

**CTSF**



- Ray Byler
- NDIA SE Conference 24-28 Oct, San Diego
- The Future of Open Source Software (OSS) in DoD
- Abstract number: 10742
- 254-532-8321 x2348
- [ray.byler@us.army.mil](mailto:ray.byler@us.army.mil)

**CTSF**



# The Future of Open Source Software (OSS) in DoD

2010-10-06

Dr Ray Byler

[ray.byler@us.army.mil](mailto:ray.byler@us.army.mil)



## Outline

- Introduction to OSS
- DoD Plans for OSS
- Forces Driving Adoption of OSS
- OSS Performance, Security, Reliability, & Cost
- Quantifiable Trends and Market Share
- OSS Worldwide Adoption
- OSS Future
- Examples



## BLUF

- OSS is NOT a panacea, but it is the future of software
- OSS has demonstrated that it is
  - high performance
  - secure
  - cost effective
  - getting better every day
- DoD recognizes the growing role of OSS and is planning accordingly



## What is OSS

[http://en.wikipedia.org/wiki/Open-source\\_software](http://en.wikipedia.org/wiki/Open-source_software)

- May be free of cost
- Get source code
- Allowed to study, change, improve, and redistribute software

OSS really about freedom, not free  
– can't restrict rights of others



WIKIPEDIA



## DoD Plans for Open Source

- 2007-03-09 DoD OSS FAQ
- 2006-06-07 Deputy Under Secretary of Defense, Advanced Systems & Concepts – OTD Plan
- 2007-06-05 Department of the Navy OSS Guidance
- 2009-03-23 AR 25-2 Information Assurance
- 2009-10-16 DoD CIO Memorandum on OSS

**DoD has largest installed Red Hat user base in world**



## 2007-03-07 DoD OSS FAQ

[http://cio-nii.defense.gov/sites/loss/Open\\_Source\\_Software\\_\(OSS\)\\_FAQ.htm](http://cio-nii.defense.gov/sites/loss/Open_Source_Software_(OSS)_FAQ.htm)

- **Q: Isn't using open source software forbidden by DoD Information Assurance Policy?**
- No. This **misconception comes from a misinterpretation of DoD Instruction 8500.2**, "Information Assurance (IA) Implementation", Enclosure 4, control DCPD-1.
- The control in question reads:
- DCPD-1 Public Domain Software Controls  
Binary or machine executable public domain software products and other software products with limited or no warranty such as those commonly known as **freeware or shareware are not used in DoD information systems** unless they are necessary for mission accomplishment and there are no alternative IT solutions available. Such products are assessed for information assurance impacts, and approved for use by the DAA. The assessment addresses the fact that such software products are difficult or impossible to review, repair, or extend, given that the Government does not have access to the original source code and there is no owner who could make such repairs on behalf of the Government. This control is intended to limit the use of certain kinds of "binary or machine executable" software when "the **Government does not have access to the original source code**". As clarified in the 2009 DoD CIO Memorandum, this control does not prohibit the use of open source software, since with open source software the government *does* have access to the original source code.
- In the [Desktop Application STIG version 3, release 1 \(09 March 2007\)](#); in its section 2.4, it clearly states that **DCPD-1 does not apply to open source software**, for this very reason. The STIG first notes that "DoD has clarified policy on the use of open source software to take advantage of the capabilities available in the Open Source community as long as certain prerequisites are met. DoD no longer requires that operating system software be obtained through a valid vendor channel and have a formal support path, if the source code for the operating system is publicly available for review". It notes in particular that three cases for software are acceptable:
  - A utility that has **publicly available source code is acceptable**.
  - A commercial product that incorporates open source software is acceptable because the commercial vendor provides a warranty.
  - Vendor supported open source software is acceptable.
- The DISA STIG also notes "4. **A utility that comes compiled and has no warranty is not acceptable**." Thus, a program must come with either source code or a warranty; if it has neither, then special dispensation is required, since it difficult to review, repair, or extend the program either directly or via someone else.



# 2006-06-07 DoD OTD Roadmap Plan,

Deputy Under Secretary of Defense, Advanced Systems & Concepts, Ms. Sue Payton,

<http://www.acq.osd.mil/jctd/articles/OTDRoadmapFinal.pdf>

- "To complete its missions, the Department of Defense **(DoD) must continually reinvent itself** as threats and technologies shift and evolve."
- "Fundamentally, companies have realized that **technology is now a commodity** and the business model is **providing professional services for solutions versus closed products.**"
- "**IBM provides a good example** of engineering a corporate culture change away from proprietary implementations to leveraging and heavily investing in open solutions."
- "This entails a parallel shift in acquisitions methodologies and business process to facilitate discovery and **re-use of software code** across DoD."
- "To summarize: **OSS** and open source development methodologies are **important to the National Security** and National Interest of the U.S. for the following reasons:
  - **Enhances agility of IT** industries to more rapidly adapt and change to user needed capabilities.
  - **Strengthens the industrial base** by not protecting industry from competition. Makes industry more likely to compete on ideas and execution versus product lock-in.
  - Adoption recognizes a change in our position with regard to **balance of trade of IT.**"





# 2006-06-07 DoD OTD Roadmap Plan,

Deputy Under Secretary of Defense, Advanced Systems & Concepts, Ms. Sue Payton

<http://www.acq.osd.mil/jctd/articles/OTDRoadmapFinal.pdf>

- “Ultimately, the government will need to **embrace OTD, integrate it into formal acquisition directives** and policies and enforce its application through appropriate procedures and review processes.”
- **Summary of additional advantages offered by OSS**
  - **Encourages software re-use** – don't reinvent the wheel
  - **Can increase code quality and security** – learn about problems sooner than closed source
  - **Open source software is potentially subject to scrutiny by many eyes** – bugs can't hide
  - **Decreases vendor lock-in** – no needless upgrades, no proprietary binary formats
  - **Reduces cost of acquisition** – no “per-seat” licenses
  - **Increases customizability** – easy to port, easy to fix
  - **Meritocratic community** – free exchange of ideas, steady accumulation of source code



# 2007-06-05 DON OSS Guidance,

DON CIO Robert J. Carey

<http://www.doncio.navy.mil/PolicyView.aspx?ID=312>

"A key piece in supporting the **DoD goal is the ability to utilize OSS** as part of the Department of the Navy's (DON) Information Technology (IT) portfolio."

"The **misconception** that OSS is neither a commercial off-the-shelf (COTS) nor government off-the-shelf (GOTS) solution has **hindered the DON's ability to leverage the benefits of OSS methodology.**"

"**DON commands will treat OSS as COTS** when it meets the definition of a commercial item, per enclosure (1)."

"Open Source Software: Computer **software that includes source code** that can be used and modified by the user; this software has been copyrighted and **includes a license agreement** restricting its use, modification, and distribution. Open Source Software is software that is copyrighted and licensed under a license agreement that is **not public domain software or freeware**. The Open Source Initiative (OSI) web site (<http://opensource.org>) contains more information on open source and open source licenses."



**CTSF**



## 2009-03-23 AR 25-2 Information Assurance,

[http://www.army.mil/usapa/epubs/pdf/r25\\_2.pdf](http://www.army.mil/usapa/epubs/pdf/r25_2.pdf)

Section II, Software Security, 4-6 Controls, h:

**“Use of “open source” software (for example, Red Hat Linux) is permitted when the source code is available** for

examination of malicious content, applicable configuration implementation guidance is available and implemented, a protection profile is in existence, or a risk and vulnerability assessment has been conducted with mitigation strategies implemented with DAA and CCB approval and documentation in the C&A package. Notify RCIOs and the supporting RCERT/TNOSC of local software use approval.”

**CTSF**



# DoD OSS Clarifying Guidance,

2009-10-16 David M. Wennergren, ASD(NII)/DoD CIO

<http://cio-nii.defense.gov/sites/oss/2009OSS.pdf>

"There are many OSS programs in operational use by the Department today, in both classified and unclassified environments. **Unfortunately, there have been misconceptions and misinterpretations of the existing laws, policies and regulations that deal with software and apply to OSS, that have hampered effective DoD use and development of OSS.** Attachment 2 contains clarifying guidance to address some of those issues."

