WebKit
Portable, Embeddable WebEngine in comparison

Holger Hans Peter Freyther
European Embedded Linux Conference 2007
About me

Workaholic?

- Holger Freyther (zecke@selfish.org)
- Involved with Linux on handhelds since 2000, starting with the Agenda Vr3, Sharp Zaurus, Compaq iPAQ.
- Google Summer of Code Student in 2007, working on WebKit/Gtk+ with OpenMoko as mentoring organization.
- Working for GMIT GmbH on DVB-H (freyther@gmit-gmbh.de)
- Sponsored by Trolltech to work on OpenEmbedded (holger.freyther@trolltech.com)
Agenda

• WebKit project - Goals and Mission
• WebKit ports to Wx, Gtk+ and Qt
• Mozilla/Gecko/Firefox/Minimo?
• Measuring and Benchmarking
• WebKit optimized for Qtopia Core
• Conclusions
What are we going to do now?
Finding out why WebKit rocks

- The Web is getting more important
- The Web is getting more complex
- We have broadband everywhere
- We need good browser engines
- We need to embed internet technology into our products/applications
WebKit Project
Goals and Mission

http://webkit.org/projects/goals.html
WebKit Project
Goals and Mission

- Web Content Engine

http://webkit.org/projects/goals.html
WebKit Project
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• Web Content Engine
• Compatibility

http://webkit.org/projects/goals.html
WebKit Project
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- Web Content Engine
- Compatibility
- Stability

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- Web Content Engine
- Compatibility
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- Usability

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• Open Source

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- Open Source
- Standards Compliance

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WebKit Project

Goals and Mission

- Web Content Engine
- Compatibility
- Stability
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- Open Source
- Standards Compliance
- Performance

http://webkit.org/projects/goals.html
WebKit Project

Goals and Mission

- Web Content Engine
- Compatibility
- Stability
- Security
- Usability
- Open Source
- Standards Compliance
- Performance
- Portability

http://webkit.org/projects/goals.html
WebKit Project
Goals and Mission

- Web Content Engine
- Compatibility
- Stability
- Security
- Usability
- Open Source
- Standards Compliance
- Performance
- Portability
- Hackability

http://webkit.org/projects/goals.html
WebKit Project

In other words

- We care for Performance (Speed + RAM)
- We are the fastest!
- Every change gets reviewed
- Support for SVG, HTML5, CSS3, XML...
- We want people to use WebKit
The WebKit ports

The official ones

- WebKit using Wx
- WebKit using Gtk+
- WebKit using Qt
The INQ in Bulgaria is a dangerous place

Apple fan boys roam the streets
By Nick Farrell: Wednesday, 17 October 2007, 2:10 PM

THE INQ’S Bulgarian office in Sofia is probably not in the safest work location in Europe.

According to Reporters without Borders, Bulgaria is ranked a pitiful 51st in its world league tables for nice places for hacks to work.

The best is Iceland although we wouldn't imagine you would get many good stories and the worst is Eritrea.
OpenMoko Browser, Sugar WebKit Activity, QtLauncher, Iris Browser
CELF Embedded Linux Conference Europe
November 2 & 3, 2007

The CELF Embedded Linux Conference – Europe 2007

Register Here

Location: Linz, Austria
Dates: November 2 and 3 (Friday, Saturday), 2007
Venue: Johannes Kepler University
Times: 9:00 am to 7:00 pm
Price: Students 16 Euro; Private 64 Euro; Company 256 Euro (tentative)

ELC–Europe 2007 (ELC–E) is a joint conference with the 9th Real–Time Linux Workshop (RTLWS) that is organized by the Real Time Linux Foundation.

Conference Highlights
OpenMoko Browser, Sugar WebKit Activity, QtLauncher, Iris Browser
Overview and dependencies

Status
• One active developer
• Development in a branch to avoid the review process

Dependencies
• wxWidgets
• CURL for networking
• libxml2 for XML handling
WebKit/Gtk+
Overview and dependencies

Status
• Committer and Reviewers available
• Industry interest
• OpenMoko and various GNOME application adopted it
• No stable API yet

Dependencies
• Gtk+ (Gdk, Pango, Cairo) version 2.6 works
• CURL for networking
• libxml2 for XML handling
• ICU for unicode handling
WebKit/Qt
Overview and dependencies

Status
• Committer and Reviewers available
• It will be part of Qt4.4 for all platforms with stable API
• The commercial Iris Browser is available
• Consulting is available as well

Dependencies
• QtCore, QtGui, QtXml, QtNetwork
Mozilla/Gecko/Firefox
Overview and dependencies

Status
• Mature and widely used
• Sort of Stable but not complete API
• Linux and non-x86 systems are 2nd class citizens
• Mozilla Manifesto

Dependencies
• Gtk+ (Gdk, Pango, Cairo), X11
The Competition
Measuring and Benchmarking

• Use WebKit/Gtk+, WebKit/Qt and Minimo
• Determine/Measure the installed size
• Open about:blank, a Foto Log and determine the memory footprint usage.
The Process
Selecting machine and applications

