AWS Academy Cloud Foundations
Course Introduction Student Guide
Version 2.0.14

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Contents

Course Introduction

AWS Academy Cloud Foundations
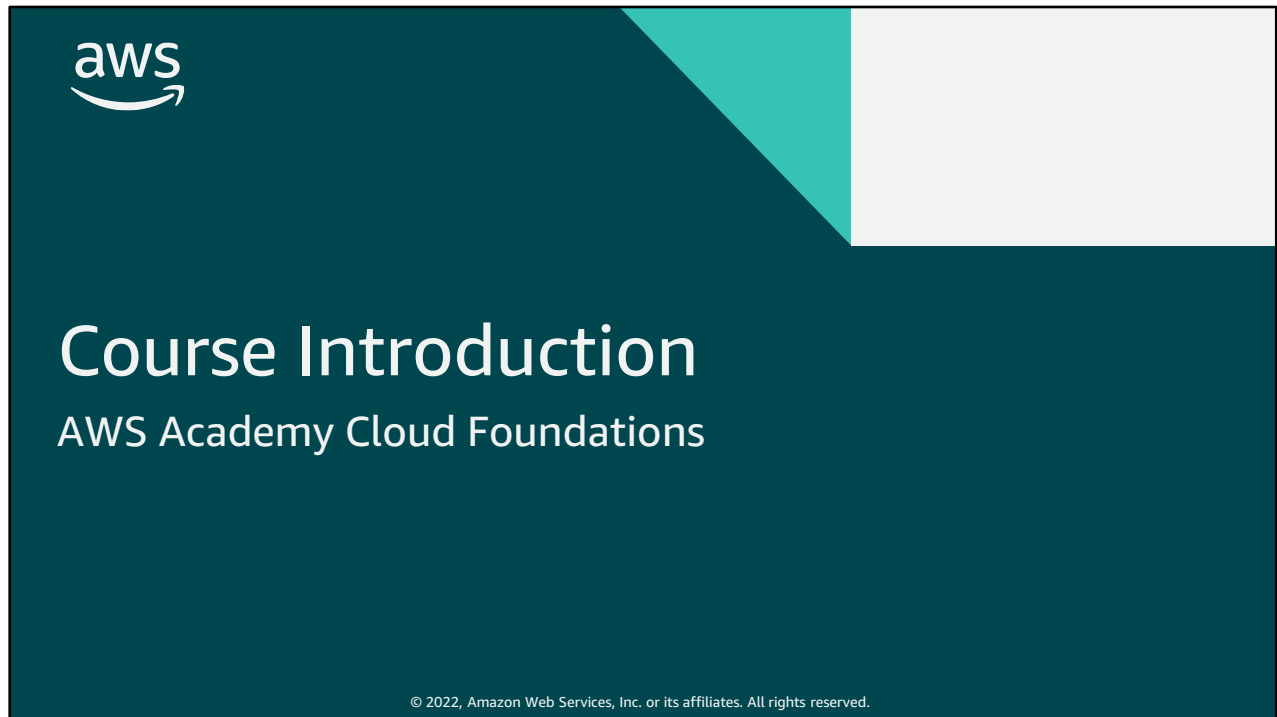
Welcome to AWS Academy Cloud Foundations!

Module overview

Topics

- Course objectives and overview

- AWS certification exam information

- AWS Documentation

- What's new at AWS

Activities

- AWS Documentation scavenger hunt

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This course introduction module will address the following topics:

- Course objectives and overview
- AWS certification exam information
- AWS Documentation
- What's new at AWS

The module concludes with a scavenger hunt activity that challenges you to locate information in the AWS Documentation.

Module objectives

After completing this module, you should be able to:

- Recognize the purpose of the AWS Academy Cloud Foundations course
- Recognize the course structure
- Recognize the AWS certification process
- Navigate the AWS Documentation website
- Explore new technologies at AWS

After completing this module, you should be able to:
- Recognize the purpose of the AWS Academy Cloud Foundations course
- Recognize the course structure
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- Explore new technologies at AWS

Section 1: Course objectives and overview

Course Introduction

Introducing Section 1: Course objectives and overview.

Course prerequisites

- General Required Knowledge

  - IT technical knowledge

  - IT business knowledge

- Preferred Knowledge

  - Familiarity with cloud computing concepts

  - Working knowledge of distributed systems

  - Familiarity with general networking concepts

  - Working knowledge of multi-tier architectures

To begin, it is important to have an understanding of the prerequisites for this course.

First, you should have general **IT technical knowledge**. The foundational computer literacy skills you will need to be successful in this course include a knowledge of basic computer concepts, file management, and a good understanding of the internet.

Second, you should have general **IT business knowledge**. This includes insight into how information technology is used by businesses and other organizations.

