- EFS
 - EFS is a serverless network file system for sharing files.
- Storage Gateway
 - Storage Gateway is a hybrid storage service.
- Backup

- Backup helps you manage data backups across multiple data services.

Content Delivery

- CloudFront
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▼ Security and Compliance

▼ Section Introduction

- Shared Responsibility Model
- Well-Architected Framework
- Security

- Encryption
- Secrets Management

▼ Understanding the Shared Responsibility Model

Review

- Shared Responsibility Model
 - In the public cloud, there is a shared security responsibility between you and AWS.
 - AWS' responsibility; Security **of** the Cloud.
 - Your responsibility; Security **in** the Cloud.

▼ Leveraging the Well-Architected Framework

Review

- Well-Architected Framework
 - The 6 pillars of the Well-Architected Framework describe design principles and best practices for running workloads in the cloud.
 - Operational Excellence
 - Security
 - Reliability
 - Performance Efficiency
 - Cost Optimization
 - Sustainability

▼ Understanding IAM Users

Review

- IAM
 - IAM allows you to control access to your AWS services and resources.
- Users

- Users are entities you create in IAM to represent the person or application needing to access AWS resources.
- Groups
 - A group is a collection of IAM users that helps you apply common access controls to all group members.

▼ Understanding IAM Permissions

Review

- Roles
 - Roles define access permissions and temporarily assumed by an IAM user or service.
- Policies
 - You manage permissions for IAM users, groups, and roles by creating a policy document in JSON format and attaching it.
- IAM Credential Report
 - The IAM credential report lists all users in your account and the status of their various credentials.

▼ Exploring Application Security Services

Review

- WAF
 - WAF helps your web applications against common web attacks.
 - WAF protects against SQL injection and cross-site scripting attacks.
- Shield
 - Shield is a managed Distributed Denial of Service (DDoS) protection service.
 - Shield provides DDoS protection and works with CloudFront, Route53, Elastic Load Balancing, and AWS Global Accelerator.
- Macie

- Macie helps you discover and protect sensitive data.

▼ Exploring Additional Security Services

Review

- Config
 - Config allows you to assess, audit, and evaluate the configurations of your resources.
 - Config allows you to identify changes to various resources over time.
- GuardDuty
 - GuardDuty is an intelligent threat detection system that uncovers unauthorized behavior.
 - GuardDuty identifies malicious or unauthorized activities in your AWS account.
- Inspector
 - Inspector works with EC2 instances to uncover and report vulnerabilities.
 - Inspector only works for EC2 instances.
- Artifact
 - Artifact offers on-demand access to AWS security and compliance reports.
 - Artifact provides you with compliance reports.
- Cognito
 - Cognito helps you control access to mobile and web applications.

▼ Utilizing Data Encryption and Secrets Management Services

Review

- Key Management Service (KMS)
 - KMS allows you generate and store encryption keys.

- AWS manages KMS keys.
- CloudHSM
 - CloudHSM is a hardware security module (HSM) used to generate encryption keys.
 - You manage the keys generated with CloudHSM.
- Secret Manager
 - Secret Manager allows you to manage and retrieve secrets (passwords or keys).
 - Secret Manager has built-in integration for RDS, Redshift, and DocumentDB.

▼ Section Review

Shared Responsibility Model

- The shared responsibility model outlines your responsibilities vs. AWS' when it comes to security and compliance.

Well-Architected Framework

- The well-architected framework describes design principles and best practice for running workloads in the cloud.

Security

- Identity and Access Management (IAM)
 - IAM allows you to control access to your AWS services and resources.
- Web Application Firewall (WAF)
 - WAF helps protect your web applications against common web attacks.
- Shield
 - Shield is a managed Distributed Denial of Service (DDoS) protection service.
- Macie

- Macie helps you discover and protect sensitive data.
- Config
 - Config allows you to assess, audit, and evaluate the configurations of your resources.
- GuardDuty
 - GuardDuty is an intelligent threat detection system that uncovers unauthorized behavior.
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Encryption

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 - CloudHSM is a hardware security module (HSM) used to generate encryption keys.

Secrets Management

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▼ Pricing, Billing, and Governance

▼ Section Introduction

Pricing

- Application Discovery Service

Billing

- Budgets
- Cost and Usage Reports
- Cost Explorer

Management and Governance

- Organizations
- Control Tower
- System Manager
- Marketplace
- AWS Partner Network (APN)
- Managed Services
- Professional Services
- AWS License Manager
- AWS Certificate Manager

Support Plans

- Basic
- Developer
- Business
- Enterprise

▼ Understanding AWS Pricing

Review

- Pricing

- There are 3 fundamental drivers of cost; Compute, Storage, and Outbound Data Transfer.
 - S3, EC2, Lambda, RDS
- Total Cost of Ownership (TCO)
 - TCO is a financial estimate that helps you understand both the direct and indirect costs of AWS.
- Pricing Calculator
 - The Pricing Calculator provides an estimate of AWS fees and charges.
 - Pricing Calculator helps you to calculate the TCO
- Price List API
 - The Price List API allows you to query the price of AWS services.
 - Price List API is one way to determine the cost of services.

