

Android

**101 on developing for Android,
the Open Mobile Platform
by Google.**

*Ask not what your android can do for you,
ask what you can do for your android!*

OSD Community Day 2009
Kenneth Solbjerg



Android History

- November, 2007
- G-Phone
- -> Open Source Mobile platform from Google

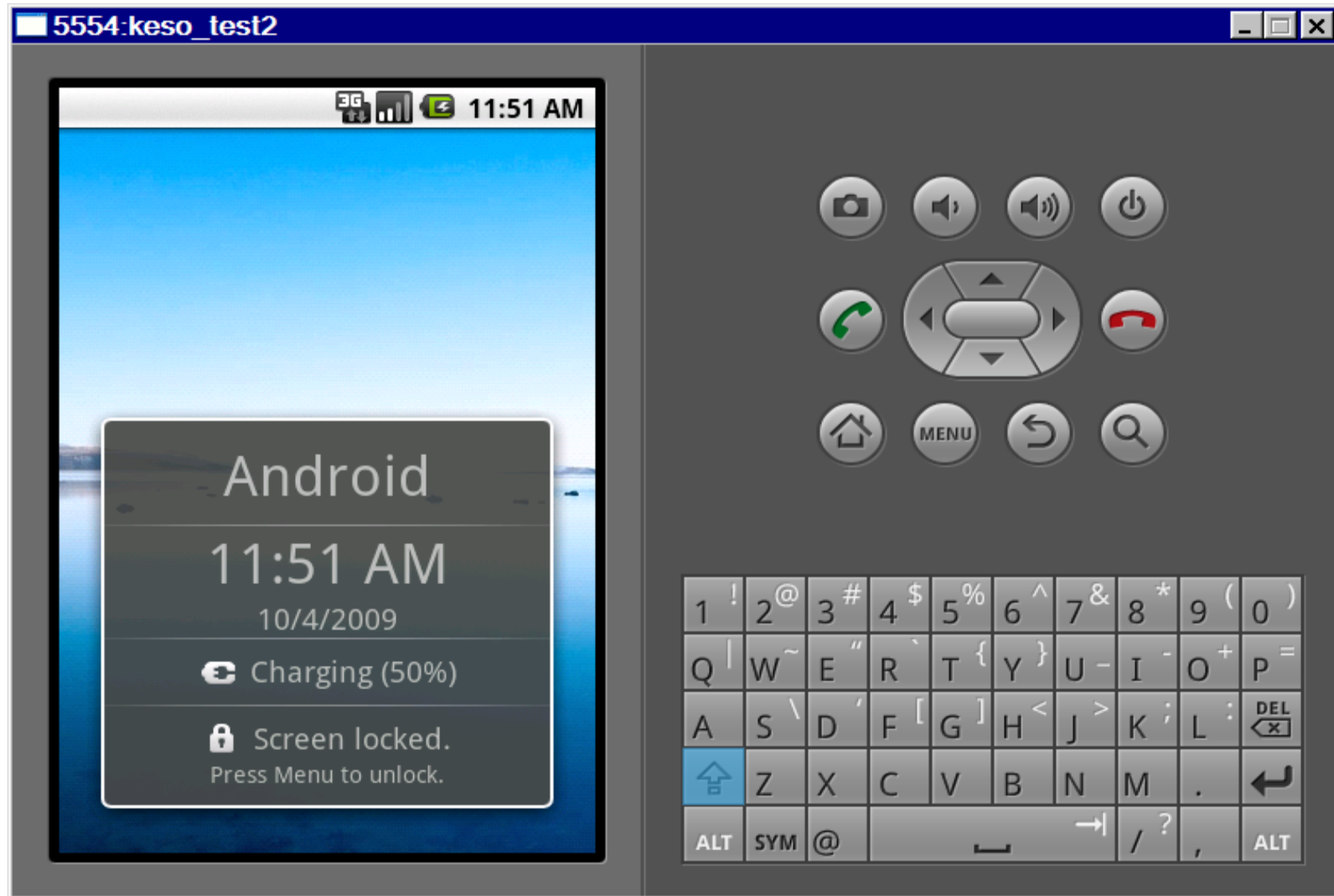
Platform Overview

- Linux Kernel
(2.6.27-a5504199 (htc-kernel@and18-2))
- Dalvik Virtual Machine
register-based virtual machine
- Dalvik Executable .dex files
- Android Package .apk file

Development Tools

- Android SDK, ex. Android Emulator
QEMU-based device-emulation tool
- Android Development Tools (ADT)
plugin for Eclipse
- Android NDK, Native Development Tool
- Android Scripting Environment (ASE)
Python, Perl, Lua, shell, etc.

