Git for Distributed Software Development (LFD109x)

Course Overview

With Linux having thousands of developers spread worldwide, working on many different time zones and on various complex projects, it became imperative to coordinate and keep track of all that work in a rational way. Because Git was designed for that purpose, it has grown to be used by literally millions of other projects; it is the underpinning of most open source software work that is being done today.

The purpose of this course is to get you up and running and being able to contribute and use Git in a relatively short amount of time. We won't cover in great detail some of the most complicated workflows that you can run into if your team is already using Git, but upon course completion you should be able to understand what tools are needed to successfully handle more complex issues.

Let's begin the adventure of using Git and learn how to use it in our everyday work.

Course Learning Objectives

By the end of this course, you will learn the following:
- What Git is and how to install it.
- How to initialize a repository, make changes in it, make it available to others, and acquire and use the changes made by other individuals.
- How to find errors in your work and how to go back to a working copy to quickly identify the change that produced the error.
- Some essential Git procedures, such as cloning, branching, making commits, getting diffs, doing merges, and rebasing.
- Complicated workflows, so you understand how to approach them when problems arise.


Prerequisites

To make the most of this course, a Linux system is necessary. Either a physical or a virtual machine, and any modern distribution will work. You will need to have experience as a developer on any operating system. You will need some experience in working at the command line is not necessary, but would be helpful.

Lab exercises in this course are designed to work either on native hardware, or using a virtual machine (VM), under a hypervisor, such as those in the KVM, VMWare, or Virtual Box families. Detailed instructions to set up your lab environment are provided in the course.

Audience

This course is designed for computer users who have limited or no experience working in a Linux environment; and/or for those who already have done some work on Linux systems and are looking to gain a good grasp on Linux tools for software development.

Course Instructor(s)
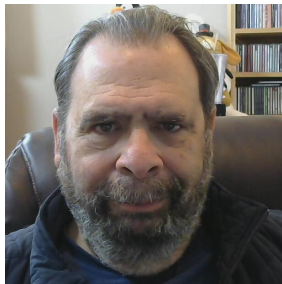
Jerry Cooperstein, Ph.D. has been working with Linux since 1994, developing and delivering training in both the kernel and user space. He has overall responsibility for all training content at The Linux Foundation. During a two-decade career in nuclear astrophysics, he developed state-of-the-art simulation software on many kinds of supercomputers and taught at both the undergraduate and graduate levels. Jerry joined The Linux Foundation in 2009. He is currently working as a Senior Content Manager for the Linux Foundation.

Course Length

15 hours

Course Outline

Welcome!

- Welcome!

Chapter 1. Introduction to Git

- Introduction
- Git Overview
- Lab Exercises
- Knowledge Check (Verified Certificate track only)

Chapter 2. Git Installation

- Introduction
- Git Installation
- Lab Exercises
- Knowledge Check (Verified Certificate track only)

Chapter 3. Git and Revision Control Systems

- Introduction
- Git and Revision Control Systems
- Lab Exercises
- Knowledge Check (Verified Certificate track only)

Chapter 4. Using Git: An Example

- Introduction
- Using Git: An Example
- Lab Exercises
- Knowledge Check (Verified Certificate track only)

Chapter 5. Git Concepts and Architecture

- Introduction
- Git Concepts and Architecture
- Lab Exercises
- Knowledge Check (Verified Certificate track only)

Chapter 6. Managing Files and the Index

- Introduction
- Managing Files and the Index
- Lab Exercises
- Knowledge Check (Verified Certificate track only)

Chapter 7. Commits

- Introduction
- Commits
- Lab Exercises
- Knowledge Check (Verified Certificate track only)

Chapter 8. Branches

- Introduction
- Branches
- Lab Exercises
- Knowledge Check (Verified Certificate track only)

Chapter 9. Diffs

- Introduction
- Diffs
- Lab Exercises
- Knowledge Check (Verified Certificate track only)

Chapter 10. Merges

- Introduction
- Merges
- Lab Exercises
- Knowledge Check (Verified Certificate track only)

Chapter 11. Managing Local and Remote Repositories

- Introduction
- Managing Local and Remote Repositories
- Lab Exercises
- Knowledge Check (Verified Certificate track only)

Chapter 12. Using Patches

- Introduction
- Using Patches
- Lab Exercises
- Knowledge Check (Verified Certificate track only)

Chapter 13. Advances Git Interfaces: Gerrit

- Introduction
- Advanced Git Interfaces: Gerrit

- Lab Exercises
- Knowledge Check (Verified Certificate track only)
- Course Feedback

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 git.

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 32 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](#).