



# Kubernetes Bootcamp

4 days- Hands on

## Course Overview

Kubernetes is a Cloud Orchestration Platform, providing reliability, replication and stability, while minimizing resources for applications and services. This course guides students through the Kubernetes architecture, useful commands, containerization and Kubernetes best practices. Each student has access to their own high availability Kubernetes environment capable of demonstrating the “K8s” features discussed in the lecture portion of the course. This is a “Lab Intensive” hands-on course.

## What You'll Learn

Students will learn how to deploy services on Kubernetes. First you will learn the Kubernetes architecture, and functionality of each component. Following a review of containerization, and what it means to the Kubernetes platform you will deep dive into the *kubectl* command line utility, learning how to administer services on the Kubernetes Cluster. Students will follow a storyline, beginning with a newly installed K8s cluster, where they will deploy a new microservice from start to finish. The journey will take you through all the steps to deploy stateless and stateful services. You will deploy and test jobs, storage, and deployment services, learning how to manage K8s replication services. Troubleshooting and testing are taught as the course progresses. At the end of the class, you will experiment with deployment automation using Helm and Tiller. When completed, you will be able to develop, test, and run new services on a Kubernetes cloud.

### 1. Kubernetes Architecture

- Components
- Containers
- Pods
- Master Services
- Node Services
- K8s Services

### 2. kubectl Commands

- kubernetes namespace

- kubernetes context
- Contexts
- Kubernetes Resources

### **3. Pods**

- What is a Pod?
- Create, List, Delete Pods
- How to Access Running Pods
- Pod Wellness Tracking
- Managing Cloud Resource Consumption
- Volumes

### **4. Labels and Annotations**

- Labels
- Annotations

### **5. Networking**

- Packet Forwarding
- Services
- Network Plugins

### **6. Replica sets**

- ReplicaSet Function
- Deploying ReplicaSets
- Scaling ReplicaSets

### **7. DaemonSets**

- DaemonSet Purpose
- Managing DaemonSets
- Updating DaemonSets

### **8. Jobs**

- The K8s Job
- Work Queues

### **9. Configuration Files and Secrets**

- Config Maps
- Secrets
- Managing ConfigMaps and Secrets

### **10. Deployments**

- Deployment Object
- Updating Deployments

- Deployment Strategies

## **11. Storage**

- Storage Architecture
- K8s Stateful Service Architecture

## **12. Stateful Applications**

- Challenges with Stateful Services
- K8s Stateful Service Architecture

## **13. Application Examples**

- Enabling Resource Quota
- WordPress

## **14. Introduction to Helm and Tiller**

- Helm Introduction
- Charts

## **15. Monitor, Log, and Debug**

- How to Troubleshoot Kubernetes

## **LABS:**

01. Navigating the Kubernetes Lab Environment
02. Docker Refresher A Practical Docker Exercise
03. Launch Pod on Kubernetes
04. Run Create or Apply
05. Kubernetes Namespace
06. Kubernetes Context
07. The Kubernetes get Command
08. The Kubernetes describe Command
09. The kubernetes dashboard
10. K8s Keeps Pods Running
11. Listing-Pods, Deployments, Services
12. Creating a Pod Manifest
13. Creating and Deleting a Deployment
14. Liveness and Readiness Probe
15. AI Resource Definition and Controls
16. exec, cp, ConfigMap, Secrets
17. Building a Composite Pod
18. Listing Pods with Labels
19. Defining an Annotation
20. Port Forwarding with Kubernetes

21. Deploy network policy
22. Local Registry
23. ReplicaSet Fades into Abstraction
24. Creating a Composite Deployment
25. K8s Jobs
26. Exposing a Deployment
27. Scaling Imperative Declarative Autoscaling
28. Add a New Volume to a Pod
29. Add Blogging sidecar to webby
30. Write a Chart to Deploy Webby
31. Accessing and viewing Logs

### **Prerequisites** (not mandatory)

Basic Linux skills are helpful but not mandatory  
Familiarity with a text editor like vi, vim, or nano is helpful.

### **Who Should Attend**

Any company or individual who wants to advance their knowledge of the cloud environment, keep up with the most recent changes, and prepare themselves for the future of applications and services in the public or private cloud environment. Networking, general IT, devOps, systems, and storage folks would be a great fit.

### **Follow-on Courses** (not mandatory)

Ceph, available 3/31/2019