Introduction

The AWS Certified: SAP on AWS - Specialty examination validates advanced technical skills and experience to design, implement, migrate, and operate SAP workloads optimally on AWS.

This examination validates an individual's ability to perform the following tasks:

- Design an SAP solution that runs in the AWS Cloud in adherence with the AWS Well-Architected Framework
- Design an SAP solution that runs in the AWS Cloud in adherence with SAP certification and support requirements
- Implement new SAP workloads on AWS
- Migrate existing SAP workloads to AWS
- Operate SAP workloads on AWS

Target candidate description

The target candidate possesses the knowledge, skills, experience, and competence to design, implement, migrate, and operate SAP workloads on AWS.

This person likely has 5 or more years of SAP experience and 1 or more years of experience in working with SAP on AWS.

Recommended AWS knowledge:

- High availability/disaster recovery
- Core AWS infrastructure services
- AWS migration tools
- AWS global infrastructure
- Security best practices
- Multi-account scenarios and multi-Region scenarios
- Operations and management services and tools
- AWS transfer services

Recommended SAP knowledge and other IT knowledge:

- SAP Basis and SAP NetWeaver administration
- SAP supported databases (including SAP HANA)
- SAP supported operating systems (Linux and Windows)
- SAP migration and installation tools
- Sizing
- Identity management

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 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: SAP on AWS - Specialty (PAS-C01) 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 750. Your score shows how you performed on the exam as a whole and whether or not 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. It 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.

Domain	% of Exam
Domain 1: Design of SAP workloads on AWS	30%
Domain 2: Implementation of SAP workloads on AWS	24%
Domain 3: Migration of SAP workloads to AWS	26%
Domain 4: Operation and maintenance of SAP workloads on AWS	20%
TOTAL	**100%**

Domain 1: Design of SAP workloads on AWS

1.1 Design the AWS account structure and connectivity patterns for SAP workloads on AWS.

- Knowledge of:
  - o AWS global infrastructure
  - o Account strategy for SAP workloads
  - o VPC patterns for SAP workloads
  - o SAP connectivity strategies (for example, AWS Direct Connect, AWS VPN, SAProuter, SAP GUI, Amazon AppStream)

- Skills in:
  - o Evaluating the use of a single AWS account versus the use of multiple AWS accounts
  - o Evaluating the use of a single VPC versus the use of multiple VPCs, including user restrictions with VPC sharing
  - o Evaluating on-premises, co-location, and cloud integration connectivity options
  - o Defining AWS Regions and Availability Zones based on network and latency requirements
  - o Designing connectivity options between different AWS accounts and different VPCs

1.2 Design a secure solution for hosting SAP workloads on AWS.

- Knowledge of:
  - o AWS Identity and Access Management (IAM)
  - o Route tables, security groups, and network ACLs
  - o Encryption options for data at rest and data in transit
  - o AWS service endpoints

- Skills in:
  - o Defining IAM users and roles for SAP workloads on AWS
  - o Defining inbound and outbound network flows by using security group rules and network ACL rules
  - o Troubleshooting traffic flow by using AWS native tools
  - o Defining the encryption strategy for data at rest and data in transit
  - o Defining service endpoints for service integrations

1.3 Define optimized and cost-effective infrastructure solutions for SAP workloads on AWS.

- Knowledge of:
    - o Certified operating system releases for SAP
    - o Certified database release versions for SAP
    - o Certified block storage solutions for SAP
    - o Certified instance types
    - o Best practices to define shared storage solutions
    - o AWS pricing models
    - o SAP transport strategy

- Skills in:
    - o Defining SAP certified solutions on AWS based on operating system, database, and SAP combinations
    - o Selecting the optimal instance family for SAP workloads
    - o Defining instance sizing based on SAP Application Performance Standard (SAPS) performance measurements, database sizing tools, and SAP Early Watch Alert (EWA) reports
    - o Defining the right storage selection for SAP workloads
    - o Defining shared storage solutions for SAP file systems
    - o Evaluating AWS pricing models
    - o Evaluating a shared solution versus a dedicated solution for database licensing
    - o Evaluating dedicated hardware solution benefits (for example, SAP certified Nitro based EC2 instance)

1.4 Design highly resilient solutions for SAP workloads on AWS.

- Knowledge of:
    - o High-availability solution options for SAP workloads on AWS
    - o Disaster recovery solution options for SAP workloads on AWS

