

# Linux and Open Source

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Presented to the Mission Oaks Computer Club

December 11, 2003

# What is “Linux?”

- A UNIX-like Operating System, created from scratch by developers around the world.
- Began as a hobby project by a Finnish University Student in 1991. Now a multi-billion-dollar per year industry.
- Capable of running on tiny embedded systems (PDAs, robots, DSL routers) as well as the largest mainframes.

# What is “Open Source?”

- “Open Source” is a kind of software license (a kind of “End User License Agreement”)
- There are a number of different licenses which are certified as “Open Source” (by the non-profit “Open Source Initiative”)  
<http://www.opensource.org/>

# What is “Open Source?”

- It doesn't *just* mean “Access to the source-code”
- The license must **not restrict** anyone from **selling** or **giving away** the software
- The program **must include** the **source code**, and allow distribution
- The license **must allow** for **derived works** and other modifications to be released under the same license
- The license **must not discriminate** against **persons or groups**
- The license **must not discriminate** against **fields of endeavor** (e.g., it cannot say “For educational use only”)

# Why choose Open Source?

- **Open Source is Flexible**
  - The source code is available, so it can be altered to suit your needs.
  - A program can change in ways the author never intended or dreamed of!
- **Open Source is Inexpensive**
  - Up front costs for the software are nil!
  - Because the source is available, anyone can learn how software works, so support can become competitive; and therefore *cheap!*

# Why choose Open Source?

- **Open Source developers are motivated**
  - Most developers of Open Source are doing it because they have a need or a want to; they are not simply programmer drones at a huge corporation!
- **Better Security, and fewer bugs!**
  - Accidental (or malicious) bugs are found quickly, since anyone and everyone can examine the code.
  - Viruses, “spyware,” etc. are almost non-existent!
  - Actual bugs are fixed quickly, and in the open.

# Why choose Open Source?

- **The code will survive!**
  - While the loss of a major corporate contributor may be a deterrent, it will never mean the *death* of a piece of Open Source software.
  - The code will always be out there, since it can always be passed along!
- ***You* can contribute!**
  - Even if you cannot help write the software, you can contribute with bug reports, feature requests, etc.
  - When was the last time you e-mailed someone at Microsoft who works on OfficeXP!?

# Why Switch to Linux?

- Many are frustrated with **bugs**, **viruses**, and **crashes**.
- Others are sick of **spyware**, **pop-up ads**, and having their computers **hijacked** to attack others or send spam.
- Some are tired of **recurring costs** (both new versions of software, and new hardware just to run it!)
- Finally, many have major concerns with new **licensing** that takes away their **rights** and invades their **privacy!**



# Other Reasons to Use Linux

- Linux is a powerful **multitasking, multi-user** operating system
- The underlying OS and tools are separate from the graphical environment (GUI), so it is more well suited as a server. (It can run powerful servers on less powerful hardware.)
- It runs web servers, databases, email, print servers, file shares...

# Where does Linux run?

- **Embedded systems**
  - TiVo & entertainment systems
  - Robots
  - PDAs / hand held computers
  - Cellphones
  - Gateways, server appliances, wireless access points
  - Point-of-sale systems (cash registers)

Licensing cost for the Linux OS itself is \$0.

Compared that to commercial embedded OSes!  
(Every dollar counts in this arena!)

For more, see: <http://www.linuxdevices.com/>

# Where does Linux run?

- **Variety of CPU architectures**
  - “IBM Compatible” PCs
    - 386, 486, 586, Pentium
  - Next generation PCs
    - Itanium, AMD64/Opteron
  - Motorola 68000 / PowerPC
    - Apple Macintosh, Atari ST, Amiga, etc.
  - Alpha
  - ARM
  - IBM S/390
  - MIPS
  - PA-RISC
  - Sparc

<http://www.xs4all.nl/~paulvand/linuxweb/docs/architectures.htm>

# Where does Linux run?

- **Giant Mainframes & Clusters**
  - IBM, HP and others sell Linux-based systems
  - Some make their own large systems out of hundreds, or thousands of commodity systems (clusters)
  - Users include:
    - Google (search engine)
    - Amazon (e-commerce site)
    - Dreamworks (animated motion pictures)
    - NASA
    - National weather service
    - Other government & military

# Where does Linux run?

- **Thin Clients (and servers)**
  - Linux servers store and run applications, and store all user data
  - Extremely low-end Linux clients display the applications
  - Used in K-12 schools and colleges, and some small businesses

# Microsoft software seems *particularly* insecure

**November 2002**

Internet Explorer bug allowed malicious websites and emails to control PCs.  
(Example site demonstrated simple “FORMAT A:” command  
by simply visiting a web page!)

