

Android Programmierung leichtgemacht

Lars Vogel
Twitter: @vogella



Lars Vogel

Arbeitet als unabhängiger Eclipse und Android Berater und Trainer

Arbeit zusätzlichen für SAP AG als “Product Owner” in einem Mobile Team

Pflegt <http://www.vogella.de> mit Tutorials über Java, Eclipse and Android mit ~25 000 Besuchern pro Tag



During this presentation

- Android overview
- Android Programming
- Q&A



What is Android?



- Software stack based on Linux with a Java programming interface.
- Open Source
- Developed officially by the Open Handset Alliance lead by Google



On Android you develop in Java

Really?

Android Programming

A man with short brown hair and a beard is shown from the chest up, wearing a dark jacket. He has his hands pressed against his eyes, covering them completely. He is wearing a watch on his left wrist and a ring on his right ring finger. The background is dark and out of focus.

You use the Java
programming language
but Android does not run
Java Bytecode

Application runs on the Dalvik virtual machine

Tool dx **converts Java Bytecode** into **Dalvik Executable Code (.dex)**

Main target of Dalvik

Low memory
consumption and fast
execution

Overview of the API Capabilities

Rich UI components

Threads and Background Processing

Full network stack (Http, JSON)

Database and File System access

Access to the hardware (GPS, Camera, Phone)

and much more.....



Restrictions

Its a freaking phone



Developer Toolchain



Android Development Tools (ADT) for Eclipse

Eclipse based tooling

Windows

Linux (i386)

Mac OS (Intel)

A screenshot of the 'New Android Project' dialog box in Eclipse. The dialog has a blue title bar and a light beige background. It contains several sections: 'Contents' with three radio buttons, 'Location' with a text field and a 'Browse...' button, 'Samples' with a dropdown menu, 'Build Target' with a table of targets, and 'Properties' with four text fields. At the bottom are buttons for '< Back', 'Next >', 'Finish', and 'Cancel'.

New Android Project

Creates a new Android Project resource.

Project name:

Contents

- ☒ Create new project in workspace
- ☐ Create project from existing source
- ☒ Use default location

Location:

☐ Create project from existing sample

Samples:

Build Target

Target Name	Vendor	Platform	API...
☐ Android 1.5	Android Open Source Project	1.5	3
☐ Google APIs	Google Inc.	1.5	3
☐ Android 2.0	Android Open Source Project	2.0	5
☐ Google APIs	Google Inc.	2.0	5
☒ Android 2.1	Android Open Source Project	2.1	7
☐ Google APIs	Google Inc.	2.1	7

Standard Android platform 2.1

Properties

Application name:

Package name:

☒ Create Activity:

Min SDK Version:

Emulator



QEMU-based ARM emulator runs same image as a device

Use same toolchain to work with device or emulator

Initial startup is sloooooowwwwwww.....

Demo



Past

Present

Future

AndroidManifest.xml

- Central configuration file for your application
 - uses-permission: asked to uses something which requires permission
 - permissions: the new permissions that the app defines
 - instrumentation: the events that should be hooked
 - uses-library: defines the optional libraries which the app uses
 - uses-sdk: which SDK uses the application
 - application: defines activities, services, content provider and broadcast receiver