- Skills in:
    - o Defining the optimal architecture by considering operating system, database, and application cluster requirements
    - o Designing single and distributed SAP solutions on AWS infrastructure
    - o Designing highly available solutions for SAP systems based on availability requirements
    - o Designing disaster recovery solutions for SAP systems based on recovery time objective (RTO) and recovery point objective (RPO) requirements
    - o Defining the optimal architecture by considering scale-up and scale-out options
    - o Evaluating instance placement options for availability improvement

Domain 2: Implementation of SAP workloads on AWS

2.1 Deploy databases for SAP workloads on AWS.

- Knowledge of:
    - o Administration of operating systems (for example, Linux, Windows)
    - o File system layout of databases
    - o AWS network concepts
    - o Database administration and security

- Skills in:
  - o Installing database systems
  - o Installing database clients

2.2 Deploy SAP applications on AWS.

- Knowledge of:
  - o Administration of operating systems (for example, Linux, Windows)
  - o File system layout of SAP applications
  - o AWS network concepts
  - o SAP Basis and SAP security

- Skills in:
  - o Installing SAP applications
  - o Configuring SAP applications

2.3 Configure high availability for SAP workloads.

- Knowledge of:
  - o AWS global infrastructure
  - o Administration of operating systems and databases
  - o SAP certified high-availability solutions on AWS
  - o AWS networking concepts (for example, Amazon Route 53, overlay IP addresses, routing methods)
  - o High-availability cluster concepts

- Skills in:
  - o Evaluating SAP certified high-availability solutions
  - o Configuring a highly available cluster between ABAP SAP Central Services (ASCS) and Enqueue Replication Server (ERS) nodes
  - o Configuring a highly available cluster between database nodes
  - o Performing cluster failover tests

2.4 Configure the disaster recovery setup for SAP workloads.

- Knowledge of:
  - o AWS global infrastructure
  - o Administration of operating systems and databases
  - o AWS networking concepts (for example, Route 53, routing methods)
  - o RTO and RPO
  - o Disaster recovery scenarios (for example, backup and restore, pilot light, warm standby, multi-site)
  - o Disaster recovery solutions on AWS

- Skills in:
  - o Configuring disaster recovery solutions
  - o Configuring database replication
  - o Performing disaster recovery testing

2.5 Automate deployments of SAP workloads.

- Knowledge of:
    - o Infrastructure as code (IaC) (for example, AWS CloudFormation)
    - o Configuration management tools (for example, AWS Systems Manager)
    - o AWS Launch Wizard for SAP
    - o DevOps tools

- Skills in:
    - o Automating infrastructure deployments by using IaC
    - o Automating SAP application installations
    - o Automating SAP deployments by using Launch Wizard
    - o Using configuration management tools

2.6 Validate AWS infrastructure for hosting SAP workloads.

- Knowledge of:
    - o Administration of operating systems (for example, Linux, Windows)
    - o Database file system layout
    - o AWS network concepts
    - o Database administration and security
    - o Performance baseline for SAP

- Skills in:
    - o Performing tests with the HANA Hardware and Cloud Measurement Tools (HCMT)
    - o Reviewing instance families and sizes
    - o Validating dedicated hardware solution benefits (for example, SAP certified Nitro based EC2 instance)
    - o Performing license checks for infrastructure for SAP workloads on AWS
    - o Performing storage checks by using the flexible I/O tester (FIO) and the dd command
    - o Performing network latency tests
    - o Validating infrastructure (for example, Well-Architected Review, SAP OSS Notes, certified operating systems, relational database management system combinations)

Domain 3: Migration of SAP workloads to AWS

3.1 Determine the optimal migration approach for SAP workloads to AWS.

- Knowledge of:
    - o Homogeneous migration process and heterogeneous migration process
    - o Target SAP environment architecture (operating system, database, and application)
    - o SAP interfaces and integration
    - o Data migration tools
    - o Data transfer options
    - o DNS and AWS networking services (for example, Direct Connect, Site-to-Site VPN, Route 53)
    - o AWS storage services (for example, Amazon Elastic File System [Amazon EFS], Amazon FSx, Amazon S3)
    - o AWS compute services (for example, Amazon EC2)
    - o AWS directory services specific to SAP workloads on Windows

- Skills in:
  - Creating a technical migration and cutover plan
  - Determining the suitable tools and methodologies for cloud migration
  - Evaluating the compatibility for target SAP environments on AWS

