

A Comparision on Text-Based and Graphical Browser

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Abstract:

In today world there begins a huge competition between the browser to reach the requirements of the people as, there are so many things that a user required as per their need. In this paper we have taken two browsers into consideration that shows the use, fulfillment, differentiation and various techniques that work with two different types of browsers such as “Text-based” and “Graphical-based”. The conclusion is made by considering both the techniques pros and cons as per the basic features provided by both types of browsers. We had research basically considering two browsers i.e. “IE” for graphical based and “LYNX” for text-based.

Introduction

In modern computing devices, from the Cellular phone to desktop, the web browser has become a ubiquitous piece of software. The browsers have become increasingly complex over the years, not only passing plain text and html, but images, videos and other complex protocols and file formats. This paper attempts to show and contrast the current two major browsers such as Internet Explorer (IE) and Lynx.

The following sections -- cover anti-exploitation technologies for the browser such as Internet Explorer (IE) and lynx with their add-ons. First a general discussion on IE and lynx web browser, its architecture, it's applications and version contrast and other features followed by more detailed information with add-ons capability [further discussion in this paper based on IE 9 onwards].. Lastly, our conclusion based on the actual belief of IE and Lynx.

The views expressed throughout this document are based on independent data collection.

Introduction to IE [Internet Explorer]:

Microsoft develops the internet explorer web browser. Microsoft released the first version of IE on August 16, 1995. IE and its component are closed source applications.

Internet explorer uses the “Loosely Coupled” [MSDN-LCIE], where frames and tabs are independent of each other. The low integrity processes of tabs used for browsing, hosting ActiveX controls, GPU acceleration & manage activity independent of tabs, thus medium integrity process converted to a low integrity by IE frame/broker process [iexplorer.exe, ieframe.dll].

iexplorer.exe	3240	Medium	"C:\Program Files (x86)\
iexplorer.exe	4588	Low	"C:\Program Files (x86)\
iexplorer.exe	5580	Low	"C:\Program Files (x86)\
iexplorer.exe	3960	Low	"C:\Program Files (x86)\

IE Architecture:

IE is com-based architecture, which drives the interaction of all its components and enables component reuse and extensibility.

The com has an extension capabilities in IE are categorized into 3 major extensions.

- Browser extensions
- Content extensions
- Hosting and Reuse

A Bowser extension is not directly related to the viewable content of web pages. It includes features such as Shortcut menu extensions, Custom toolbars, Explorer bars and Browser Helper Objects [BHO].

The Content extensions invoked specifically by IE content [shdocvw.dll], which includes ActiveX controls, Binary behaviors and Active documents.

By hosting and reusing the IE components as a part of your own browser or add rich rendering and internet capabilities.

Layout Engine: Trident [also known as MSHTML] is the layout engine for various versions of IE. It is an OLE Active Document Object that represents IE's layout, rendering and editing engines. This is what IE uses to display web pages [mshtml.dll]^[5].

Application of IE:

Above 5.0 version of trident or IE support various applications such as:

AOL explorer, Limewire, Lunascape, Neoplanet, Google talk, Green browser, Real Networks etc.

What's new with IE 10 and 11?

IE 10:

This version continues to provide key security and performance feature as in earlier version of browser with some add-ons such as:

Support of new standards like HTML5, CSS3 and SVG to provide developers with new featured facilities. Line of business applications that require legacy ActiveX controls can use IE for the desktop. Enhanced protected mode is used to restrict ability of attackers to access sensitive information in personal and corporate world. Clicking on link provides keep you in same browsing experience to follow the links.

Administration control is given to take decision about how links get opened. Indexed Database

API update supports for web standards. Smart Screen Filter offers anti-phishing protection, application reputation and anti-malware protection.

