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# Linux Debug Training



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**Presenters:** John O'Sullivan and Manas Marawaha

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**Document source:** <https://github.com/SpecialistLinuxTraining/linux-debug-training/tree/main/Slides>

**Part-1 Demonstrations:** <https://www.udemy.com/course/linux-debug-training-part-1/?referralCode=6534D858AEF9555AB23F>

**Part-2 Demonstrations:** <https://www.udemy.com/course/linux-debug-training-part-2/?referralCode=1FAF95060F47194A895F>

# Presenters Introduction



## John O'Sullivan

John O'Sullivan is a software architect with over 30 years of experience, specializing in the development and optimization of Linux-based embedded systems. He has extensive hands-on expertise in hardware-software integration and product development across a wide range of industries.

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## Manas Marawaha

Manas Marawaha is a Principal Engineer with over 13 years of experience in embedded Linux software development. With a strong understanding of Linux internals, kernel programming, and device drivers, he brings extensive hands-on expertise in product development across audio, video, and networking domains.

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# Course information

- Example code demonstrated in the course is available on the [GitHub](#).
- For **document source**, please refer to this [link](#).
- For video demonstration, please refer to the following links.
  - [Linux Debug Training \(Part-1\)](#)
  - [Linux Debug Training \(Part-2\)](#)
- Demonstrations in the course use **Ubuntu (OS 22.04)**, **Arch Linux (2025.08.01)** and a Buildroot based installation on the **Raspberry-Pi**.
- Please review the [instructions](#) for building the course examples before proceeding.
- We value your **feedback and suggestions!** Please share them via email at [specialistlinuxtraining@gmail.com](mailto:specialistlinuxtraining@gmail.com).
- For corrections on the training material, feel free to raise [issues](#) and [pull request](#) in the GitHub repository.



# Course Outline

## Linux Debug Training (Part-1)

**Module 1:** Linux Operating System Architecture

**Module 2:** Basic Linux Analysis and Observability Tools

**Module 3:** Application Debugging

**Module 4:** Memory Issues in Linux Applications

## Linux Debug Training (Part-2)

**Module 5:** Tracing in Linux

**Module 6:** Profiling in Linux

**Module 7:** Linux Kernel Debugging



# Part-1 Synopsis

- Module 1 began with the Linux OS system itself, discussing the fundamental architecture and structure of the Linux operating system.
- In the second module of this course, we explored the Basic Linux Analysis and Observability Tools. We demonstrated how these foundational tools served as the first level of debugging and how they provided insights into the system's state and behavior.
- The third module of this course looked at how we could dissect application binaries with tools like binutils and how we could employ powerful debugging applications like GDB for more in-depth analysis.
- The fourth module was dedicated to addressing common memory issues in user-space applications, along with exploring related tools such as valgrind and sanitizers which are designed to detect and resolve these issues before the code is deployed.



## Part-2 Synopsis

- Module five takes a look at tracing in Linux. We cover userspace tools like strace, ltrace, uprobe and perf. We also look at kernel space tools like Kprobe, Perf, ftrace, eBPF, and LTTng.
- In the sixth module of this course, we will explore profiling in Linux looking at tools like massif, heaptrack and memusage to profile memory. We will investigate the use of callgrind, cachegrind and perf-stat for CPU and hardware profiling. We will also look at stacktrace profiling using eBPF profile, gprof and sysprof. And, we will look at how data visualization tools can complement our analysis.
- In the seventh and final module we take a comprehensive look at Kernel debugging, investigating Kernel OPPS, reviewing logging and SysRq, and using tools like KGDB. We will show Kernel recovery using Kexec and Kdump. And we will also examine many of the new tools that have emerged in recent years like: UBSAN, KCSAN and KASAN.