Additionally, to ensure success in this course, it is preferred that you have:
- A general familiarity with cloud computing concepts
- A working knowledge of distributed systems
- Familiarity with general networking concepts
- A working knowledge of multi-tier architectures

Course objectives

After completing this course, you should be able to:

- Define the AWS Cloud.
- Explain the AWS pricing philosophy.
- Identify the global infrastructure components of AWS.
- Describe security and compliance measures of the AWS Cloud including AWS Identity and Access Management (IAM).
- Create an AWS Virtual Private Cloud (Amazon VPC).
- Demonstrate when to use Amazon Elastic Compute Cloud (EC2), AWS Lambda and AWS Elastic Beanstalk.
- Differentiate between Amazon S3, Amazon EBS, Amazon EFS and Amazon S3 Glacier.
- Demonstrate when to use AWS Database services including Amazon Relational Database Service (RDS), Amazon DynamoDB, Amazon Redshift, and Amazon Aurora.
- Explain AWS Cloud architectural principles.
- Explore key concepts related to Elastic Load Balancing (ELB), Amazon CloudWatch, and Auto Scaling.

Course outline

- Module 1: Cloud Concepts Overview
- Module 2: Cloud Economics and Billing
- Module 3: AWS Global Infrastructure Overview
- Module 4: AWS Cloud Security
- Module 5: Networking and Content Delivery

- Module 6: Compute
- Module 7: Storage
- Module 8: Databases
- Module 9: Cloud Architecture
- Module 10: Automatic Scaling and Monitoring

To achieve the course objectives, the course explores the following topics:
- Cloud concepts
- Cloud economics and billing
- AWS Global Infrastructure
- AWS Cloud security
- Networking and content delivery
- Compute
- Storage
- Databases
- Cloud architecture
- Automatic scaling and monitoring

The next ten slides provide more detail on what subtopics are covered in each module.

Module 1: Cloud Concepts Overview

Module sections:

- Introduction to cloud computing
- Advantages of cloud computing
- Introduction to Amazon Web Services (AWS)
- Moving to the AWS Cloud – The AWS Cloud Adoption Framework (AWS CAF)

In this module, Section 1 introduces **cloud computing**.

In Section 2, you learn about the **advantages that cloud computing provides** over a traditional, on-premises computing model.

In Section 3, you learn about what **AWS** is and the broad range of AWS products and services. You become familiar with the idea that AWS services are designed to work together to build solutions that meet business goals and technology requirements.

The module concludes with Section 4, which is about the **AWS Cloud Adoption Framework** (AWS CAF). It covers the fundamental changes that must be supported for an organization to successfully migrate its IT portfolio to the cloud.

Module 2: Cloud Economics and Billing

Module sections:

• Fundamentals of pricing

• Total Cost of Ownership

• AWS Organizations

• AWS Billing and Cost Management

• Technical support

The purpose of this module is to introduce you to the business advantages of moving to the cloud.

Section 1 describes the principles for **how AWS sets prices** for the various services. This includes the AWS pricing model and a description of the AWS Free Tier: https://aws.amazon.com/free/.

Section 2 describes the **Total Cost of Ownership** and how customers can reduce their overall costs by moving IT services to the cloud. The section outlines four types of costs that are reduced by using cloud computing, and provides examples that illustrate each of these types.

Section 3 describes how customers can use AWS Organizations to manage their costs.

Section 4 describes **billing** and the components of the AWS Billing dashboard. This section includes a demonstration of how customers can use the dashboard to understand and manage their costs.

Finally, Section 5 describes the four different options for **AWS Technical Support**: Basic Support, Developer Support, Business Support, and Enterprise Support. The section also includes an activity that will help you understand the benefits of each support option.

Module 3: AWS Global Infrastructure Overview

Module sections:

• AWS Global Infrastructure

• AWS services and service category overview

Module 3 provides an overview of the AWS global infrastructure.

In Section 1, you are introduced to the major parts of the **AWS Global Infrastructure**, including Regions, Availability Zones, the network infrastructure, and Points of Presence.

In Section 2, you are shown a listing of all the **AWS service categories**, and then you are provided with a listing of each of the services that this course will discuss. The module ends with an AWS Management Console clickthrough activity.

Module 4: AWS Cloud Security

Module sections:
- AWS shared responsibility model
- AWS Identity and Access Management (IAM)
- Securing a new AWS account
- Securing accounts
- Securing data on AWS
- Working to ensure compliance

This module provides an introduction to the AWS approach to security.

In Section 1, you are introduced to the **AWS shared responsibility model**, which specifies which responsibilities belong to the customer and which responsibilities belong to AWS.

Section 2 introduces you to the key concepts of **AWS Identity and Access Management (IAM)**, including users, groups, policies, and roles.

Section 3 provides guidance on **how to secure a new AWS account**. It discusses how you should avoid using the AWS account root user for day-to-day activities. It also discusses best practices, such as creating IAM users that have multi-factor authentication (MFA) enabled.

Section 3 highlights other ways to **secure accounts**. It discusses the security-related features of AWS Organizations, which include service control policies. This section also discusses AWS Shield, Amazon Cognito, and AWS Key Management Service (AWS KMS).

Section 5 discusses how to **secure data on AWS**. Topics include encryption of data at rest and data in transit, and discusses options for securing data that is stored on Amazon Simple Storage Service (Amazon S3).

Finally, Section 6 discusses how AWS supports customer efforts to deploy solutions that are in **compliance** with laws and regulations. It also discusses the certifications that AWS maintains and AWS services—such as AWS Config and AWS Artifact—that support compliance.

