

Introduction to Android Internals Development (3 Days)

Audience Java and OO developers, and other technical professionals that need to understand the underlying internals of Android framework.

Course Abstract This course will have a goal of understand the core underlying internal components of the Android environment with the purpose of monitoring device user's activity. Topics in this series will include: memory management, Android security and permissions policy, protection level policies, overview of mobile data sharing strategies and security threats, illustrate ALL external access possibilities (phone, camera, microphone, etc), internal messaging and eavesdropping, external networking operations and vulnerabilities, use of device media and access interception abilities, location-based services and utilization, use of device sensors and

The culmination of this series will be the design, development and deployment an app that will build a security sandbox that controls and monitors device activities.

Objectives Upon conclusion, each participant will have acquired these skills:

- Understand the Android security framework and the role of permissions policy
- Discussion of OS loading sequences and use of bootloaders
- Discuss memory management with emphasis on restriction and threat modeling
- Illustrate how permissions enforced via Activity, Service, Broadcasts and Content Providers
- Depict Mobile Data Sharing strategies (MDM, EMM, etc) and discussion of specific mobile security threats
- Understand discretionary vs mandatory access controls
- Illustrate internal message architecture (IPC, RPC, AIDL, ICC) with emphasis on eavesdropping opportunities
- Understand how Android external networking (WiFi, Bluetooth, etc) occurs and explicit vulnerabilities (HTTPS, SSL, TLS, etc)
- Depict control of external URL via internalized white listings.
- Illustrate functionality of media abilities (audio, camera, phone, etc) and capabilities for monitoring and restricting such access
- Use of location-based content and utilization in Geofencing activities
- Understand sensor framework and accessibility options.

Prerequisites Each student should have a basic understanding of programming, OO languages preferably, and basic knowledge of Android environment.