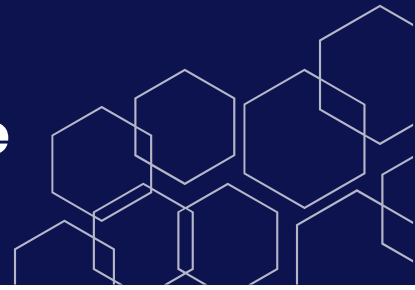


# AWS Certified Developer – Associate

## (DVA-C02) Exam Guide



### Introduction

The AWS Certified Developer – Associate (DVA-C02) exam is intended for individuals who perform a developer role. The exam validates a candidate's ability to demonstrate proficiency in developing, testing, deploying, and debugging AWS cloud-based applications.

The exam also validates a candidate's ability to complete the following tasks:

- Develop and optimize applications on AWS
- Package and deploy by using continuous integration and continuous delivery (CI/CD) workflows
- Secure application code and data
- Identify and resolve application issues

### Target candidate description

The target candidate has 1 or more years of hands-on experience in developing and maintaining applications by using AWS services.

### Recommended general IT knowledge

The target candidate should have the following:

- Proficiency in at least one high-level programming language
- Understanding of application lifecycle management
- Basic understanding of cloud-native applications to write code
- Ability to develop functional applications
- Experience in using development tools

### Recommended AWS knowledge

The target candidate should be able to do the following:

- Develop and secure applications by using AWS service APIs, the AWS CLI, and SDKs
- Use a CI/CD pipeline to deploy applications on AWS

### What is considered out of scope for the target candidate?

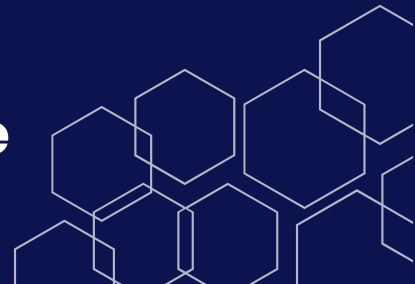
The following is a non-exhaustive list of related job tasks that the target candidate is not expected to be able to perform. These items are considered out of scope for the exam:

- Design architectures (for example, distributed systems, microservices, database schemas and modeling)
- Design and create CI/CD pipelines
- Administer IAM users and groups
- Administer servers and operating systems
- Design AWS networking infrastructure (for example, Amazon VPC, AWS Direct Connect)

To view a detailed list of specific tools and technologies that might be covered on the exam, in addition to a list of in-scope AWS services, refer to the Appendix.

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### Exam content

#### Response types

There are two types of questions on the exam:

- **Multiple choice:** Has one correct response and three incorrect responses (distractors)
- **Multiple response:** Has two or more correct responses out of five or more response options

Select one or more responses that best complete the statement or answer the question. Distractors, or incorrect answers, are response options that a candidate with incomplete knowledge or skill might choose. Distractors are generally plausible responses that match the content area.

Unanswered questions are scored as incorrect; there is no penalty for guessing. The exam includes 50 questions that will affect your score.

#### Unscored content

The exam includes 15 unscored questions that do not affect your score. AWS collects information about candidate performance on these unscored questions to evaluate these questions for future use as scored questions. These unscored questions are not identified on the exam.

#### Exam results

The AWS Certified Developer – Associate (DVA-C02) exam is a pass or fail exam. The exam is scored against a minimum standard established by AWS professionals who follow certification industry best practices and guidelines.

Your results for the exam are reported as a scaled score of 100–1,000. The minimum passing score is 720. Your score shows how you performed on the exam as a whole and whether you passed. Scaled scoring models help equate scores across multiple exam forms that might have slightly different difficulty levels.

Your score report could contain a table of classifications of your performance at each section level. This information is intended to provide general feedback about your exam performance. The exam uses a compensatory scoring model, which means that you do not need to achieve a passing score in each section. You need to pass only the overall exam.

Each section of the exam has a specific weighting, so some sections have more questions than other sections have. The table contains general information that highlights your strengths and weaknesses. Use caution when interpreting section-level feedback.

#### Content outline

This exam guide includes weightings, test domains, and task statements for the exam. This guide is not a comprehensive listing of the content on the exam. However, additional context for each of the task statements is available to help guide your preparation for the exam. The following table lists the main content domains and their weightings. The table precedes the complete exam content outline, which includes the additional context. The percentage in each domain represents only scored content.