Module 5: Networking and Content Delivery

Module sections:

- Networking basics
- Amazon VPC
- VPC networking
- VPC security
- Amazon Route 53
- Amazon CloudFront

The purpose of this module is to introduce you to the fundamental of AWS networking and content delivery services: Amazon Virtual Private Cloud (Amazon VPC), Amazon Route 53, and Amazon CloudFront. You will have the opportunity to label a virtual private cloud (VPC) network architecture diagram, design a VPC, watch how a VPC is built, and finally build a VPC yourself.

Section 1 discusses **networking concepts** that will be referenced throughout the rest of the module: network, subnet, IPv4 and IPv6 addresses, and Classless Inter-Domain Routing (CIDR) notation.

Section 2 provides an overview of the key terminology and features of **Amazon VPC**, which you must be familiar with when you design and build your own virtual private clouds (VPCs).

In Section 3, you learn about several important **VPC networking** options: internet gateway, network address translation (NAT) gateway, VPC endpoints, VPC sharing, VPC peering, AWS Site-to-Site VPN, AWS Direct Connect, and AWS Transit Gateway.

In Section 4, you learn **how to secure VPCs** with network access control lists (network ACLs) and security groups.

Section 5 covers Domain Name System (DNS) resolution and **Amazon Route 53**. It also covers the topic of DNS failover, which introduces the topic of high availability that you will learn about in more detail in module 10.

Finally, section 6 covers the features and benefits of **Amazon CloudFront**.

Module 6: Compute

Module sections:

- Compute services overview
- Amazon EC2
- Amazon EC2 cost optimization
- Container services
- Introduction to AWS Lambda
- Introduction to AWS Elastic Beanstalk

This module provides an introduction to many of the compute services offered by AWS.

Section 1 provides a high-level, compute services overview.

Section 2 introduces you to the key concepts of **Amazon Elastic Compute Cloud (Amazon EC2)**, including **Amazon Machine Images (AMIs)**, instance types, network settings, user data scripts, storage options, security groups, key pairs, instance lifecycle phases, Elastic IP addresses, instance metadata, and the benefits of using Amazon CloudWatch for monitoring.

Section 3 focuses on the four pillars of cost optimization, with an emphasis on cost optimization as it relates to Amazon EC2.

Section 4 covers container services. It introduces Docker and the differences between virtual machines and containers. It then discusses **Amazon Elastic Container Service (Amazon ECS), AWS Fargate, Kubernetes, Amazon Elastic Kubernetes Service (Amazon EKS),** and **Amazon Elastic Container Registry (Amazon ECR).**

Section 5 introduces serverless computing with **AWS Lambda**. Event sources and Lambda function configuration basics are introduced, and the section ends with examples of a schedule-based Lambda function and an event-based Lambda function.

Finally, Section 6 describes the advantages of using **AWS Elastic Beanstalk** for web application deployments. It concludes with a hands-on activity where you deploy a simple web application to Elastic Beanstalk.

Module 7: Storage

Module sections:
- Amazon Elastic Block Store (Amazon EBS)
- Amazon Simple Storage Service (Amazon S3)
- Amazon Elastic File System (Amazon EFS)
- Amazon Simple Storage Service Glacier

Module 7 introduces you to the various options for storing data with AWS. The module provides an overview of storages services—which are based on four different storage technologies—so that you can choose a storage service for various use cases.

Section 1 provides you with an overview of the functionality of **Amazon Elastic Block Store (Amazon EBS)** and a summary of common use cases. It also introduces the concept of block versus object storage, and how to interact with Amazon EBS through the AWS Management Console.

Section 2 provides an overview of the functionality of **Amazon Simple Storage Service (Amazon S3)** and a summary of common use cases. It also describes how Amazon S3 scales as demand grows and discusses the concept of data redundancy. The section also contains a general overview of Amazon S3 pricing.

Section 3 starts with an overview of the functionality of **Amazon Elastic File Store (Amazon EFS)** and a summary of common use cases. It also provides an overview of the Amazon EFS architecture and a list of common Amazon EFS resources.

Finally, in Section 4, you are provided an overview of the functionality of **Amazon Simple Storage Service Glacier** and a summary of common use cases. This last section also describes the lifecycle of migrating data from Amazon S3 to Amazon S3 Glacier.

Module 8: Databases

Module sections:

- Amazon Relational Database Service (Amazon RDS)
- Amazon DynamoDB
- Amazon Redshift
- Amazon Aurora

This module introduces you to four of the most commonly used AWS database services, with an emphasis on differentiating which database service to select for various use cases.

Section 1 provides an overview of the **Amazon Relational Database Service (Amazon RDS)**. It describes the difference between a managed and unmanaged service, and provides an overview of how to provide a highly available Amazon RDS implementation.

In Section 2, an overview of the **Amazon DynamoDB** services is provided. The section also describes how DynamoDB uses data partitioning to address scenarios that call for high data volumes and the ability to scale out on demand.

Section 3 provides an overview of **Amazon Redshift**. The section describes the parallel processing architecture of Amazon Redshift, and how this architecture supports processing very large datasets. It also reviews some of the more common use cases for Amazon Redshift.

Finally, Section 4 provides an overview of **Amazon Aurora**. The module describes the use cases where Amazon Aurora is a better solution than Amazon RDS. It also discusses how Amazon Aurora provides a more resilient database solution through the use of multiple Availability Zones.

Module 9: Cloud Architecture

Module sections:

• AWS Well-Architected Framework

• Reliability and availability

• AWS Trusted Advisor

The purpose of this module is to introduce you to designing and building cloud architectures according to best practices.