- Uses GtkLauncher, QtLauncher and Minimo
- MACHINE="fic-gta01",
  DISTRO="angstrom-2007.1"
- bitbake xterminal-elc-europe2007-image
- using exmap-console and xrestop to measure
NOTE: Psyco JIT Compiler (http://psyco.sf.net) not available. Install it to increase performance.
NOTE: Handling BitBake files: \ (4797/4797) [100 %]
NOTE: Parsing finished. 4564 cached, 0 parsed, 233 skipped, 0 masked.
NOTE: build 200710311821: started

OE Build Configuration:
    BB_VERSION    = "1.8.9"
    OE_REVISION   = "1d191d57e609530bf7d6cc6785f7e63b0c24231"
    TARGET_ARCH   = "arm"
    TARGET_OS     = "linux-gnueabi"
    MACHINE       = "fic-gta01"
    DISTRO        = "angstrom"
    DISTRO_VERSION = "2007.9-test-20071031"
    TARGET_FPU    = "soft"

NOTE: Resolving missing task queue dependencies
NOTE: preferred version 2.5 of glibc not available (for item virtual/arm-angstrom-linux-gnueabi-libc-for-gcc)
NOTE: Preparing runqueue
NOTE: Executing runqueue
Task1 2388 Task 4 /home/zecke/openembedded/org.openembedded.dev/packages/images/xterminal-clc-europe2007-image.bb False True
NOTE: package xterminal-clc-europe2007-image-1.0: started
NOTE: package xterminal-clc-europe2007-image-1.0-r0: task do_rootfs: started
NOTE: package xterminal-clc-europe2007-image-1.0-r0: task do_rootfs: completed
Use 'connect' command to connect to remote server or '?' for help.
: connect 192.168.0.202:4040
Creating system snapshot ...

Welcome to exmap-console 0.4.1
Use 'connect' command to connect to remote server or '?' for help.
: connect 192.168.0.202:4040
Creating system snapshot ... 39 processes running.
Enter a command or '?' for help.
: add QtLauncher
: print
Process 1590 [.QtLauncher.qtopia]
Virtual memory : 37300 KB
Effective VM : 35563 KB
Heap : 6140 KB
Stack : 86016 B
vdso : 0 B
Mapped : 17452 KB
Effective mapped: 15715 KB
Sole use : 14704 KB
xrestop - Display: localhost:0
Monitoring 5 clients. XErrors: 0
Pixmaps: 2167K total, Other: 9K total, All: 2177K total

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<th>Wins</th>
<th>GCs</th>
<th>Fnts</th>
<th>Pxms</th>
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<td>Number of Libraries (indirect)</td>
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<td>31</td>
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<tr>
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<tr>
<td>Mozilla</td>
<td>29</td>
<td>53</td>
<td>12 MB + deps</td>
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# Opening about:blank

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<th>Browser</th>
<th>Exmap information</th>
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<th></th>
<th>X11 resources</th>
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<td></td>
<td>VM</td>
<td>Heap</td>
<td>Mapped</td>
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</tr>
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<td>WebKit/Qt</td>
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<td>2 MB</td>
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<td>195 KB</td>
</tr>
<tr>
<td>WebKit/Qtopia</td>
<td>21 MB</td>
<td>720 KB</td>
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</tr>
<tr>
<td>WebKit/Gtk+</td>
<td>56 MB</td>
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<td>13 MB</td>
<td>2 B</td>
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<tr>
<td>Mozilla</td>
<td>69 MB</td>
<td>5 MB</td>
<td>17 MB</td>
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## Opening a Foto Log

<table>
<thead>
<tr>
<th>Browser</th>
<th>Exmap information</th>
<th>X11 resources</th>
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<td>WebKit/Qt</td>
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<td>WebKit/Qtopia</td>
<td>37 MB</td>
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<td>WebKit/Gtk+</td>
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<tr>
<td>Mozilla</td>
<td>100 MB</td>
<td>9 MB</td>
</tr>
</tbody>
</table>

[http://www.antena.de/antenna-flog](http://www.antena.de/antenna-flog)
Interpretation

- Mozilla uses the most memory
- Mozilla uploads the most to the X-Server
- WebKit/Gtk+ is doing client side rendering
- WebKit/Qt is doing well too, specially on QtopiaCore.
Shrinking it
An excercise using QtopiaCore

- Build a stripped down version of Qt/QtopiaCore
- Only enough features to compile WebKit/Qt
- Remove SVG, XML, XPath, SQLite from WebKit
- Play with more gcc options
- First attempt was statically linking and the result was one 15 MB binary.
Conclusion
What did we see and learn

- exmap, xrestop and OpenEmbedded
- WebKit is an interesting option for building browsers or embedding web content
- It is the engine performing the best
- Apple, Nokia, Trolltech use it commercially
- Qt4.4 will feature the first stable release of WebKit for Linux

Questions?