<http://www.jmu.edu/computing/security/info/iehot.shtml>

**January 2003, Davis-Besse Nuclear Power Plant, Ohio**

Safety monitoring system disabled for *5 hours* due to “Slammer” worm

<http://securityfocus.com/news/6767>

**June 2003, Harvard University**

Personal correspondence between administrators and the Dean of Faculty at  
Harvard accidentally leaked due to Windows virus

<http://www.thecrimson.com/article.aspx?ref=348459>

# Microsoft is one of many who 'spy' on its own customers

**September 2000**

Internet Explorer 5.5 tracked default bookmarks by redirecting via an MS server

<http://slashdot.org/articles/00/09/13/0023213.shtml>

**April 2002**

Windows XP Search Assistant silently connects to a server at Microsoft

<http://www.theregister.co.uk/content/4/24815.html>

**February 2003**

Microsoft Media Player logs users' DVD picks to server at Microsoft

<http://www.itworld.com/AppDev/1471/IDG020221mediaplayer/>

Windows XP Update extracts info. about PCs and sends it to an MS server

<http://www.theinquirer.net/?article=7980>

# Governments Switching to Linux and Open Source!

(Just the *latest* news...)

- Britain's National Health Service considering  
(December 2003; <http://observer.guardian.co.uk/business/story/0,6903,1101344,00.html>)
- Brazil leaning away from Microsoft  
(November 2003; <http://apnews.excite.com/article/20031116/D7URSKHO0.html>)
- “Vietnam embracing open-source products”  
(October 2003; <http://www.bayarea.com/mld/mercurynews/business/7139304.htm>)
- Massachusetts mandates open source; locks horns with Microsoft  
(October 2003; [http://www.boston.com/business/articles/2003/10/19/in\\_open\\_source\\_gain\\_bay\\_state\\_locks\\_horns\\_with\\_microsoft/](http://www.boston.com/business/articles/2003/10/19/in_open_source_gain_bay_state_locks_horns_with_microsoft/))
- “Israel slams the door on Microsoft”  
(October 2003; <http://www.theregister.co.uk/content/4/33365.html>)
- UK Office of Government Commerce  
(October 2003; <http://news.bbc.co.uk/1/hi/technology/3181108.stm>)
- “Japan, China, Korea may develop Windows replacement”  
(August 2003; <http://www.reuters.com/locales/newsArticle.jsp?type=technologyNews&storyID=3363256>)
- “City [of Toronto Children's Services Division] rolls out Linux desktop”  
(July 2003; [http://www.itworldcanada.com/index.cfm/ci\\_id/46194.htm](http://www.itworldcanada.com/index.cfm/ci_id/46194.htm))
- Linux reaches Afghanistan  
(July 2003; <http://news.bbc.co.uk/2/hi/technology/3067871.stm>)



# Not ready for Linux?

## Use Open Source anyway!

- Countless applications have been released as Open Source
- Much is developed specifically for Linux
- However, much is either designed with other platforms in mind, or gets 'ported' later!
- Some major commercial applications were later released as Open Source software!

