

**Running Containers on Amazon Elastic Kubernetes Service (Amazon EKS)**

**Course Number:** AWS-140
**Duration:** 3 days

**Overview**

This live, private Running Containers on Amazon Elastic Kubernetes Service (Amazon EKS) training course teaches teams how to manage containers and orchestrate Kubernetes using Amazon EKS.

Accelebrate is an AWS Training Partner (ATP) and this hands-on official AWS Classroom Training course is taught by an accredited Amazon Authorized Instructor (AAI).

**Prerequisites**

* Basic Linux administration experience
* Basic network administration experience
* Basic knowledge of containers and Kubernetes
* Completed the free online course [Amazon Elastic Kubernetes Service (EKS) Primer](https://www.aws.training/Details/eLearning?id=32894) or have the equivalent knowledge
* Ideally, completed an AWS Associate-level certification or have equivalent experience
* Students must have taken Accelebrate's [AWS Technical Essentials](file:////training/aws-technical-essentials) or have the equivalent knowledge

**Materials**

All AWS training students will receive comprehensive courseware.

**Software Needed on Each Student PC**

A modern web browser and an Internet connection free of restrictive firewalls, so that the student can connect by SSH or Remote Desktop (RDP) into AWS virtual machines.

**Objectives**

* Work with containers, Kubernetes, and Amazon EKS fundamentals and understand the impact of containers on workflows
* Build an Amazon EKS cluster by selecting the correct compute resources to support worker nodes
* Secure their environment with AWS Identity and Access Management (IAM) authentication by creating an Amazon EKS service role for your cluster
* Deploy an application on the cluster
* Publish container images to ECR and secure access via IAM policy
* Automate and deploy applications and examine automation 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
* Understand scenarios where bottlenecks require the best scaling approach using horizontal or vertical scaling
* Assess the tradeoffs between efficiency, resiliency, and cost and impact for tuning one over the other
* Describe and outline a holistic, iterative approach to optimizing your environment
* Design for cost, efficiency, and resiliency
* Configure the AWS networking services to support the cluster
* Describe how EKS/Amazon Virtual Private Cloud (VPC) functions and simplifies inter-node communications
* Describe the function of VPC Container Network Interface (CNI). Review the benefits of a service mesh
* Upgrade their Kubernetes, Amazon EKS, and third-party tools

**Outline**

* Introduction
* Container Fundamentals
	+ Design principles for building applications
	+ What are containers?
	+ Components of a container
	+ Writing Dockerfiles
* Kubernetes Fundamentals
	+ Challenges of managing many containers
	+ What is Kubernetes and why is it important?
	+ Components of the Kubernetes control plane
	+ Kubernetes worker nodes and pods
	+ Key Kubernetes objects
	+ Managing Kubernetes with kubectl
	+ Deploying Kubernetes Pods
* Amazon EKS Fundamentals
	+ How Amazon EKS manages the Kubernetes control plane
	+ Fundamentals of Amazon EKS security
	+ Use cases for extending Amazon EKS to the data plane
	+ Running worker nodes on managed node groups
	+ Running containers on AWS Fargate with Amazon EKS
	+ Amazon EKS tasks versus Kubernetes tasks
* Building an Amazon EKS Cluster
	+ Visual review of the Amazon EKS architecture to be built in labs
	+ IAM authentication
	+ Amazon VPC and AWS networking fundamentals
	+ Different methods to create a cluster
	+ High-level steps in cluster creation
	+ Function of eksctl
	+ Preparing for labs: Review the lab activities for the course
	+ Building an Amazon EKS cluster
* Deploying Applications to Your Amazon EKS Cluster
	+ Publishing container images to Amazon ECR
	+ Deploying applications with Helm
	+ Continuous deployment in Amazon EKS
	+ GitOps and Amazon EKS
	+ Deploying applications
* Architecting on Amazon EKS: Observe and Optimize
	+ Configuring observability in an Amazon EKS cluster
	+ Collecting metrics
	+ Using metrics to automatically scale EC2 Auto Scaling groups
	+ Managing logs
	+ Application tracing in Amazon EKS
	+ Gaining and applying insight from observability
	+ Monitoring Amazon EKS
* Architecting on Amazon EKS: Balancing Efficiency, Resiliency, and Cost
	+ Optimizing your Amazon EKS application architecture
	+ Relationship between cost, efficiency, and resilience
	+ Anatomy of an Amazon EKS cluster from a cost perspective
	+ Using tagging with pod placement for cost accountability
	+ Sizing containers and worker nodes efficiently
* Managing Networking in Amazon EKS
	+ Review: VPC fundamentals
	+ The importance of major communication components
	+ Communication flow in a noncontainerized architecture
	+ Challenges of network communication in Kubernetes
	+ Comparing the Docker communication solution with the Kubernetes model
	+ How Amazon EKS and Amazon VPC simplify inter-node communications
	+ Managing pod communication in Amazon EKS
	+ The relationship between communications and scalability
	+ Running worker nodes in a subnet not associated with the cluster
	+ Managing service name resolution
	+ Using a service mesh with Amazon EKS
	+ Configuring AWS App Mesh
	+ Exploring Amazon EKS Communication
* Securing Amazon EKS Clusters
	+ How IAM integrates with Kubernetes Role Based Access Control (RBAC)
	+ Managing cluster endpoint access control
	+ Auditing access with AWS CloudTrail logs
	+ Mitigating security risks during the build of a container image
	+ Securing network communications
	+ Managing secrets
	+ Securing Amazon EKS
* Managing Upgrades in Amazon EKS
	+ Contrasting Kubernetes version updates and Amazon EKS platform version updates
	+ Upgrading your Kubernetes version
	+ Upgrading your Amazon EKS version
	+ Maintaining your third-party applications
* Conclusion