



GuruTeam offers the full  
portfolio of **Linux Foundation™**  
Instructor-led courses  
*both on and off-site  
in Ireland and globally*



*Ireland's Only  
Linux Foundation™  
Authorized Training Partner*





# Linux System Administration (LFCS CERTIFICATION) GTLFCS

## Course Description

This official Linux Foundation™ instructor-led course, prepares the student to take the Linux Foundation Certified System Administrator® Certification (LFCS) exam, and will teach you everything you need to know to be an advanced systems administrator.

## You'll learn:

- How to administer, configure and upgrade Linux systems running one of the three major Linux distribution families: Red Hat, SUSE, Debian/Ubuntu.
- How to master the tools and concepts you'll need to efficiently build and manage an enterprise Linux infrastructure.
- How to use state-of-the-art system administration techniques in real-life scenarios via practical labs.

## Exam

One exam voucher will be included with your course fee. Exam is web proctored, on live Linux systems and can be taken anywhere you have reliable internet connectivity, certain other criteria apply.

## Duration

4 days

## Target Audience

IT Professionals with basic Linux knowledge who require the necessary skills and abilities to work as a professional Linux system administrator.

## Course Pre-Requisites

Students should have basic knowledge of Linux and its most common utilities and text editors. See GuruTeam course: [Fundamentals of Linux \(from the Linux Foundation\) - GTLFS1](#)

## Suggested Follow-on Courses

To progress your Linux Foundation Certification, you can take the LFCE – Linux Foundation Certified Engineer™ exam preparation course: [Advanced Linux System Administration and Networking \(LFCE CERTIFICATION\) – GTLFCE](#)

## Course Content

### 1. Introduction

#### 2. Linux Filesystem Tree Layout

- Data Distinctions
- FHS Linux Standard Directory Tree
- root (/) directory
- /bin
- /boot
- /dev
- /etc
- /home
- /lib & /lib64
- /media
- /mnt
- /opt
- /proc
- /sys
- /root
- /sbin
- /srv
- /tmp
- /usr
- /var
- /run

### 3. Processes

- Programs and Processes
- Process States
- Execution Modes
- Daemons
- Creating Processes
- Process Limits
- Process Monitoring
- Signals
- niceness
- Libraries

### 4. Package Management Systems

- Software Packaging Concepts
- RPM (Red Hat Package Manager)
- DPKG (Debian Package)
- Revision Control Systems

### 5. Package Installers

- Package Installers
- yum
- zypper
- APT

### 6. Partitioning and Formatting Disks

- Common Disk Types
- Disk Geometry
- Partitioning
- Naming Disk Devices
- Sizing up partitions
- Partition table editors

### 7. Linux Filesystems

- Filesystem Basics
- Available Filesystems
- Virtual Filesystem (VFS)
- Filesystem Concepts
- Disk and Filesystem Usage
- Extended Attributes
- ext4

- XFS
- btrfs
- Creating and Formatting Filesystems
- Checking and Repairing Filesystems
- Mounting Filesystems
- Swap
- Filesystem Quotas

### 8. RAID and LVM

- RAID
- RAID Levels
- Software RAID Configuration
- Logical Volume Management (LVM)
- Volumes and Volume Groups
- Working with Logical Volumes
- Resizing Logical Volumes
- LVM Snapshots

### 9. Kernel Services and Configuration

- Kernel Overview
- Kernel Configuration
- sysctl
- Kernel Modules
- Module Utilities
- Module Configuration
- udev and Device Management

### 10. User and Group Account Management

- User Accounts
- Management
- Passwords
- Restricted Shells and Accounts
- The root Account
- Group Management
- PAM (Pluggable Authentication Modules)
- Authentication Process
- Configuring PAM
- LDAP Authentication
- File Permissions and Ownership
- SSH

### 11. Networking

- IP Addresses
- Hostnames
- Network Devices
- ip and ifconfig
- Network Configuration Files
- Network Manager
- Routing

- DNS and Hostname Resolution
- Network Diagnostics

### 12. Firewalls

- Firewalls
- Interfaces
- firewallld
- Zones
- Source Management
- Service and Port Management