**"OSS meets the definition of "commercial computer software" and shall be given appropriate statutory preference."**

"Executive agencies, including the Department of Defense, are **required to conduct market** research when preparing for the procurement of property or services by 41 USC Sec. 253a (reference (e)) (see also FAR 10.001 (reference (f))). Market research for **software should include OSS when it may meet mission needs.**"



# CTSF



- 1999-11 <http://sourceforge.net/>
- 2010-8 240,000 projects
- 48 million users

- GSA May Create [forge.gov](http://forge.gov)

<http://fcw.com/articles/2010/06/24/gsa-forge-project-and-cloud-computing.aspx>



- 2009-04 DISA Initiative
- <http://forge.mil/>
  - <https://software.forge.mil/sf/sfmain/do/home>
  - <https://project.forge.mil/sf/sfmain/do/home>
  - [www.disa.mil/forge](http://www.disa.mil/forge)
- DoD source code repository
- Modeled on sourceforge
- Inside DoD firewall
- CAC or ECA cert to access



## What is driving the move to OSS?

- Economic forces
  - Indirect costs – Globalization (cheapest place to produce)
  - Direct costs – licensing fees
  
- Superior quality
  - Performance
  - Security
  - Reliability

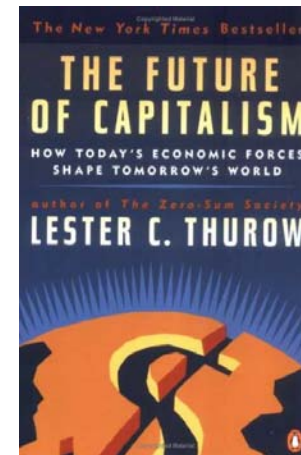
**CTSF**



# Economic Forces



# 1997-04-01 The Future of Capitalism



- Globalization changes software economics
- Software can/will be done where most cost efficient e.g., China and India
- Developing nations see OSS as way of bridging digital divide

- 1997-04-01 The Future of Capitalism, Lester Thurow, Penguin Books <http://books.google.com>
- 2004-5-24, "We're getting the best and brightest in China and India, and the numbers are just going up there." Talking to Bill Gates, Scientific American, <http://www.scientificamerican.com/article.cfm?id=talking-to-bill-gates>
- 2004-9-2, Globalization is inevitable, Lester C. Thurow, MIT Professor, <http://emagazine.credit-suisse.com/app/article/index.cfm?fuseaction=OpenArticle&aoid=45171&lang=EN>
- 2009-4-12, Microsoft announces 5,000 layoffs in U.S.,
- 35% of Microsoft's patent applications in 2008 came from H-1B and green-card employees, <http://www.sfgate.com/cgi-bin/article.cgi?f=/c/a/2009/04/11/ED3G16HV0L.DTL>
- 2009-6-4, Ballmer threatens to move U.S. jobs overseas rather than pay taxes, <http://www.crunchgear.com/2009/06/04/patriotic-microsoft-threatens-to-move-us-jobs-overseas-rather-than-pay-taxes/>
- 2010-7-7, Microsoft announces more job cuts, <http://www.tomsguide.com/us/Redmond-Worldwide-Job-Cuts-Washington,news-7368.html>

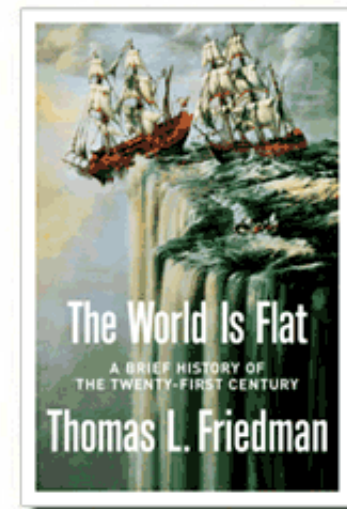




# 2005-04-05 The World Is Flat

Thomas L. Friedman

<http://books.google.com/>



“...blended models of community-developed software are driving more competition and producing cheaper, if not free, software for the public.” p. 109

“So a nineteen-year old from Stanford and a twenty-four year-old from New Zealand, working in an open-source community for free, starting from

two ends of the world, produced a browser that took 5 percent of the Internet Explorer market in about six months.” - talking about Firefox produced by Blake Ross and Ben Goodger, p. 112

“... it wasn't long before Apache became a kind of “blended model,” thanks to its collaboration with IBM. Some people worked on it for free and others were paid to do so by IBM, so the company could sell its own services, upgrades, and attachments around the basic software.” p. 108

“So IBM is very happy to pay quality software engineers to work on Linux in order to encourage its expansion as a competitor to Microsoft Windows – and thereby cut into Microsoft's profits, weakening its ability to compete with IBM in its areas of specialty.” p. 108

**CTSF**



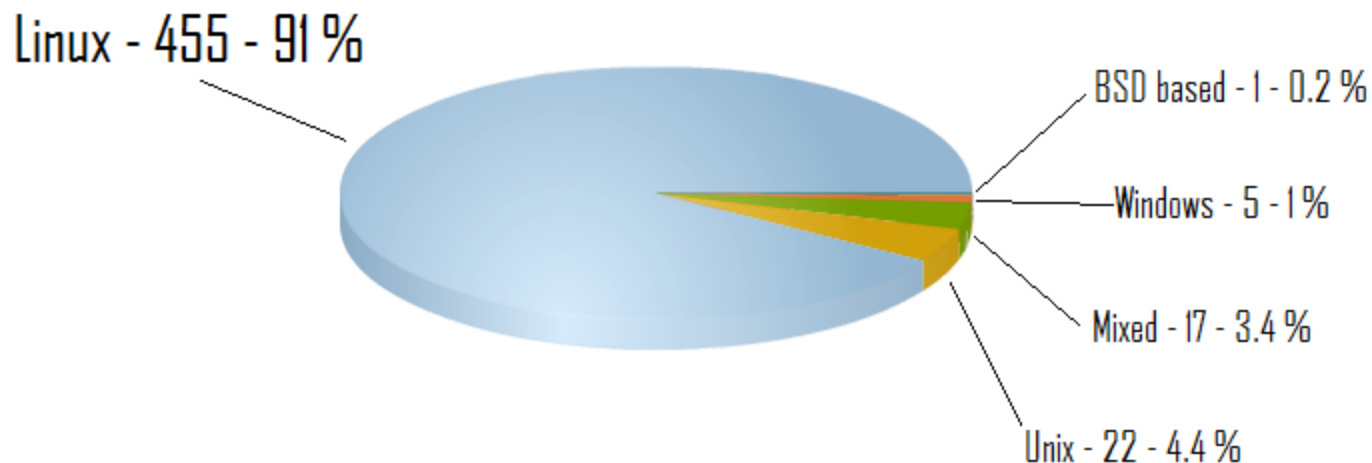
OSS is High Performance





## 2010-06 Top 500 Supercomputers in the World

<http://www.top500.org> – twice yearly lists, ranks, and publishes 500 fastest supercomputers with benchmark results.



All top ten supercomputers run Linux (7 U.S., 2 China, 1 Germany).

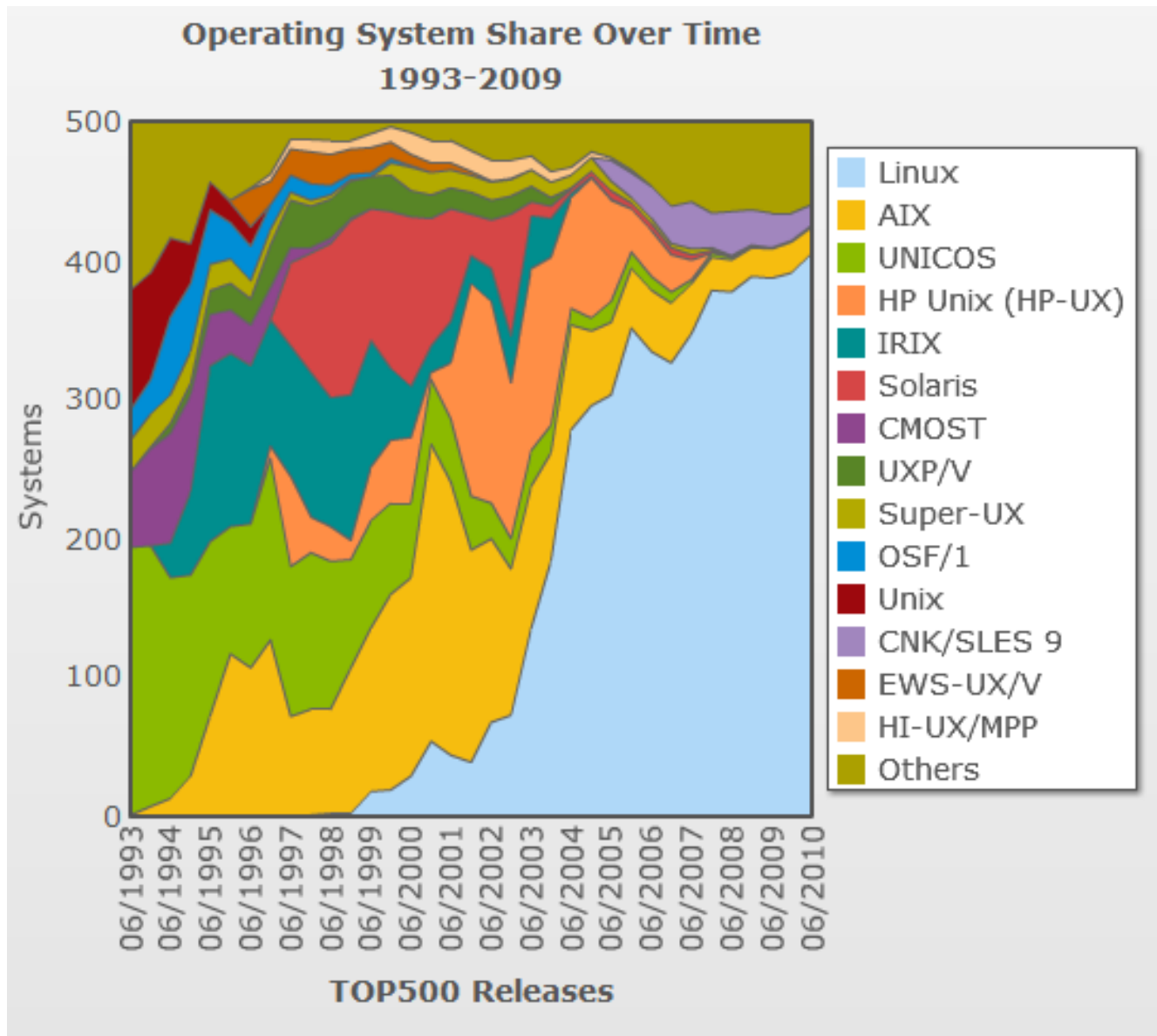
Fastest Windows supercomputer ranked 24 (actually dual boot SuSE Linux). Only 2 Windows machines in top 100.



