



Running Containers on Amazon Elastic Kubernetes Service (Amazon EKS)

Course ID #: 7000-731-ZZ-Z

Hours: 21

Course Content

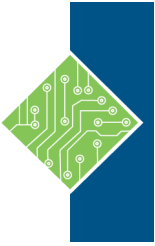
Course Description:

In this course, you will learn container management and orchestration for Kubernetes using Amazon EKS. Amazon EKS makes it easy for you to run Kubernetes on AWS without needing to install, operate, and maintain your own Kubernetes control plane. You will build an Amazon EKS cluster, configure the environment, deploy the cluster, and then add applications to your cluster. You will manage container images using Amazon Elastic Container Registry (ECR) and learn how to automate application deployment. You will deploy applications using CI/CD tools. You will learn how to monitor and scale your environment by using metrics, logging, tracing, and horizontal/vertical scaling. You will learn how to design and manage a large container environment by designing for efficiency, cost, and resiliency. You will configure AWS networking services to support the cluster and learn how to secure your Amazon EKS environment.

Course Objectives:

In this course, you will learn to:

- Describe Kubernetes and Amazon EKS fundamentals and the impact of containers on workflows.
- Build an Amazon EKS cluster by selecting the correct compute resources to support worker nodes.
- Secure your environment with AWS Identity and Access Management (IAM) authentication and Kubernetes Role Based Access Control (RBAC) authorization.
- Deploy an application on the cluster. Publish container images to Amazon ECR and secure access via IAM policy.
- Deploy applications using automated tools and pipelines. Create a GitOps pipeline using WeaveFlux.
- Collect monitoring data through metrics, logs, and tracing with AWS X-Ray and identify metrics for performance tuning. Review scenarios where bottlenecks require the best scaling approach using horizontal or vertical scaling.
- Assess the tradeoffs between efficiency, resiliency, and cost and the impact of tuning for one over the others. Describe and outline a holistic, iterative approach to optimizing your environment.
- Design for cost, efficiency, and resiliency.
- Configure AWS networking services to support the cluster. Describe how Amazon Virtual Private Cloud (VPC) supports Amazon EKS clusters and simplifies inter-node communications. Describe the function of the VPC Container Network Interface (CNI). Review the benefits of a service mesh.
- Upgrade your Kubernetes, Amazon EKS, and third party tools



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Prerequisites:

- Introduction to Containers
- Amazon Elastic Kubernetes Service (EKS) Primer
- AWS Cloud Practitioner Essentials (or equivalent real-world experience)
- Basic Linux administration experience
- Basic network administration experience
- Basic knowledge of containers and microservices

Target Audience:

- DevOps engineers
- Systems administrators

Topics:

Lesson 1: Course Introduction

- Course preparation activities and agenda

Lesson 2: Kubernetes Fundamentals

- Container orchestration
- Kubernetes objects
- Kubernetes internals

Lesson 3: Amazon EKS Fundamentals

- Introduction to Amazon EKS
- Amazon EKS control plane
- Amazon EKS data plane
- Fundamentals of Amazon EKS security
- Amazon EKS API

Lesson 4: Building an Amazon EKS Cluster

- Configuring your environment
- Creating an Amazon EKS cluster

Demo: Deploying a cluster

- Deploying worker nodes

Demo: Completing a cluster configuration

Preparing for Lab 1: Building an Amazon EKS Cluster

Lesson 5: Deploying Applications to Your Amazon EKS Cluster

- Configuring Amazon Elastic Container Registry (Amazon ECR)

Demo: Configuring Amazon ECR

- Deploying applications with Helm

Demo: Deploying applications with Helm

- Continuous deployment in Amazon EKS
- GitOps and Amazon EKS

Preparing for Lab 2: Deploying Applications



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Lesson 6: Configuring Observability in Amazon EKS

- Configuring observability in an Amazon EKS cluster
- Collecting metrics
- Using metrics for automatic scaling
- Managing logs
- Application tracing in Amazon EKS
- Gaining and applying insight from observability

Preparing for Lab 3: Monitoring Amazon EKS

Lesson 7: Balancing Efficiency, Resilience, and Cost Optimization in Amazon EKS

- The high level overview
- Designing for resilience
- Designing for cost optimization
- Designing for efficiency

Lesson 8: Managing Networking in Amazon EKS

- Review: Networking in AWS
- Communicating in Amazon EKS
- Managing your IP space
- Deploying a service mesh

Preparing for Lab 4: Exploring Amazon EKS Communication

Lesson 9: Managing Authentication and Authorization in Amazon EKS

- Understanding the AWS shared responsibility model
 - Authentication and authorization
 - Managing IAM and RBAC
- Demo: Customizing RBAC roles
- Managing pod permissions using RBAC service accounts

Lesson 10: Implementing Secure Workflows

- Securing cluster endpoint access
- Improving the security of your workflows
- Improving host and network security
- Managing secrets

Preparing for Lab 5: Securing Amazon EKS

Lesson 11: Managing Upgrades in Amazon EKS

- Planning for an upgrade
- Upgrading your Kubernetes version
- Amazon EKS platform versions

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