Information Technology

Argo CD: Kubernetes Application Management

Course Introduction

Welcome to "Argo CD: Kubernetes Application Management," a five-day course designed to equip professionals with the skills needed to implement declarative GitOps workflows for Kubernetes applications. As organizations increasingly adopt Kubernetes, managing application states and ensuring consistency across environments becomes critical. This course dives deep into Argo CD's architecture, deployment strategies, and best practices for managing complex Kubernetes clusters. You will learn how to synchronize application states with Git repositories, automate rollouts, and monitor deployments effectively.

Through hands-on labs and real-world case studies, you will explore advanced topics such as progressive delivery strategies, canary deployments, and blue-green deployments. You will also learn how to integrate Argo CD with infrastructure-as-code tools like Terraform and Helm, ensuring seamless collaboration between development and operations teams. The course emphasizes practical application, enabling you to design scalable, secure, and maintainable GitOps workflows that align with modern DevOps practices.

By the end of this course, you will have the expertise to manage Kubernetes applications using Argo CD, fostering a culture of automation, collaboration, and continuous improvement. Whether you are a Kubernetes administrator, DevOps engineer, or cloud architect, this course provides the knowledge and skills necessary to excel in Kubernetes-based projects and drive innovation within your organization.

Target Audience

This course is ideal for Kubernetes administrators, DevOps engineers, and cloud architects involved in GitOps processes. It is particularly beneficial for professionals looking to deepen their Kubernetes expertise or those preparing for roles in cloud-native development.

Learning Objectives

- Understand the principles of GitOps and their role in Kubernetes application management.
- Install, configure, and manage Argo CD instances.
- Synchronize application states between Git repositories and Kubernetes clusters.
- Automate rollouts and rollbacks using progressive delivery strategies.
- Troubleshoot and optimize Argo CD deployments.

Course Outline

- **Day 01**

  Foundations of GitOps with Argo CD

  - Introduction to GitOps
    - Definition and importance of GitOps in Kubernetes.
    - Benefits of implementing GitOps workflows.
    - Overview of GitOps tools (Argo CD, Flux).
  - Introduction to Argo CD
    - Argo CD architecture and components.
    - Installing Argo CD on Kubernetes clusters.
    - Configuring Argo CD CLI and UI.
  - Interactive Session
    - Hands-on exercise: Deploy Argo CD on a Kubernetes cluster.
- **Day 02**

  Managing Application States

  - Understanding Application States
    - Declaring application states in YAML.
    - Connecting Git repositories to Argo CD.
    - Syncing application states with Kubernetes clusters.
  - Automating Rollouts
    - Configuring automated sync policies.

- Using health checks and sync status.
- Practical Exercise
  - Set up an Argo CD application and sync it with a Git repository.
- **Day 03**

  Progressive Delivery Strategies

  - Canary Deployments
    - Configuring canary releases with Argo CD.
    - Monitoring canary metrics.
  - Blue-Green Deployments
    - Setting up blue-green deployments.
    - Rolling back deployments safely.
  - Role Play
    - Implement a canary deployment strategy for a sample application.
- **Day 04**

  Integrating Infrastructure as Code

  - Automating Infrastructure Provisioning
    - Integrating Terraform with Argo CD.
    - Managing infrastructure configurations in version control.
  - Managing Secrets
    - Securing sensitive data with Kubernetes secrets.
    - Enforcing access controls.
  - Group Activity
    - Automate infrastructure provisioning using Terraform and Argo CD.
- **Day 05**

  Advanced Topics and Best Practices

  - Securing Argo CD
    - Configuring RBAC and authentication.
    - Protecting sensitive data with secrets management.
  - Scaling Argo CD
    - Optimizing performance with distributed clusters.
    - Handling large-scale GitOps workflows.
  - Best Practices and Real-World Examples
    - Reviewing best practices for GitOps with Argo CD.
    - Discussing real-world case studies and success stories.
  - Final Project Presentation: Comprehensive GitOps Workflow
  - Closing Remarks

Confirmed Sessions

FROM	TO	DURATION	FEES	LOCATION
May 25, 2025	May 29, 2025	5 days	4250.00 $	KSA - Riyadh
July 21, 2025	July 25, 2025	5 days	4250.00 $	UAE - Dubai
Oct. 6, 2025	Oct. 10, 2025	5 days	2150.00 $	Virtual - Online