

Building consumer products with open source communities -- the Maemo and 770 experiences--

Ari Jaaksi
Nokia

Linux World,
Boston, 2006



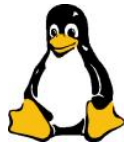
Agenda

- The first product – Nokia 770 Internet Tablet
- Open Architecture
- Open Development – as a part of OSS communities
- Maemo – development platform
- Future



maemo.org

The first product – The Nokia 770 Internet Tablet



Engadget: Handheld of the Year 2005 (both readers' and editor's choice)

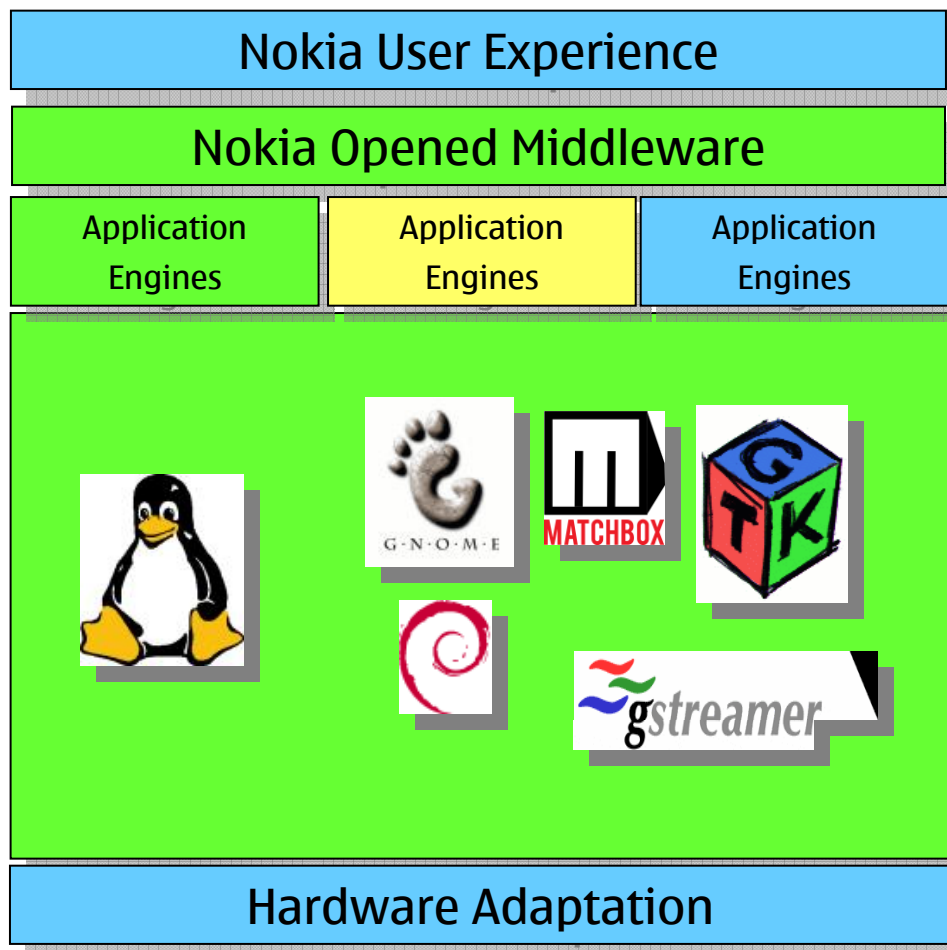
Best Embedded Linux/Mobile Product or Initiative at the 2005 UK Linux & Open Source Awards.

Alan Cox in an email: "What is most impressive is that you've actually made a Linux system feel like a Nokia device not like a Linux device by Nokia."

Russell Beattie in his blog: "Every shop in the Valley who isn't focused on cell phones should have a team dedicated to the 770. ... I can envision a million scenarios around this device. ... this is the open mobile platform that the Valley have been calling for. I really hope we can take advantage of it."

Open Architecture – our fundamental design principle

The Nokia Linux / OSS stack



- ...
- GNOME desktop environment components
 - GTK+, Gnome-vfs, Gconf
- D-BUS message bus
- Matchbox window manager
- X.org window server
- GStreamer and Helix multimedia frameworks
- Sylpheed email engine
- BlueZ bluetooth stack
- OMAP Linux DSPgateway
- Debian package management system
- Linux kernel
- ...