In Section 1, you learn about the **AWS Well-Architected Framework** and its purpose, how the framework is organized, and its design principles and best practices. You will also learn how to use it to design a cloud architecture solution that is secure, performant, resilient, and efficient. Finally, this section also introduces the **AWS Well-Architected Tool**, which can be used to evaluate your architectural designs against AWS Well-Architected Framework best practices.

In Section 2, you learn about reliability and high availability, which are two factors to consider when you design an architecture that can withstand failure.

In Section 3, you learn about **AWS Trusted Advisor**. You can use this tool to evaluate and improve your AWS environment when you implement your architectural designs.

Module 10: Automatic Scaling and Monitoring

Module sections:

• Elastic Load Balancing

• Amazon CloudWatch

• Amazon EC2 Auto Scaling

The purpose of this module is to introduce you to three fundamental AWS services that can be used together to build dynamic, scalable architectures.

Section 1 introduces you to **Elastic Load Balancing**, which is a service that automatically distributes incoming application traffic across multiple targets, such as Amazon EC2 instances, containers, IP addresses, and Lambda functions.

Section 2 introduces you to **Amazon CloudWatch**, which is a service that provides you with data and actionable insights to monitor your applications, respond to system-wide performance changes, optimize resource utilization, and get a unified view of operational health.

Finally, Section 3 introduces you to the **Amazon EC2 Auto Scaling** features that help you maintain application availability and enable you to automatically add or remove EC2 instances according to conditions that you define.

Section 2: AWS certification exam information

Course Introduction

Introducing Section 2: AWS certification exam information.
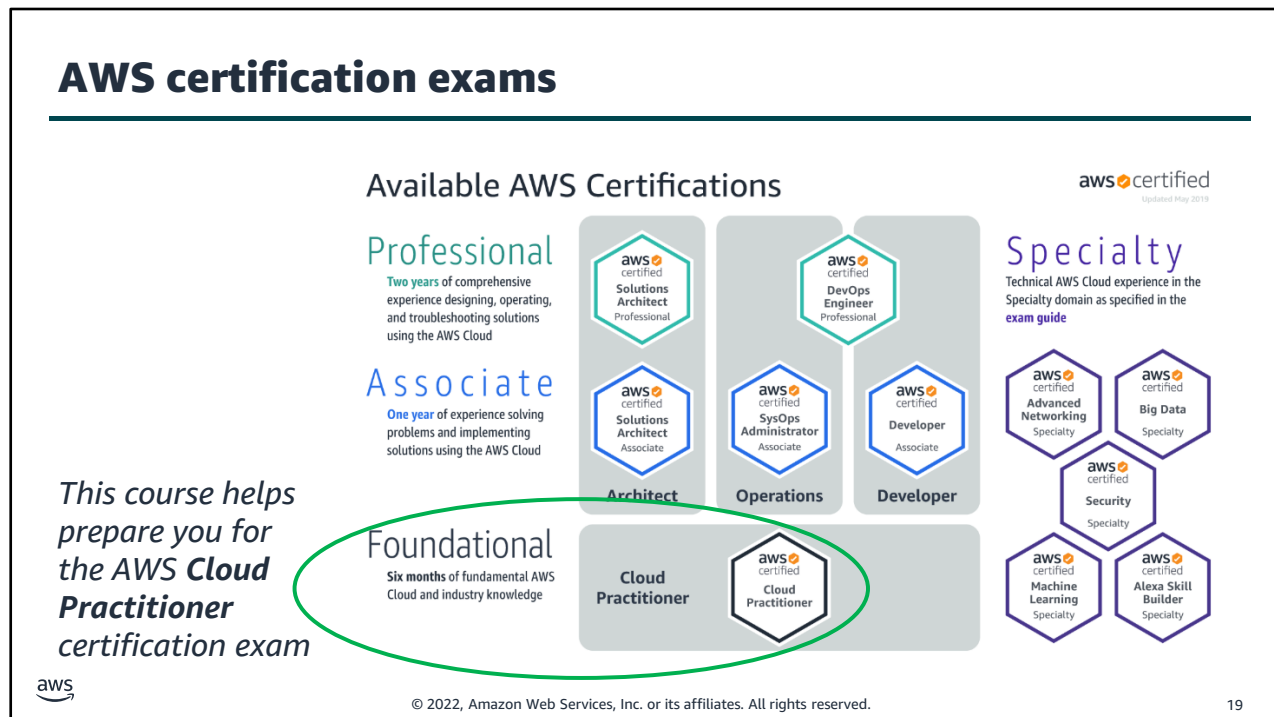
AWS Certification helps learners build credibility and confidence by validating their cloud expertise with an industry-recognized credential, and it helps organizations identify skilled professionals who can lead cloud initiatives by using AWS.

You must earn a passing score via a proctored exam to earn an AWS Certification. After receiving a passing score, you will receive your certification credentials.

AWS Certification does not publish a list of all services or features that are covered in a certification exam. However, the exam guide for each exam lists the current topic areas and objectives covered in the exam. Exam guides can be found at https://aws.amazon.com/certification/certification-prep/?src=certification-faqs.

You will be required to update your certification (or recertify) every 3 years. View the AWS Certification Recertification page at https://aws.amazon.com/certification/recertification/ for more details.