Android programming constructs



Main Android programming constructs



Activity

Views

Intents

Broadcast Receiver

Services

ContentProvider

Activity

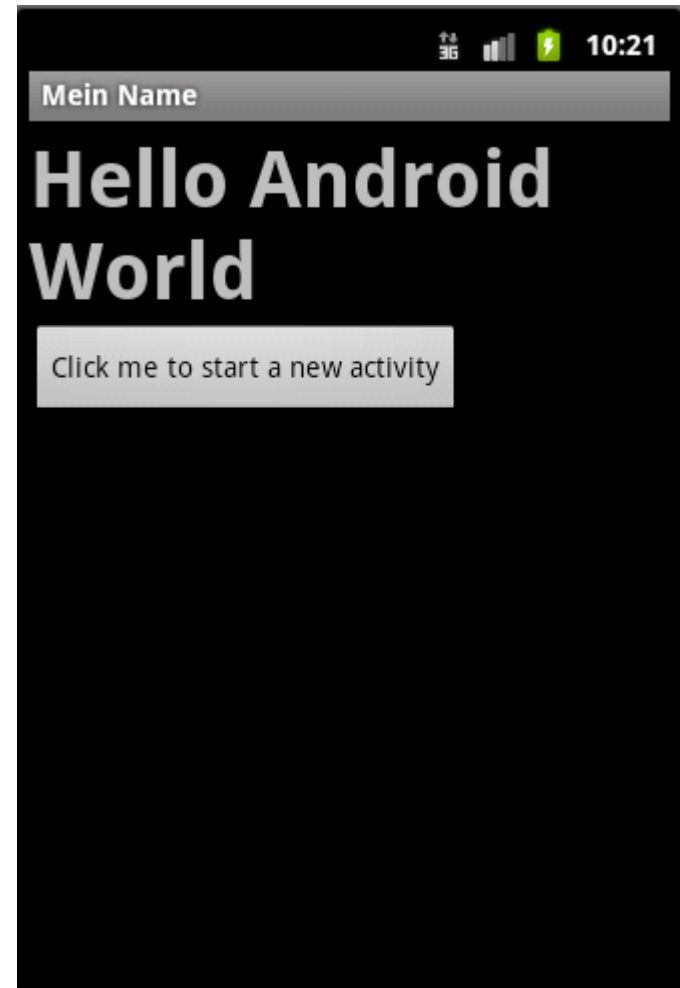


Activity

An activity is a single, focused thing that the user can do.

Extends “android.app.Activity”

Layout of Activity defines UI elements and their arrangements



Demo

Presentation Timer



Life Cycle of an Activity

```
void onCreate(Bundle savedInstanceState)
void onStart()
void onRestart()
void onResume()
void onPause()
void onStop()
void onDestroy()
```



Android may destroy you!

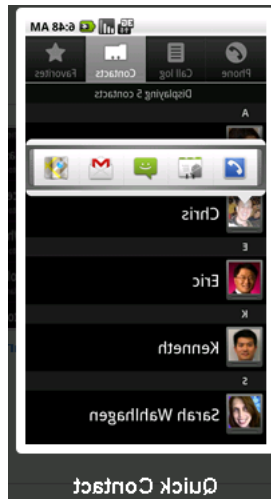
I had only the
best intents....



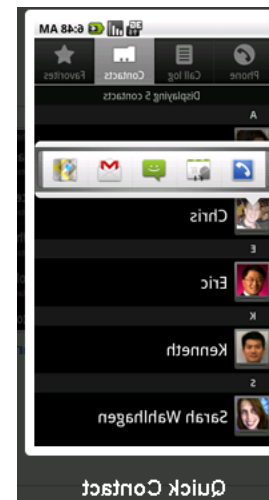
Intents - messages to tell the system to do something

- Two types

- Explicit: Asking someone to do something
- Implicit: Asking the system who can do something



Intent



Implicit Intents

- **`new Intent(Intent.ACTION_VIEW, Uri.parse("http://www.vogella.de"));`**
- **`new Intent(Intent.ACTION_CALL, Uri.parse("tel:(+49)12345789"));`**

Demo: Create and call the “Your are done” activity



A waiter in a formal tuxedo, consisting of a white dress shirt, a black bow tie, and a black vest, is holding a large, round, silver tray. The waiter is standing against a plain, light-colored wall. The word "Services" is overlaid on the right side of the image, in a white, sans-serif font with a blue glow effect.

Services

Services

Android provides a multitude of system services

- NotificationService
- VibratorService
- LocationService
- AlarmService
-

Access via `context.getSystemService(Context.CONST);`

You can define your own service.

Timer check Application

Lets alert!





Security

Each apps gets into own user and runs in its own process



Android Application requires explicit permissions, e.g. for

- DB access
- Phone access
- Contacts
- Internet
- System messages





There is more....

I can talk and
hear



Internet (java.net, Apache HttpClient, JSON...)
Bluetooth
Email
SMS
VoIP (SIP (Session Initiation Protocol))

I have
feelings



Camera API
Motion Detection
Location API (GIS)
Heat Sensor
Accelerator

Other Capabilities

Storage: File System / Preferences SQLiteDatabase

Push to device

Interactive Widgets on the homescreen

Live Wallpapers (as background)

Animations

Simple List handling

(Multi-) Touch

NFS



Performance?