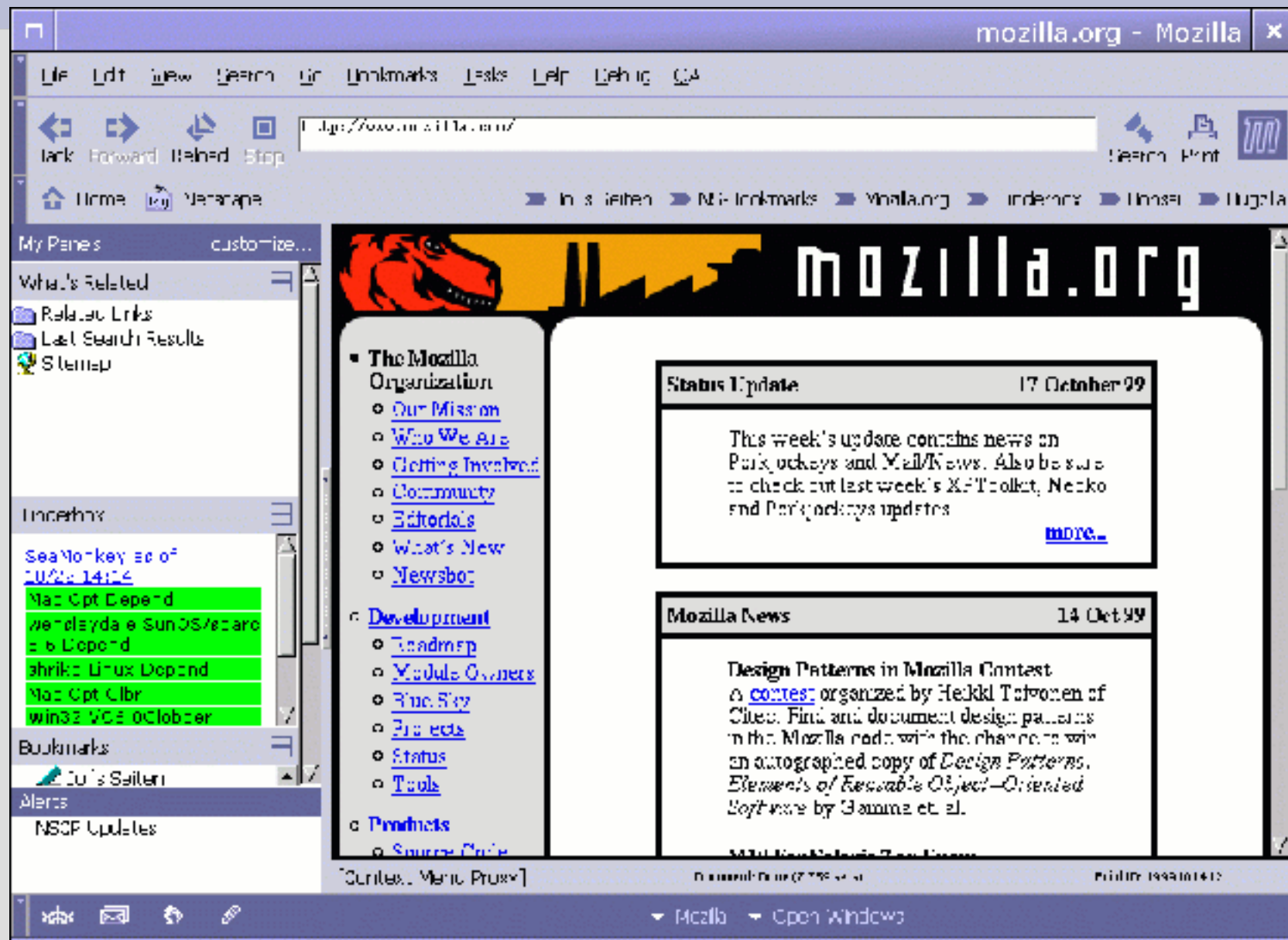
# Examples of Open Source software you can use TODAY

- **Mozilla – Web Browser**
  - Netscape code base was released “into the wild”
  - It is now one of the most standards-compliant browsers
  - Developers design it to be **user-oriented**, rather than creating yet another means to serve **advertising**
  - AOL now uses Open Source Mozilla project as a basis for commercial Netscape releases!!!