### 13. System Startup and Shutdown

- Understanding the Boot Sequence
- Grand Unified Boot Loader
- GRUB Configuration Files
- System Configuration Files in /etc
- The init Process
- systemd
- SysVinit Startup
- chkconfig and service
- Upstart
- Shutting down/Rebooting the System

### 14. Backup and Recovery Methods

- Backup Basics
- cpio
- tar
- Compression: gzip, bzip2 and xz and Backups
- dd
- rsync
- dump and restore\*\*
- mt\*\*
- Backup Programs

### 15. Local System Security

- Local System Security
- Creating a Security Policy
- Updates and Security
- Physical Security
- Filesystem Security
- Linux Security Modules

### 16. Basic Troubleshooting and System Rescue

- Troubleshooting Overview
- Things to Check: Networking
- Boot Process Failures
- Filesystem Corruption and Recovery
- Virtual Consoles
- Rescue Media and Troubleshooting
- System Rescue and Recovery



# Advanced Linux System Administration and Networking (LFCE CERTIFICATION)

*GTLFCE*

## Course Description

This official Linux Foundation™ instructor-led course prepares the student to take the Linux Foundation Certified Engineer® (LFCE) exam. Whether you're looking for certification, or need training to help transition to Linux from other platforms, or you're just brushing up on these vital admin and networking skills, this course will teach you what you need to know.

## You'll learn:

- How to design, deploy and maintain a network running under Linux.
- How to administer the network services.
- The skills to create and operate a network in any major Linux distribution.
- How to securely configure the network interfaces.
- How to deploy and configure file, web, email and name servers.

This course is designed to work with a wide range of Linux distributions, so you will be able to apply these concepts regardless of your distro.

## Exam

One exam voucher will be included with your course fee. Exam is web proctored, on live Linux systems and can be taken anywhere you have reliable internet connectivity, certain other criteria apply.

## Duration

4 Days

## Target Audience

System administrators and IT professionals who need to gain a hands-on knowledge of Linux network configuration and services as well as related topics such as basic security and performance.

## Course Prerequisites

Working knowledge of Linux Fundamentals and Linux System Administration. See GuruTeam courses *GTLFS1* and *GTLFCS*.

## Suggested Follow-on Courses

See additional Linux courses on this brochure. You can also visit our website to see over 35 Linux related courses in our learning portfolio:

<http://www.guruteamirl.com/unixlinux/>

## Course Content

### 1. Introduction

- Linux Foundation, Laboratory Exercises
- Distribution Details, Obtaining Class Solutions and Resources

### 2. Linux Networking Concepts and Review

- OSI Model Introduction and Upper Layers
- OSI Model Transport Layer
- OSI Model Network Layer
- OSI Model Lower Layers
- Network Topology
- Domain Name System
- System Services
- Managing System Services

### 3. Network Configuration

- Runtime Network Configuration
- Boot Time Network Configuration
- Intro to OpenVPN

### 4. Network Troubleshooting and Monitoring

- Network Troubleshooting
- Client-Side Troubleshooting
- Server-Side Troubleshooting
- Network Monitoring

### 5. Remote Access

- Remote Access History
- Intro to Cryptography
- Secure Remote Access
- Remote Graphics

### 6. Domain Name Service

- Overview Of DNS
- BIND (named) Server
- BIND Zone Configuration

### 7. HTTP Servers

- Apache
- Apache Configuration
- Apache Virtual Hosts
- Apache Security

### 8. Advanced HTTP Servers

- Mod Rewrite
- Mod Alias
- Mod Status
- Mod Include
- Mod Perl
- Performance Considerations

### 9. Email Servers

- Email Overview
- Postfix
- Dovecot

### 10. File Sharing

- FTP
- vsftpd
- rsync
- SSH Based Protocols
- Other Protocols

### 11. Advanced Networking

- Routing
- VLANs
- DHCP
- NTP

### 12. HTTP Caching

- Overview
- Squid Configuration

### 13. Network File Systems

- NFS
- SMB/CIFS
- Other Network File Systems

### 14. Introduction to Network Security

- Security Concepts
- Security Practices
- Security Tools

### 15. Firewalls

- TCP Wrappers
- netfilter Concepts
- Iptables Command
- Managing IPtables
- Advanced Firewalls

