Kubernetes & Openshift

Description

The objective of this training is to provide knowledge to the participants how Container technologies, which increasingly becoming popular, can be managed modernly in a production environment with high availability, fault tolerance, minimum human intervention, self-management and scaling characteristics.

First of all, the topics that will be discussed conceptually during the training are going to be covered with examples through the existing problems, the answers given to these problems and the alternative ones. The subjects that are conceptually explained and exemplified by utilizing different means will be put flesh on the bones through the open-source Kubernetes platform, generally accepted in the industry, and OpenShift product installed on Kubernetes platform. Thus, the participants will have the opportunity to master on the Kubernetes platform as well along with modern Cluster management and Container orchestration.

Training Benefits

- You will become acquainted with current Cluster management problems and inefficiencies.
- You will see how Containers are used in a production environment, which has been frequently used in the development environment.
- You will be familiar with modern Cluster management tools and techniques
- You will overcome the first learning barrier by getting to know the Kubernetes platform and will be able to cope better with the problems you may confront in the future.
- You will see how you can apply these modern tools introduced to your existing workflows. Additionally, you will have the knowledge that you will be able to adapt easily.

Audience

Developers, operators, quality/test engineers and software and system architects who wish to have strong foundations and practices on Kubernetes and OpenShift technologies

Topics

Motivation

In this section, the problems that cause us to need Cluster management and Container orchestration, the solutions to these problems and the advantages and disadvantages of these solutions will be discussed.

Modern Cluster and Application Management

Participants will gain information on how clusters and applications are managed in modern architectures. This information will be reinforced through sample scenarios. The topics lectured conceptually and exemplified with different tools in this section will help in understanding the structure of Kubernetes and OpenShift in the following sections.

Kubernetes – Basic Concepts

In this section, the basic concepts of Kubernetes (Pod, Replication Controller Deployment, Service, Labels, Namespace, Volumes, Config Map, Stateful Sets, Daemon Sets, Secrets, etc.) will be exemplified on an existing Kubernetes cluster.

Participants who will be familiar with the Kubernetes CLI and its basic notions will be deploying their first applications to Kubernetes in pairwise groups in an environment

prepared for them.

Kubernetes – Architecture

The main components (kubelet, kube-apiserver, kube-proxy, kube-scheduler, etc.) of the Kubernetes platform familiarized by the user will be explained with their basic functions, and the roles of Kubernetes in their life cycle will be conveyed to the participants for problem-solving purposes.

Installations of Simple Kubernetes Clusters

Studies will be carried out on how to build both the development environment and the test environments with `Minikube` and` kubeadm` tools.

OpenShift – Basic Concepts and Architecture

After familiarization with Kubernetes platform on which OpenShift is installed, the architecture of OpenShift and its basic concepts will be focused. How OpenShift handles Kubernetes will be understood by learning the task-sharing processes between them, the OpenShift's value-added services and their aims.

Kubernetes Networking

Studies will be carried out on how to build both the development environment and the test environments with `Minikube` and` kubeadm` tools.

Techniques, Tools and Tricks

The tools in the rich Kubernetes ecosystem and OpenShift will be introduced to the participants who have already become familiar with Kubernetes and OpenShift, the information about the most optimized techniques will be provided, and the most important and tricky parts of these techniques will be mentioned. At the end of this

section, the participants will be able to comprehend all aspects of the introduced technology and to save time in doing researches themselves.

End to End Transformation

Participants getting familiar with the Container orchestration by performing simple examples will reinforce the acquired theoretical and practical knowledge by working in pair groups along with the instructor and making a classic application stack run on Kubernetes and OpenShift.

Problem Solving

Common problems frequently encountered in Kubernetes and OpenShift will be introduced to the participants. Participants in groups will be expected to solve various problems in different types.

Outline

Gün 1:

- Container Orkestrasyona Giriş, Terminoloji ve Tarihçe
- Kubernetes'e Giriş
- Windows/macOS Kubernetes Kurulum Alternatifleri (Minikube, Docker for Windows)
- Linux Sunucuda kubeadm ile Kubernetes Cluster'ı kurulması
- Kubernetes Bileşenlerinin ve Mimarisinin İncelenmesi
- Kubernetes Objelerinin (pod, deployment, servis, vb) İncelenmesi
- Containerize Edilmiş bir Uygulamanın Kubernetes ile Ayağa Kaldırılması
- Pod Yaşam Döngüsünün Anlatılması
- Kubernetes Secret'ların İncelenmesi

- Workshop

Gün 2:

- Kubernetes ile Service Discovery
- Kubernetes Servis Tipleri (Cluster IP, NodePort ve Load Balancer)
- Ingress Controller
- Yüksek Erişilebilirlik Senaryoları (Affinity, Anti-Affinity Filtreleri)
- Kubernetes Networking Altyapısı
- Horizontal Pod Autoscaling
- Enterprise Kullanım Senaryoları – RBAC
- Cluster Bakımı ve Hata Ayıklama
- Helm Chart
- Kubernetes Operator
- Metrik Toplama (Prometheus) ve Gösterme (Grafana)

Gün 3:

- OpenShift'e Giriş
- Windows/macOS OpenShift Kurulumu (MiniShift)
- Linux Sunucuda OpenShift Cluster'ı kurulması
- OpenShift Cluster Mimarisi
- Metrik Toplama ve Gösterme
- Kubernetes ile Kurulmuş Bir Uygulamanın OpenShift ile Ayağa Kaldırılması
- Storage Yönetimi
- Network Yönetimi
- Yüksek Erişilebilirlik Senaryoları
- Autoscaling

Prerequisites

Docker Fundamentals