# Supercomputer OS Over Time

Super-UX – NEC version of Unix with many BSD & Linux features

SLES – SUSE Linux Enterprise Server





# 2010-01-19 New Chinese Supercomputer to run Linux

- New University of Science and Technology of China supercomputer
  - 80 quad-core Loongson 3 processors
  - theoretical peak performance of 1 TFLOPS
  - 56% less power consumption compared to previous Loongson chip
  - MIPS compatible chip developed by Institute of Computing Technology, Chinese Academy of Sciences
- 2010-1-19, China Details Homemade Supercomputer Plans,
  - <http://www.technologyreview.com/computing/24374/page1/>
  - <http://en.wikipedia.org/wiki/Loongson>
  - [http://en.wikipedia.org/wiki/University\\_of\\_Science\\_%26\\_Technology\\_of\\_China](http://en.wikipedia.org/wiki/University_of_Science_%26_Technology_of_China)



**CTSF**



# Why OSS is More Secure & Reliable



# Why OSS is More Secure & Reliable

1997-5-27 The Cathedral and the Bazaar, Eric S. Raymond

<http://rfrost.people.si.umich.edu/courses/SI110/readings/IntellecProp/Cathedral-Bazaar.pdf>

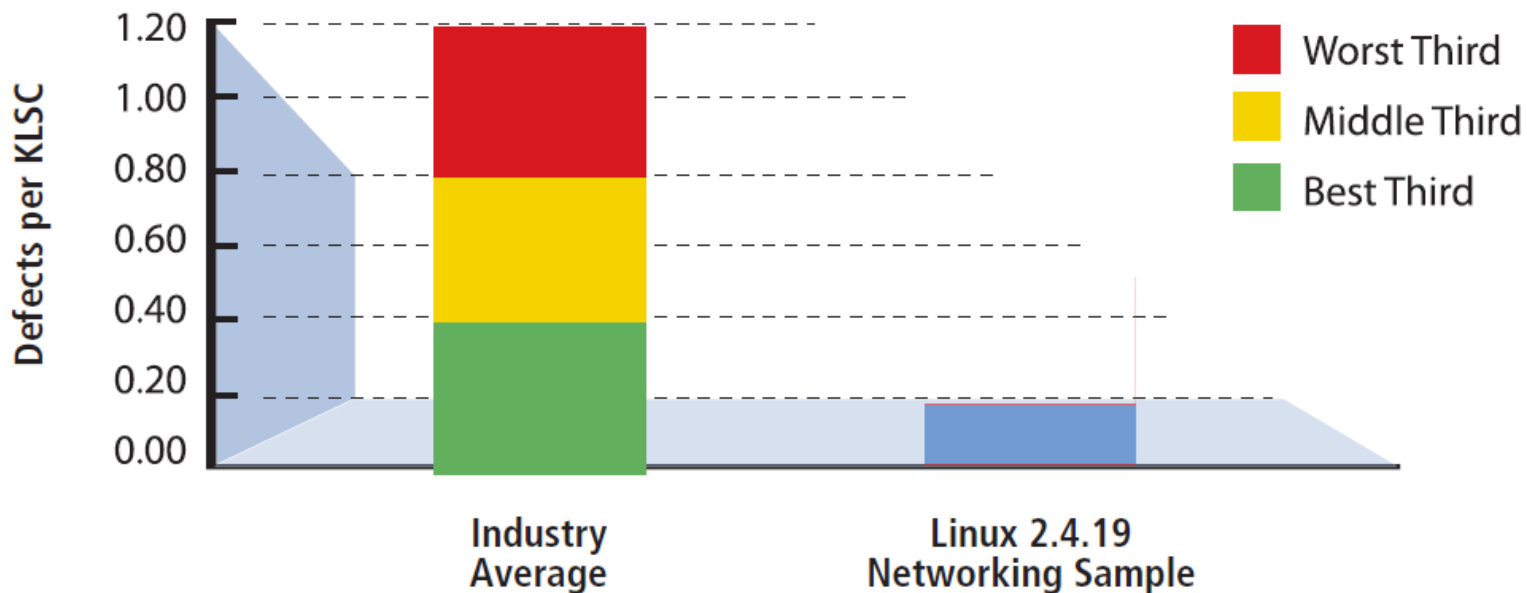
- “given enough eyeballs, all bugs are shallow”
- Source code available to all
- Modifications freely redistributable
- Many users track down bugs
- More peer review
- Fewer deadlines – code is ready when it’s ready
- **Quality is the motive, not profit**



# Reasoning LLC Comparison of TCP/IP Stacks

How Open-Source and Commercial Software Compare: A Quantitative Analysis of TCP/IP Implementations in Commercial Software and in the Linux Kernel, technical white paper, 2006, Reasoning, LLC, <http://www.reasoning.com>

### Industry Defect Comparison





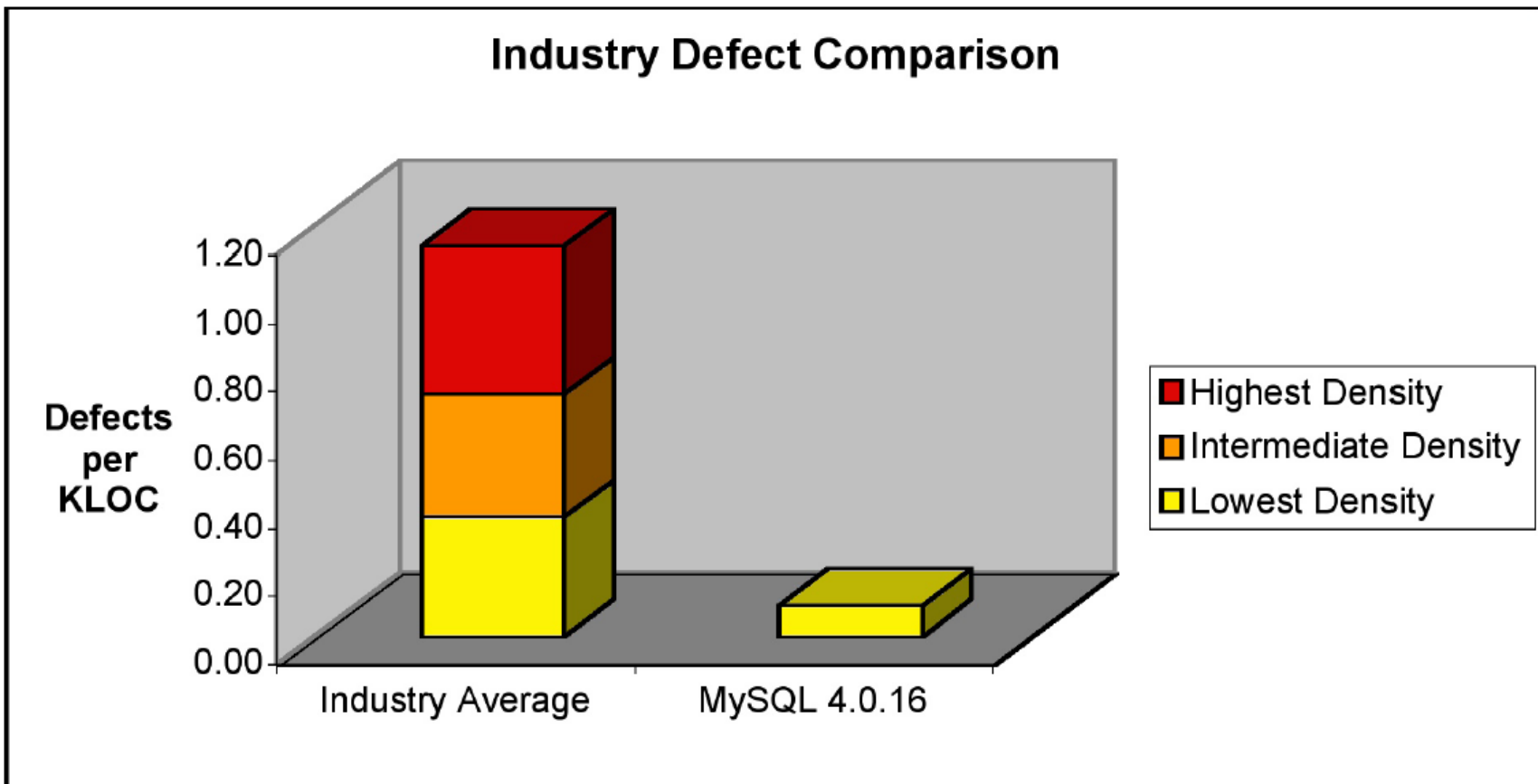


# Reasoning LLC Comparison of MySQL

How Open-Source and Commercial Software Compare: MySQL 4.0.16, technical white paper, 2006, Reasoning, LLC,

