

Linux/Android System Development

Android is often the platform of choice when planning industrial and consumer products that require a modern, multi-touch gesture-controlled user interface. One positive aspect is the common and familiar Android user interface. There are constellations in which Android, being an open source project, can easily be integrated into one's own products, which will then be able to run Android apps.

The ubiquity of Android in everyday life and its easy and fun operation mean, however, that the complexity, the necessary efforts and the risks of adaptation are usually systematically underestimated. This especially applies to products with long life cycles. And it applies even more when functions that are untypical for smartphones or tablets need to be implemented for use in an industrial context.

On the other hand, the closer the capabilities and functions of the product under development are to a smartphone or tablet, the easier it is to realize its operation under Android. The challenges start when using screen resolutions that do not conform with Android, or when adapting the power management policy. Things get even more complicated when trying to integrate „untypical“ hardware, for instance access to a CAN bus. That is why one will find devices with an Android operating system mainly in the fields of user terminals in building and industrial automation, mobile data entry systems, car entertainment and products from the consumer and telecommunications industries.

Integrating your own hardware

The starting point for porting a complete Android system onto your own hardware is the Android BSP provided by the hardware manufacturer. Besides developing concepts for the integration of hardware, emlix also provides support in building up an Android-specific development environment. This includes repositories and tooling, but also the Android build system as well as the integration of system tests, for instance the CTS (Compatibility Test Suite).



In the context of the board bring-up, we develop Linux/Android boot loaders, kernels and drivers as well as the optimization of vendor board support packages as the basis of a productable Android system.

The integration of additional hardware such as a measurement module or alternative components necessitates planning the changes across the entire framework. The

Linux / Qt – Alternative for Applications

For the development of a client /server based device control with a modern multitouch user interface Linux/Qt is a highly flexible solution. Functionalities like state machines or a multilingual user interface can be designed and implemented without the restrictions of a smartphone or tablet framework.

Another aspect is that system requirements are much lower than with Android. Transparency and controllability of the system are significantly higher.

interactions with other components of the system need to be dealt with.

emlix provides support with the analysis of the system's design, with the expansion and configuration of the BSP and with the adaptation of the software and the API at all levels.

Update „Over the Air“

The AOSP (Android Open Source Project) already includes a few mechanisms for safely updating the whole system wirelessly via WLAN (OTA, over the air). When developing products with Android and integrating additional hardware and interfaces, this update concept needs to be extended in order, for example, to transmit additional firmware to the device.

With our know-how and development services we help you modify the existing update functions and recovery mechanisms and expand them to suit your own needs.

The developer seminar „Linux/Android system architecture and porting“ offers a good overview of these themes and provides the basis for making an informed technology decision, for instance choosing between Linux/Android and Linux/Qt.

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Seminar: Android Porting

Goal of the seminar

The aim of the seminar is to provide you with a comprehensive overview of the Android system architecture and its specific components. The main focus is on the low-level layers, as well as on adapting and expanding it in order to port it onto your own hardware. The development of applications (apps) under Android is not part of the seminar.

Target group / Prerequisites

Developers and software architects with a good knowledge of Unix/Linux and C/C++/Java as well as knowledge of Linux system programming and kernel and driver development.

Content of the seminar

- Introduction to Android
- Structure of an Android system
- Android Open Source Project (AOSP)
- Adaptation of the AOSP for your own products
- Porting Android onto your own hardware
- Android-specific functions in the Linux kernel
- Android boot loader and update concept
- Android Debug Bridge (ADB)
- Android file system layout
- Android build system
- Native binaries / integration into build system
- System services and hardware abstraction
- Android framework
- API and Android application lifecycle
- Developing with Android SDK
- Integration of your own components
- Compatibility Test Suite (CTS)

Duration

Two days, 09:00 bis 17:00 and
09:00 bis 16:00