LFS143x - Introduction to Service Mesh with Linkerd

Course Overview

The service mesh is an increasingly critical component of the cloud native ecosystem, with the Kubernetes ecosystem especially using service mesh projects to add reliability, security, and observability to applications.

In this course, you will learn the basics of the service mesh and the benefits that it provides, and gain concrete, hands-on skills using Linkerd, the open source, ultralight CNCF service mesh for Kubernetes. We'll take you all the way from "so what is a service mesh, anyways?" to "I'm running (or at least ready to run!) Linkerd in production", and hopefully have a little fun along the way. Whether you're responsible for a production Kubernetes application today, or simply have heard about this "service mesh thing" and want to find out what it's all about, we've got you covered. You will walk away with practical knowledge of an important cloud native technology which can be applied directly to any cloud native environment.

Course Learning Objectives

Once you've completed this course, you will understand what a service mesh is, what it's good for, and how it relates to the rest of the cloud native ecosystem. You'll understand how to use Linkerd to deliver on the service mesh value propositions of security, reliability, and observability to Kubernetes applications. Finally, you'll have the practical knowledge that you need to confidently run Linkerd in a production environment.

This course has hands-on labs. These sections will teach you how to use the Linkerd CLI and UI to deploy and operate Linkerd, as well as to secure, observe, and add reliability to your Kubernetes applications.

Finally, you'll become familiar with the open source community and ecosystem around Linkerd and how you can become not just a Linkerd user but a Linkerd contributor!

Prerequisites

To be successful, you should understand the core Kubernetes resource types (Service, Deployment, Pod, DaemonSet, etc.) and be comfortable reading and writing YAML.

In addition, you should also be comfortable working in a Linux terminal environment and with running a Kubernetes cluster on your computer or in the cloud.

It is also useful to be familiar with building container images and running them in Kubernetes using kubectl.

Audience

This course is designed for site reliability engineers, DevOps personnel, cluster administrators, and developers who want to learn more about Linkerd and service mesh.

Course Instructor(s)

Charles Pretzer is a Field Engineer at Buoyant, creators of Linkerd, where he helps organizations around the world successfully run Linkerd in their environments. He is a Certified Kubernetes Application Developer and has been working with Kubernetes for several years. Charles has over a decade of experience as a consultant and engineer in modern software environments.

Course Length

20 hours

Course Outline

Welcome!

- Welcome!

Chapter 1. What Is a Service Mesh?

- Introduction
- What Is a Service Mesh?
- Knowledge Check (Verified Certificate track only)
- Summary

Chapter 2. Linkerd and the Service Mesh Ecosystem

- Introduction
- Linkerd and the Service Mesh Ecosystem
- Knowledge Check (Verified Certificate track only)
- Summary

Chapter 3. Linkerd Architecture

- Introduction
- Linkerd Architecture
- Knowledge Check (Verified Certificate track only)
- Summary

Chapter 4. The Data Plane Starring Linkerd2-proxy

- Introduction
- The Data Plane Starring Linkerd2-proxy
- Knowledge Check (Verified Certificate track only)
- Summary

Chapter 5. The Linkerd Control Plane

- Introduction
- The Linkerd Control Plane
- Knowledge Check (Verified Certificate track only)
- Summary

Chapter 6. Linkerd Extensions

- Introduction
- Linkerd Extensions
- Knowledge Check (Verified Certificate track only)
- Summary

Chapter 7. Deploying Linkerd to a Kubernetes Cluster

- Introduction

- Deploying Linkerd to a Kubernetes Cluster
- Knowledge Check (Verified Certificate track only)
- Summary

Chapter 8. Getting "Golden Metrics" for Your Applications

- Introduction
- Getting "Golden Metrics" for Your Applications
- Knowledge Check (Verified Certificate track only)
- Summary

Chapter 9. Using Service Profiles for Per-Route Metrics

- Introduction
- Using Service Profiles for Per-Route Metrics
- Knowledge Check (Verified Certificate track only)
- Summary

Chapter 10. Retries and Timeouts

- Introduction
- Retries and Timeouts
- Knowledge Check (Verified Certificate track only)
- Summary

Chapter 11. Securing Your Application Communication with mTLS

- Introduction
- Securing Your Application Communication with mTLS
- Knowledge Check (Verified Certificate track only)
- Summary

Chapter 12. Canary and Blue-Green Deployments

- Introduction
- Canary and Blue-Green Deployments
- Knowledge Check (Verified Certificate track only)
- Summary

Chapter 13. Using Linkerd in Production

- Introduction
- Using Linkerd in Production
- Knowledge Check (Verified Certificate track only)
- Summary

Chapter 14. Course Summary and Next Steps?

- Introduction
- Course Summary and Next Steps
- Knowledge Check (Verified Certificate track only)
- Summary

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 service mesh and Linkerd.

We strongly encourage you to not only 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 additional methods to present the learning material, including hands-on exercises, video demonstrations and knowledge check questions (Verified Certificate track only).

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 20 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 our Professional Certificates, visit edX website.

About The Linux Foundation

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

Over 85,000 open source technologists and leaders worldwide gather at Linux Foundation events annually to share ideas, learn and collaborate. Linux Foundation events are the meeting place of choice for open source maintainers, developers, architects, infrastructure managers, and sysadmins and technologists leading open source program offices, and other critical leadership functions.

These events are the best place to gain visibility within the open source community quickly and advance open source development work by forming connections with the people evaluating and creating the next generation of technology. They provide a forum to share and gain knowledge, help organizations identify software trends early to inform future technology investments, connect employers with talent, and showcase technologies and services to influential open source professionals, media, and analysts around the globe.

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

- Open Source Summit North America, Europe, and Japan
- Embedded Linux Conference North America and Europe
- Open Networking & Edge Summit
- 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
- Linux Kernel Maintainer Summit
- The Linux Foundation Member Summit
- Open Compliance Summit
- 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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