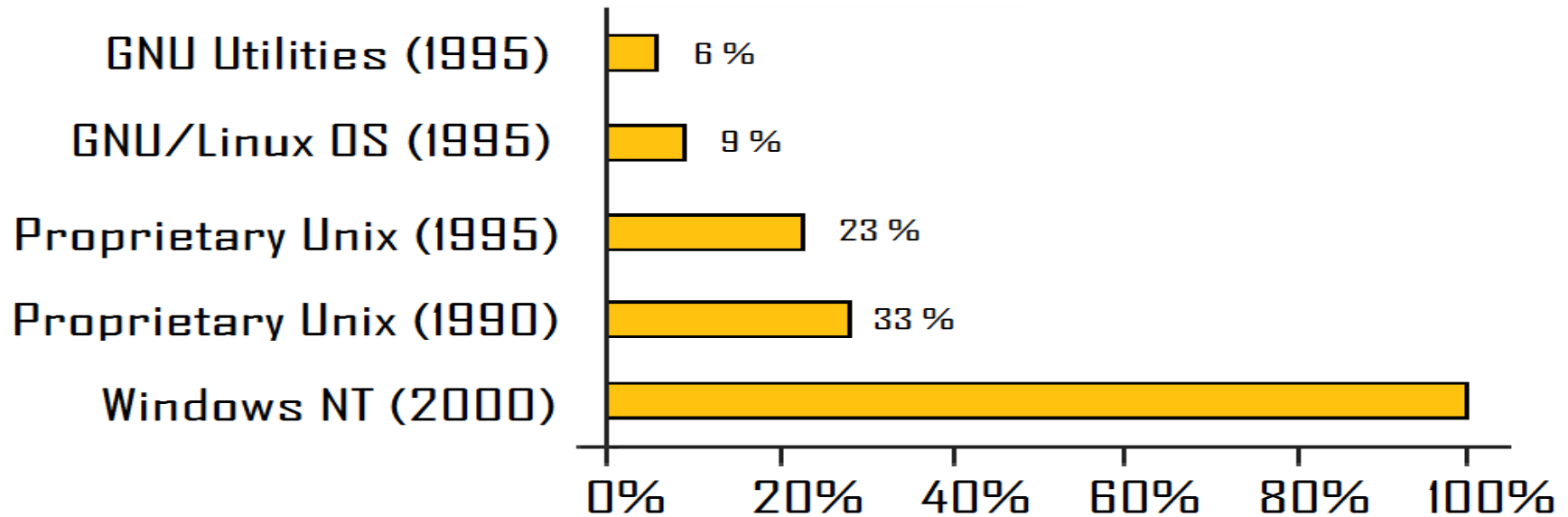
<http://www.reasoning.com>

### Industry Defect Comparison





# Failure Rates Measured by Fuzz Tests



- An Empirical Study of the Reliability of UNIX Utilities, B.P. Miller, L. Fredriksen, and B. So, *Communications of the ACM* 33, 12 (December 1990), <http://portal.acm.org/citation.cfm?id=96267.96279>
- Fuzz Revisited: A Re-examination of the Reliability of UNIX Utilities and Services, B.P. Miller, D. Koski, C.P. Lee, V. Maganty, R. Murthy, A. Natarajan, and J. Steidl, *Computer Sciences Technical Report #1268*, University of Wisconsin-Madison, April 1995, <http://www.eecs.northwestern.edu/~robby/courses/395-495-2009-fall/fuzz-revisited.pdf>
- An Empirical Study of the Robustness of Windows NT Applications Using Random Testing, J.E. Forrester and B.P. Miller, *4th USENIX Windows Systems Symposium*, Seattle, August 2000, <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.127.4701&rep=rep1&type=pdf>