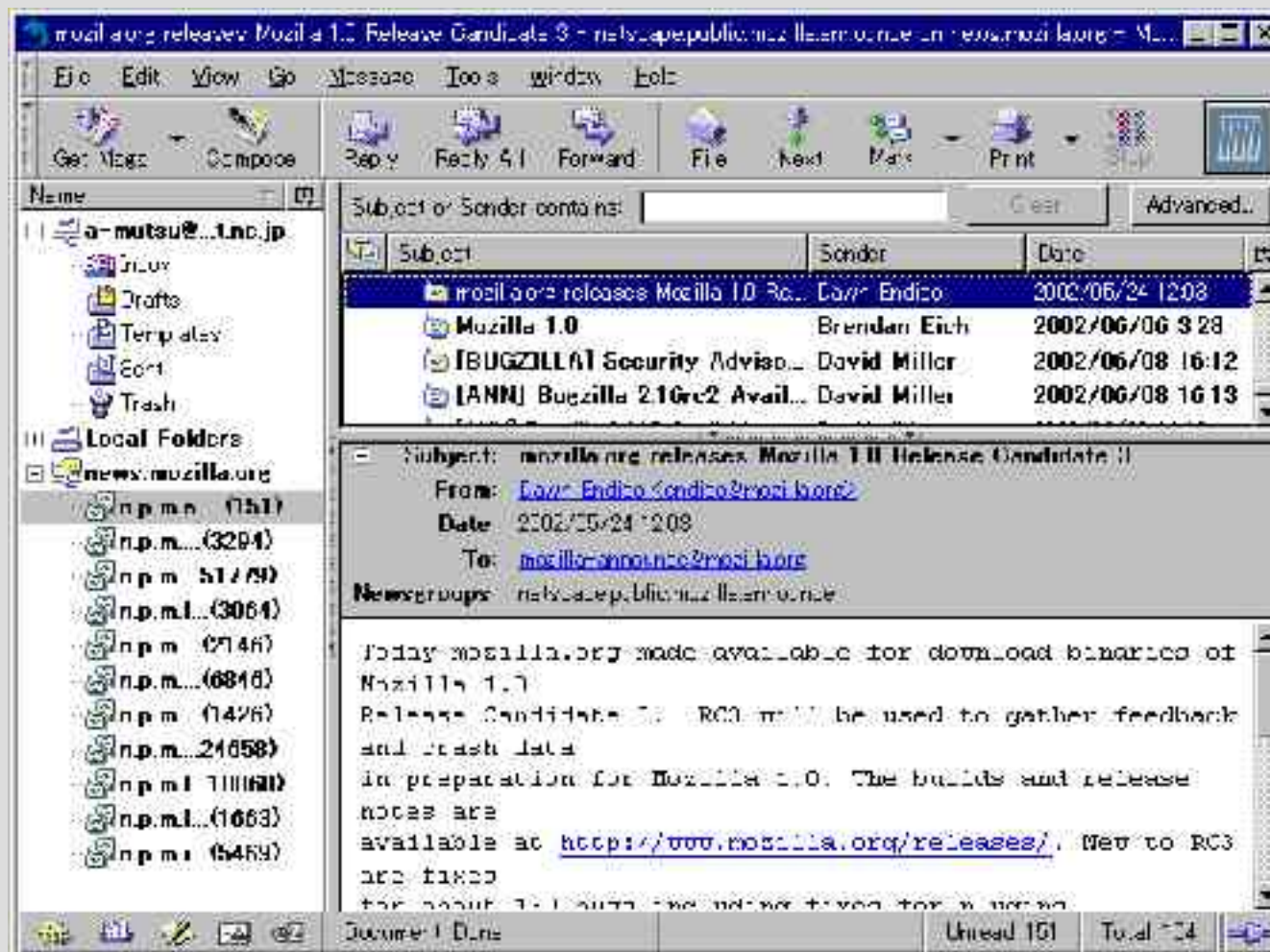
<http://www.mozilla.org/>



# Mozilla Browser



# Mozilla Mail and Usenet News reader



# Examples of Open Source software you can use TODAY

- **OpenOffice.org** – Office productivity suite
  - German “StarOffice” suite was purchased by Sun Microsystems and released as Open Source
  - Has a high degree of Microsoft Office compatibility
  - Can export directly to PDF
  - Includes integrated **Word Processor**, **Spreadsheet**, **Presentation**, and **Drawing** apps
  - Like AOL/Netscape does with “Mozilla,” Sun now uses OpenOffice.org as a basis for their commercial “StarOffice” product

<http://www.openoffice.org/>



# OpenOffice.org Writer

The screenshot shows the OpenOffice.org 1.0 Writer application window. The title bar reads 'OpenOffice.org 1.0 - OpenOffice.org 1.0.2'. The menu bar includes 'File', 'Edit', 'View', 'Format', 'Tools', 'Window', and 'Help'. The toolbar contains various icons for file operations and text formatting. The main document area displays a large logo for 'OpenOffice.org 1.0' with two birds flying above it. Below the logo is a section titled 'Freedom at Work' with several columns of text describing the software's features and benefits. A 'Paragraph Styles' sidebar is visible on the right side of the window.