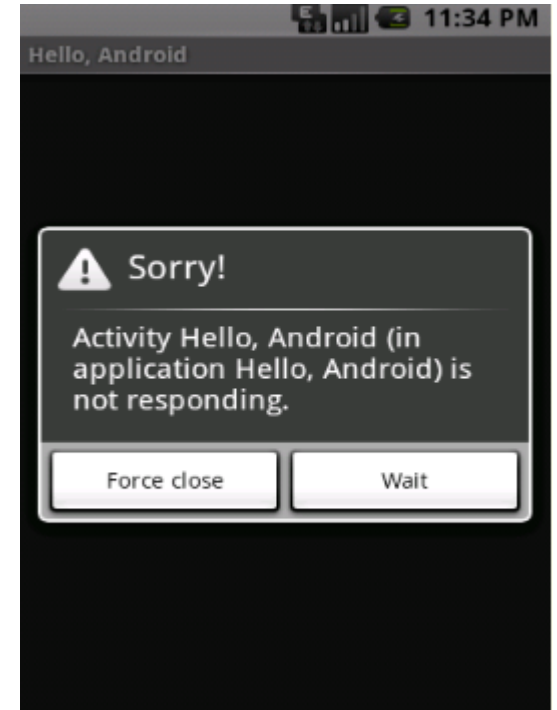


Be fast!