The information on this slide is current as of November 2019. However, exams are frequently updated and the details regarding which exams are available—and what is tested by each exam— are subject to change.

For the latest AWS certification exam information, go to https://aws.amazon.com/certification/.

AWS Certified Cloud Practitioner exam

- Details about the exam—including how to register for it—are at
  https://aws.amazon.com/certification/certified-cloud-practitioner/

  - Download and carefully read the AWS Certified Cloud Practitioner Exam Guide at
    https://d1.awsstatic.com/training-and-certification/Docs - Cloud
    Practitioner/AWS_Certified_Cloud_Practitioner-Exam_Guide_EN_v1.6.pdf
  - Download the sample exam questions at https://d1.awsstatic.com/training-and-
    certification/Docs - Cloud Practitioner/AWS Certified Cloud Practioner_Sample
    Questions_v1.1_FINAL.PDF

- See the recommended path to attain the certification at
  https://aws.amazon.com/training/path-cloudpractitioner/

  - AWS Academy Cloud Foundations covers much of the same material found in the Cloud
    Practitioner Essentials course, but in greater depth.
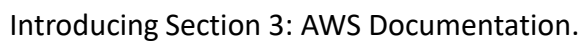 - There is additional free digital training available at https://www.aws.training/.

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The **AWS Certified Cloud Practitioner** certification provides individuals in various cloud and technology roles with a way to validate their AWS Cloud knowledge and enhance their professional credibility. This exam covers four domains, including cloud concepts, security, technology, and billing and pricing.

The AWS Certified Cloud Practitioner exam is the only AWS certification exam that is classified as foundational (as shown on the previous slide). It is often the first AWS exam that IT professionals attempt to obtain.

Though this **AWS Academy Cloud Foundations** course is not listed in the AWS Certified Cloud Practitioner Exam Guide as one of the AWS training options recommended to prepare for the exam, this course does cover many of the same topics that are covered by AWS commercial courses, such as AWS Technical Essentials, AWS Business Essentials, and AWS Cloud Practitioner Essentials. Therefore, the AWS Academy Cloud Foundations course you are taking now is a good way to help prepare yourself to take this exam.

The services included in the AWS Certified Cloud Practitioner exam change as new services are added. At a minimum, you should be able to describe the overall functionality of a broad range of AWS services before taking the exam. For an overview of the AWS services see the Amazon Web Services Cloud Platform section of the Overview of Amazon Web Services whitepaper at https://docs.aws.amazon.com/whitepapers/latest/aws-overview/amazon-web-services-cloud-platform.html.

Section 3: AWS Documentation

Course Introduction

Introducing Section 3: AWS Documentation.

AWS Documentation

- Find user guides, developer guides, API references, tutorials, and more at https://docs.aws.amazon.com/

- *Whitepapers* are also available at https://aws.amazon.com/whitepapers/, including these which are recommended reading for the AWS Cloud Practitioner exam:
  - Overview of Amazon Web Services: https://d0.awsstatic.com/whitepapers/aws-overview.pdf
  - Architecting for the Cloud: AWS Best Practices: https://d1.awsstatic.com/whitepapers/AWS_Cloud_Best_Practices.pdf
  - How AWS Pricing Works: https://d0.awsstatic.com/whitepapers/aws_pricing_overview.pdf
  - The Total Cost of (Non) Ownership of Web Applications in the Cloud: https://media.amazonwebservices.com/AWS_TCO_Web_Applications.pdf

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AWS provides extensive and detailed documentation for each AWS service. Guides and application programming interface (API) references are organized by service category. There are also many general resources and tutorials that can be accessed from the AWS Documentation pages. General resources include case studies, an A-to-Z glossary of AWS terms, whitepapers, FAQs, information about AWS Training and Certification, and more.

Also, each SDK and toolkit has documentation—for example, the AWS Command Line Interface (AWS CLI), the boto3 libraries for AWS SDK for Python, and many others.

AWS whitepapers and guides can be filtered by product, category, or industry, so that you can find the information that is most relevant to your needs.

Activity – AWS Documentation Scavenger Hunt

- Navigate the AWS Documentation website
- Start from the main page at
  https://docs.aws.amazon.com
- Five challenge questions for the class appear in the following slides

In this educator-led activity, you will be challenged to access the AWS Documentation pages and practice locating specific information.

AWS Documentation Scavenger Hunt – Question 1

- Question #1: What guides and references exist for the Amazon EC2 service?

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What guides and references exist for the Amazon EC2 service?

Browse to https://docs.aws.amazon.com and see if you can identify at least six guides or references.

AWS Documentation Scavenger Hunt – Question 1 Answer

- Question #1: What guides and references exist for the Amazon EC2 service?

- Answer https://docs.aws.amazon.com/ec2/?id=docs_gateway:
  - User Guides for Linux and Windows
  - API Reference
  - AWS CLI Reference
  - EC2 Instance Connect Reference
  - User Guide for Auto Scaling
  - VM Import/Export User Guide

What guides and references exist for the Amazon EC2 service?

Browse to https://docs.aws.amazon.com and see if you can identify at least six guides or references.

AWS Documentation Scavenger Hunt – Question 2

- Question #2: Can you find the documentation that describes how to create an Amazon S3 bucket?