OpenOffice.org 1.0  
Freedom at Work

**Just how free is OpenOffice.org 1.0?**

- Free to use - Get downloaded & installed from the internet
- Free from license fees - you will never need to buy a license or pay for an upgrade again
- Free to modify & improve - you can

**A new approach to office productivity software**

OpenOffice.org 1.0 was not designed to be a direct office software. It is a complete system for documents and spreadsheets, design eye-catching presentations and produce dynamic illustrations.

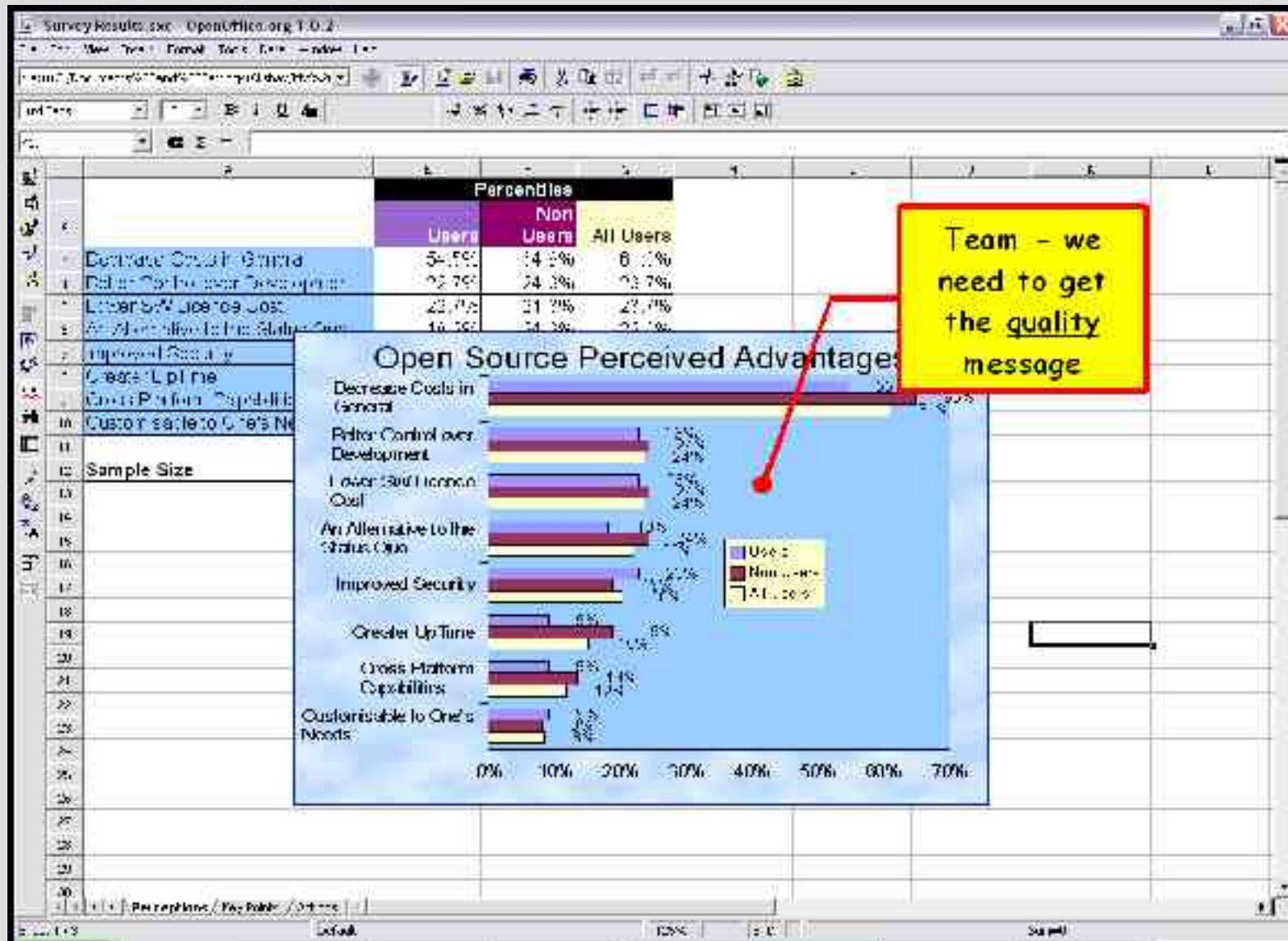
If you're used to using other office suites - such as Microsoft Office - you'll be surprised at how easy

**DRAW** can produce everything from simple diagrams to highly detailed illustrations and spreadsheets.

**IMPRESS** is the fastest, most powerful way to create effective multimedia presentations. Your presentations will truly stand out with special effects, animation and high impact drawing tools.

