Running Containers on Amazon Elastic Kubernetes Service (Amazon EKS)

Duration: 24 Hours (3 Days)

Course Overview

The Running Containers on Amazon Elastic Kubernetes Service (Amazon EKS) course is designed to equip learners with the skills necessary to deploy, manage, and scale containerized applications using Amazon EKS. Covering a range of topics from Container Fundamentals to Managing Upgrades in Amazon EKS, the course is comprehensive and provides hands-on labs to reinforce learning. Learners will gain a deep understanding of containers, Kubernetes, and the specifics of Amazon EKS, which will prepare them for real-world application deployment. The course also emphasizes Security, networking, and observability within EKS environments, crucial for maintaining robust and efficient systems. By the end of this AWS EKS course, participants will have the practical knowledge needed for EKS certification, positioning them to effectively utilize Amazon EKS in their cloud-native development projects.

Audience profile

The course provides comprehensive insights into deploying applications using Amazon EKS, catering to IT professionals interested in containerization and Kubernetes.

- Cloud Architects
- DevOps Engineers
- Software Developers
- Systems Administrators
- IT Managers
- Technical Leads
- Solution Architects
- Cloud DevOps Practitioners
- Infrastructure Engineers
- Application Support Specialists
- Network Engineers focusing on cloud infrastructure
- Security Specialists with an interest in container security
- Quality Assurance Engineers and Testers involved in CI/CD pipelines
- Technical Project Managers overseeing cloud-based projects
- Data Engineers deploying data-centric applications in Kubernetes environments

Course Syllabus

Day 1

Module 0: Course Introduction

- Course preparation activities and agenda

Module 1: Container Fundamentals

- Design principles for building applications

- Introduction to containers
- Components of a container
- Writing Dockerfiles

Module 2: Kubernetes Fundamentals

- Challenges of managing multiple containers
- Overview of Kubernetes and its importance
- Components of the Kubernetes control plane
- Kubernetes worker nodes and pods
- Key Kubernetes objects
- Managing Kubernetes using kubectl
- Hands-On Lab 1: Deploying Kubernetes Pods

Module 3: Amazon EKS Fundamentals

- How Amazon EKS manages the Kubernetes control plane
- Fundamentals of Amazon EKS security
- Extending Amazon EKS to the data plane: Use cases
- Running worker nodes in managed node groups
- Deploying containers on AWS Fargate with Amazon EKS
- Comparison: Amazon EKS tasks vs Kubernetes tasks

Module 4: Building an Amazon EKS Cluster

- Visual overview of the Amazon EKS architecture for labs
- IAM authentication fundamentals
- Amazon VPC and AWS networking basics
- Methods to create a cluster
- High-level cluster creation steps
- Introduction to eksctl
- Preparation for Labs: Reviewing lab activities for the course
- Hands-On Lab 2: Building an Amazon EKS cluster

Day 2

Module 5: Deploying Applications to Your Amazon EKS Cluster

- Publishing container images to Amazon ECR
- Deploying applications using Helm
- Implementing continuous deployment in Amazon EKS
- Introduction to GitOps with Amazon EKS
- Hands-On Lab 3: Deploying Applications

Module 6: Architecting on Amazon EKS - Part 1: Observability and Optimization

- Configuring observability in an Amazon EKS cluster
- Collecting and analyzing metrics
- Using metrics for EC2 Auto Scaling
- Managing and accessing logs

- Application tracing in Amazon EKS
- Insights from observability: Application and implementation
- Hands-On Lab 4: Monitoring Amazon EKS

Module 7: Architecting on Amazon EKS - Part 2: Efficiency, Resiliency, and Cost Management

- Optimizing Amazon EKS application architecture
- Balancing cost, efficiency, and resilience
- Cost anatomy of an Amazon EKS cluster
- Using tagging for pod placement and cost accountability
- Efficient container and worker node sizing

Day 3

Module 8: Managing Networking in Amazon EKS

- Review of Amazon VPC fundamentals
- Understanding communication components and their importance
- Communication flow in traditional vs Kubernetes architectures
- Networking challenges in Kubernetes
- Comparing Docker and Kubernetes communication models
- Simplifying inter-node communications with Amazon EKS and Amazon VPC
- Managing pod communication in Amazon EKS
- Communication scalability considerations
- Running worker nodes in non-associated subnets
- Managing service name resolution
- Leveraging service mesh solutions with Amazon EKS
- Configuring AWS App Mesh
- Hands-On Lab 5: Exploring Amazon EKS Communication

Module 9: Securing Amazon EKS Clusters

- Integrating IAM with Kubernetes RBAC
- Managing cluster endpoint access control
- Access auditing using AWS CloudTrail logs
- Mitigating container image build security risks
- Securing network communications
- Managing secrets in Amazon EKS
- Hands-On Lab 6: Securing Amazon EKS

Module 10: Managing Upgrades in Amazon EKS

- Understanding Kubernetes version updates vs Amazon EKS platform version updates
- Upgrading Kubernetes versions
- Upgrading Amazon EKS versions
- Maintaining third-party applications