▼ Understanding Billing Services

Review

- Budgets
 - Budgets allows you to set custom budgets that alert you when your costs or usage exceed your budgeted amount.
 - Alerted when your usage exceeds a defined threshold using Budgets.
- Cost and Usage Report
 - The Cost and Usage report contains the most comprehensive set of cost and usage data.
 - Cost and Usage Report provides the most detailed set of AWS cost and usage data available.
- Cost Explorer
 - Cost Explorer allows you to visualize and forecast your costs and usage over time.

- Cost Explorer help you visualize and forecast spending.
- Cost Allocation Tags
 - Tags are useful for tracking spend.

▼ Exploring Governance Services

Review

- Organizations
 - Organizations allows you to centrally manage multiple AWS accounts under one umbrella.
 - Organizations saves you money through consolidated billing.
- Control Tower
 - Control Tower helps you ensure your accounts conform to company-wide policy.
 - Control Tower helps you enforce best use of services across your organization.
- Systems Manager
 - System Manager gives you visibility and control over your AWS resources.
 - Automation, Maintenance Windows, Patch Manager.
 - System Manager helps you maintain your resources through automatic patching and updates.
- Trusted Advisor
 - Trusted Advisor provided real-time guidance to help you provision your resources following AWS best practices.
- License Manager
 - License Manager helps you manage software licenses.
 - License Manager helps you manage on-premises or AWS-based Oracle licenses.

- Certificate Manager
 - Certificate Manager helps you provision and manage SSL/TLS certificates.
 - Certificate Manager provides free public certificates.

▼ Utilizing Management Services

Review

- Managed Services
 - Managed Services helps you efficiently operate your AWS infrastructure.
 - Managed Services augments your staff and helps improve your overall operational efficiency.
- Professional Services
 - Professional services helps enterprise customers move to cloud-based operating model.
 - Professional Services can help you migrate from on-promises to the cloud.
- AWS Partner Network (APN)
 - APN is a global community of approved partners that offer software solutions and consulting services for AWS.
- Marketplace
 - Marketplace is a digital catalog of prebuilt solutions you can purchase or license. You may also sell your own solutions to others via Marketplace.
 - AWS recognizes partners and providers from these networks.
- Personal Health Dashboard
 - Personal Health Dashboard alerts you to events that might impact your AWS environment.
 - Personal Health Dashboard provides tailored advice.

▼ Exploring Support Plans

Review

- Basic Support Plans
 - Basic Support is included for free all AWS accounts.
 - Open tickets and the types of tickets you are allowed to open.
- Developer Support Plan
 - Developer Support start at \$29 a month and is recommended for testing and development.
 - Open tickets and the types of tickets you are allowed to open.
- Business Support Plan
 - Business Support starts at \$100 a month and is recommended for production workloads.
 - Open tickets and the types of tickets you are allowed to open.
 - This support plan includes the full set of Trusted Advisor checks.
- Enterprise Support Plan
 - Enterprise Support starts at \$15,000 a month and is recommended for business or mission-critical production workloads.
 - Open tickets and the types of tickets you are allowed to open.
 - This support plan includes the full set of Trusted Advisor checks.
 - This support plan provides access to a Technical Account Manager (TAM) and the Concierge Support Team.

▼ Section Review

Pricing

- Application Discovery Service
 - Application Discovery Service helps you plan migration projects to the AWS cloud.

Billing

- Budgets
 - Budgets allows you to set custom budgets that alert you when your costs or usage exceed your budgeted amount.
- Cost and Usage Reports
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- Cost Explorer
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Management and Governance

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 - Organizations allows you to centrally manage multiple AWS accounts under one umbrella.
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 - Control Tower helps you ensure your accounts conform to company-wide policies.
- System Manager
 - System Manager gives you visibility into and control over you AWS resources.
- Trusted Advisor
 - Trusted Advisor provides real-time guidance to help you provision your resources following AWS best practices.
- Marketplace
 - Marketplace is a digital catalog of prebuilt solutions you can purchase or license. You may also sell your own solutions to others via Marketplace.
- Personal Health Dashboard

- Personal Health Dashboard alerts you to events that might impact your AWS environment.

Support Plans

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