### 16. Virtualization Overview

- Virtualization History
- libvirt
- Docker Example

### 17. High Availability

- Overview
- DRDB

### 18. System log

- Overview

### 19. Package Management

- Installing from Source
- Package Management
- Packaging System Benefits
- Main Package Management Systems
- Role of Linux Distributions
- Building RPM Packages
- RPM Spec File Sections
- RPM Spec File Example
- Building Debian Packages

These courses can be delivered both on and off-site [www.GuruTeamIRL.com](http://www.GuruTeamIRL.com)



# Essentials of OpenStack Administration

## (ACCREDITED OPENSTACK FOUNDATION™ CERTIFICATION)

GTLFCOA

### Course Description

This official Linux Foundation™ course prepares the student for the “Certified OpenStack Administrator”, from the OpenStack Foundation™, the most recognised OpenStack Certification in the industry. The Linux Foundation is an Approved Training Partner to deliver the OpenStack COA certification training for the OpenStack Foundation™. This course will teach you everything you need to know to create and manage private and public clouds with OpenStack.

### You'll learn:

- The full range of OpenStack services, including deployment, administration, usage and distributed storage.
- How to deploy multiple distros and provision virtual machines using OpenStack services.
- How to create and deploy enterprise Infrastructure-as-a-Service.
- How to run and troubleshoot Neutron, Ceph and Nova Services, and much more.

### Exam

Exam is web proctored on live systems and performance based. One exam voucher will be included with your course fee, though you are entitled to a free re-take if required. Exams are web proctored on live systems and performance based.

### Duration

4 Days

### Target Audience

System Administrators who are primarily responsible for operating OpenStack clouds. Administrators and developers deploying applications and infrastructure on OpenStack will also benefit from this course.

### Course Prerequisites

Knowledge in Linux System Administration, concepts and administration for network, storage and virtual systems is useful. Basic Linux command line skills are required.

### Course Content

#### 1. Introduction

- Linux Foundation™ and the OpenStack Foundation™
- Linux Foundation Training
- Laboratory Exercises

#### 2. Cloud Fundamentals

- The Cloud
- Conventional Data Centre Architecture
- Virtualization
- Cloud Architecture
- Basic Tenets of Open Cloud Computing

#### 3. Managing Guests Virtual Machines with OpenStack Compute

- Using OpenStack Dashboard
- Using the python-novaclient Command Line Interfaces

#### 4. Components of an OpenStack Cloud

- General Introduction to OpenStack Components
- OpenStack Compute: Nova
- Overview of Hypervisor Backends
- OpenStack Image Service: Glance
- OpenStack Identity: Keystone
- OpenStack Block Storage: Cinder
- OpenStack Dashboard: Horizon

#### 5. Components of a Cloud – Part Two

- OpenStack Object Storage: Swift
- OpenStack Networking: Neutron
- OpenStack Monitoring: Ceilometer
- OpenStack Orchestration: Heat
- OpenStack DBaaS: Trove
- The Oslo Framework

#### 6. Reference Architecture

- Node Roles
- Best Practices
- Scalability

#### 7. Deploying Prerequisite Services

- Time Management: NTP
- Relational Database
- AMQP Server: RabbitMQ

#### 8. Deploying Services Overview

- Deploying A Service
- Deploying the Glance Image Service
- Deploying Networking with Neutron

#### 9. Advanced Software Defined Networking with Neutron

- An introduction to SDN
- Layer 2 Networking Primer
- An introduction to OpenFlow
- An introduction to Open vSwitch
- L3 and DHCP Primer
- An introduction to Linux Network Namespaces
- Understanding Neutron Packet Flows
- OpenStack Routing Models
- Neutron CLI Options

#### 10. Advanced Software Defined Networking with Neutron – Part Two

- Alternative Neutron Backends
- The Neutron ML2 framework

#### 11. Distributed Cloud Storage with Ceph

- Introduction to Ceph
- RADOS Block Device
- RADOS Gateway
- Deploying a 3-node Ceph Cluster
- Using Ceph RBD for Glance Image Storage
- Using Ceph RBD for Cinder Block Storage
- radosgw for Swift-Compatible Object Access