Android Emulator



Android Development Tools

The screenshot displays the DDMS (Dalvik Debug Monitor Service) interface within the Eclipse IDE. The interface is divided into several panels:

- Devices:** A list of running processes on the emulator. The 'emulator-5554' device is online, and various system and application processes are listed with their PIDs.
- File Explorer:** A tree view showing the file system of the emulator. The 'system' directory is expanded, showing a list of APK files such as AlarmClock.apk, ApplicationsProvider.apk, Browser.apk, etc.
- Emulator Control:** A panel for controlling the emulator's telephony status, including voice and data settings, and telephony actions like incoming numbers and voice/SMS.
- LogCat:** A panel showing the system log. The log entries include messages from the JDWP (Java Debug Wire Protocol) and dalvikvm (Dalvik VM), such as 'JDWP shutting down net...', '+++ peer disconnected', and 'Debugger has detached; object registry had 1 entries'.

Name	Size	Date	Time	Permissi...	Info
data		2009-09-17	08:58	drwxrwx-x	
sdcard		1970-01-01	00:00	d--rwxr-x	
system		2009-09-15	03:17	drwxr-xr-x	
app		2009-09-15	03:24	drwxr-xr-x	
AlarmClock.apk	232289	2009-09-15	03:21	-rw-r--r--	com.andr...
ApplicationsProvider.apk	14563	2009-09-15	03:21	-rw-r--r--	com.andr...
Browser.apk	12118...	2009-09-15	03:24	-rw-r--r--	com.andr...
Calculator.apk	82669	2009-09-15	03:21	-rw-r--r--	com.andr...
Camera.apk	551038	2009-09-15	03:21	-rw-r--r--	com.andr...
Contacts.apk	502203	2009-09-15	03:24	-rw-r--r--	com.andr...
ContactsProvider.apk	49090	2009-09-15	03:21	-rw-r--r--	com.andr...
CustomLocale.apk	18292	2009-09-15	03:21	-rw-r--r--	com.andr...
Development.apk	97458	2009-09-15	03:24	-rw-r--r--	com.andr...
DownloadProvider.apk	70725	2009-09-15	03:21	-rw-r--r--	com.andr...
DrmProvider.apk	14295	2009-09-15	03:21	-rw-r--r--	com.andr...
Email.apk	542030	2009-09-15	03:21	-rw-r--r--	com.andr...
EnhancedGoogleSearchProvider.apk	145459	2009-09-15	03:24	-rw-r--r--	com.goo...
Fallback.apk	8956	2009-09-15	03:21	-rw-r--r--	com.andr...
GestureBuilder.apk	23528	2009-09-15	03:21	-rw-r--r--	com.andr...
GlobalSearch.apk	85834	2009-09-15	03:21	-rw-r--r--	com.andr...
HTMLViewer.apk	10347	2009-09-15	03:21	-rw-r--r--	com.andr...
LatinIME.apk	202238	2009-09-15	03:21	-rw-r--r--	com.andr...
Launcher.apk	809532	2009-09-15	03:21	-rw-r--r--	com.andr...
MediaProvider.apk	38742	2009-09-15	03:21	-rw-r--r--	com.andr...
Mms.apk	568831	2009-09-15	03:21	-rw-r--r--	com.andr...

