

Online Training on Embedded Linux Porting Hacks By Pradeep Tewani

Course Description

The course provides the deeper insights into Embedded Linux Platform to help with porting the Linux for Embedded Platforms. The fundamentals such as booting up the board, components involved in the boot up process, configuring & building the various images serve as the starting point to build the solid fundamentals. Further to this, the course provides the extensive hands-on for the booting up the kernel from various interfaces and the way to recover the bricked board. The course also briefs about the commonly used build Systems such as Buildroot & Yocto

Course Objective

The Embedded Linux Porting Hacks attempts to serve multiple objectives:

- To enable participants develop the stronghold on Embedded Linux boot up process
- To enable participant configure & build the required Embedded Linux Images
- To enable participants develop the understanding of U-boot Bootloader
- To enable participants boot up the kernel from various interfaces
- To provide the comfortability with Build Systems such as Buildroot Yocto

Target group:

Professionals/Students looking to get started with Embedded Linux Porting.

Pre-requisite

Knowledge of C Programming with comfortability in Linux environment

Methology

Every theoretical topic is accompanied by corresponding hands-on/assignment to get the deep understanding of the topic.

Assessment

Assignment Based

Learning Outcome

- Comfortability with configuring & compiling the Embedded Linux Images.
- Indepth understanding of Embedded Linux boot-up flow
- Recover the bricked board using the pre-built images
- Indepth understanding of how the various components are linked together
- Understand the bootargs to boot the kernel with various interfaces
- Comfortability with Embedded Linux Build Systems such as Buildroot and Yocto

Session 1: Getting comfortable with Embedded Linux System

- Embedded System Components
- Target board features
- Target board Images

Exercises/Assignments

- Booting Up with pre-built Images

Session 2: Understanding the Embedded Linux boot up flow

- Understand the booting up concept
- Basic Microcontroller Boot Flow
- PC Boot flow
- Target board boot up flow

Exercises/Assignments

- Recover the board using the u-boot
- Partitioning the SD Card
- Populating the RootFS

Session 3: Recovering the Bricked Board

- Understanding the U-boot Environmental Variables
- Understanding the need for ramdisk
- Booting up with Backup Partition

Exercises/Assignments

- Recovering the bricked board with serial interface
- Modifying the bootargs to boot up with back-up partition

Session 4: Bootloaders

- Bootloader Stages
- Bootloader design constraints
- Understanding U-Boot

Exercises/Assignments

- Saving the U-Boot environment in SD Card
- Adding the custom command in u-boot

Session 5: Linux Kernel Overview

- Configure & build the Kernel
- Understanding the various Kernel Configuration Options

Exercises/Assignments

- Minimizing the Kernel Size

Session 6: Playing around with Kernel Booting

- Understand the Initramfs & boot-up the kernel with the same
- Understand the NFS parameters
- Understand the basics of Device Tree Blob (DTB)

Exercises/Assignments

- Configure & build the Kernel with initramfs support
- Tweaking the bootargs to boot up with NFS rootfs

- Modifying & building the DTB to configure the platform specific features

Session 7: Embedded Linux Build Systems

- Need for Build Systems
- Popular Builsystems
- Brief about Buildroot & Yocto

Exercises/Assignments

- Build the BBB Image with Buildroot
- Build the BBB Image with Yocto

Session 8: Wrap Up

- Q & A
- Next Steps