



# Open Source Software in mobile devices

**NOKIA**

**Timofey Turenko**

**[timofey.turenko@nokia.com](mailto:timofey.turenko@nokia.com)**

**Nokia Research Center, Office of CTO**

# Agenda

- What is OSS?
- How did OSS come into mobile?
- OSS platforms for mobile devices
- Maemo

# What is OSS? 1/2

- The source code is available and you can read it, modify it, compile it
- Free Software Foundation (FSF) ([www.fsf.org](http://www.fsf.org)), 1985
  - GNU project
  - GNU licences
  - Free Software Directory (<http://directory.fsf.org/>)
  - The Free Software Definition
  - Projects hosting
- Open Source Initiative (OSI), 1998 (<http://www.opensource.org/>)
  - reviewing and approving licenses: do they comply with OpenSource Definition?
- Very very long list of available software
  - <http://directory.fsf.org/>
  - [http://en.wikipedia.org/wiki/List\\_of\\_open\\_source\\_software\\_packages](http://en.wikipedia.org/wiki/List_of_open_source_software_packages)
  - Sourceforge.net hosted 311583 projects yesterday (177,686 projects 22.05.2008)



# What is OSS? 2/2

- Open Source ≠ Free
  - Free SW can be closed-source (Google Picasa)
  - If you have source code it doesn't automatically mean you can use it in any way you want (Software IPRs!!!, mp3 codec)
- Open Source ≠ GPL: there are a lot of different licenses
- It is a good idea to read license agreement

# How did OSS come into mobile? 1/3

- Mobile devices become more and more complex and more close to PC: now mobile phone looks like a multimedia computer and Internet center
- We need applications from 3<sup>rd</sup>-party developers
  - Platform should be open for 3<sup>rd</sup>-party developers
  - How to inspire people and companies to create applications for our platform?
  - Experienced PC application developers should be able to start creating applications for mobiles without significant reeducation
- It should be easy to port existing applications to mobile device
  - Not necessary to create everything from scratch
- There are a lot of useful code under GPL: if we use GPL code it have to be open source

# How did OSS come into mobile? 2/3

- How can I develop for mobile?
  - JavaME: virtual machine, slow, limited capabilities
  - Proprietary OS with some public APIs: special knowledge is needed; proprietary SDKs; a lot of limitations
    - Symbian
    - Windows Mobile
    - Mac OS
- Is it possible to run PC OS in mobile?
  - Different HW, different processor architecture (ARM), device is always on
  - Strong power consumption and heat dissipation requirements
  - Reliability: “blue screen of death” is not good for mobile phone
  - Security: do you want some hacker can use your phone to send spam sms?
- Let's take Linux and modify it to be suitable for mobile!

# How did OSS come into mobile? 3/3

- Embedded Linux
  - some hacker's Linux ports: HP iPAQ
  - A lot of linux-powered devices: routers, measuring instruments, internet-kiosks, navigators
- Why Linux?
  - Highly configurable: we can get rid of all unnecessary stuff to optimize for mobile
  - There are ports and compilers for a number of processor architectures (Intel, ARM, Alpha, SPARC, PowerPC, SuperH, MIPS, Motorola 68000, ....)
  - Official support from many processor vendors
  - OSS means we can modify everything
  - A lot of applications and developer tools
  - A lot of developers
  - It is good to have the same OS on mobile and PC
  - There are well tested and stable versions

# Alternatives

- Maemo
  - Nokia + Community
- Android
  - Google, Open Headset Alliance
- LiMo
  - A number of supporters leaded by Motorola
- Moblin
  - Open source project supported by Intel
- Qtopia phone edition
  - Trolltech
  - Openmoko
- TuxPhone
  - Group of enthusiasts (~5 persons)