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Domain	% of Exam
Domain 1: Cloud Concepts	26%
Domain 2: Security and Compliance	25%
Domain 3: Technology	33%
Domain 4: Billing and Pricing	16%
TOTAL	100%

### Domain 1: Development with AWS Services

#### Task statement 1: Develop code for applications hosted on AWS.

Knowledge of:

- Architectural patterns (for example, event-driven, microservices, monolithic, choreography, orchestration, fanout)
- Idempotency
- Differences between stateful and stateless concepts
- Differences between tightly coupled and loosely coupled components
- Fault-tolerant design patterns (for example, retries with exponential backoff and jitter, deadletter queues)
- Differences between synchronous and asynchronous patterns

Skills in:

- Creating fault-tolerant and resilient applications in a programming language (for example, Java, C#, Python, JavaScript, TypeScript, Go)
- Creating, extending, and maintaining APIs (for example, response/request transformations, enforcing validation rules, overriding status codes)
- Writing and running unit tests in development environments (for example, using AWS Serverless Application Model [AWS SAM])
- Writing code to use messaging services
- Writing code that interacts with AWS services by using APIs and AWS SDKs
- Handling data streaming by using AWS services

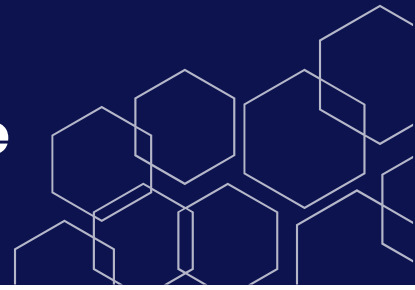
#### Task Statement 2: Develop code for AWS Lambda.

Knowledge of:

- Event source mapping
- Stateless applications
- Unit testing
- Event-driven architecture
- Scalability
- The access of private resources in VPCs from Lambda code

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Skills in:

- Configuring Lambda functions by defining environment variables and parameters (for example, memory, concurrency, timeout, runtime, handler, layers, extensions, triggers, destinations)
- Handling the event lifecycle and errors by using code (for example, Lambda Destinations, dead-letter queues)
- Writing and running test code by using AWS services and tools
- Integrating Lambda functions with AWS services
- Tuning Lambda functions for optimal performance

### Task Statement 3: Use data stores in application development.

Knowledge of:

- Relational and non-relational databases
- Create, read, update, and delete (CRUD) operations
- High-cardinality partition keys for balanced partition access
- Cloud storage options (for example, file, object, databases)
- Database consistency models (for example, strongly consistent, eventually consistent)
- Differences between query and scan operations
- Amazon DynamoDB keys and indexing
- Caching strategies (for example, write-through, read-through, lazy loading, TTL)
- Amazon S3 tiers and lifecycle management
- Differences between ephemeral and persistent data storage patterns

Skills in:

- Serializing and deserializing data to provide persistence to a data store
- Using, managing, and maintaining data stores
- Managing data lifecycles
- Using data caching services

## Domain 2: Security

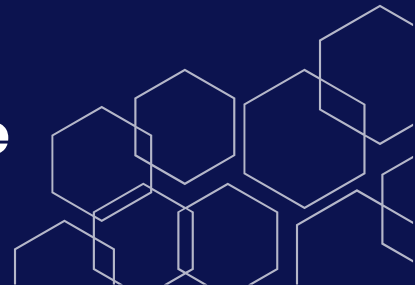
### Task Statement 1: Implement authentication and/or authorization for applications and AWS services.

Knowledge of:

- Identity federation (for example, Security Assertion Markup Language [SAML], OpenID Connect [OIDC], Amazon Cognito)
- Bearer tokens (for example, JSON Web Token [JWT], OAuth, AWS Security Token Service [AWS STS])
- The comparison of user pools and identity pools in Amazon Cognito
- Resource-based policies, service policies, and principal policies
- Role-based access control (RBAC)
- Application authorization that uses ACLs
- The principle of least privilege
- Differences between AWS managed policies and customer-managed policies

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- Identity and access management (IAM)

Skills in:

- Using an identity provider to implement federated access (for example, Amazon Cognito, AWS Identity and Access Management [IAM])
- Securing applications by using bearer tokens
- Configuring programmatic access to AWS
- Making authenticated calls to AWS services
- Assuming an IAM role
- Defining permissions for principals

### Task Statement 2: Implement encryption by using AWS services.

Knowledge of:

- Encryption at rest and in transit
- Certificate management (for example, AWS Certificate Manager Private Certificate Authority)
- Key protection (for example, key rotation)
- Differences between client-side encryption and server-side encryption
- Differences between AWS managed and customer-managed AWS Key Management Service (AWS KMS) keys

Skills in:

- Using encryption keys to encrypt or decrypt data
- Generating certificates and SSH keys for development purposes
- Using encryption across account boundaries
- Enabling and disabling key rotation

### Task Statement 3: Manage sensitive data in application code.

Knowledge of:

- Data classification (for example, personally identifiable information [PII], protected health information [PHI])
- Environment variables
- Secrets management (for example, AWS Secrets Manager, AWS Systems Manager Parameter Store)
- Secure credential handling

Skills in:

- Encrypting environment variables that contain sensitive data
- Using secret management services to secure sensitive data
- Sanitizing sensitive data

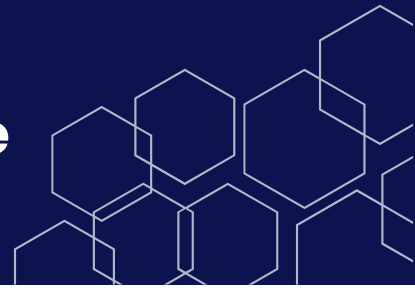
## Domain 3: Deployment

### Task Statement 1: Prepare application artifacts to be deployed to AWS.

Knowledge of:

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- Ways to access application configuration data (for example, AWS AppConfig, Secrets Manager, Parameter Store)
- Lambda deployment packaging, layers, and configuration options
- Git-based version control tools (for example, Git, AWS CodeCommit)
- Container images

Skills in:

- Managing the dependencies of the code module (for example, environment variables, configuration files, container images) within the package
- Organizing files and a directory structure for application deployment
- Using code repositories in deployment environments
- Applying application requirements for resources (for example, memory, cores)

### **Task Statement 2: Test applications in development environments.**

Knowledge of:

- Features in AWS services that perform application deployment
- Integration testing that uses mock endpoints
- Lambda versions and aliases

Skills in:

- Testing deployed code by using AWS services and tools
- Performing mock integration for APIs and resolving integration dependencies
- Testing applications by using development endpoints (for example, configuring stages in Amazon API Gateway)
- Deploying application stack updates to existing environments (for example, deploying an AWS SAM template to a different staging environment)

### **Task Statement 3: Automate deployment testing.**

Knowledge of:

- API Gateway stages
- Branches and actions in the continuous integration and continuous delivery (CI/CD) workflow
- Automated software testing (for example, unit testing, mock testing)

Skills in:

- Creating application test events (for example, JSON payloads for testing Lambda, API Gateway, AWS SAM resources)
- Deploying API resources to various environments
- Creating application environments that use approved versions for integration testing (for example, Lambda aliases, container image tags, AWS Amplify branches, AWS Copilot environments)
- Implementing and deploying infrastructure as code (IaC) templates (for example, AWS SAM templates, AWS CloudFormation templates)

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- Managing environments in individual AWS services (for example, differentiating between development, test, and production in API Gateway)

### **Task Statement 4: Deploy code by using AWS CI/CD services.**

Knowledge of:

- Git-based version control tools (for example, Git, AWS CodeCommit)
- Manual and automated approvals in AWS CodePipeline
- Access application configurations from AWS AppConfig and Secrets Manager
- CI/CD workflows that use AWS services
- Application deployment that uses AWS services and tools (for example, CloudFormation, AWS Cloud Development Kit [AWS CDK], AWS SAM, AWS CodeArtifact, Copilot, Amplify, Lambda)
- Lambda deployment packaging options
- API Gateway stages and custom domains
- Deployment strategies (for example, canary, blue/green, rolling)

Skills in:

- Updating existing IaC templates (for example, AWS SAM templates, CloudFormation templates)
- Managing application environments by using AWS services
- Deploying an application version by using deployment strategies
- Committing code to a repository to invoke build, test, and deployment actions
- Using orchestrated workflows to deploy code to different environments
- Performing application rollbacks by using existing deployment strategies
- Using labels and branches for version and release management
- Using existing runtime configurations to create dynamic deployments (for example, using staging variables from API Gateway in Lambda functions)

### **Domain 4: Troubleshooting and Optimization**

#### **Task Statement 1: Assist in a root cause analysis.**

Knowledge of:

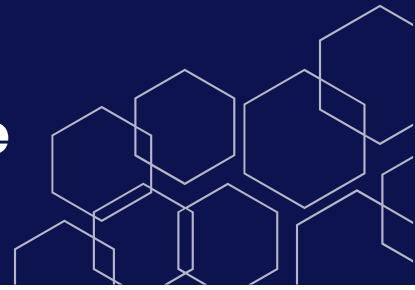
- Logging and monitoring systems
- Languages for log queries (for example, Amazon CloudWatch Logs Insights)
- Data visualizations
- Code analysis tools
- Common HTTP error codes
- Common exceptions generated by SDKs
- Service maps in AWS X-Ray

Skills in:

- Debugging code to identify defects
- Interpreting application metrics, logs, and traces
- Querying logs to find relevant data

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- Implementing custom metrics (for example, CloudWatch embedded metric format [EMF])
- Reviewing application health by using dashboards and insights
- Troubleshooting deployment failures by using service output logs

### **Task Statement 2: Instrument code for observability.**

Knowledge of:

- Distributed tracing
- Differences between logging, monitoring, and observability
- Structured logging
- Application metrics (for example, custom, embedded, built-in)

Skills in:

- Implementing an effective logging strategy to record application behavior and state
- Implementing code that emits custom metrics
- Adding annotations for tracing services
- Implementing notification alerts for specific actions (for example, notifications about quota limits or deployment completions)
- Implementing tracing by using AWS services and tools

### **Task Statement 3: Optimize applications by using AWS services and features.**

Knowledge of:

- Caching
- Concurrency
- Messaging services (for example, Amazon Simple Queue Service [Amazon SQS], Amazon Simple Notification Service [Amazon SNS])

Skills in:

- Profiling application performance
- Determining minimum memory and compute power for an application
- Using subscription filter policies to optimize messaging
- Caching content based on request headers