3.2 Perform a homogeneous migration of SAP workloads to AWS.

- Knowledge of:
  - Migration process methodologies for homogeneous migration (for example, backup and restore, database replication, block level replication)
  - AWS data transfer services (for example, AWS Snowball, AWS DataSync, S3 Transfer Acceleration)
  - DNS and AWS networking services (for example, Direct Connect, Site-to-Site VPN, Route 53)
  - AWS storage services (for example, Amazon EFS, Amazon FSx, Amazon S3)
  - AWS compute services (for example, Amazon EC2)

- Skills in:
  - Using SAP and database-specific migration tools (for example, backup and restore, database replication)
  - Using AWS native tools for migrations (for example, AWS Server Migration Service [AWS SMS], AWS Application Migration Service [CloudEndure Migration])

3.3 Perform a heterogeneous migration of SAP workloads to AWS.

- Knowledge of:
  - Migration process methodologies for heterogeneous migration (for example, SAP export/import with Software Provisioning Manager (SWPM), Software Update Manager - Database Migration Option (SUM-DMO) with System Move, third-party vendor tools)
  - AWS data transfer services (for example, Snowball, DataSync, S3 Transfer Acceleration)
  - Migration from anyDB to SAP HANA
  - DNS and AWS networking services (for example, Direct Connect, Site-to-Site VPN, Route 53, DNS)
  - AWS storage services (for example, Amazon EFS, Amazon FSx, Amazon S3)
  - AWS compute services (for example, Amazon EC2)

- Skills in:
  - Using SAP and database-specific migration tools (for example, export/import, SWPM, SUM-DMO)
  - Using AWS native tools for migrations (for example, AWS SMS, AWS Application Migration Service [CloudEndure Migration])

3.4 Optimize the migration of SAP workloads.

- Knowledge of:
  - Migration process methodologies
  - Data transfer optimization
  - Network optimization
  - AWS networking services (for example, Direct Connect, Site-to-Site VPN, Route 53)
  - AWS storage services (for example, Amazon EFS, Amazon FSx, Amazon S3)
  - AWS compute services (for example, Amazon EC2)
  - AWS automation tools (for example, Launch Wizard, CloudFormation, Systems Manager)

- Skills in:
  - o Deploying target SAP environments in an automated way
  - o Fine-tuning data transfer
  - o Architecting for migration acceleration

Domain 4: Operation and maintenance of SAP workloads on AWS

4.1 Monitor the underlying infrastructure of SAP environments on AWS for performance, availability, and security.

- Knowledge of:
  - o Performance monitoring of AWS services for SAP
  - o Availability monitoring of AWS services for SAP

- Skills in:
  - o Configuring custom metrics and alarms for SAP (for example, Amazon CloudWatch)
  - o Configuring alarm notifications and invoking actions (for example, Amazon Simple Notification Service [Amazon SNS])
  - o Installing and updating AWS Data Provider for SAP
  - o Monitoring API calls for accounts (for example, AWS CloudTrail)
  - o Monitoring and invoking responses for alerts (for example, Amazon GuardDuty)

4.2 Manage the data protection of SAP applications by using AWS native services.

- Knowledge of:
  - o RTO and RPO
  - o Backup and recovery strategies for SAP databases and applications
  - o Protection of data at rest and data in transit (for example, data encryption)
  - o Network traffic logging, monitoring, threat detection, and analytics
  - o IAM

- Skills in:
  - o Configuring and managing backup and restore of SAP databases by using database native tools and AWS Backint Agent for databases
  - o Managing S3 Lifecycle policies
  - o Configuring and managing Amazon Elastic Block Store (Amazon EBS) snapshots and Amazon Machine Images (AMIs)
  - o Automating backup of SAP components on AWS (for example, AWS Backup, AWS Storage Gateway)
  - o Configuring encryption for AWS storage and backup services and tools
  - o Creating and managing accounts, users, groups, access policies, and roles in IAM
  - o Implementing detective controls (for example, CloudTrail, CloudWatch, GuardDuty)

4.3 Perform routine and proactive maintenance activities for SAP applications on AWS.

- Knowledge of:
  - o Patch management of different operating systems, SAP applications, and databases
  - o Downtime management of SAP systems on AWS
  - o Basics of Linux and Windows clustering
  - o Architectures and administration for high availability and disaster recovery

- Skills in:
    - o Configuring and automating patching by using Systems Manager Patch Manager
    - o Managing downtime schedules by using Systems Manager maintenance windows
    - o Defining maintenance actions by using Systems Manager documents
    - o Restoring data from AWS sources (for example, EBS snapshots, AMIs)
    - o Operating and maintaining high-availability architectures (for example, application failovers, database failovers)
    - o Maintaining a disaster recovery landscape and performing disaster recovery drills
    - o Performing operations as code (for example, CloudFormation, Systems Manager, AWS Lambda)

