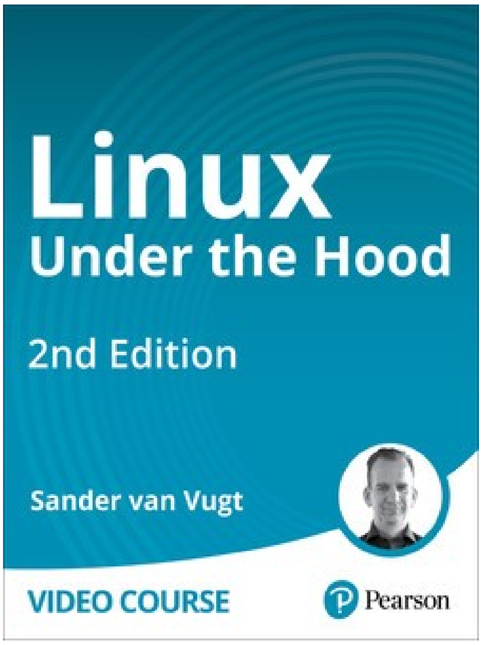

Linux Under the Hood, 2nd Edition

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Linux Under the Hood offers an extensive exploration of how Linux functions, allowing you to fully harness its capabilities. Familiarizing yourself with Linux internals will allow you to surpass mere commands and gain valuable insights to optimize your use of Linux. The first module dives into a deeper understanding of Linux architecture. The following module will focus on storage and filesystems. Next, we will cover core components, including memory, processes, and the intricacies of command execution. Finally, we will explore Linux's evolution into a container-based platform.

Module 1: Linux Architecture

Lesson 1: Core Linux Elements

Lesson 2: The Linux Boot Procedure

Lesson 3: Looking Closer at the Kernel

3.3 Managing and Tuning Kernel Modules
3.4 The /proc Pseudo Filesystem
3.5 Using /proc to get Detailed System Information
3.6 Reading Process Information in /proc
3.7 Tuning the Kernel through /proc/sys
3.8 Testing Critical Features with sysrq
3.9 Using Watchdogs
3.10 eBPF

Lesson 4: Systemd Taking Over

4.1 Manually Starting Systemd
4.2 Systemd Unit Files
4.3 Tweaking Unit Files
4.4 Mounting Filesystems with Systemd
4.5 Using Sockets
4.6 Scheduling Processes with Timers
4.7 Analyzing Systemd Performance
4.8 Advanced Dependency Handling
4.9 Managing Resource Allocation – Part 1
4.10 Managing Resource Allocation – Part 2
4.11 Managing Resource Allocation – Part 3
4.12 Creating Custom Units
4.13 Creating Custom Targets
4.14 Running User Processes in Systemd

Lesson 5: Hardware Handling

5.1 Understanding Device Nodes
5.2 Initializing Devices Automatically or Manually
5.3 Analyzing sysfs
5.4 Systemd-udevd
5.5 Creating Udev Rules

Module 2: Storage and Filesystems

Lesson 6: Storage Devices

6.1 Linux Storage Devices
6.2 Partitions: MBR and GPT
6.3 Managing Partitions
6.4 Images and ISO Files
6.5 Understanding Flexible Storage Solutions
6.6 Managing LVM Logical Volumes
6.7 Using LVM Features

6.8 Device Mapper

6.9 Manually Creating Device Mapper Storage

6.10 LVM and VDO

6.11 Stratis

6.12 Creating Encrypted Devices

6.13 Booting from Encrypted Devices

Lesson 7: Filesystems

7.1 Filesystems and the VFS

7.2 About POSIX and non-POSIX Filesystems

7.3 Linux Filesystem Components

7.4 Inodes and Block Allocation

7.5 Sparse Files

7.6 FUSE Filesystems

7.7 Next-generation Filesystems

7.8 Running ZFS on Linux

7.9 Running Btrfs

7.10 Using the Ext Filesystem Debugger

7.11 Managing XFS IDs

Lesson 8: Cloud and Datacenter Storage

8.1 Storage Challenges in Cloud and Datacenter

8.2 Working with SSD Media

8.3 Understanding iSCSI

8.4 Configuring iSCSI Storage

8.5 Connecting the Initiator

8.6 Object Storage

8.7 Configuring a Ceph Cluster

8.8 Configuring a Ceph Client

Module 3: Core Linux Components

Lesson 9: Memory Management

9.1 Linux Memory Allocation: Virtual vs. Physical Memory

9.2 Cache

9.3 Active and Inactive Memory

9.4 The Need to Swap

9.5 Configuring and Monitoring Swap Space

9.6 Managing Huge Pages

9.7 Managing Dirty Cache

9.8 Out of Memory (OOM) and Dealing with it

9.9 Analyzing Kernel Memory

Lesson 10: Processes

10.1 How a Process is Created

10.2 Processes and Threads

10.3 Killing a Zombie

10.4 Priorities, Schedulers, and Nice Values

10.5 Inter-process Communication, Sockets, Pipes, and More

10.6 Communicating on the D-Bus Message Interface

10.7 Monitoring IPC Usage

Lesson 11: Linux Commands and How They Work

11.1 Exploring What Happens When Commands are Executed

11.2 System Space and User Space

11.3 Understanding System Calls

11.4 How Processes get Access to System Calls

11.5 How Process Memory is Organized

11.6 Creating Processes

11.7 Allocating Memory

11.8 Accessing Libraries

11.9 Analyzing Library Usage

Lesson 12: Networking

12.1 Linux Network Device Names

12.2 The OSI Model

12.3 Transforming Data into Packets

12.4 Analyzing Packet Headers

12.5 IPv4 and IPv6

12.6 How Linux Chooses a Network Interface

12.7 Analyzing and Optimizing Networking

12.8 Bonding and Teaming

12.9 Network Bridge Devices

Module 4: Key Linux Components

Lesson 13: Containers are Linux, Linux is Containers

13.1 Running an Application on Linux

13.2 Running Applications in a Chroot Jail

13.3 Managing Linux Process Resource Allocation

13.4 Using unshare to run Namespaced Processes

13.5 Running Linux Applications with Namespaces and Cgroups

13.6 From Restricted Linux Applications to Containers

13.7 Container Runtimes

13.8 Systemd Containers

13.9 Containers and the Future of Linux

Lesson 14: The Code Behind Linux

14.1 The C Programming Language

14.2 Working Together in Git

14.3 From Git Project to Linux Distributions

14.4 C Programs: From Source Code to Binary

14.5 C and Libraries

14.6 Compiling a C Program from a Makefile