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Can you find the documentation that describes how to create an Amazon S3 bucket?

Browse to https://docs.aws.amazon.com and figure out how to navigate to documentation that provides this information. Be prepared to discuss your findings with the class.

AWS Documentation Scavenger Hunt – Question 2 Answer

- Question #2: Can you find the documentation that describes how to create an Amazon S3 bucket?

- Answer https://docs.aws.amazon.com/AmazonS3/latest/gsg/CreatingABucket.html:
  - From https://docs.aws.amazon.com/ click **S3**
  - Click the **Getting Started Guide**
  - Click **Create a Bucket**

Can you find the documentation that describes how to create an Amazon S3 bucket?

Browse to https://docs.aws.amazon.com and figure out how to navigate to documentation that provides this information. Be prepared to discuss your findings with the class.

AWS Documentation Scavenger Hunt – Question 3

- Question #3: Can you find a one-sentence summary of the AWS Cloud9 service?

Can you find a one sentence summary of the AWS Cloud9 service?

Starting at https://docs.aws.amazon.com, see if you can find a page that provides the summary. Be prepared to share your findings.

AWS Documentation Scavenger Hunt – Question 3 Answer

- Question #3: Can you find a one-sentence summary of the AWS Cloud9 service?

- Answer https://docs.aws.amazon.com/cloud9/?id=docs_gateway:
  - AWS Cloud9 is a cloud-based integrated development environment (IDE) that you use to write, run, and debug code.

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Can you find a one sentence summary of the AWS Cloud9 service?

Starting at https://docs.aws.amazon.com, see if you can find a page that provides the summary. Be prepared to share your findings.

AWS Documentation Scavenger Hunt – Question 4

- Question #4: Which programming languages does the AWS Lambda service API support?

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Which programming languages does the AWS Lambda service API support?

Browse to https://docs.aws.amazon.com and figure out how to navigate to documentation that provides this information. Be prepared to discuss your findings with the class.

AWS Documentation Scavenger Hunt – Question 4 Answer

- Question #4: Which programming languages does the AWS Lambda service API support?

- Answer https://docs.aws.amazon.com/lambda/latest/dg/gettingstarted-tools.html:
  - From the main AWS Documentation page, click the **AWS Lambda** link
  - Click the **API Reference** link
  - Click **Getting Started** > **Tools** to find a table that lists the following languages: **Node.js**, **Java**, **C#**, **Python**, **Ruby**, **Go**, and **PowerShell**

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Which programming languages does the AWS Lambda service API support?

Browse to https://docs.aws.amazon.com and figure out how to navigate to documentation that provides this information. Be prepared to discuss your findings with the class.

AWS Documentation Scavenger Hunt – Question 5

- Question #5: Find the tutorial that describes how to run a serverless Hello World application, then scroll through the documented steps. What two AWS services does the tutorial have you use?

Find the tutorial that describes how to run a serverless Hello World application, then scroll through the documented steps. What two AWS services does the tutorial have you use?

Browse to https://docs.aws.amazon.com and figure out how to navigate to documentation that provides this information. Be prepared to discuss your findings with the class.

AWS Documentation Scavenger Hunt – Question 5 Answer

- Question #5: Find the tutorial that describes how to run a serverless Hello World application, then scroll through the documented steps. What two AWS services does the tutorial have you use?

- Answer https://aws.amazon.com/getting-started/tutorials/run-serverless-code/:
  - From the main AWS Documentation page, click **Tutorials and Projects**
  - In the **Websites & Web Apps** area, click the tutorial.
  - The tutorial has you use **AWS Lambda** and **Amazon CloudWatch**.

Find the tutorial that describes how to run a serverless Hello World application, then scroll through the documented steps. What two AWS services does the tutorial have you use?

Browse to https://docs.aws.amazon.com and figure out how to navigate to documentation that provides this information. Be prepared to discuss your findings with the class.

The "What's New at AWS" section introduces new and emerging technologies at AWS.

What is Amazon CodeWhisperer?

AI-powered code generator for IDEs and code editors

CodeWhisperer

- AI coding companion:
  - Generates code suggestions based on comments and existing code
  - Offers real-time support for code authoring directly within your integrated development environment (IDE)
- AI security scanner:
  - Helps identify hard-to-find vulnerabilities
  - References multiple standards and best practices

Content processed by CodeWhisperer Professional is not stored or used for service improvement.

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Amazon CodeWhisperer analyzes your comments and code as you write them in your integrated development environment (IDE). It goes beyond code completion by using natural language processing to comprehend the comments in your code. By understanding English comments, CodeWhisperer generates complete functions and code blocks that align with your descriptions. CodeWhisperer also analyzes the surrounding code, ensuring the generated code matches your style and naming conventions and seamlessly integrates into the existing context.

When scanning for security vulnerabilities, CodeWhisperer assesses your code against multiple sets of standards and best practices. This includes the following:
- Open Worldwide Application Security Project (OWASP) standards
- Crypto library best practices
- AWS security standards

The security scan feature is continuously updated to help keep applications free from new security vulnerabilities.

Compatibility: CodeWhisperer integrates with popular tools such as Visual Studio Code, JetBrains IDEs (IntelliJ IDEA, PyCharm, etc.), Amazon SageMaker Studio, JupyterLab, AWS Cloud9, and AWS Lambda console.