#### 12. OpenStack Object Storage with Swift

- OpenStack Object Storage: Swift

- Deploying a 3-node Swift Cluster
- Interacting with Swift

#### 13. High Availability in the Cloud

- An introduction to High Availability
- An introduction to the Pacemaker High Availability Stack
- Resource Management in Pacemaker
- Highly Available OpenStack Reference Architecture
- OpenStack VM High Availability

#### 14. Cloud Security with OpenStack

- Keystone Authentication Model
- Network Security
- Hypervisor Security

#### 15. Monitoring and Metering

- Deployment Considerations for Cloud Monitoring
- OpenStack Ceilometer
- Metering
- Billing

#### 16. Cloud Automation

- Cloud Deployment
- Cloud Configuration Management
- Puppet
- Chef
- Full-Scale Deployment Tools
- Razor
- Crowbar
- MaaS
- Juju
- Heat

#### 17. Conclusion

- Fundamentals
- Components
- Reference Architecture
- High Availability
- Other features
- Fundamentals
- Components
- Reference Architecture
- High Availability
- Other features

“Trainer was excellent, really knew his stuff. He sets the gold standard for trainers, would be great if all trainers were like him.”

April 2017

Check our website for scheduled dates [www.GuruTeamIRL.com](http://www.GuruTeamIRL.com)

# ENTERPRISE IT & LINUX SYSTEM ADMINISTRATION

## Linux System Administration (4-days)

LFCS CERTIFICATION *GTLFCS*

See page 2 of this brochure for details.

## Advanced Linux System Administration and Networking (4-days) LFCE CERTIFICATION *GTLFCE*

See page 3 of this brochure for details.

## Essentials of OpenStack Administration (4-days)

ACCREDITED OPENSTACK FOUNDATION™ CERTIFICATION *GTLFCOA*

See page 4 of this brochure for details.

“*Very good course. Good intro to Linux which was what I was looking for. Very approachable and knowledgeable instructor.*”

February 2017

## Fundamentals of Linux *GTLFS1*

This comprehensive Official Linux Foundation™ instructor-led course will give you a good working knowledge of Linux, from both a graphical and command line perspective, allowing you to easily navigate through any of the major Linux distributions. This class is designed for people who have little or no prior experience with Linux or Unix.

## Linux Security *GTLFS3*

This course will walk you through the many risks and threats that exist, show you how to use best practices and other open-source tools to mitigate or counteract those threats, and teach you what you need to know to detect and recover from those attacks that do happen. This advanced, completely hands-on course adopts a highly technical approach to cover important security techniques and tools.

## High Availability Linux Architecture *GTLFS4*

Uptime is critical, and this course will teach you the concepts and tools you need to maintain an extremely high level of availability for your Linux servers, even under heavy load. You can't afford to have mission-critical systems go down, and this course will teach you how to ensure that your servers stand up under even the most intense pressure. Developed for some of the largest Linux deployments in the world, this course will teach you how to create and maintain systems that allow for highly-available applications and much more.

## Linux Performance Tuning *GTLFS5*

This course will teach you the appropriate tools, subsystems, and techniques you need to get the best possible performance out of Linux. This course is designed to give you all the tools and techniques you need to keep your Linux systems running at optimal levels. These techniques and tools have been developed and tested in the most demanding high-performance computing environments.

## Linux Enterprise Automation *GTLFS6*

Automation lets you minimize costs by reducing manual operations, helps ensure compliance across the data centre, standardizes your software infrastructure and accelerates deployments for your bare-metal and cloud infrastructures. This course will teach you how to use automation to achieve these outcomes. In this course you'll learn everything you need to know to automate an enterprise Linux environment.

## Open Source Virtualization *GTLFS8*

Learn KVM from the ground up with a focus on QEMU and libvirt, as well as Xen. By the end of this course, you will understand how these and other related open source components can be assembled to create a virtual IT infrastructure. There is a focus on practical deployment skills, securing the virtual infrastructure, and administering solutions.

## Software Defined Networking with OpenDaylight *GTLFSDNO*

Software Defined Networking with OpenDaylight discusses: SDN, OpenDaylight, Tools such as mininet and Wireshark and Applications using OpenDaylight APIs. After completing this course, students will: Have a solid understanding of SDN and the protocols, tools and methods used; Understand the OpenDaylight SDN controller with its APIs and how it fits into SDN; Write applications on-top of the OpenDaylight APIs; Gained understanding of the tools to simulate and debug network topologies and more.