**CTSF**

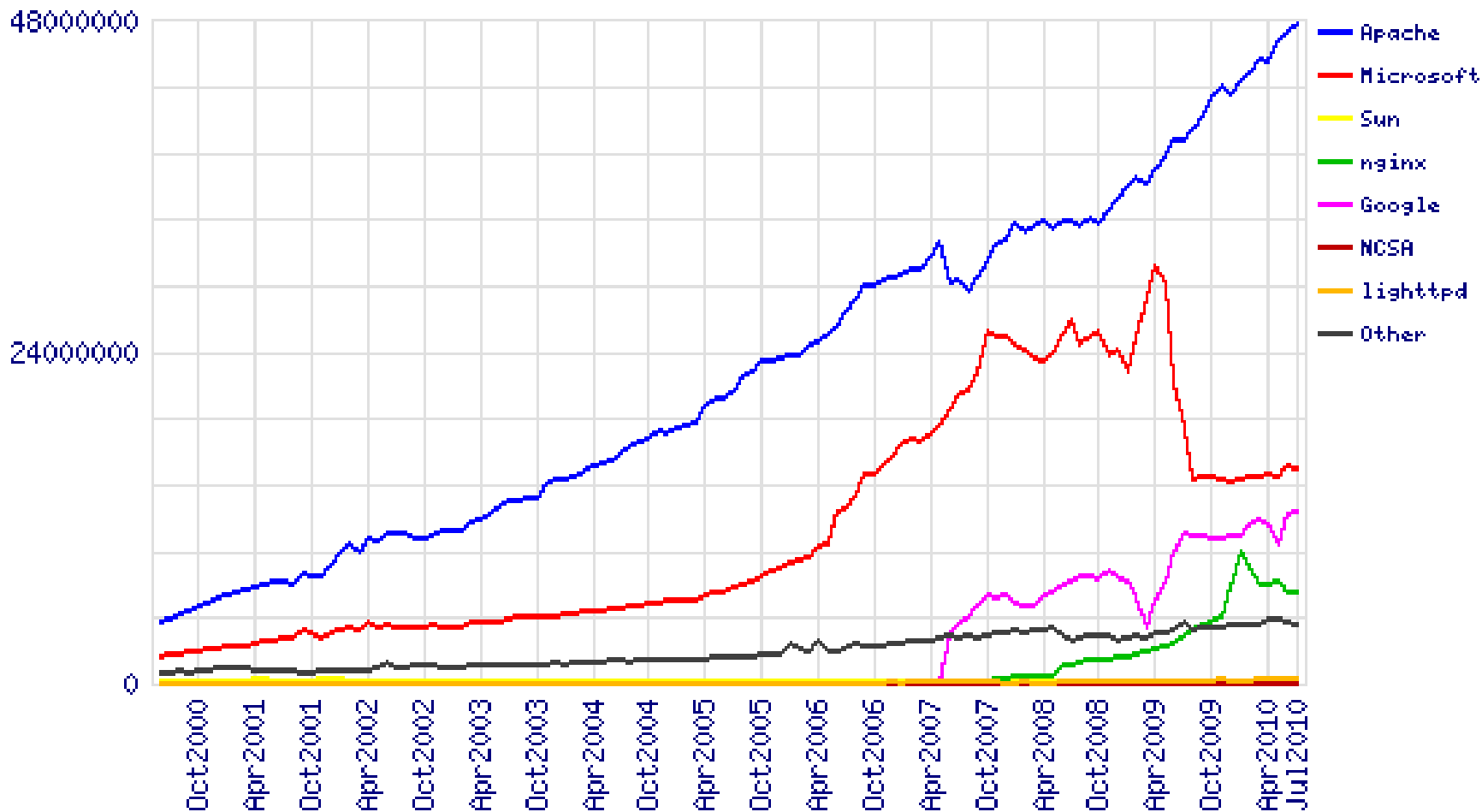


# Quantifiable Trends and Market Share



# Apache Dominates Active Web Servers All Domains June 2000 – July 2010

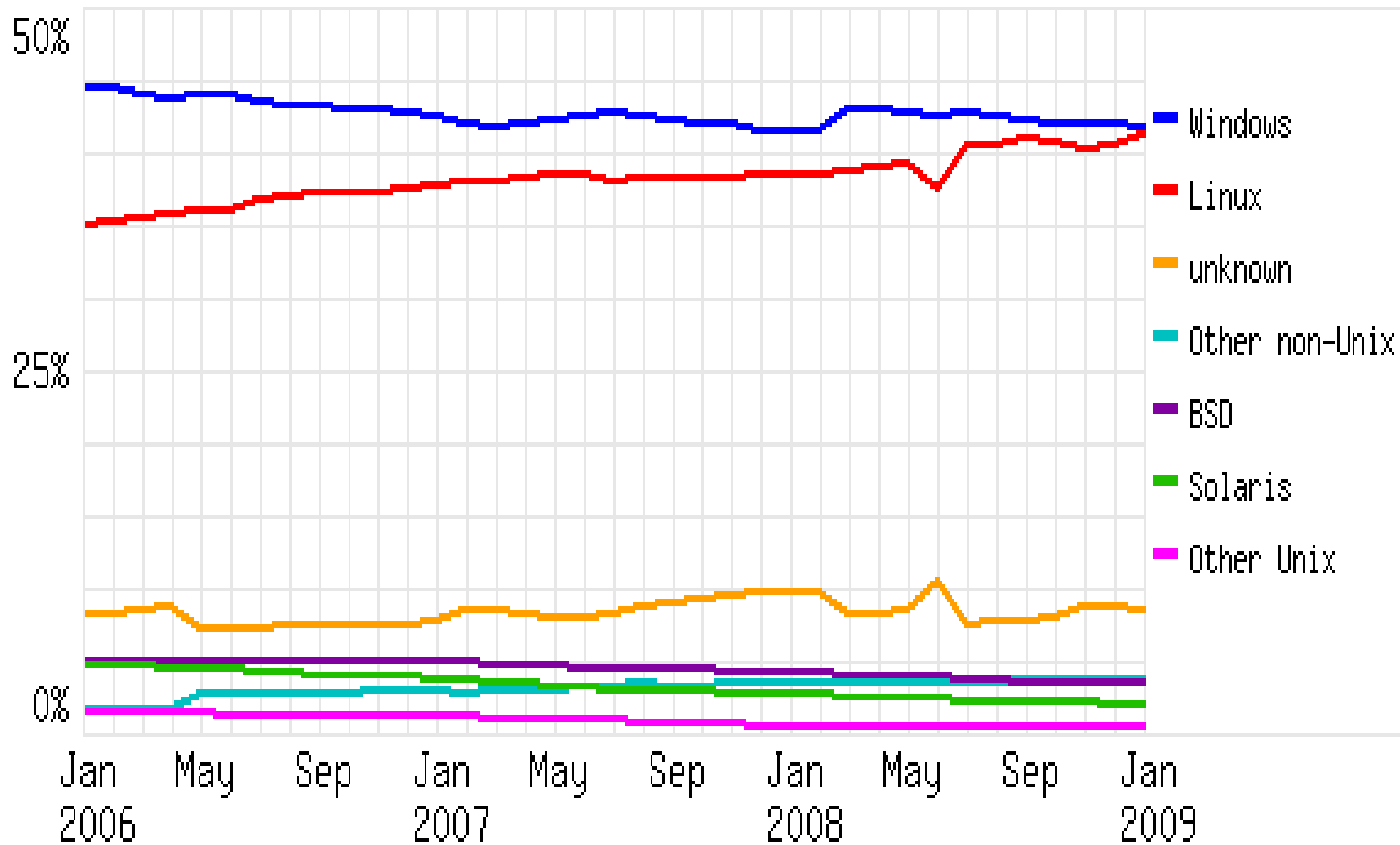
<http://www.netcraft.com>





# Linux SSL Site Growth 2006 – 2009

<http://www.netcraft.com>



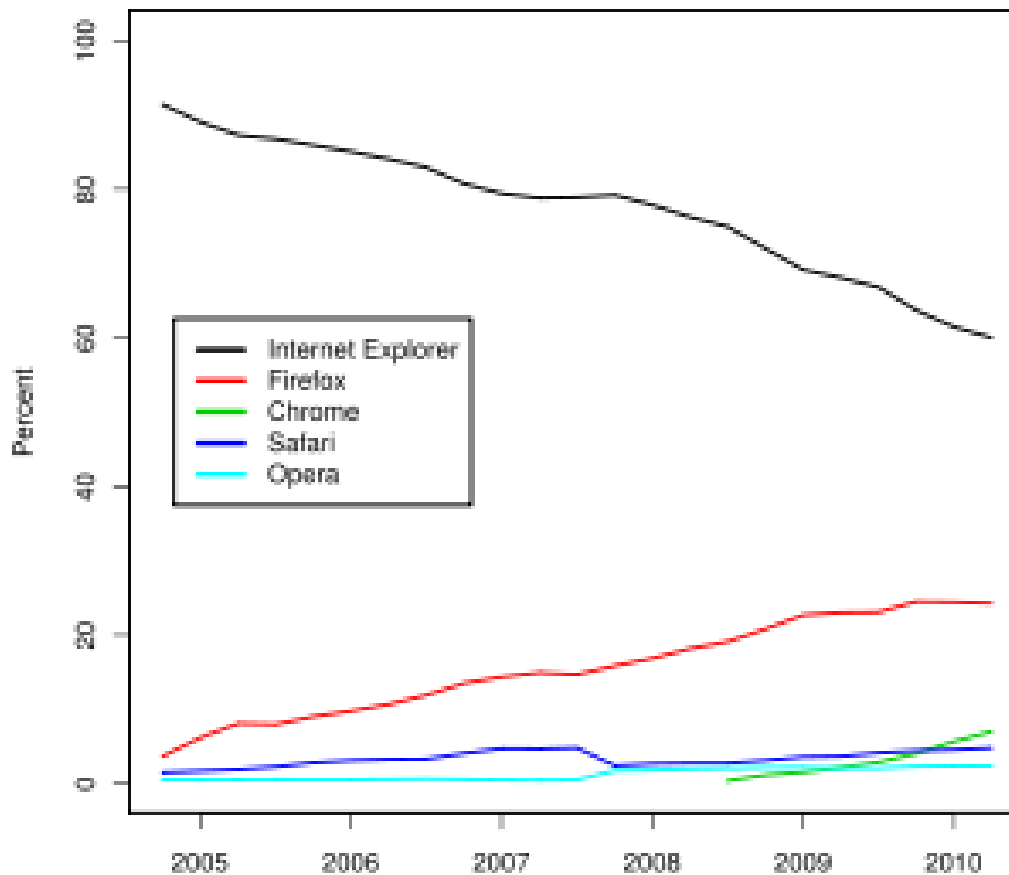


## Firefox Growth 2004 Q4 – 2010 Q2

<http://www.netapplications.com>

2010-5-4 <http://www.networkworld.com/news/2010/050410-microsoft-losing-browser-influence-and.html?source=nww>

