Debugging Linux Applications

Course 106 – 24 Hours

Overview
Debugging Linux Applications is an advanced course for competent Linux programmers that wish to learn more about common failure modes of Linux applications and how to debug them with various tools and programming methods.

Course Objectives
Understand common Linux application failure modes and efficiently debug them using advanced methods.

Who Should Attend
Competent Linux programmers who wish to achieve a higher degree of understanding on common Linux application failure modes and advanced debugging techniques used to handle them.

Prerequisites
Participants must have completed Linux Programming course or have equivalent knowledge (e.g. student must be able to write a multi-threaded Linux application that use a mutex to protect a shared variable before taking this course).

Course Contents

A Course Introduction
- Course Objectives
- Course Delivery
- Course Practical
- Course Structure

- **Build time debugging assistance**
- Pre-processing info
- Debugging information
- ELF tools
- Symbols, name mangling and map files, problems regarding symbols
- Include paths, Lib paths
- Dynamic loading

- **Using the GDB debugger efficiently**
- GDB overview
- Useful commands
- Remote debugging

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- Automation
- Using Eclipse front end
- DDD

- **Stack structure**
- What can go wrong?
- Stacks and multi-threading
- Stacks and Signals

- **Dynamic allocations and memory leaks**
- Allocating memory without de-allocation
- De-allocating non allocated memory
- De-allocating already de-allocated memory
- Tools for detecting memory bugs

- **Multi-threaded applications**
- Synchronization mechanisms
- Shared resources and keeping data integrity

- **Programmed debug assistance**
- Preparing your code for efficient debug and trace
- Proper exception trapping and handling

- **Post-mortem activities**
- Debugging application at customer's site
- Core dumps, crash data

- **Debugging Tools**
- Debugging Tools
- Tracing Tools
- Profiling tools
- Misc. tools in the development process

- **Kernel Debugging**
- Kernel configuration for debug
- Debug with printk
- Debug with proc and sysfs
- debugfs
- kgdb
- Tracing Tools

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