Support: CodeWhisperer supports a wide range of programming languages and development environments, including Python, Java, JavaScript, TypeScript, C#, Go, Rust, PHP, Ruby, Kotlin, C,

C++, shell scripting, structured query language (SQL), and Scala.

Installation: You can access CodeWhisperer by downloading and installing the AWS Toolkit IDE extension or plugin. You can also activate CodeWhisperer from directly within the AWS Lambda and AWS Cloud9 console code editors.

Installation instructions vary depending on the environment. For more information, see "Getting started" in the *CodeWhisperer User Guide* at
https://docs.aws.amazon.com/codewhisperer/latest/userguide/getting-started.html.

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Code generation

- Code suggestions
- Code completion
- Code generation from comments
- Alternate code suggestions
- Option to accept or reject
- Reference tracking for code that resembles open-source training data

```
1  import boto3
```

```
1  import boto3
2  # create an s3 bucket named cw95323
```

```
< 1/3 >  Accept  [ tab ]  Accept Word ⌘ →  …

2  # create an s3 bucket named cw95323
   s3 = boto3.resource('s3')
   s3.create_bucket(Bucket='cw59323')
   # upload a file to the bucket
```

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The code generation feature of CodeWhisperer offers code suggestions in real time in your development environment. It automatically offers code completion and code generation suggestions. It uses natural language processing of English comments in your code and an understanding of surrounding code to suggest whole lines of code, complete functions, and logical blocks of code. The generated code is aligned with your coding style and naming conventions. CodeWhisperer prioritizes secure coding and responsible artificial intelligence (responsible AI) practices. It's optimized for Amazon APIs and trained extensively on Amazon and open-source code. You have the option to accept the first suggestion, explore more suggestions, or continue writing your own code. It's important to review each code suggestion before accepting it because you might need to make edits to ensure that the suggestion aligns with your intended functionality.

User actions
- Previous and next suggestion: Use the left arrow and right arrow.
- Accept a suggestion: Press Tab.
- Reject a suggestion: Press Esc.
- Manually start code generation when typing a comment: On MacOS, press Option+C, and on Windows, press Alt+C.

Open Code Reference Log

CodeWhisperer learns from open-source projects and the code it suggests might occasionally resemble code samples from the training data. With the reference log, you can view references to code suggestions that are similar to the training data. When such occurrences happen, CodeWhisperer notifies you and provides repository and licensing information. Use this information to make decisions about whether to use the code in your project and properly attribute the source code as desired.

Security scan

```
1   import boto3
2
3   def upload_file(bucket_name, file_path):
4       s3 = boto3.client('s3')
5       with open(file_path, 'rb') as file:
6           s3.upload_fileobj(file, bucket_name, file_path)
7        print("File uploaded.")
8
9   bucket_name = input("Enter bucket name: ")
10  file_path = input("Enter file path to upload: ")
11  upload_file(bucket_name, file_path)
```

PROBLEMS

⚠️ CWE-22 – Path traversal: Constructing path names with unsanitized user input can lead to…

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The security scanning feature of CodeWhisperer detects security vulnerabilities in both CodeWhisperer-generated code and developer-written code. It scans the code to identify potential vulnerabilities and provides suggestions for remediation. This includes scanning for hard-to-find vulnerabilities that might be overlooked. The security scan is compatible with popular IDEs such as VS Code and JetBrains. It supports Python, Java, and JavaScript.

Benefits of Amazon CodeWhisperer

Value to developers

- Increase velocity.

- Spend less time writing code.

- Receive help directly within your IDE.

- Find security vulnerabilities in your code.

Value to organizations

- Use at all experience levels.

- Support open-source attribution.

- Reduce the risk of security vulnerabilities.

- Increase code quality and developer productivity.

Automated code generation automates repetitive tasks and saves you time. It eliminates the need for you to invest excessive hours in exploring and learning new technologies. Instead, you can rely on high-quality code suggestions that match your coding style. This approach enhances your productivity so you can focus on critical tasks, which encourages innovation and progress in software development. With automated code generation, you can streamline your workflows and achieve significant time savings while ensuring the delivery of code that meets your standards.

CodeWhisperer code generation offers many benefits for software development organizations. It accelerates application development for faster delivery of software solutions. By automating repetitive tasks, it optimizes the use of developer time, so developers can focus on more critical aspects of the project. Additionally, code generation helps mitigate security vulnerabilities, safeguarding the integrity of the codebase.

CodeWhisperer also protects open source intellectual property by providing the open source reference tracker. CodeWhisperer enhances code quality and reliability, leading to robust and efficient applications. And it supports an efficient response to evolving software threats, keeping the codebase up to date with the latest security practices. CodeWhisperer has the potential to increase development speed, security, and the quality of software.

Resources:
- Visit "Getting started" at https://aws.amazon.com/codewhisperer/resources/.
- Dive deep with the "Amazon CodeWhisperer – Getting Started" course on AWS Skill Builder at https://explore.skillbuilder.aws/learn/course/external/view/elearning/16405/amazon-codewhisperer-getting-started.
- Learn how to build an event-driven serverless app at https://catalog.us-east-1.prod.workshops.aws/workshops/a33a5d69-1417-4d5f-acc9-ae5c7fba665b/en-US/.