IE 11:

This version helps user to interact with next generation of web apps, games, and media, through following key features:

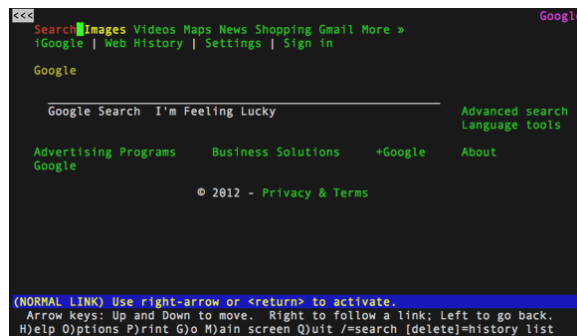
1. Perfect to touch
2. Pinned sites
3. Seamless integration
4. Click to call
5. Syncing across the devices
6. Do Not Track(DNT) exceptions

IE 11 is optimized to support all of the popular web standards, to offer premier security and to provide new and updated developer tools. It's including advanced feature for developer and IT professional too than ever before,

1. Enhanced Protocol Mode [EPM]
2. WebGL
3. Canvas 2D L2 extensions
4. Full screen API
5. CSS flexible box layout model
6. Improved HTML5 video
7. Using F12 developer tools

Introduction to LYNX:

LYNX developed by Montulli, Grobe & Rezac team. Lynx is built in C language & its text based browser. Its first version launched is 2.0.10.



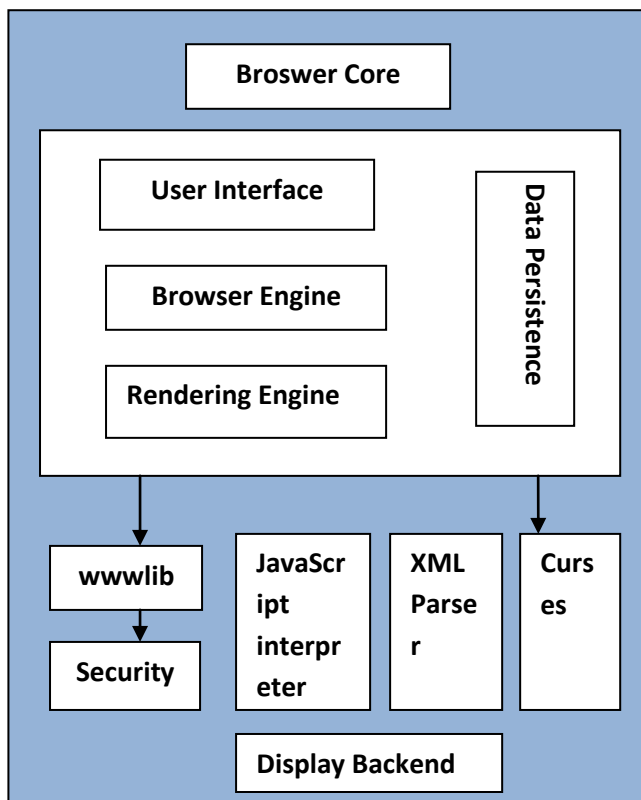
It's one of the open source browser. Its fast, no frills, plain text browser, predates www yet still in

wide use. It's having small but complex codebase. It's followed by support of Gopher protocol, but now support was grafted on www protocol, making lynx pure web browser. Other protocol supports are Http, IPv6, SSL, NNTP and FTP.

LYNX Architecture:

Lynx by its nature has an attribute that makes it particularly appealing to people with certain disabilities, because it strips down a webpage to its most basic, GUI-Less state, & can be completely navigable by keyboard^[4].

1. Lynx had follow Incremental Process model and resulted in system composed of small fragments of code with no. coherent overall structure, contractedly much of code is on low-level that increase its complexity.
2. The “libgnutls” library provides optional support for secure protocols.
3. The “Curses” library is used to display & navigate information on character cell terminals.



4. Due to Lynx's text-only nature- the rendering engine outputs web pages in linear form rather than attempting to layout elements at appropriate co-

ordinates, and the user interface relies dealing with menus, widgets and mouse events.

5. Lynx does not contain JavaScript interpreter or Xml parser as they are modern feature not supported yet.

Applications of LYNX:

Various applications supported by Lynx browser are:

An Amiga part made in 1995, Robotics support, Remote access technologies: such as Telnet and SSH.

Latest tablet supporting lynx: Lenovo IdeaTab K3.

What's new to LYNX?