Open Development – as a part of OSS communities

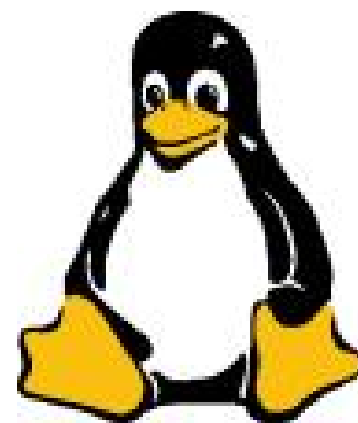
- We first identified gaps in existing OSS components and our need, and then
 1. **Integrated** hundreds of unmodified components as such
 2. **Sponsored** development of existing OSS components like OMAP kernel, D-BUS, GNOME-VFS, GTK+, GStreamer, OBEX etc
 3. **Developed** new components and open sourced them

All activities focused on

1. NOT re-inventing the wheel
2. Work constructively with the open source community with a give and take approach
3. Solving critical issues in the areas of:
 - UI and usability
 - Power management
 - Performance
 - Memory management
 - Application functionality
 - Cross-development tools
 - Integration
 - Testing

1. We integrated components as such

- This is the ultimate goal
 - No branching –no back-porting
 - Shared maintenance cost
 - Good quality
- Not always trivial
 - We have resource limited hardware
 - We are building consumer products
 - Quality
 - Uncompromised user experience



libatk1.0-0
base-passwd
libbz2-1.0
desktop-file-utils
libexpat1
libgcc1
libstdc++5
gnuchess
libid3-3.8.3
iptables
libpcap0.7
libpng12-0
nano-tiny
libncurses5
ncurses-base



freedesktop.org

2. We sponsored the development of existing components

- We selected components, such as D-BUS because
 - It addressed our requirements well – a good starting point
 - There was an active community around it
 - We and the existing community had very similar goals
 - We believed that we can become a part of the community and there is no need to branch
- We sponsored the development
 - Contributed code and participated the development
 - Performed a lot of testing
 - Hired key developers
 - Promoted the use of D-BUS



Some OSS people and companies involved with the development of Nokia 770

...

GNOME component work (gconf, D-BUS, gnome-vfs, GTK+, Gazpacho . . .) with *Mikael Hallendal, Andres Carlsson, Richard Hult, Michael Natterer* (Imendio AG).

• **Matchbox, X.org, GTK+** with *Matthew Allum, Ross Burton, Richard Purdie* (OpenedHand)

• **gStreamer** with *Christian Schaller, Wim Taymans* and others (Fluendo)

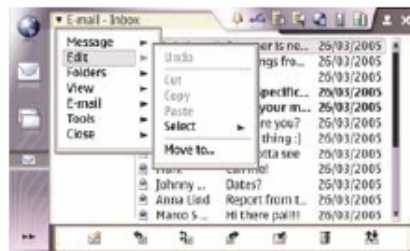
• **GPE palmtop** with *Nils Faerber and Florian Boor* and others (Kernelconcepts)

...

NOKIA
Connecting People

3. We developed new components and open sourced them

- Developed for our own needs
 - By ourselves or through subcontractors
 - (L)GPL'd
 - Nokia copyright
- Examples:
 - Hildon application framework
 - OMAP DSPgateway
 - Scratchbox



Vertical menu layout

<File type> >	Edit>	View>	Tools>	Close>
New >	Undo	<View 1>	Settings...	Close window
<file type1>	-----	<View 2>	-----	Close all
<file type2>	Cut	Zoom >	-----	windows
Open...or Open	Copy	() 50 %	✓ Find on page	
-----	Paste	(o) 100 %	Search <Files>...	
Save	Select >	() 200 %	-----	
Save as...	(Mark)	or	Help	
-----	(Unmark)	Zoom in		
Rename...	Mark all	Zoom out		
Delete	Unmark all	-----		
-----	-----	Sort...		
Send via e-mail...	Move to...	-----		
Details		✓ Full screen		
		Show toolbar >		
		✓ Normal screen		
		✓ Full screen		