# MAEMO

- Devices are available on the market (in Russia [www.linuxcenter.ru](http://www.linuxcenter.ru))
- Nokia provides support (see [www.maemo.org](http://www.maemo.org))
  - Regular device SW, SDK, tutorials updates
  - Help with applications distribution and promoting (Maemo repositories)
  - A big number of applications from Nokia
- Big number of available applications: [maemo extras](#), [garage.maemo.org](http://garage.maemo.org)
- Wide range of development tools: almost all that you can find in Linux
- Linux SDK with cross-compile and emulation tools: you can compile for ARM and run on device or you can compile for i386 and run on PC



# Android

- Only one device is available now (T-Mobile G1, made by HTC)
- Hacker's ports testing result: very slow (UI written in Java, only Java is available for application developers)
- Cross platform SDK (Java + Eclipse + Android plug-in)
- Licensing issues are not clear (complex combination of Linux kernel, Google code and hardware vendor code (drivers, device-specific applications))
- A lot of restrictions in SDK

# LiMo

- SDK from Motorola: MOTODEV Studio
  - Trial license, valid until December 31, 2008
  - No right to disclose info on SDK and other software test results
  - Closed source, available to free download in binary form
    - Contains a limited number of source files (application examples):
      - no right to disclose them
      - Right to use them to develop your own application
      - No right to disclose your own code if it uses these source files or parts of these files
  - Functionally incomplete (info from Motorola web-site)
- There are a number of devices on the market now
  - Motorola ROKR EM30, MOTOZINE ZN5, U9, MOTO Z6w, MOTORAZR2 V8, ...; NEC NTTDOCOMO FOMA 906im; Panasonic NTT DOCOMO FOMA P906i; Aplix OPAL; LG LiMo Phone; Purple Labs Purple Magic
- OS Source code is open only for kernel and some libraries, but device drivers, UI, user applications, and many key libraries are closed; a lot of closed APIs
- Big question about future licensing and openness

# Moblin

- Open source project supported by Intel
  - Linux port for Intel Atom processors
- Main target - Mobile Internet Devices (MID): small laptops like Eee PC, OLPC
- Cooperates with Ubuntu Mobile
- Uses **Hildon** desktop and **libOSSO** (there are a lot of links from moblin.org to the documentation on maemo.org)
  - **Application porting between Moblin and Maemo should be an easy task**
- SDK uses Intel C++ compiler (not GNU)
  - Free for download (now), but not open source
  - GNU compilers exist, but there is no any notice about them on moblin.org
- To install a new application to the mobile device it is necessary to create a new image with Moblin Image Creator and re-flash the device
- “Moblin Image Create” tool is a set of bash and python scripts

# Maemo vs desktop Linux

- Different CPU architecture (do we need to know about it?)
- Security mode: single user desktop
- Light weight base system: BusyBox instead full set of GNU utilities
- Hildon Desktop
  - Optimized for small screen
  - Input methods: touch screen support, virtual keyboard, handwriting recognition
- Device state monitoring and improved power management (proprietary code)
  - Battery monitoring
  - Go to sleep mode as soon as possible, switch off unused HW
  - Screen backlight control
- LibOSSO: maemo initialization, battery status messages, **application state saving**, OSSO category databases
- JFFS2 filesystem (compressed)

# MAEMO SDK

- Scratchbox
- GNU toolchain: compilers, linkers, debuggers, profilers
  - ARM
  - i386
- Rootstrap – a clone of device root filesystem
- Xepher – virtual X server (emulates device screen)

# Application porting

- Command line apps: just compile in Scratchbox for ARM (do not forget to check for missing libraries)
- Graphical apps
  - GTK+ should not be used directly; use Hildon instead
  - Consider state saving issue
- Try to avoid unnecessary HW usage: BATTERY!!!

# How to start

- Download SDK install scripts from [maemo.org](http://maemo.org)
- Try to port something or try to create HelloWorld: see [Maemo 4 Quick Start Guide](#) and [Maemo Diablo Reference Manual](#)
- Or go to [garage.maemo.org](http://garage.maemo.org): you can find a lot of Open Source application – use them as examples
- Java, Python? Why not? It should work...
- Something you do not like in Maemo? SDK? Any ideas how to improve? Let's create your own project, contact community, contact Nokia, ...



**Questions? Ideas?  
Projects?**

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