Browsers for devices running on Embedded Linux

Whitepaper

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Revision History

Version	Date	Changes
1.0	November 17, 2008	Original
1.1	November 19, 2008	Further updates

Contents

1. Need for embedded browsers

Browsers on embedded devices feature as an add-on application enabling users over internet to use the embedded device as a regular desktop device for connectivity. Depending upon the browser capabilities, user can have an access to:

1. Rich browsing experience for HTML and WAP sites.
2. Flash plug-ins and embedded video streaming.
3. HTML email / RSS feeds.

Additionally the browser can be used to achieve the following functionalities on the embedded device:

1. User interface for the applications.

2. Selection criterion for Embedded Browsers

The selection of the embedded browser is based on the following metrics:

1. **License**
   The web browser for Linux should be open source and free to use.
   It should be possible to have add-ons on the browser for custom multimedia applications.

2. **Features**
   The browser should be capable of displaying most popular websites. It should have the support for the following protocols.
   a. HTML 4.01, CSS 2.1
   b. JavaScript 1.5
   c. Unicode and international language support

3. **Graphics and Display**
   The browser should have the following image / multimedia capabilities:
   a. BMP, GIF, PNG and JPEG Support
   b. Windowed Video playback using an external plug-in

4. **Transport**
   The browser should support browsing of secure and non secure websites both.
   a. HTTP1.1
   b. HTTPS

5. **Development environment**
   To add custom features to the browser the following features need to be there for the browser.
   a. ISO C Implementation
   b. Support for RGB and YUV frame buffers
   c. Plug-in support

3. Available embedded browsers

Following is the list of available embedded browsers for Linux platform:

1. **ANT Fresco**
   a. small footprint, target platform independent
   b. HTML 4.01, JavaScript 1.3 with extensions, keyboard navigation
   c. Macromedia Flash Player 5
   d. SSL security
   e. Supports Plug-in protocols

   License: Commercial
   URL: www.antlimited.com

2. **ANT Galio**
   a. Macromedia Flash Player 6

   License: Commercial
   URL: www.antlimited.com

3. **Amya**
   a. HTTP/1.1, CSS
   b. Displays free and open image formats such as PNG and SVG

   License: W3C
   URL: www.w3.org/Amaya

4. **Opera Mobile**
   a. Internet Suite
   b. Email client, news and RSS readers
   c. Plug-in support
   d. Tabbed browsing, page zooming, mouse gestures

   License: Proprietary
   URL: http://www.opera.com/

5. **Dillo**
   a. No support for CSS, JavaScript, or Java
   b. Written in C / based on GTK

   License: GPL
   URL: www.dillo.org

6. **Oregano**
   a. HTML 4.01,
   b. CSS-1
   c. DOM-0, JavaScript 1.5

d. Macromedia Flash 4.0 content.

License: Commercial
URL: http://www.oreganouk.net/oregano2.html

7. **Konqueror Embedded**
   a. HTML4, CSS, JavaScript
   b. SSL
   c. Built-in Image Viewer
   d. IPv6 support
   e. Flash Plug-in
   f. Qt/Embedded platform

License: GPL
URL: http://www.konqueror.org/embedded/

8. **Mozilla / Mozilla Firefox**
   a. HTML, XML, XHTML, SVG 1.1 (partial),CSS
   b. SSL/ TLS
   c. ECMA Script (JavaScript), DOM,
   d. PNG images with alpha transparency
   e. Tabbed browsing, live bookmarking, download manager

License: GPL/LGPL
URL: www.firefox.com

9. **Kazehakase**
   a. Support for RSS as well as its Japanese variants LIRS and HINA-DI
   b. Drag-and-drop of browser tabs
   c. Mouse gestures
   d. Based on GTK2 libs

License: GPL
URL: http://kazehakase.sourceforge.jp/

10. **SeaMonkey**
    a. Internet Suite
    b. Written in: C++, JavaScript
    c. Web-browser, advanced e-mail and newsgroup client
    d. Support for Add-ons

License: GPL/LGPL
Website: http://www.seamonkey-project.org/

11. **Skipstone**
    a. Bookmarks
    b. Downloading

License: GPL
Based on GTK+
Website: http://www.muhri.net/skipstone/

12. **NetSurf**
    a. HTML4, CSS
    b. Based on GTK+
    c. Written in ANSI C
    d. No support for JavaScript
    e. Ability to render GIF, JPEG, PNG and BMP images

    License: GNU GPL
    Website: http://www.netsurf-browser.org/

13. **NetFront**
    a. Based on: Linux/GTK+ and Linux/QtEmbedded/Qtopia
    b. Plug-In and Extension Modules

    License: Commercial
    Website: http://www.access-company.com/products/mobile_solutions/netfrontmobile/browser/index.html

14. **IceWeasel**

    License: MPL/ GPL/ LGPL tri license
    Website: Homepage of GNU Gnuzilla and IceWeasel

15. **Madfox**

    License: MPL
    Website: http://www.splyb.com/madfox/

16. **Minimo**
    a. Development centered around ARM based devices

    License: MPL/GPL/LGPL
    Website: www.mozilla.org/projects/minimo/

17. **Galeon / Epiphany**
    a. Web browser for the GNOME desktop
    b. Tabbed browsing, cookie management, popup blocking
    c. Extensions system.

    License: GPL
    URL: http://www.gnome.org/projects/epiphany/

18. **Flock**
    a. Browser for social networking

    License: MPL/LGPL dual license
    Website: www.flock.com

19. **Iris**
    a. WebKit Rendering Engine
    b. HTTP/S, JavaScript
    c. Bookmark editor,
    d. SVG, XPath and XSLT support
    e. Netscape plug-in API
    f. AJAX/Web 2.0
    g. Based on Linux/QtEmbedded/Qtopia

    License:
    Website: http://www.torchmobile.com/products/

20. **ViewML**
    a. Runs on Micro windows / X Windowing system
    b. Use the Fast Light Tool Kit (FLTK) applications framework for the user interface
    c. Small footprint
    d. JavaScript Support

    License: GPL
    Website: http://www.viewml.com/

4. Conclusion

Based on the above analysis the following browsers can be considered in the order of preference. The order has been proposed on the basis of the selection criteria and the license availability of the browser:

1. **NetFront** :
   + Feature Rich, Available for embedded platforms
   - License costs

2. **Konqueror Embedded**
   + Qt/Embedded based
   + Feature rich browser for embedded platforms

3. **Mozilla Firefox**
   + Most of the web features
   + GPL/LGPL
   - Performance on embedded devices

4. **Epiphany**
   + Most of the web features
   + GPL
   - Performance on embedded devices

5. **Sea Monkey**
   + Complete Internet Suite
   + LGPL License
   + Support for Add-ons

6. **Minimo**
   + Small footprint, available on ARM based devices
   + MPL/GPL/LGPL

7. **Flock**
   + Browser targeted for Social Networking websites
   + MPL/LGPL dual license

Net Front is a commercial browser. Konqueror Embedded looks like an obvious choice for browsers based in Qt/Embedded. It has support for SSL/ flash plug-in and add-ons for further application development. For GTK based browsers Mozilla or Epiphany can be the options, Mozilla having more features than epiphany in terms of browser capabilities.

5. References

1. http://www.nationmaster.com/encyclopedia/Comparison-of-web-browsers
2. Refer to the individual links for the browser details