



## Embedded Android + Automotive 4 Days

Android Automotive OS is a version of Android tailored for In-Vehicle Infotainment (IVI) - navigation, vehicle status, audio, and more. The source code for Android Automotive is available as part of the Android Open Source Project (AOSP), on which this course is based.

Dieser Kurs wird in englischer Sprache durchgeführt.

### Listenpreis

3.350,00 € exkl. MwSt

3.986,50 € inkl. MwSt

### Dauer

4 Tage

### Leistungen Präsenz

- Schulung im Trainingscenter
- Verpflegung
- Teilnahmebestätigung / Zertifikat

### Leistungen bei VCL Training

- Technischer Support
- Online Zugang
- Teilnahmebestätigung / Zertifikat

### Ihre Ansprechpartnerin



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## Inhalte

- **Introduction to Android**
  - Android architecture: the big picture
  - The Android Open Source Project (AOSP)
  - Building Android from source
  - The impact of Project Treble
- **Creating a new Android product**
  - The structure of an Android device
  - Setting basic hardware characteristics
  - Integrating Linux and Kernel modules
  - Adding the product to the "lunch" menu
- **The kernel**
  - Looking at some Android-specific changes to Linux
  - Building Linux from source
- **Booting Android**
  - Options for storage layout
  - Flashing images using fastboot
  - Android init: events and services
  - Understanding run command (.rc) scripts
- **The Android build system**
  - Building a product from packages and modules
  - Android makefiles (Android.mk)
  - Android Blueprint files (Android.bp)
- **The Android framework**
  - Understanding Android services
  - The role of binder and AIDL
  - Adding a custom system service inside a persistent app
  - Accessing the service from a platform library
- **Security**
  - How Android permissions work and how to add your own
  - POSIX User ID and Group ID within Android



- Understanding and modifying SELinux policy files
- **The Hardware Abstraction layer**
  - HIDL - HAL Interfaces Definition language
  - Run-time linking and the Vendor Native Development Kit (VNDK)
  - The Vendor Interface (VINTF)
- **Testing: CTS and VTS**
  - Validating your Android implementation using the Compatibility Test Suite, CTS
  - Testing the Vendor HAL using the Vendor Test Suite, VTS
- **Android Automotive**
  - Android and IVI (In-Vehicle Infotainment)
  - The architecture of Android Automotive
  - Building Android Automotive from AOSP
- **The Vehicle HAL**
  - Interface to vehicle buses (e.g. CAN)
  - Defining and exporting Vehicle Properties
  - Subscribing to vehicle events
- **The Car API**
  - The Car Service
  - The android.car.\* classes
  - Writing system car applications
  - 3rd party car apps
- **Audio in Android Automotive**
  - Audio in normal Android
  - Audio policy configuration
  - Integrating Android audio with the vehicle audio system
- **The Exterior View System**
  - Meeting the 2 second boot requirement
  - The Exterior View System (EVS)
  - The EVS camera and display HALs

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### Ziele

The first part of the course gives a detailed background on the Android operating system. In this section, you will learn how to build Android from source and run the system images on the target device. You will learn about the Android security framework and SELinux policy. All code and examples are based on Android version 13 and covers the new hardware abstraction layers introduced in Project Treble.

Once the ground work is in place, the later topics show how the services and features that are part of Android Automotive provide the framework for an IVI system. You will begin by building Android Automotive from AOSP and then see how it integrates with vehicle networks, such as CAN bus, via the Vehicle HAL. You will also find out about the new Extended View System which ensures the video stream from the exterior cameras is presented to the driver within 2 seconds of powering up the device.

Roughly half of the course is taken by hands-on lab sessions during which you will apply the theory to create an Android Automotive device.

The course is available on-site (plus Traveling expenses from UK) or Online LIVE . On-site training takes place in your offices and will include an ARM-based development board for the labs. For the online version, we use a virtual classroom based on cloud instances and a browser UI, using the Cuttlefish emulator as the target.



## Zielgruppe

This course is ideal for system architects, engineers and project leaders who want to learn the details of Android Automotive.

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## Voraussetzungen

- Good knowledge of embedded Linux concepts, such as toolchain/bootloader/kernel/root filesystem
  - Good knowledge of Linux command-line tools such as make, grep, and find
  - Good knowledge of C/C++ and Java
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