

Android Media Development

Introduction:

This 3-day course gives developers an understanding of the Android Media implementation. The course is designed to aid developers who must implement codecs, drivers, or application software for media devices such as cameras and audio record/playback devices.

At Course Completion

At the end of the course, students should be able to describe the architecture and design of the Android media platform, including:

- Understand the Android media architecture
- Identify the components & roles of the Android media layers & components
- Understand how / when drivers are needed and written for media components
- Understand OpenMAX, at the application, intermediate, and development levels
- Understand the components of Stagefright (playback engine)
- Understand the role and interface of Awesome Player
- Understand how Java applications interact with media components
- Understand power management considerations for media elements

Prerequisites

Before taking this course, students should have the following skills:

- C Programming Language competency
- Java Programming Language competency
- Basic Android experience (at least as user application development level)
- Knowledge of basic hardware terms

Android Media Development

Course Outline

Introduction to Android Media Framework

- Overview of Media Components
- Media Server
- Surface Flinger
- Audio Flinger
- OpenMAX
- Binder IPC

OpenMAX Application Layer

- Media Player
- Media Recorder
- Media Scanner
- Java classes for media
 - CameraProfile

OpenMAX Integration Layer

- IL Components
 - Sources
 - Sinks
 - Codecs
 - Filters, etc.
- Loading components
- Controlling components
- Connecting components

OpenMAX Development Layer

- Need for acceleration in media
- Application domains of DL
 - Audio Codecs
 - Image Codecs
 - Image Processing
 - Signal Processing
 - Video Codecs

Native Development

- What is the NDK
- Installing the NDK
- Building the native code
- Invoking the native code
- Debugging native code

Android Media Development

Writing Codecs for OpenMAX

- OpenMAX IL Codecs
- HW vs. SW Codecs
- Plugins for Stagefright
- media_codecs.xml
- Media profiles (media_profiles.xml)
- Producing the .so shared library

Android Camera

- Camera framework
- HAL interface for cameras
- HAL v3 for cameras
- Camera kernel driver
- Camera service
- Application support for cameras

Stagefright

- Stagefright Architecture
- Components of Stagefright
- Media Extractor
- Awesome Player
- Time Synchronization
- OMX Subsystem

Android Permissions

- Permissions on Android
- Types of Permissions
- How Apps Request Permissions
- Media-related Permissions

Android Power Management

- Power strategy
- PM Driver
- Registering with the PM Driver
- Wake Locks
- Media components and PM
- Application power management
- Battery consumption expectations

Logging and Tracing

- Log Files & Tracing Mechanisms
- dmesg
- Logcat
- /dev/log
- Where is syslog
- Systrace tool