1. Lynx web browser error is the Hexadecimal format of the error caused. This is common error code also used by windows.
2. Lynx also act as text-to-speech application for usually impaired people & can power refreshable Braille display. It supports more than 200 configurable options too^[3].
3. Release 2.8.7 (onwards) contains many bug fixes & new features. For example: the ability to save the current browsing session has been added. This version also offers improved support for secured SSL, HTML interpretation & Cookies^[4].
4. Lynx also uses for :
 - a. Testing web browser for logical structure for search engines.
 - b. Testing web pages for accessibility to screen readers.
 - c. Fast, safe access to text base web sites.

Lynx is definitely not for end users. It's pros who either do not have any GUI support or for those who are still working on legacy systems that do not support GUI browser.

Lynx Point to cover: the text-based lynx, took just 1min on solaris to load the 70mb files.

Differentiate Browser functionality and Performance [7].

	IE	Lynx
Developer	Microsoft	Montulli, Grobe, Rezac, et al.
Average Market Share	18%	--
Cost to User	\$0	\$0
Open Source?	No	Yes
Download Page	(microsoft.com)	(lynx.isc.org)
Software License	Proprietary	GPL
Languages	Spanish	Spanish
Current Layout Engine	Trident / WebGL	built-in

Page Zooming	Yes	No
Pop-up Blocking	Yes	No
Tabbed Browsing	Yes	No
Tabbing Navigation	Yes	No
Text-to-Speech	Yes	No
Voice Control	Yes	No

Performance:

	IE	Lynx
Overall Performance Rankings	5th out of 5	--
Java Script Speed	6306 MILLISECONDS	--
DOM Selection Speed	137 MILLISECONDS	--
CSS Rendering Speed	793 MILLISECONDS	--
Page Load Times	4 SECONDS	--
CPU Usage	18.1	--
Browser Cache Performance	2 SECONDS	--

Features:

	IE	Lynx
Accessibility Features		
Access Keys	Yes	No
Ad Filtering	Yes	No
Caret Navigation	Yes	No
Full-text History Search	Yes	No
Incremental Finding	Yes	No

Browser Features	IE	Lynx
Auto Updater	Yes	No
Downloads	Yes	No
Form Input	Yes	No
Password Management	Yes	No
Per-site Security Configuration	Yes	No
Privacy Mode	Yes	No
Search Engine Toolbar	Yes	No
Bookmarks	Yes	Yes

Support:

JavaScript Support	IE	Lynx
DHTML	Yes	No
DOM 1	Yes	No
ECMA Script 3	Yes	No
JavaScript	Yes	No
Rich Editing	Yes	No
XML Http Request	Yes	No
XPath	Yes	No

Web Technology Support	IE	Lynx
CSS2.1	Yes	No
LINKs	No	Yes
SMIL	Yes	No
VML	Yes	No

XSLT	Yes	No
Frames	Yes	Yes

Mobile Technology Support	IE	Lynx
	No	No

Plugins and Syndicated Content Support	IE	Lynx
ActiveX	Yes	No
Atom	Yes	No
Gears	Yes	No
Java	Yes	No
Other Web Feed	Yes	No
RSS	Yes	No

Protocol Support	IE	Lynx
data:URI	Yes	No
EV	Yes	No
Gopher	No	Yes
IDN	Yes	No
NNTP (Usenet)	No	Yes
Proxy Possibilities	Yes	No
FTP	Yes	Yes
HTTP	Yes	Yes
IPv6	Yes	Yes
SSL	Yes	Yes

Image Format Supported	IE	Lynx
GIF	Yes	No
JPEG	Yes	No
PNG	Yes	No

Conclusion:

Many browsers have been proposed in the last decade. We have examined the history and evolution of two webbrowsers domain IE and

Lynx. The rendering engine is responsible for performing many complex, error-prone tasks such as parsing HTML and executing JavaScript. It will be interesting to observe how the web browser domain adapts to support many different functionalities and speed of the rendering process. We have also observed several interesting differentiations of two browsers IE and Lynx such as performance, accessibility features, browser features, JavaScript support, web-technology support and protocol support etc.

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