Introduction to Kubernetes (LFS158x)

Course Overview

Is your team beginning to use Kubernetes for container orchestration? Do you need guidelines on how to start transforming your organization with Kubernetes and cloud-native patterns? Would you like to simplify software container orchestration and find a way to grow your use of Kubernetes without adding infrastructure complexity? Then this is the course for you!

In this course, we will discuss some of Kubernetes' basic concepts and talk about the architecture of the system, the problems it solves, and the model that it uses to handle containerized deployments and scaling.

This course offers an introduction to Kubernetes and includes technical instructions on how to deploy a stand-alone and multi-tier application. You will learn about ConfigMaps and Secrets, and how to use Ingress.

Upon completion, developers will have a solid understanding of the origin, architecture and building blocks for Kubernetes, and will be able to begin testing the new cloud-native pattern to begin the cloud-native journey.

Course Instructors

Chris Pokorni is the founder of NQB8 Cloud Tech Consulting and an independent instructor for The Linux Foundation. Chris holds both CKA and CKAD certificates and teaches Kubernetes courses for Administrators and Application Developers. As a consultant for small and global enterprises alike, Chris led workshops and designed HA Middleware/ESB, Datacenter Monitoring and Hybrid Cloud Architecture solutions.

Audience

Containers are now being used in the entire lifecycle of an application, be it Development, Quality Assurance, or Production. As this course covers only the basics of Kubernetes, without going into too much detail, this course is for anyone who is using or planning to use containers in any form.

Prerequisites

Basic knowledge of Linux Command Line Interface (CLI) and container technology like Docker and rkt is required.

Course Length

2-3 hours per week for 14 weeks.

Course Learning Objectives

By the end of this course, you should be able to:

- Understand the origin, architecture, primary components and building blocks of Kubernetes.
- Set up and access a Kubernetes cluster using Minikube.
- Run applications on the deployed Kubernetes environment, and access the deployed applications.
- Understand the usefulness of Kubernetes communities, and how you can participate.

Course Outline

Welcome!

- Welcome!

Chapter 1. From Monolith to Microservices

- Introduction
- From Monolith to Microservices
- Knowledge Check
- Learning Objectives (Review)

Chapter 2. Container Orchestration

- Introduction
- Container Orchestration
- Knowledge Check
- Learning Objectives (Review)

Chapter 3. Kubernetes

- Introduction
- Kubernetes
- Knowledge Check
- Learning Objectives (Review)

Chapter 4. Kubernetes Architecture

- Introduction
- Kubernetes Architecture
- Knowledge Check
- Learning Objectives (Review)

Chapter 5. Installing Kubernetes

- Introduction
- Installing Kubernetes
- Knowledge Check
- Learning Objectives (Review)

Chapter 6. Minikube - Installing Local Kubernetes Clusters

- Introduction

- Knowledge Check
- Learning Objectives (Review)

Chapter 13. ConfigMaps and Secrets

- Introduction
- ConfigMaps and Secrets
- Knowledge Check
- Learning Objectives (Review)

Chapter 14. Ingress

- Introduction
- Ingress
- Knowledge Check
- Learning Objectives (Review)

Chapter 15. Advanced Topics

- Introduction
- Advanced Topics
- Knowledge Check
- Learning Objectives (Review)

Chapter 16. Kubernetes Community

- Introduction
- Kubernetes Community
- Knowledge Check
- Learning Objectives (Review)

Final Exam (Verified Certificate track only)

edX Platform

If you are using edX for the first time, we strongly encourage you to start by taking a free 'how to use edX' course that the team at edX has made available. In this course, you will learn how to navigate the edX platform, how to connect with other edX learners, how to answer problems on the edX platform, how grades work in edX courses, and how to complete your first course. Click here to register for "*DemoX*" and you will be on your way. You will find the edX platform simple and intuitive.

Getting Help

For any **technical issues** with the edX platform (including login problems and issues with the Verified Certificate), please use the **Help** icon located on the upper right side of your screen.

One great way to interact with peers taking this course and resolving any **content-related issues** is via the **Discussion Forums**. These forums can be used in the following ways:

- To discuss concepts, tools, and technologies presented in this course, or related to the topics discussed in the course material.
- To ask questions about course content.
- To share resources and ideas related to Kubernetes.

We strongly encourage you not only to ask questions, but to share with your peers opinions about the course content, as well as valuable related resources. The Discussion Forums will be reviewed periodically by the Linux Foundation staff, but it is primarily a community resource, not an 'ask the instructor' service.

To learn more tips on how to use them, read the following article: "*[Getting the Most Out of the edX Discussion Forums](#)*".

