



AWS Certified Solutions Architect – Professional (SAP-C02)

Course Outline — Module Breakdown

This document provides the complete, bulleted module-wise outline following the 20-part masterclass structure for the **AWS Certified Solutions Architect – Professional (SAP-C02)** certification roadmap.

MODULE 01 — AWS Architecture & Well-Architected

- Deep dive into the 6 pillars of the AWS Well-Architected Framework (Operational Excellence, Security, Reliability, Performance Efficiency, Cost Optimization, Sustainability).
- Trade-off analysis, architectural anti-patterns, and implementing workloads using AWS Trusted Advisor and Well-Architected Tool.

MODULE 02 — IAM & Enterprise Security

- Advanced identity and access management for large enterprises.
- IAM Policies (Condition keys, Principal, NotAction) and Cross-Account Access via STS (AssumeRole).
- Identity Federation (SAML 2.0, OIDC), AWS IAM Identity Center (formerly SSO), and Permission Boundaries.

MODULE 03 — AWS Organizations & Multi-Account Architecture

- Enterprise scale management and governance.
- Organizational Units (OUs) and Service Control Policies (SCPs) inheritance and evaluation.
- AWS Control Tower, Guardrails (Preventive vs. Detective), and centralized logging/security tool account delegation.

MODULE 04 — VPC Production Architecture

- Building secure, scalable network foundations.
- Multi-tier VPC designs (Public, Private, Isolated subnets) and NAT Gateways vs. NAT Instances.
- VPC Endpoints (Interface endpoints via AWS PrivateLink vs. Gateway endpoints) and Route Tables architecture.

MODULE 05 — Advanced AWS Networking

- Connecting VPCs and hybrid cloud environments.
- AWS Transit Gateway (hub-and-spoke models, route tables, attachments) and VPC Peering limits and constraints.
- AWS Direct Connect (Dedicated/Hosted connections, Direct Connect Gateways) and Site-to-Site VPN with BGP.

MODULE 06 — Route 53 & Global Architecture

- Global traffic management and DNS design.
- Routing policies (Latency, Geolocation, Geoproximity, Weighted, Failover) and DNSSEC.
- Resolver endpoints (Inbound/Outbound forwarders) and multi-region active-active/active-passive architectures.

MODULE 07 — ALB, NLB, CloudFront, WAF

- Edge security, content delivery, and traffic distribution.
- Application Load Balancer (path/host-based routing, target groups) and Network Load Balancer (TCP/UDP, static IPs).
- Amazon CloudFront (origin shielding, Lambda@Edge / CloudFront Functions) and AWS WAF & Shield integration.

MODULE 08 — EC2 & Auto Scaling

- Virtual server management and elastic scaling strategies.
- Purchase options (Savings Plans, Reserved Instances, Spot Instances with interruption handling).
- AMI pipelines, Launch Templates, and Auto Scaling policies (Target Tracking, Step Scaling, Predictive Scaling).

MODULE 09 — ECS, ECR & Fargate

- Containerization at scale without operational overhead.
- Amazon ECS task definitions, container insights, and networking modes (awsvpc, bridge, host).
- AWS Fargate vs. EC2 launch types, ECR vulnerability scanning, and IAM task execution roles.

MODULE 10 — EKS + Serverless Architecture

- Kubernetes on AWS paired with event-driven serverless computing.
- Amazon EKS architecture (Control plane vs. Worker nodes) and IAM Roles for Service Accounts (IRSA).
- AWS Lambda (VPC integration, provisioned concurrency, Lambda layers) and AWS Step Functions for orchestration.

MODULE 11 — S3 & Storage Architecture

- Object storage governance, cost management, and hybrid file systems.
- S3 Storage Classes (Standard, Intelligent-Tiering, Glacier Flexible/Deep Archive) and Lifecycle Policies.
- S3 Object Lock (Compliance vs. Governance modes), Cross-Region Replication (CRR), and AWS Storage Gateway.

MODULE 12 — RDS, Aurora, DynamoDB & ElastiCache

- Choosing the right managed database engine.

- Amazon RDS Multi-AZ vs. Read Replicas and Aurora Global Databases.
- DynamoDB advanced design (Partition keys, Global Secondary Indexes, DAX) and ElastiCache (Redis cluster mode, caching strategies).

MODULE 13 — Advanced Database + DR

- Database migration, scaling, and failure survival.
- Database Migration Service (AWS DMS) with change data capture (CDC) and multi-region Aurora failover mechanisms.
- Database sharding patterns and point-in-time recovery (PITR).

MODULE 14 — High Availability & Disaster Recovery

- Enterprise business continuity planning.
- Defining RTO (Recovery Time Objective) and RPO (Recovery Point Objective).
- 4 DR strategies: Backup & Restore, Pilot Light, Warm Standby, and Multi-Site Active-Active.

MODULE 15 — AWS Security Architecture

- Threat detection, compliance, and encryption at scale.
- AWS KMS (Customer Managed Keys, key policies, rotation) and AWS Secrets Manager vs. Parameter Store.
- Amazon GuardDuty, AWS Security Hub, and Amazon Macie for sensitive data discovery.

MODULE 16 — Monitoring & Operations

- Full-stack observability and automated remediation.
- Amazon CloudWatch (Metrics, Logs, Anomaly Detection, Alarms) and AWS CloudTrail (Organization trails, log integrity validation).
- AWS Systems Manager (Parameter Store, Patch Manager, Session Manager) and AWS Config (Custom rules with AWS Lambda).

MODULE 17 — AWS DevOps & CI/CD

- Native automation pipelines and deployment strategies.
- AWS CodePipeline, CodeBuild, and CodeDeploy integration.
- Deployment strategies (Blue/Green, Rolling, Canary deployments with App Mesh or CodeDeploy traffic shifting).

MODULE 18 — Terraform & Infrastructure as Code

- Managing cloud infrastructure declaratively and securely.
- Terraform state management (Remote state via S3 + DynamoDB locking).
- Modules design, workspaces, variable management, and importing existing AWS resources.

MODULE 19 — Cost Optimization + Migration

- FinOps, cloud financial management, and lift-and-shift strategies.

- AWS Cost Explorer, AWS Budgets, Cost Allocation Tags, and Trusted Advisor cost recommendations.
- AWS Migration Hub, Application Discovery Service, and the 6 R's of migration (Rehost, Replatform, Refactor, Repurchase, Retain, Retire).

MODULE 20 — Professional Architecture Capstone

- Comprehensive end-to-end multi-tier enterprise architecture design.
- Synthesizing all prior modules into a mock enterprise case study.
- Designing a secure, highly available, fault-tolerant, and cost-optimized global financial or e-commerce platform from scratch.