Usage share of web browsers



Year  
Source: Net Applications

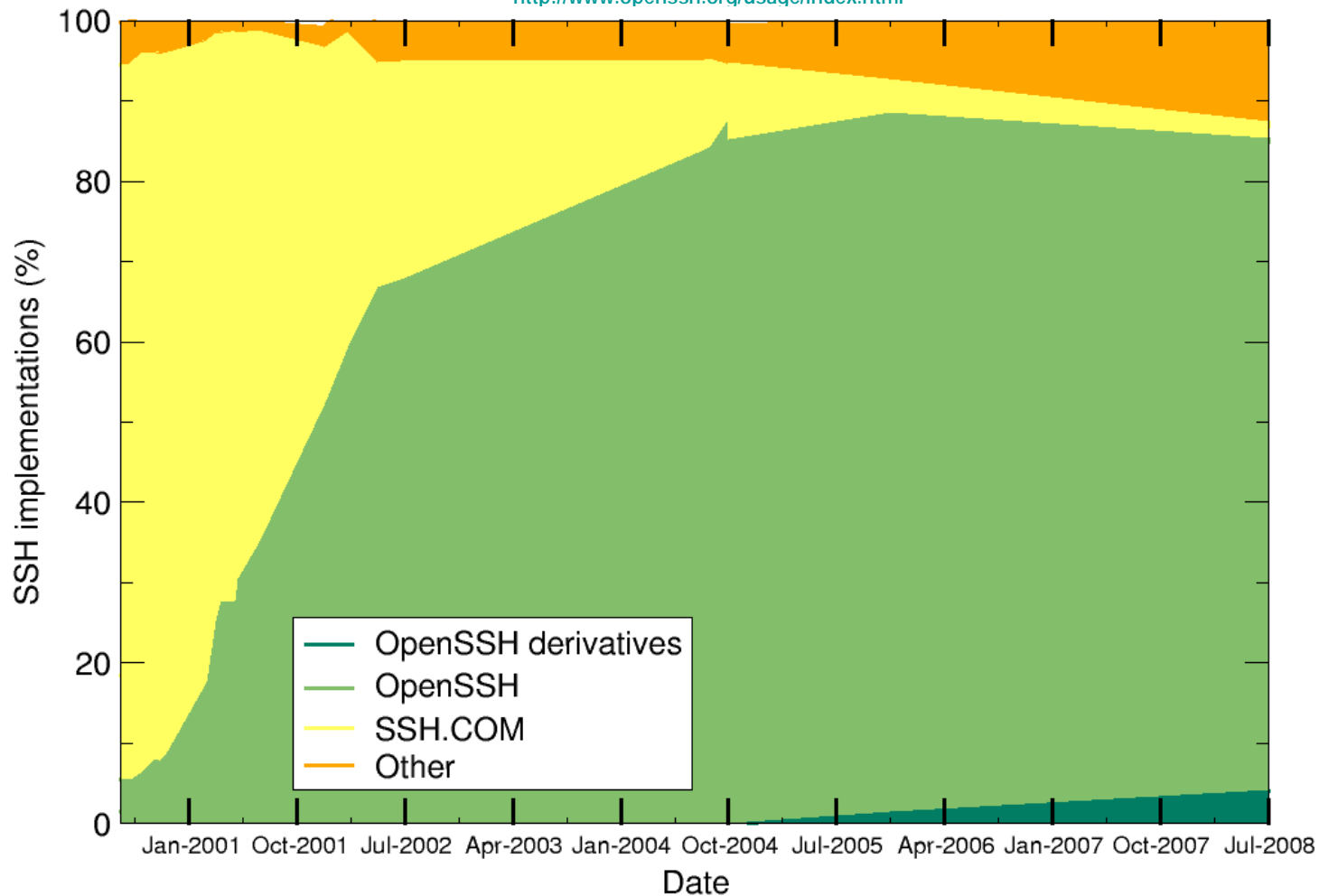


## OpenSSH Growth 2001-2008

<http://www.monkey.org/~provos/scanssh/>

<http://www.citi.umich.edu/u/provos/papers/scanssh.pdf>

<http://www.openssh.org/usage/index.html>





## OSS Is Cost Effective

- Migration costs once – proprietary costs forever
- Non-OSS cost estimates don't include
  - anti-virus cost
  - scanning costs
  - administrator time cleaning up infections





# Linux Runs Stock Exchanges

- 2004-10, **Chicago Mercantile Exchange** Uses Red Hat Enterprise Linux, [http://www.redhat.com/f/pdf/rhel/cme\\_rhel.pdf](http://www.redhat.com/f/pdf/rhel/cme_rhel.pdf)
- 2008-5-14, **New York Stock Exchange** Runs Trades on Red Hat Linux, <http://www.informationweek.com/news/software/linux/showArticle.jhtml?articleID=207800195>
- 2008-9-9, **London Stock Exchange suffers .NET Crash**, <http://www.linux.org/news/2008/09/09/0006.html>
- 2008-10-6, **Chi-Xpan-European Trading Facility** runs on Linux, <http://www.efinancialnews.com/story/2008-10-06/chi-x-speeds-its-way-to-the-top>
- 2008-12-10, **Chilean Stock Exchange Runs Red Hat Linux**, <http://www.marketwire.com/press-release/Chilean-Stock-Exchange-Streamlines-Securities-Transactions-With-IBM-NYSE-IBM-928722.htm>
- 2009-7-1, **London Stock Exchange to abandon failed Windows platform**, [http://blogs.computerworld.com/london\\_stock\\_exchange\\_to\\_abandon\\_failed\\_windows\\_platform](http://blogs.computerworld.com/london_stock_exchange_to_abandon_failed_windows_platform)
- 2010-1-22, **London Stock Exchange Begins Migration to Linux**, <http://www.linux.com/news/enterprise/case-studies/279763-london-stock-exchange-begins-migration-to-linux-based-trading-platform>
- 2010-3-3, **Deutsche Boerse Runs Red Hat Linux**, <http://customers.redhat.com/2010/03/03/deutsche-boerse-red-hat-mrg-case-study/>
- 2010-3-22, **Tokyo Stock Exchange Based on Red Hat Enterprise Linux**, <http://customers.redhat.com/2010/03/22/tokyo-stock-exchange-executes-millisecond-trading-with-new-system-based-on-red-hat-enterprise-linux/>
- 2010-5-24, **Linux to Save London Stock Exchange £10M a year**, replacing slower Microsoft .Net based system, <http://www.computerworlduk.com/news/open-source/20382/linux-trading-system-to-save-london-stock-exchange-10m-a-year/>



## 2003 Munich Switches 14,000 PCs to Linux

- City council voted 50-29 to switch
- Continual new licenses drove decision
- Ballmer offered 35% discount
- \$35 million budgeted
- As of 27 July 2010,
  - All workstations using OpenOffice
  - All servers converted
  - 3,000 of 14,000 workstations converted to LiMux client
  - About 80% of total conversion work done, switch complete by 2012

### LiMux - Freie Software für München



2003-5-28, Cnet News, <http://news.cnet.com/2100-1016-1010740.html>

2004-6-16, Bloomberg, <http://www.bloomberg.com/apps/news?pid=newsarchive&sid=aYjHOozAjHAE>

2010-3-19, Heise Media UK Ltd., <http://www.h-online.com/open/news/item/LiMux-project-management-We-were-naive-958824.html>

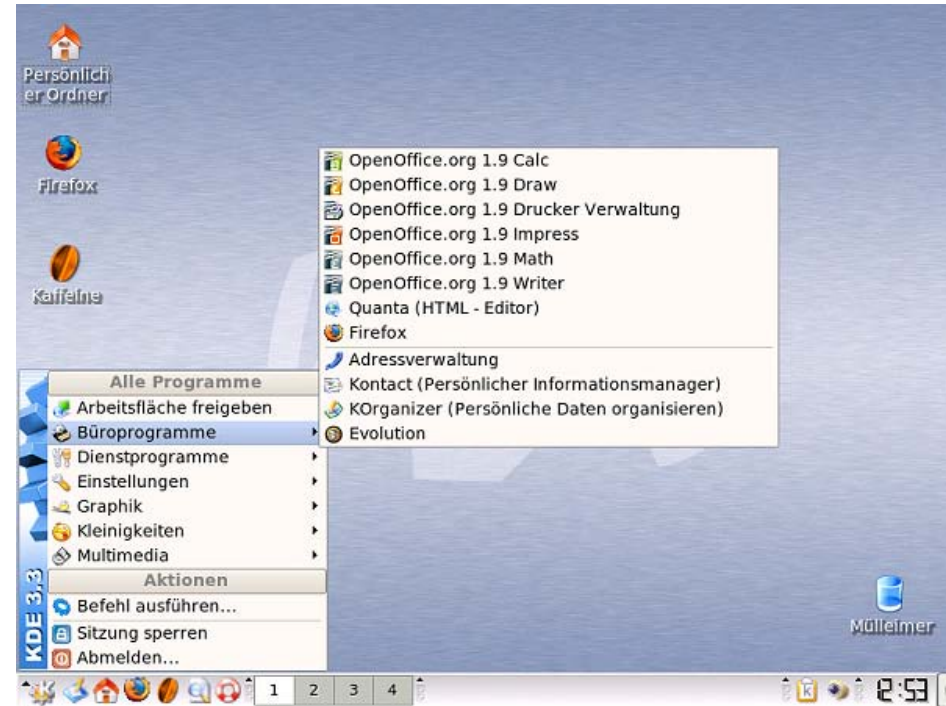
2010-7-27, Landeshauptstadt Muenchen, <http://www.muenchen.de/Rathaus/dir/limux/english/147197/index.html>

2009-4-4, LiMux works, <http://www.youtube.com/watch?v=rtqaBPeljJ0>  
<http://www.youtube.com/watch?v=BisjArTTdhA>



## 2004 Vienna Switches 16,000 PCs to Linux

- Wienux - Debian-based distribution developed by the City of Vienna for city administration
  - OpenOffice
  - Firefox,
  - SAP Java GUI
  - GIMP, K3b



- <http://www.wien.gv.at/ma14/wienux.html>  
<http://www.wien.gv.at/ma14/wienux-download.html>  
2004-11-8,  
[http://www.businessweek.com/magazine/content/04\\_45/b3907083\\_mz054.htm](http://www.businessweek.com/magazine/content/04_45/b3907083_mz054.htm)



## 2005 Extremadura Switches 80,000 PCs to Linux

"We changed the desktop systems from Windows to Linux during the weekend, when the civil servants came back next Monday morning they found Linux running on their desktop machines".