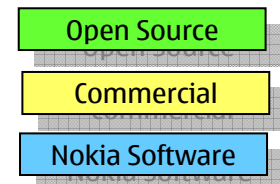
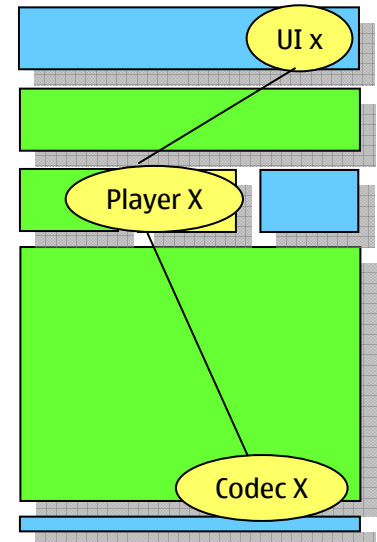
Some concrete benefits of open source for Nokia

- Obvious benefits
 - Availability of good quality code
 - Availability of well-thought architecture and integrated subsystems
- Licensing rules have been decided by the licensee
 - No need to execute complex licensing negotiations
 - Saving can be up to 6- 12 months in real projects
- The work and credentials of a developer or a subcontractor are open for analysis
 - The quality of the people and the components can be analyzed from the source code
 - Their willingness to help is easy to verify – just ask
 - The activity and direction of the component or product can be analyzed through the project discussions.
- When everything go wrong – you can take the code and run with it
 - Even branch to meet the deadlines
 - Worry about the consequences later ...

Mixing open and closed

- For a commercial product, such as Nokia's, it is vital that open source licenses allow mixing of open source and commercial components
 - Allows the usage of open source for any purpose with no restrictions
 - Support for different business models
 - Licensing shouldn't be about politics – just ensure that code is shared.
- If we believe that the open development model is superior, it'll prevail
 - Open solutions will eventually replace many closed ones – but closed solutions may be needed in special cases
 - Reduced cost and new business opportunities will make open software more agile and adaptive for change and new business challenges

The Nokia Linux / OSS stack



Maemo Development Platform @ maemo.org

- **Open source development environment for Nokia 770 Internet Tablet**
- **Targeted to** open source developers and innovation houses
- **Opportunity to** develop and share your own applications for Nokia 770
- **Key features**
 - maemo.org developer website
 - Test and debug environment on x86
 - Flashing tools
 - Developer root filesystem
 - Hildon application framework and UI
 - Scratchbox cross-compilation toolkit
 - Extensive developer documentation
 - Sample applications
 - Mailing lists, Wiki and planet for discussion, announcements and support
 - Bug reporting system for maemo SW



The screenshot shows the maemo.org website with the 'Developers' tab selected. The main content area is titled 'Getting Involved' and contains a list of links: 'Contributing Applications', 'Contributing Documentation', 'Source of the website', and 'Documentation bugs and patches'. Below this, there are sections for 'Contributing Applications', 'Contributing Documentation', and 'Source of the website', each with a brief description and a link to more information.

maemo.org

Home Developers Downloads Wiki Planet

Developers

- Getting Involved
 - API's
 - How-To's
 - Tutorial
 - Hildon UI
 - White Paper
 - Mailing Lists
 - Bugs
 - LXR

Getting Involved

- Contributing Applications
- Contributing Documentation
 - Source of the website
 - Documentation bugs and patches

The first thing you can do is to download and start using the maemo development platform. Visit our [Application Catalog wiki page](#) and add some information at appropriate [mailing lists](#) and [file bugs](#) (if you find them).

Contributing Applications

If you have written an application using the maemo development platform then visit our [Application Catalog wiki page](#) and add some information at appropriate [mailing lists](#) and [file bugs](#) (if you find them).

Contributing Documentation

Any contributed documentation like how-to, tips and tricks and tutorials would immensely help the maemo community. If you want to write one, maemo documentation format is based on the [project](#). More on contribution guidelines can be read [here](#).