Time	pid	tag	Message
10-04 12:57...	D 1007	jdwp	JDWP shutting down net...
10-04 12:57...	D 1007	jdwp	+++ peer disconnected
10-04 12:57...	I 1007	dalvikvm	Debugger has detached; object registry had 1 entries
10-04 12:57...	D 1007	dalvikvm	VM cleaning up
10-04 12:57...	D 1007	dalvikvm	LinearAlloc 0x0 used 665260 of 4194304 (15%)

Dalvik Debug Monitor Service (ddms)

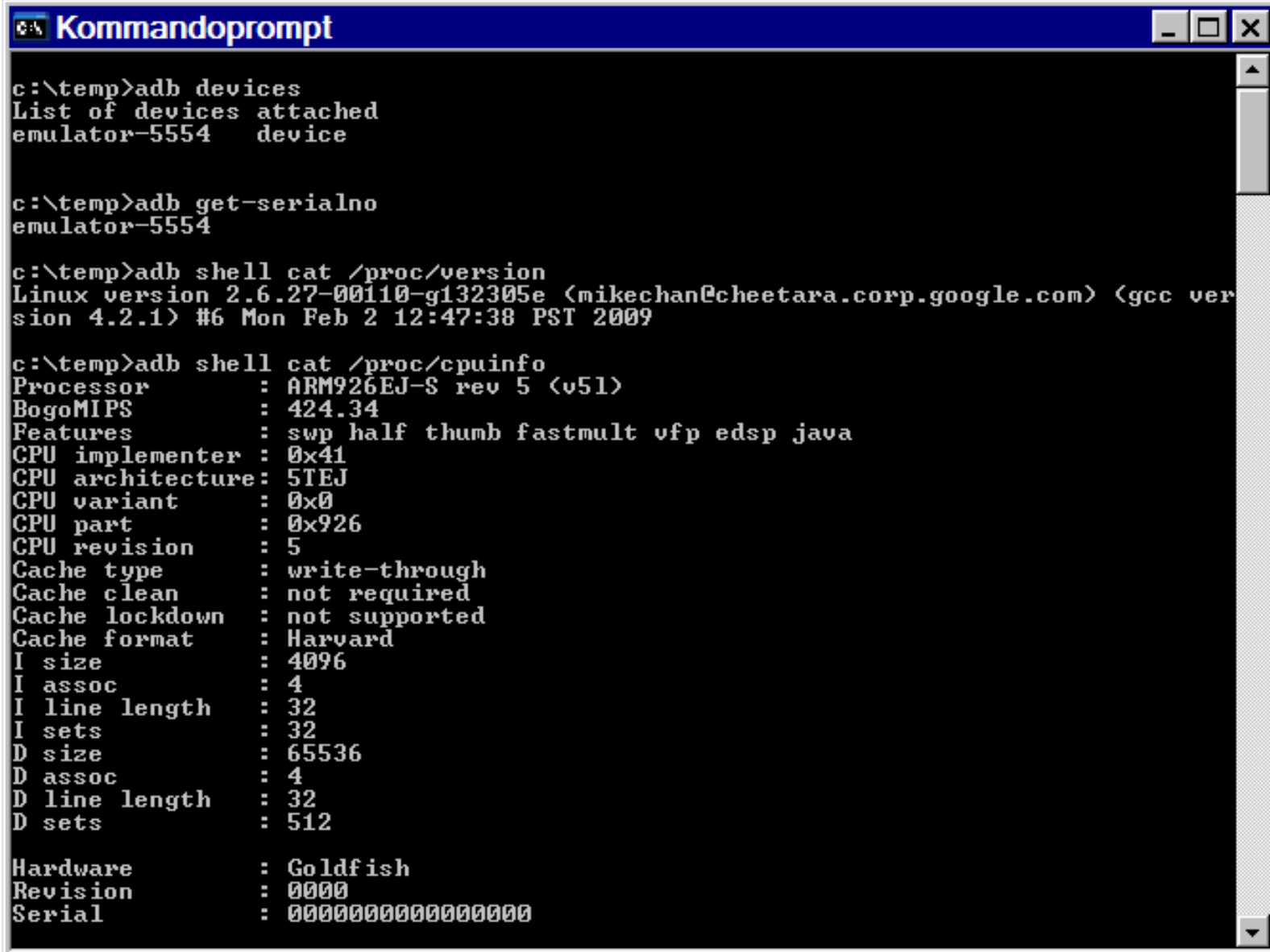
The screenshot displays the Dalvik Debug Monitor (DDMS) interface. The main window is titled "Dalvik Debug Monitor" and contains several panels:

- Process List:** A table showing running processes. The visible data is as follows:

Name	State	PID	PPID
emulator-5554	Online		keso_tes
system_process		580	8600 / 87
com.android.phone		626	8601
android.process.acore		628	8602
com.android.mms		652	8603
android.process.media		672	8604
com.android.alarmclock		689	8605
- Memory Usage:** A pie chart titled "PSS in kB" showing the distribution of memory usage across various processes. The largest segment is "Free" (green), followed by "system_server" (grey), "Inactive" (pink), "Buffers" (cyan), "PageTables" (light blue), "Slab" (light green), "zygote" (blue), "android.process.acore" (red), "com.android.phone" (orange), "android.process.media" (yellow), "com.android.mms" (purple), "com.android.alarmclock" (dark blue), "Other" (black), and "Unknown" (dark red).
- Log Window:** A window at the bottom showing system logs. The visible log entries are:

Time	pid	tag	Message
10-04 11:47:0...	I 580	Activity...	Stopping service: com.android.provide...
10-04 11:47:0...	D 628	dalvikvm	GC freed 4402 objects / 236552 bytes in...
10-04 11:47:1...	D 580	dalvikvm	GC freed 4022 objects / 213232 bytes in...
10-04 11:51:2...	D 580	Keygua...	pokeWakelock(5000)
10-04 11:52:3...	D 626	dalvikvm	GC freed 7499 objects / 408072 bytes in...
10-04 11:52:4...	I 580	jdwp	received file descriptor 58 from ADB
10-04 11:52:4...	I 626	jdwp	received file descriptor 27 from ADB
10-04 11:52:4...	I 628	jdwp	received file descriptor 40 from ADB

Android Debug Bridge (adb)



```
Kommandoprompt
c:\temp>adb devices
List of devices attached
emulator-5554    device

c:\temp>adb get-serialno
emulator-5554

c:\temp>adb shell cat /proc/version
Linux version 2.6.27-00110-g132305e (mikechan@cheetara.corp.google.com) (gcc ver
sion 4.2.1) #6 Mon Feb 2 12:47:38 PST 2009

c:\temp>adb shell cat /proc/cpuinfo
Processor       : ARM926EJ-S rev 5 (v5l)
BogoMIPS        : 424.34
Features        : swp half thumb fastmult vfp edsp java
CPU implementer : 0x41
CPU architecture: 5TEJ
CPU variant     : 0x0
CPU part        : 0x926
CPU revision    : 5
Cache type      : write-through
Cache clean     : not required
Cache lockdown  : not supported
Cache format    : Harvard
I size         : 4096
I assoc        : 4
I line length   : 32
I sets         : 32
D size         : 65536
D assoc        : 4
D line length   : 32
D sets         : 512

Hardware       : Goldfish
Revision      : 0000
Serial        : 0000000000000000
```


Android Open Source Project

- Android is a open source and fully customizable mobile platform since 21st Oct. 2008
- <http://android.git.kernel.org>

Porting Android

- Eee PC 701
Intel Celeron M ULV 353
- MIPS
MIPS Technologies to Drive Android beyond the Mobile Handset
- Openmoko, Neo 1973 and FreeRunner
Samsung SC32442B, ARM920T, ARMv4
- Beagle Board
OMAP3530, ARM® Cortex™-A8, ARMv7

Android Today



CLIQ



Galaxy



Tattoo



Hero



Magic / MT3G



Dream / G1

Carrier	T-Mobile	-- (GSM / HSDPA)	-- (GSM / EDGE)	Sprint	T-Mobile	T-Mobile
Manuf.	Motorola	Samsung	HTC	HTC	HTC	HTC

Android in the Future

- Andy Rubin, Google's top Android executive:
By year-end, phone makers will have launched 15 to 20 Android phone models
- Google will release two versions of Android this year:
Android 1.6 code-named Donut
Android 2.0 code-named Eclair
- Qualcomm puts Android on Snapdragon devices
1 GHz Scorpion Core (Cortex A8, same as Iphone 3GS)
(Current phones:
Qualcomm's MSM7200A chipset, ARM11 @ 528MHz)



Thank you!

<http://android.happyshark.dk/>