Check our website for scheduled dates [www.GuruTeamIRL.com](http://www.GuruTeamIRL.com)

# LINUX PROGRAMMING AND DEVELOPMENT TRAINING

## Introduction to Linux, Open Source Development and GIT

Linux is exploding, and the demand for Linux developers has never been stronger. This course will introduce you to the world of Linux development and a comprehensive understanding of GIT. This course will give you the background and training you need to start working with both Linux and GIT. If you've been thinking about getting into Linux development and GIT, this is the best place to start!

## Developing Applications for Linux *GTLF2*

Learn how to develop applications for the Linux environment. In this course, you'll get hands-on experience with the necessary tools and methods for Linux application development and learn about the features and techniques that are unique to Linux.

## Linux Kernel Internals and Development *GTLF3*

Learn how to develop for the Linux kernel. In this course you'll learn how Linux is architected, the basic methods for developing on the kernel, and how to efficiently work with the Linux developer community. If you are interested in learning about the Linux kernel, this is absolutely the definitive course on the subject.

## Developing Linux Device Drivers *GTLF4*

Learn how to develop device drivers for Linux systems. This course will teach you about the different types of Linux device drivers as well as the appropriate APIs and methods through which devices interface with the kernel.

## Linux Kernel Debugging and Security *GTLF5*

Learn the methods and internal infrastructure of the Linux kernel. This course focuses on the important tools used for debugging and monitoring the kernel, and how security features are implemented and controlled.

## Embedded Linux Development (4-days) *GTLF6*

This course will give you the step-by-step framework for developing an embedded Linux product. You'll learn the methods used to adapt the Linux kernel and user-space libraries and utilities to particular embedded environments, such as those in use in consumer electronics, military, medical, industrial, and auto industries.

## Inside Android: Intro to Android Internals (4-days) *GTLF7*

Get a hands-on tour of the internals of the popular Android operating system for mobile and other devices. This course will teach you the ins and outs of the Android anatomy, with a focus on hands-on experience.

**GuruTeam are specialists in delivering learning, mentoring & consultancy services in Linux, Cloud, OpenStack™, Big Data, Hadoop, DevOps, Database, Architecture, Software & Web Development Technologies**

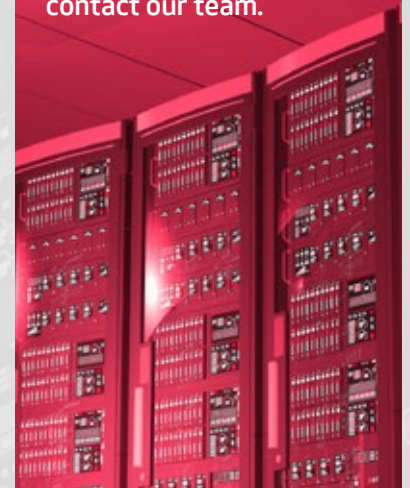
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Courses are designed to work with a wide range of Linux distributions, so you will be able to apply these concepts regardless of your distro.

Those who attend each entire course will receive a digital Certificate of Course Completion from the Linux Foundation™

Courses can be delivered both on and off-site.

We can build a custom course for you – just contact our team.



“ The training was very informative. I would completely recommend the course. It was extremely useful. ”

November 2016

### Contact us to learn more...

Tel: +353 (0)1 402 9423  
+353 (0)91 395 536

Neasa Glynn: +353 (0)87 413 2432

Catherine Ascough: +353 (0)87 832 8545

Email: [info@GuruTeamIRL.com](mailto:info@GuruTeamIRL.com)

### Dublin

Harcourt Centre,  
Block 4,  
Harcourt Road,  
Dublin 2,  
Ireland.

### Cork

NSC Campus,  
Mahon  
Cork,  
Ireland.

### Galway

Tara Rock 7,  
Galway  
Technology Park,  
Parkmore,  
Galway,  
Ireland.

### Belfast

Forsyth House,  
Cromac Square,  
Belfast  
BT2 8LA,  
Northern Ireland.