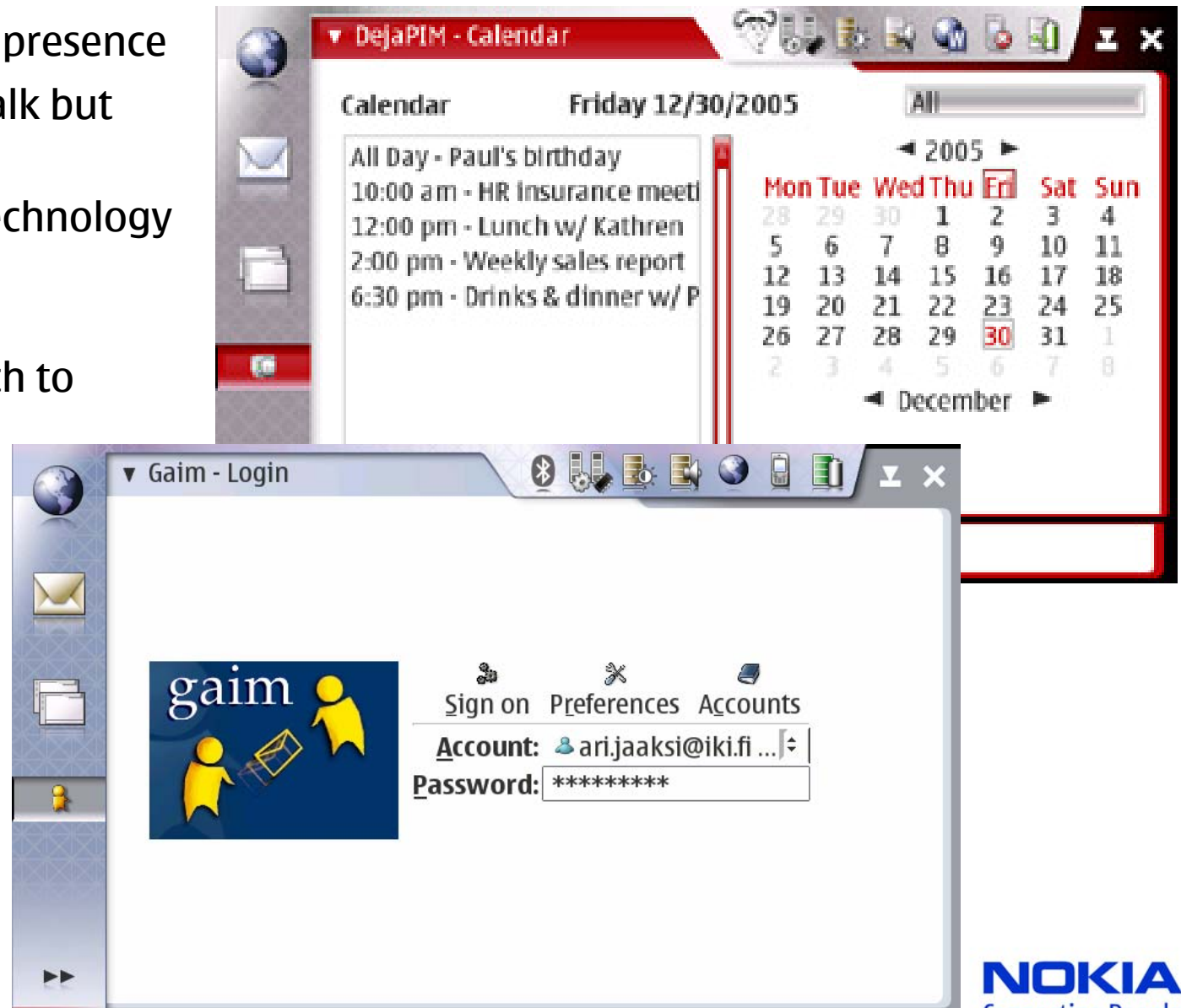
Source of the website

The [source](#) of the maemo web site is available from our subversion repository [source](#) with our viewcvs.