Leon Moreno from the "Center of New Initiatives" in Extremadura (Spain) about the gnuLinEx project

- Regional Intranet – 1400 access points , 2 Mbps bandwidth – schools, health centers, hospitals, employment offices
- gnuLinEx Project - gnu LINUX and EXTremadura
  - 1 PC for every 2 students in school
  - 66,000 PCs in schools and education centers
  - 14,000 PCs in public administration buildings
  - Their motto: "Be legal ... copy gnuLinex"



- 2005-11-10, <http://www.osnews.com/story/12611>
- 2010-6-2, <http://translate.google.com/translate?js=y&prev=t&hl=en&ie=UTF-8&layout=1&eof=1&u=http%3A%2F%2Fwww.linex.org%2Fjoomlaex%2F&sl=auto&tl=en>
- 2006-11-20, Linex Euronews, [http://www.youtube.com/watch?v=nR8Oh0Js\\_IA](http://www.youtube.com/watch?v=nR8Oh0Js_IA)
- 2010-8-12, <http://apt.linex.org/linex/linex2010/iso/LinEx-2010-rc2.iso>



## 2005 Brazil



2005-1-17, **President Lula da Silva refuses to meet with Bill Gates,**  
<http://www.worldchanging.com/archives/001960.html>

- 2005-3-29, President Luiz Inácio Lula da Silva **directed government to move from Microsoft to OSS** in order to save the government millions of dollars in royalty and licensing fees.  
[http://www.informationweek.com/blog/main/archives/2005/03/open\\_source\\_vs.html;jsessionid=SW3UHKXWPA10BQE1GHPSKH4ATMY32JVN](http://www.informationweek.com/blog/main/archives/2005/03/open_source_vs.html;jsessionid=SW3UHKXWPA10BQE1GHPSKH4ATMY32JVN)
- 2005-3-29, **"We're not going to spend taxpayers' money on a program so that Microsoft can further consolidate its monopoly."**  
Sergio Amadeu, President of Brazil's National Institute of Information Technology, [http://www.nytimes.com/2005/03/29/technology/29computer.html?\\_r=1](http://www.nytimes.com/2005/03/29/technology/29computer.html?_r=1)
- 2005-6-2, **government will save \$120M per year by switching to OSS,** Gates unsuccessful in bid to meet with Lula, <http://news.bbc.co.uk/2/hi/business/4602325.stm>
- 2006-2-15, **55,000 PCs provided with Insigne Linux,** [http://www.youtube.com/watch?v=nsgQw\\_qOdc8](http://www.youtube.com/watch?v=nsgQw_qOdc8)
- 2008-10-14, **430,000 voting machines migrated to Linux,**  
<http://www.theinquirer.net/inquirer/news/1027490/brazil-migrates-voting-machines>





# 2006 Bristol Switches 5500 Desktops to Linux

- actual Star Office cost only £10,000 (OpenOffice is completely free)
- most staff only needed 30-60 minutes of training instead of full day
- allows use of ISO standard ODF
- 15 % of users will stay on Microsoft Office for external file swapping

Options	One-off Licence Purchase	Annual Supplier Support and Upgrade	5 Year Costs
Microsoft	£618,682	£282,000	£1,464,684
StarOffice	£88,000	£19,602	£186,010

When combined with the implementation costs listed at the end of section 4 the total costs were as shown below. (We discounted the implementation costs by 50% in Microsoft's favour, due to the existing installed base, which was assumed to require no further effort.)

Options	Licence, Support and Upgrade	Implementation and Support	Total 5 Year Costs
Microsoft	£1,464,684	£242,000	£1,706,684
StarOffice	£186,010	£484,000	£670,010

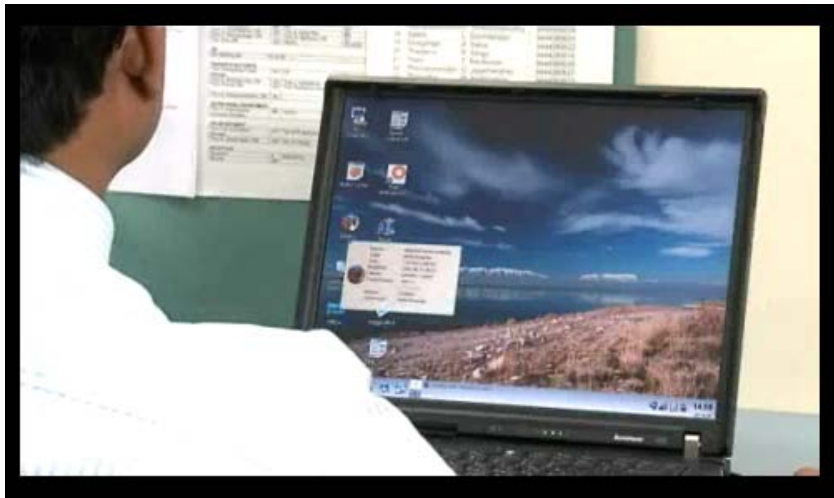
- 2006-5-31, Guardian Newspaper, <http://www.guardian.co.uk/society/2006/may/31/epublic.technology4>



# 2007 Tamil Nadu State Switches to Linux

2007-1-12 <http://www.zdnetasia.com/indian-state-goes-for-open-source-61981452.htm>

- Microsoft wanted \$57 per copy for Windows
- ELCOT - Electronic Corporation of TamilNadu, India
- Information Technology arm of Government of TamilNadu, India – government owned company
- **Migrated all operations to SUSE Linux within 12 months**
- Video shares ELCOT SUSE Linux migration success story
  - 2007-6, [http://www.youtube.com/watch?v=3\\_g72Gcaldc](http://www.youtube.com/watch?v=3_g72Gcaldc)



## ELCOT's success story of Suse linux migration

mdelcot

Savings of Rs. 5.00 crores (\$US 1.2 M)  
in migration of database on 20 servers

Easy decision making due to cost savings  
of up to 90%

New PCs for Rs. 21,600/-; a savings of  
Rs. 18,400/- a piece, inclusive of OS and  
office software

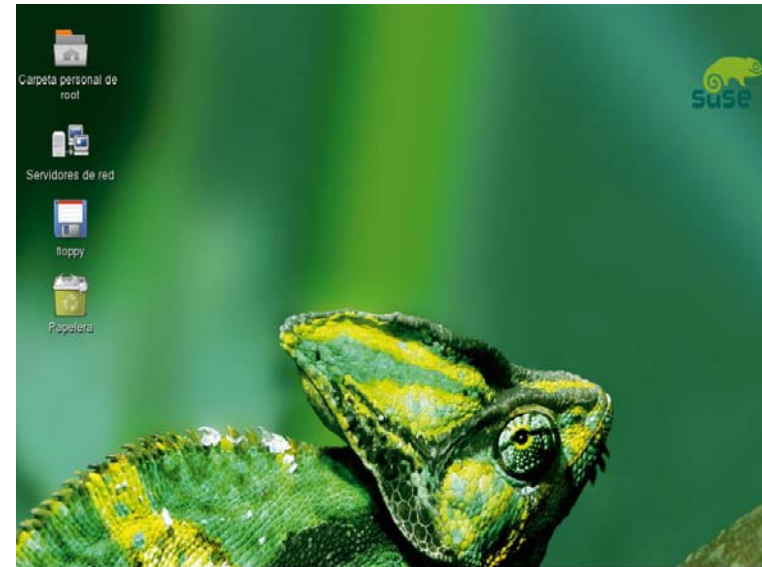
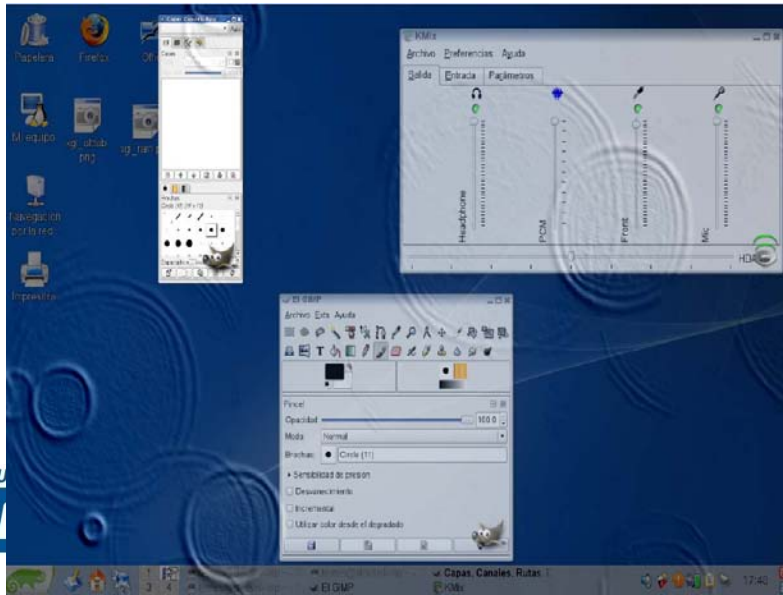
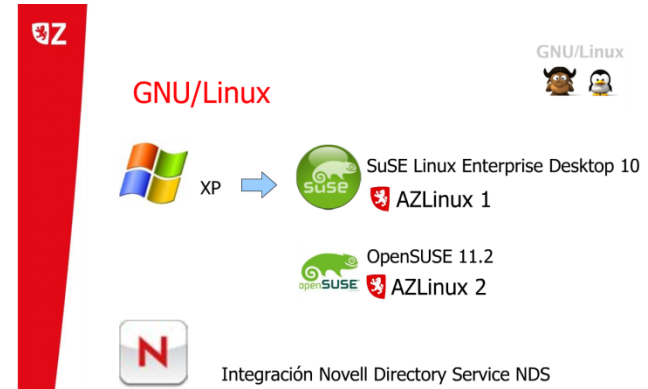
Savings of Rs. 17.00 crores (\$US 4.0 M) for  
40,000 PCs