The **DATABASE USER TOOLS** give you everything you need to work with

# OpenOffice.org Calc



# Examples of Open Source software you can use TODAY

- **The Gimp** – Graphics manipulation software
  - Originally developed for Linux and Unix by students at UC Berkeley
  - Handles photo retouching, image composition, image authoring, and file format conversion
  - Includes layers, filters, full script-ability, batch processing capabilities, and much more!
  - Often dubbed “a free replacement for PhotoShop”

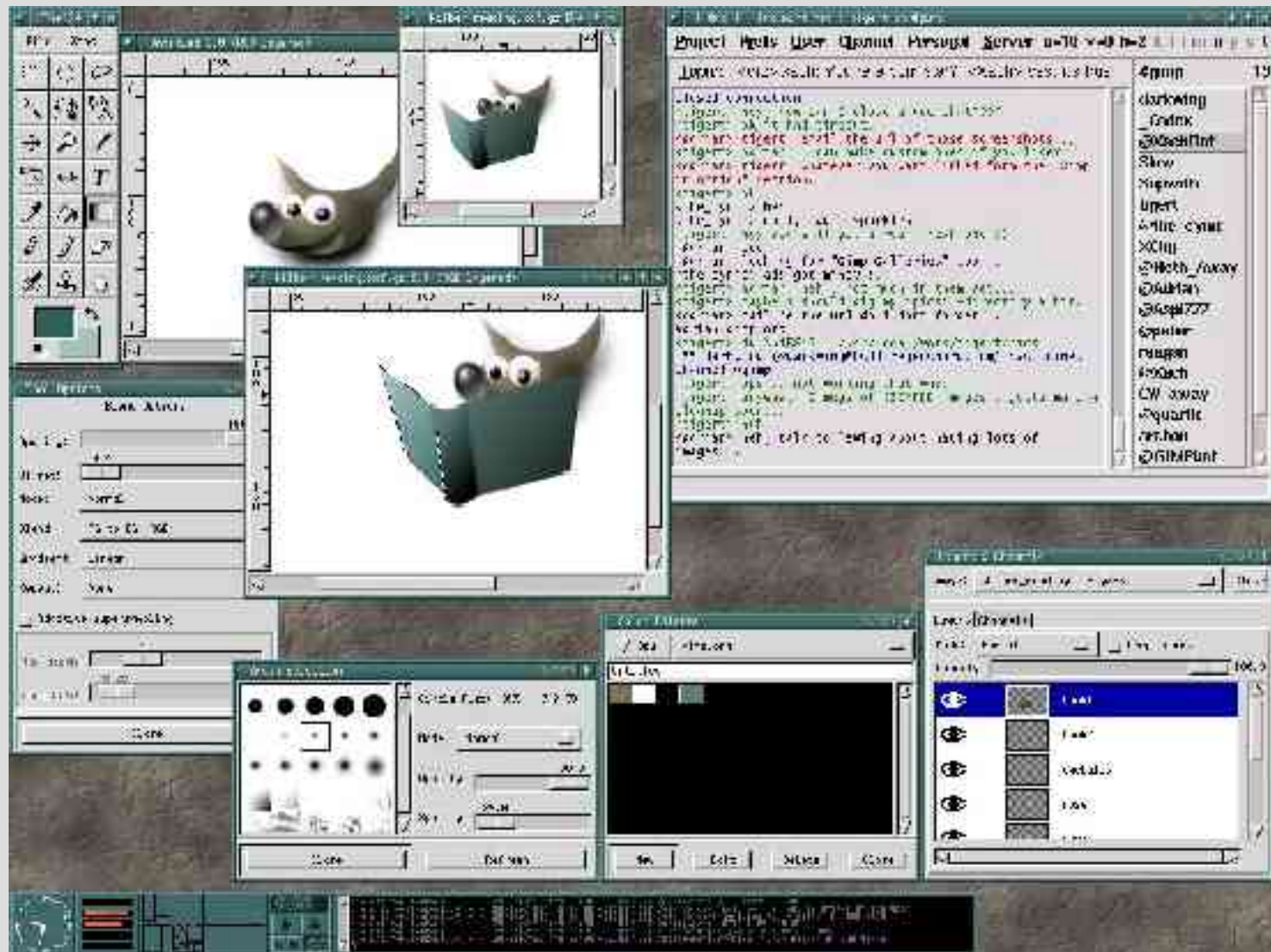
<http://www.gimp.org/>

<http://www2.arnes.si/~sopjsimo/gimp/> (For Windows)