Please use the following account to check out from the repository:

Maemo idea and goals – we wanted to:

- Create an OSS image and presence
- Be truly open – not just talk but code and act
- Enable application and technology development for OSS & commercial community
- Help minimizing our patch to community code



Installable applications on maemo

1. Accessories

1. Bluetooth Plugin
2. Clock applet
3. FBReader
4. Plucker Viewer
5. Xkbd-btHID
6. Bloglines Notifier
7. UPnP Device Monitor
8. webquery home applet

2. Education

1. Granule

3. Games

1. Battlegweled
2. Blitzkrieg Onslaught
3. CrazyParking
4. Crimson Fields
5. Doom
6. GFrotz
7. GNU Go
8. GPE-sudoku
9. Gtkmagnetic
10. IceBreaker
11. La Pulga
12. MaemoBlocks
13. MaemoDrac
14. Maemo-Sudoku
15. MaemoSwap (Minesweeper)
16. Nako
17. Nethack
18. Snake
19. Sauna
20. ScummVM
21. Tetringo
22. Tux Pux
23. Twin Distress
24. Xtris

4. Graphics

1. Horizon
2. Tux Paint

5. Internet and Networking

1. Bloglines 770
2. del.icio.us.770
3. CTorrent (Enhanced)
4. GAIM internet messenger
5. GPE-mini-browser
6. MANaOS (mozilla-based) Web Browser
7. Grsync
8. VNC viewer
9. VNC server
10. X-Chat
11. Gmailmon

6. Office

1. AbiWord
2. DejaPIM
3. Evince
4. GPE PIM suite
5. Gnumeric
6. Nticker

7. Multimedia

1. McClient/McReceiver (Remote Control)
2. Ogg Vorbis Player
3. PLCreator

8. System Tools

1. GUI-Based
 1. CPU/Mem/Screenshot applet
 2. CPU/Mem/Screenshot applet with SwapOn/Off
 3. IpHome homepage-plugin
 4. Statusbar network monitor
 5. X Terminal Emulator
 6. Reverse Shell
 7. MaemoPad
 8. CPU/MEM load graph

2. Commandline-Based (Shell only)

1. Bash
2. Bind Utils (dig, nslookup, host)
3. Bluetooth OBEX server
4. Bluetooth port scanning suite
5. Dropbear SSH client and server
6. Gnuplot
7. GNU utilities: bc, find, xargs, gcal, wget
8. IP Utils
9. Irssi IRC client
10. Joe
11. knock
12. portmapper/rpc.portmap
13. Midnight Commander
14. NEURON
15. Nmap, the port scanner
16. Octave
17. OpenVPN, an open source SSL VPN solution
18. OpenSSH SSH client and server
19. PINE mail and news client
20. rsync
21. sendip
22. slocate/locate
23. Telnet Client
24. Tcpdump
25. Tenex C Shell (tcsh)
26. tnftp
27. Unison
28. Vim
29. WirelessTools
30. Dsniff
31. mug-usbnet
32. mug-pkgtools

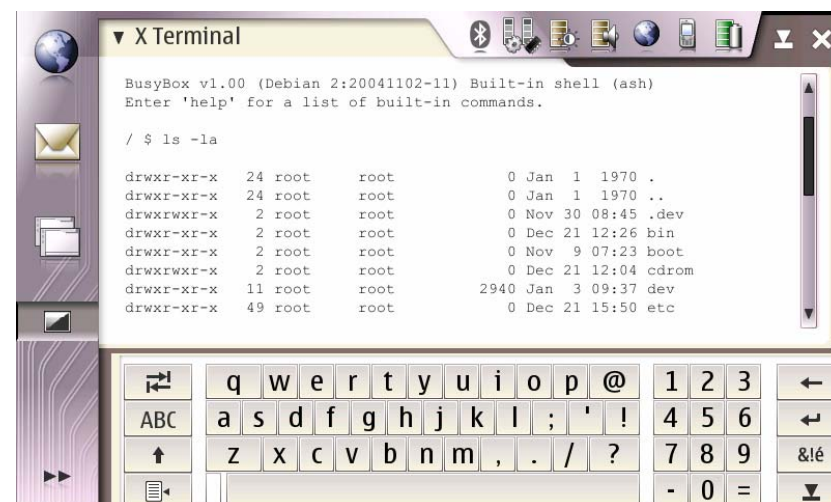
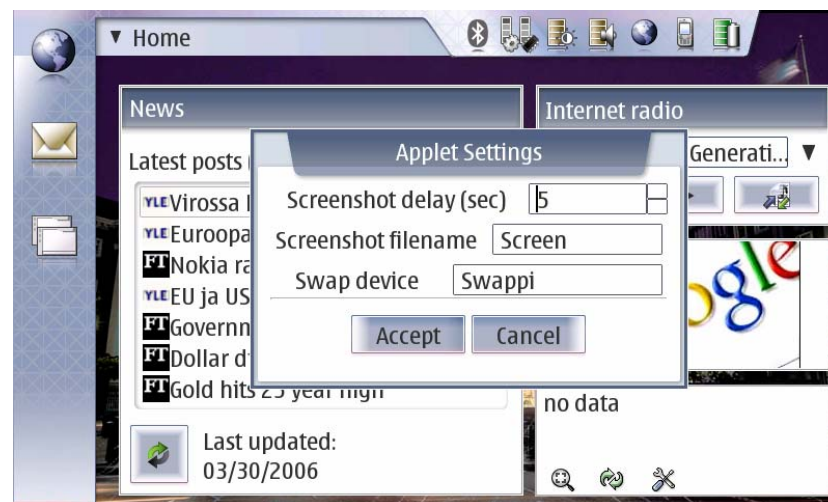
9. Programming