Course Timing

This course is entirely self-paced; there is no fixed schedule for going through the material. You can go through the course at your own pace, and you will always be returned to exactly where you left off when you come back to start a new session. However, we still suggest you avoid long breaks in between periods of work, as learning will be faster and content retention improved.

The chapters in the course have been designed to build on one another. It is probably best to work through them in sequence; if you skip or only skim some chapters quickly, you may find there are topics being discussed you have not been exposed to yet. But this is all self-paced and you can always go back, so you can thread your own path through the material.

Learning Aids

Besides simple exposition through text and figures, this course uses several additional methods to present the learning material, including demo videos, external resources, and knowledge check questions.

Audit and Verified Tracks

You can enroll into an audit or a verified track. In an audit track, you will have access to all ungraded course content: course readings, videos, and learning aids, but no certificates are

awarded when auditing. You will not be able to access any graded content (knowledge check questions at the end of each chapter, and the final exam).

In order to receive a certificate, you will need to obtain a passing grade (please refer to the "Grading" section below), verify your identity with edX, and pay a fee. Once all edX requirements have been met, you can download your certificate from the Progress tab.

To learn more about audit and verified tracks, visit edX Help Center > Certificates.

Grading (Verified Certificate track only)

At the end of each chapter, you will have a set of graded **knowledge check questions**, that are meant to further check your understanding of the material presented. The grades obtained by answering these knowledge check questions will represent **20%** of your final grade.

The remaining **80%** of your final grade is represented by the score obtained in the **final exam**. The final exam is located at the end of the course and it consists of 30 questions.

You will have a maximum of two attempts to answer each knowledge check and final exam question (other than True/False questions, in which case, you have only one attempt). You are free to reference your notes, screens from the course, etc., and there is no time limit on how long you can spend on a question. You can always skip a question and come back to it later.

In order to complete this course with a passing grade, you must obtain a passing score (knowledge check and final exam) of minimum 70%.

Course Progress and Completion (Verified Certificate track only)

Once you complete the course (including knowledge check questions and final exam), you will want to know if you have passed. You will be able to see your completion status using the **Progress** tab at the top of your screen, which will clearly indicate whether or not you have achieved a passing score.

Professional Certificate Program

Professional Certificate programs are a series of courses designed by industry leaders and top universities to build and enhance critical professional skills needed to succeed in today's most in-demand fields.

To learn more about the programs and courses offered by the Linux Foundation, click here.

About The Linux Foundation

The Linux Foundation provides a neutral, trusted hub for developers to code, manage, and

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scale open technology projects. Founded in 2000, The Linux Foundation is supported by more than 1,000 members and is the world's leading home for collaboration on open source software, open standards, open data and open hardware. The Linux Foundation's methodology focuses on leveraging best practices and addressing the needs of contributors, users and solution providers to create sustainable models for open collaboration.

The Linux Foundation hosts Linux, the world's largest and most pervasive open source software project in history. It is also home to Linux creator Linus Torvalds and lead maintainer Greg Kroah-Hartman. The success of Linux has catalyzed growth in the open source community, demonstrating the commercial efficacy of open source and inspiring countless new projects across all industries and levels of the technology stack.

As a result, the Linux Foundation today hosts far more than Linux; it is the umbrella for many critical open source projects that power corporations today, spanning virtually all industry sectors. Some of the technologies we focus on include big data and analytics, networking, embedded systems and IoT, web tools, cloud computing, edge computing, automotive, security, blockchain, and many more.

The Linux Foundation Events

The Linux Foundation hosts an increasing number of events each year, including:

- Open Source Summit North America, Europe, Japan and China
- Embedded Linux Conference + OpenIoT Summit North America and Europe
- Open Source Leadership Summit
- Open Networking Summit North America and Europe
- KubeCon + CloudNativeCon North America, Europe and China
- Automotive Linux Summit
- KVM Forum
- Linux Storage Filesystem and Memory Management Summit
- Linux Security Summit North America and Europe
- Cloud Foundry Summit
- Hyperledger Global Forum
- And many more.

To learn more about The Linux Foundation events and to register, click here.

The Linux Foundation Training

The Linux Foundation offers several types of training:

- Classroom
- Online
- On-site

- Events-based.

To get more information about specific courses offered by the Linux Foundation, click here.

The Linux Foundation Certifications

The Linux Foundation certifications give you a way to differentiate yourself in a job market that's hungry for your skills. We've taken a new, innovative approach to open source certification that allows you to showcase your skills in a way that other peers will respect and employers will trust:

- You can take your certification from any computer, anywhere, at any time.
- The certification exams are either performance-based or multiple choice.
- The exams are distribution-flexible.
- The exams are up-to-date, testing knowledge and skills that actually matter in today's IT environment.

For a list of currently offered certifications, click here.

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