Module wrap-up

Course Introduction

It's now time to review the module, and wrap up with a module summary and a listing of additional resources.

Module summary

In summary, in this module, you learned how to:

- Recognize the purpose of the AWS Academy Cloud Foundations course
- Recognize the course structure
- Recognize the AWS certification process
- Navigate the AWS Documentation website
- Explore new technologies at AWS

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In summary, in this module, you learned how to:
- Recognize the purpose of the AWS Academy Cloud Foundations course
- Recognize the course structure
- Recognize the AWS certification process
- Navigate the AWS Documentation website
- Explore new technologies at AWS

Additional resources

- AWS Certification: https://aws.amazon.com/certification/
- AWS Certified Cloud Practitioner: https://aws.amazon.com/certification/certified-cloud-practitioner/
- AWS Documentation: https://docs.aws.amazon.com/
- "Getting started" in the *CodeWhisperer User Guide*: https://docs.aws.amazon.com/codewhisperer/latest/userguide/getting-started.html
- CodeWhisperer Resources: https://aws.amazon.com/codewhisperer/resources/
- Dive deep with the "Amazon CodeWhisperer – Getting Started" course on AWS Skill Builder: https://explore.skillbuilder.aws/learn/course/external/view/elearning/16405/amazon-codewhisperer-getting-started
- Learn how to build an event-driven serverless app: https://catalog.us-east-1.prod.workshops.aws/workshops/a33a5d69-1417-4d5f-acc9-ae5c7fba665b/en-US/
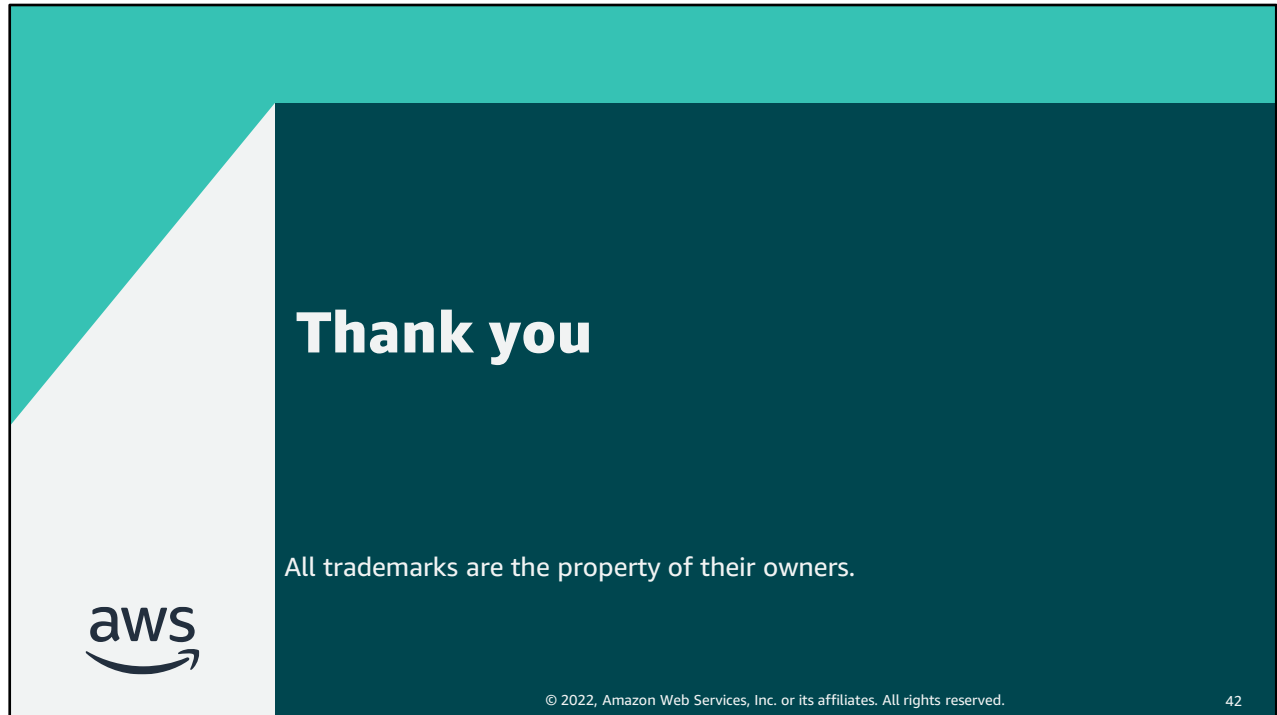
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The following resources provide more detail on the topics that are discussed in this module:
- AWS Certification: https://aws.amazon.com/certification/
- AWS Certified Cloud Practitioner: https://aws.amazon.com/certification/certified-cloud-practitioner/
- AWS Documentation: https://docs.aws.amazon.com/
- "Getting started" in the CodeWhisperer User Guide: https://docs.aws.amazon.com/codewhisperer/latest/userguide/getting-started.html
- CodeWhisperer Resources: https://aws.amazon.com/codewhisperer/resources/
- Dive deep with the "Amazon CodeWhisperer – Getting Started" course on AWS Skill Builder at https://explore.skillbuilder.aws/learn/course/external/view/elearning/16405/amazon-codewhisperer-getting-started
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Thank you

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Thank you for completing this module.

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