4.4 Review and optimize the architecture of SAP environments on AWS on a regular basis.

- Knowledge of:
    - o AWS cost and usage monitoring tools (for example, AWS Trusted Advisor, AWS Pricing Calculator)
    - o Storage configurations and utilization monitoring for SAP workloads on AWS
    - o EC2 instance sizing for SAP applications and databases

- Skills in:
    - o Performing SAP capacity planning and reconfiguring AWS services
    - o Monitoring cost and usage with AWS tools (for example, Cost Explorer, AWS Budgets)

Appendix

Which key tools, technologies, and concepts might be covered on the exam?

The following is a non-exhaustive list of the tools and technologies that could appear on the exam. This list is subject to change and is provided to help you understand the general scope of services, features, or technologies on the exam. The general tools and technologies in this list appear in no particular order. AWS services are grouped according to their primary functions. While some of these technologies will likely be covered more than others on the exam, the order and placement of them in this list is no indication of relative weight or importance:

AWS services and features

Application Integration:
- Amazon Simple Notification Service (Amazon SNS)
- AWS Step Functions

Compute:
- Amazon EC2
- Amazon EC2 Auto Scaling
- AWS Lambda

Containers:
- Amazon Elastic Container Service (Amazon ECS)
- Amazon Elastic Kubernetes Service (Amazon EKS)

Cost Management:
- AWS Budgets
- AWS Cost and Usage Report
- Cost Explorer
- Reserved Instance reporting
- Savings Plans

Database:
- Amazon RDS (solution-specific and version-specific)

Developer Tools:
- AWS Cloud Development Kit (AWS CDK)
- AWS tools and SDKs

End User Computing:
- Amazon AppStream 2.0
- Amazon WorkSpaces

Management and Governance:
- AWS CLI
- AWS CloudFormation
- AWS CloudTrail
- Amazon CloudWatch
- AWS Compute Optimizer
- AWS Config

- AWS License Manager
- AWS Management Console
- AWS Personal Health Dashboard
- AWS Systems Manager
- AWS Trusted Advisor

Migration and Transfer:

- AWS Application Migration Service (CloudEndure Migration)
- AWS DataSync
- Migration Evaluator (formerly TSO Logic)
- AWS Server Migration Service (AWS SMS)
- AWS Snow Family
- AWS Transfer Family

Networking and Content Delivery:

- Amazon API Gateway
- Amazon CloudFront
- AWS Direct Connect
- AWS Global Accelerator
- Elastic Load Balancing
- AWS PrivateLink
- Amazon Route 53
- AWS Transit Gateway
- Amazon VPC

SAP on AWS Specific:

- AWS Backint Agent
- AWS Launch Wizard

Security, Identity, and Compliance:

- Amazon GuardDuty
- AWS Identity and Access Management (IAM)
- AWS Key Management Service (AWS KMS)
- AWS Security Hub
- AWS Shield
- AWS Single Sign-On
- AWS WAF

Storage:

- AWS Backup
- CloudEndure Disaster Recovery
- Amazon Elastic Block Store (Amazon EBS)
- Amazon Elastic File System (Amazon EFS)
- Amazon FSx for Windows File Server
- Amazon S3
- Amazon S3 Glacier
- AWS Snow Family
- AWS Storage Gateway

Out-of-scope AWS services and features

The following is a non-exhaustive list of AWS services and features that are not covered on the exam. These services and features do not represent every AWS offering that is excluded from the exam content. Services or features that are entirely unrelated to the target job roles for the exam are excluded from this list because they are assumed to be irrelevant.

Out-of-scope AWS services and features include the following:

Analytics:
- All services

Augmented Reality (AR) and Virtual Reality (VR):
- Amazon Sumerian

Blockchain:
- Amazon Managed Blockchain
- Amazon Quantum Ledger Database (Amazon QLDB)

Game Tech:
- All services

Internet of Things:
- All services

Machine Learning:
- All services

Management and Governance:
- AWS Console Mobile Application
- AWS OpsWorks

Media Services:
- All services

Quantum Technologies:
- All services

Robotics:
- AWS RoboMaker

Satellite:
- AWS Ground Station

Security, Identity, and Compliance:
- AWS CloudHSM
- Amazon Macie

Serverless:
- AWS AppSync
- Amazon DynamoDB
- AWS Fargate
- Amazon Simple Queue Service (Amazon SQS)