# The Gimp



# Examples of Open Source software you can use TODAY

- **Flight Gear** – Flight simulator
  - Goals include:
    - Creating a sophisticated simulation framework for research and academic environments
    - For development and pursuit of other simulation ideas
    - And, of course, as an end-user application

<http://www.flightgear.org/>



# Examples of Open Source software you can use TODAY

- **GCC** – The GNU C Compiler
  - Famous Open Source compilers for C, C++, Java and Fortran
  - Ported to countless CPU architectures
  - Capable of cross-compiling between architectures

<http://www.mingw.org/> (GCC for Windows)

# Examples of Open Source software you can use TODAY

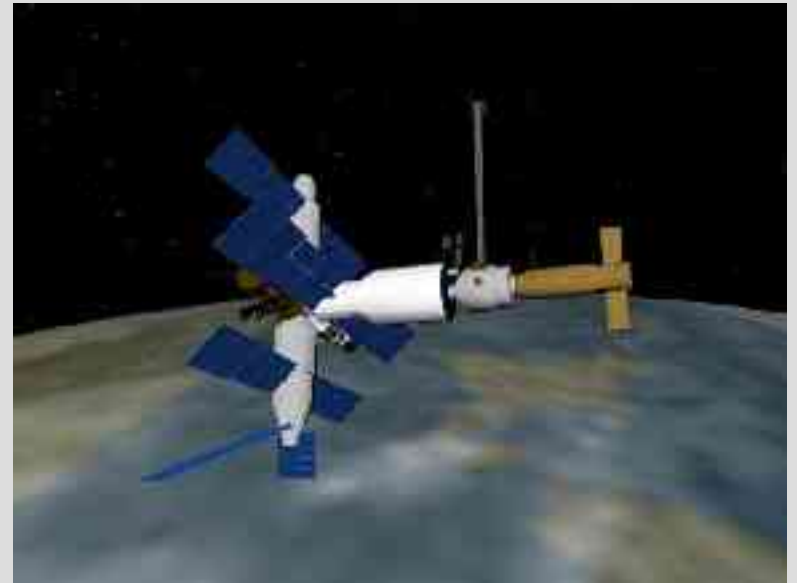
- **Audacity** – Audio editor
  - Sound record and playback
  - Import and export, WAV, MP3, AIFF and more
  - Edit, mix and apply effects to sounds
  - Additional effects can be added via plug-ins

<http://audacity.sf.net/>



# Examples of Open Source software you can use TODAY

- **Celestia** – Real-time space simulation
  - Full 3D graphics
  - Visit the Solar System
  - Visit hundreds of thousands of stars



<http://www.shatters.net/celestia/>

# Examples of Open Source software you can use TODAY

- **Tux Paint** – Drawing for young children
  - Easy enough for 3-year-olds
  - Can be 'locked down' (full-screen display, disable “Quit” and “Print” buttons, etc.)
  - Translated into over 30 languages



<http://www.newbreedsoftware.com/tuxpaint/>

# Get Open Source Software!

- **GNU Win II**

A free software compilation for Windows.

Download any/all programs from the website.

Purchase a CDROM with select titles

<http://gnuwin.epfl.ch/>



# Get Open Source Software!

- **The Open CD**

Another free software compilation for Windows. Includes only software for a broad audience, which has been thoroughly tested.



<http://www.theopencd.org/>



# Get Linux (*No-commitment!*)

- **Knoppix** - “Live CD” of Linux
  - NOT an install disc.
  - Doesn't place Linux on your hard disk...
  - Runs completely from CDROM!
  - When you're done, shut down and remove the disc; reboot and you're back in Windows!
  - Known for it's ability to detect most hardware peripherals without any configuration!
  - Sometimes used as an “emergency” boot disc to recover a dead Linux or Windows system! (Even for forensics!)



<http://www.knoppix.org/>