Avoid ApplicationNotResponding Error

Threads not allowed to modify the UI directly

Use handler or AsyncTask to update the UI after Thread is done



Summary

Android powerful and well-
designed development
platform

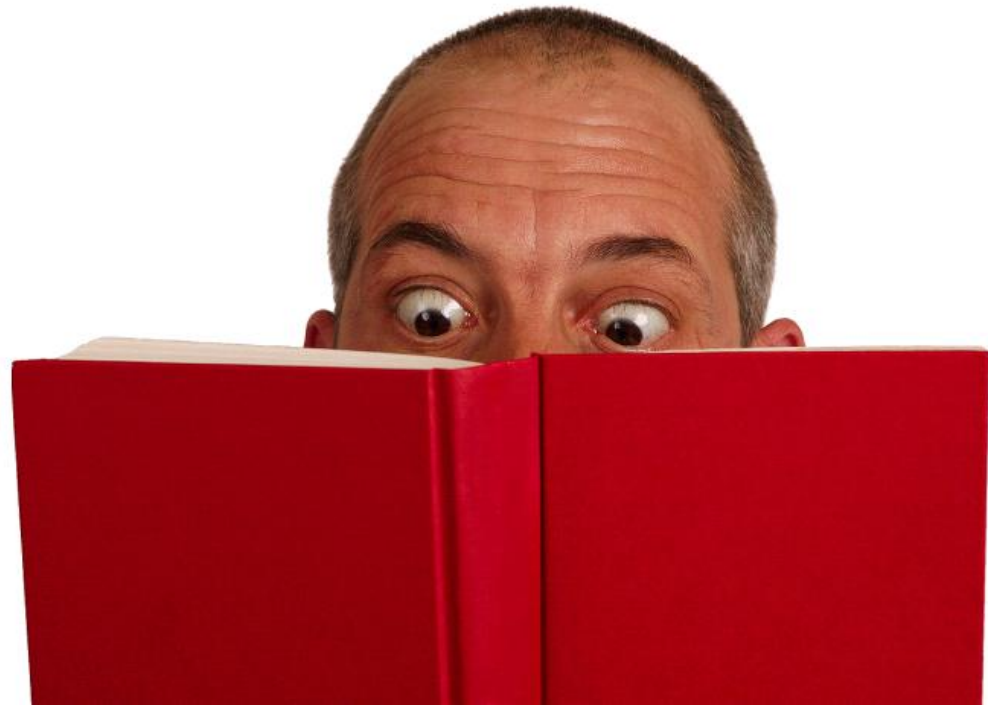
Power to the developer

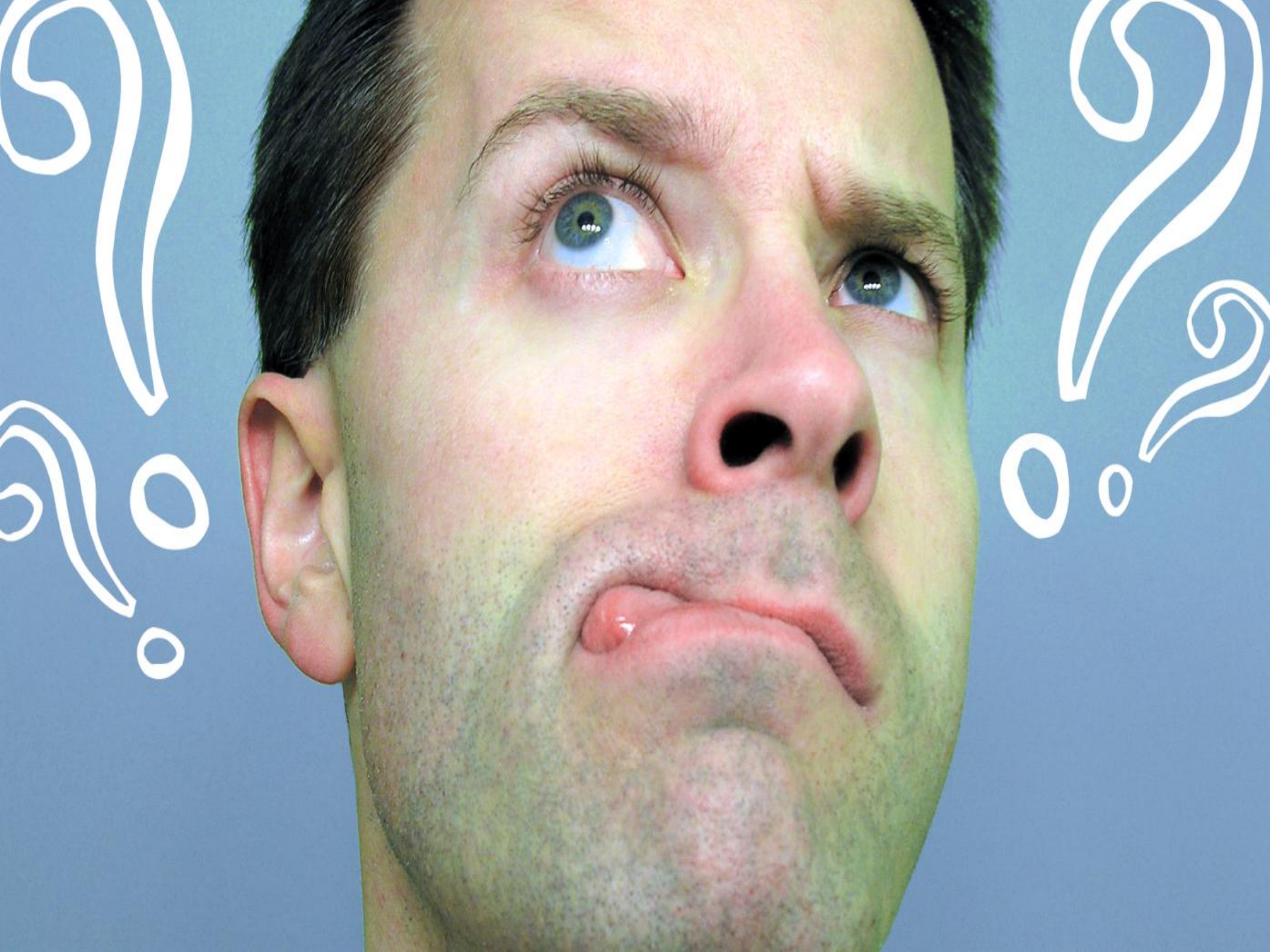


Android: Where to go from here:

Android Tutorial

<http://www.vogella.de/articles/Android/article.html>





Thank you

For further questions:

Lars.Vogel@gmail.com

<http://www.vogella.de>

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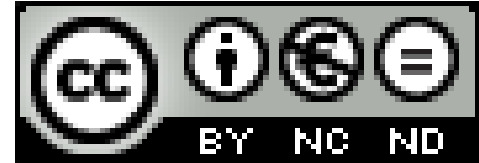
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