1. Python
2. GUnit
3. Ruby
4. SmallBASIC

10. Libraries and Other Dependencies

An example of openness

- maemo.org is mainly used for application development, but it can also go deeper
- Virtual memory swap on the mmc card
 - Developed by Armin Warda, and integrated with the Screenshot applet developed by Jakub Pavelek
 - Solves the problem of running out of memory while using multiple applications simultaneously
 - Challenges include hardware durability and end user acceptance
- What is this for Nokia:
 - Something we could productize
 - However, we must ensure that it will not break hardware, and that it is easy to use, etc



Next on maemo – mistral (v2.0)

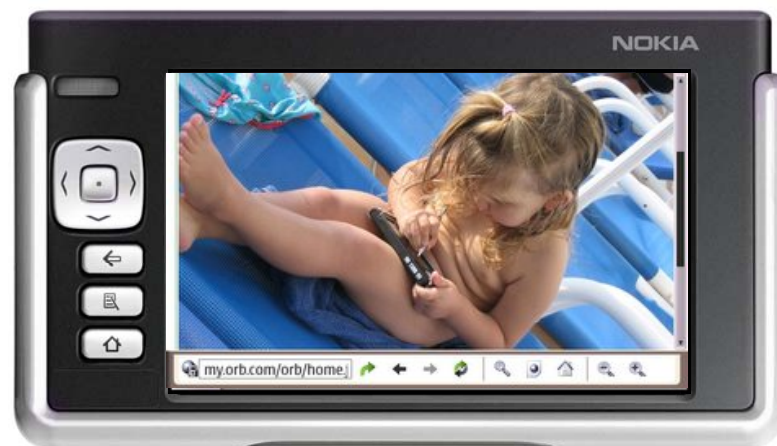
- We've got the first generation integrated platform out now, and we need to develop it further
 - Roadmap available at maemo.org – still tentative
 - Major changes are expected
 - Changes done and discussed @ maemo.org
- Some new things in v2.0
 - Telepathy - IM/VOIP Integration Framework
 - Farsight - audio/video conferencing framework
 - Real package management (apt/dpkg/gnupg)
 - support for python development
 - gazpacho UI development tool
 - Toolchain upgrade to 3.4.4 2005q3-2 (latest @ CodeSourcery)
- All existing 3rd party software needs to be recompiled



Next on our Linux based software

- Software upgrade introducing VoIP and IM
- Going towards full internet citizenship
 - Internet formats
 - Internet services
 - Internet development and upgrading model
- Strengthen open source operations
 - Use the feedback
 - Use the submitted code
 - Release and fix
 - Stay current with the latest open source component versions
- Learn to work as a part of open source communities, such as GNOME
 - We have a good start – but we've just begun!

Thank you!



www.maemo.org

www.nokia.com/770

jaaksi.blogspot.com