# 2007 Zaragoza Switches to Linux

2007-2-26 [http://www.linuxtoday.com/it\\_management/2007022601426NWPBNV](http://www.linuxtoday.com/it_management/2007022601426NWPBNV)  
 2008-5-28 <http://www.osor.eu/news/es-zaragoza-city-begins-linux-pilots-completes>  
[http://www.zaragoza.es/contenidos/azlinux/userguide\\_gnome\\_sp1.pdf](http://www.zaragoza.es/contenidos/azlinux/userguide_gnome_sp1.pdf)

- Spain's 5<sup>th</sup> largest city with 660,000 people
- In Windows dominated Aragon province
- Done in phases – OpenOffice first
- Saves €1M a year
- Novell supplying modified SUSE Linux
- Migration finishes in 2010
- AZLinux – SUSE Linux distribution of City of Zaragoza, Spain







## 2009 Vietnam Switches to OSS

2009-6-1 <http://english.vietnamnet.vn/tech/2009/01/822425/>

- By 2009-6-30
  - 100% of government IT division servers must be OSS
  - 100% of staffs must be trained
  - 50% must be proficient
- By 2009-12-31
  - 70% of clients in state agencies must be OSS
  - 70% of staff must be trained
  - 40% must be proficient
- Will use OpenOffice, Thunderbird, Firefox, Unikey (Vietnamese typing software)
- Suppliers requested to sell PCs with OSS



Minister of Information and Communications Le Doan Hop



# 2010 Malaysian Government 97% OSS

2010-7-9 <http://techie-buzz.com/foss/malaysian-government-97-open-source-software.html>

<http://www.opensource.org/node/535>

- Government aiming for 100% conversion
- Malaysian Public Sector Open Source Software Program,  
<http://www.oscc.org.my/content/view/227/139/>  
**703 / 724 agencies 97.1 % using some form of OSS**  
e.g., OpenOffice, MySQL, Apache, Linux  
**580 / 724 agencies using OSS back end**  
**218 / 724 agencies using OSS Desktop**





# 2010 Ecuador – Government Tracking OSS Migration

2010-8-12 <http://www.informatica.gov.ec/index.php/software-libre/estrategia-de-migracion/tablero>

Secretariat of Information

Training
 Documentation
 Software
 Statistics
 Communities

News Access

Choose a section

Choose a category

Ir

Transverse Systems

QUIPUX

Trámites Ciudadanos

VIAJES

Firma Electrónica

Obras Públicas

SIGOB

SIGEP

Compra pública

Links

- Government
- Associations

Visits

110573

Today 137  
Yesterday 203  
Total 764

Migration Status

Contents - Free Software

STATE OF MIGRATION A FREE SOFTWARE - MAY 2010

#	Entities of the Executive Function	Servers				Desktops	
		OS	Mail	Web	DB	Office	OS
1	Assure Ecuatorian Agency - Agro Quality	Green	Green	Green	Yellow	Yellow	Yellow
2	Postal Agency	Green	Green	Green	Yellow	Green	Red
3	Banco Central del Ecuador	Yellow	Red	Green	Yellow	Yellow	Yellow
4	State Bank	Yellow	Red	Green	Red	Yellow	Yellow
5	Ecuadorian Housing Bank	Yellow	Green	Green	Red	Yellow	Yellow
6	National Development Bank	Yellow	Red	Green	Red	Yellow	Yellow
7	Casa de la Cultura Benjamín Carrión	Yellow	Green	Green	Yellow	Yellow	Red
8	Center for Integrated Natural Resources Survey	Yellow	Green	Green	Yellow	Yellow	Red
9	Development Council of the Nationalities and Peoples	Green	Green	Green	Green	Yellow	Red
10	National Film Board	Green	Green	Green	Green	Yellow	Red
11	National Cultural Council	Yellow	Green	Green	Yellow	Yellow	Yellow
12	National Electricity Council	Yellow	Green	Green	Yellow	Yellow	Yellow
13	National Council of Childhood and Adolescence	Green	Green	Green	Yellow	Yellow	Red
14	National Council of Free Zones	Yellow	Green	Green	Yellow	Green	Yellow
15	Ecuadorian Customs Corporation	Yellow	Red	Green	Red	Red	Red
16	Deposit Insurance Corporation	Yellow	Green	Green	Yellow	Yellow	Yellow
17	National Finance	Yellow	Green	Green	Yellow	Yellow	Yellow

70	Forestry Promotion and Development of Ecuador	Green	Green	Green	Yellow	Green	Green
71	Ministry of People's Movements and P. Citizen	Green	Green	Green	Yellow	Yellow	Red
72	Secretariat for Science and Technology	Yellow	Green	Green	Yellow	Yellow	Yellow
73	National Planning Secretariat	Yellow	Red	Green	Yellow	Yellow	Yellow
74	National Secretariat of Transparency	Green	Green	Green	Yellow	Yellow	Red
75	National Water Secretariat	Green	Green	Green	Yellow	Yellow	Yellow
76	National Secretariat for Migrants	Green	Green	Green	Yellow	Yellow	Red
77	Technical Secretariat of the Ecuador Plan	Green	Green	Green	Yellow	Yellow	Red
78	Public Safety	Green	Green	Green	Yellow	Yellow	Red
79	Internal Revenue Service	Yellow	Red	Green	Red	Yellow	Red
80	Ecuadorian Vocational Training Service	Green	Green	Green	Yellow	Yellow	Red
81	Vice-President	Green	Green	Green	Yellow	Yellow	Red

#	Entities from other functions of the State	Servers				Desktops	
		OS	Mail	Web	DB	Office	OS
1	National assembly	Green	Green	Green	Green	Green	Green
2	National Judicial Council	Green	Green	Green	Yellow	Yellow	Red
3	CNE	Green	Green	Green	Yellow	Yellow	Red
4	Constitutional Court	Green	Green	Green	Yellow	Yellow	Red

OS: Operating System  
Mail: Mail Server  
Web: Web Sites and Portals  
DB: Data Base Server  
Office: Office Suite

Green	Free Software
Yellow	Partial or Migration
Red	Owner Software

In the following link to download the picture of Status of Implementation of Free Software: [State of Migration to Free Software \(Mayo. 2010\)](#)





## 2010 Indiana Access

<http://www.doe.in.gov/olt/InACCESS/index.html>



- ACCESS (Affordable Classroom Computers for Every Secondary Student)
- Using Linux kept software costs down to \$13-18 per machine per year
- With traditional model cost per machine more than \$200 per computer
- Added 22,000 workstations in 2006,

- **By end of 2009 200,000 of 300,000 high school students using Linux on daily basis**

- 24 high schools in 2006, expand to 80
- By end of 2010, more than 100 HS will use OSS
- Nov 2007 more than 100,000 using Linux & OSS
- Teachers have embraced as welcome change

- **Complete desktop system with OSS under \$250**

- Hardware reliable, teachers using systems after one year
- Initial software used (Red Hat has joined) - Linspire 5.0 and Novell Linux Desktop (NLD9), Star Office, Firefox, CMAP (<http://cmap.ihmc.us/>), Realplayer for Linux, GIMP, Codeweavers Crossover Office, Moodle (<http://moodle.org>)



- 2006-8-17, Indiana kids switch to Linux, <http://www.theinquirer.net/inquirer/news/1005938/indiana-kids-switch-to-linux>
- 2006-8-17, Linux explodes in Indiana high schools, <http://www.zdnet.com/blog/education/linux-explodes-in-indiana-high-schools-with-new-funding/414>
- 2007-11-15, Linux Makes the Grade, <http://www.techlearning.com/article/8088>
- 2010-5-1, Prepare for Impact, <http://thejournal.com/articles/2010/05/01/prepare-for-impact.aspx>
- 2010-8-27, Indiana's Open-Source Experiment, <http://www.schoolcio.com/ShowArticle/758>



## 2010 U.S.

- **Amazon** - Amazon (in filing with Securities and Exchange Commission) **cut technology expenses by about 25 percent**, from \$71 million to \$54 million by switching to Linux - 2001-10-30 <http://news.cnet.com/2100-1001-275155.html>
- **Google** - "**Google uses Linux everywhere**, on servers and on desktop machines for all of our technical employees," Brin told the crowd. He explained that Linux was chosen because it "offers us the best price-for-performance ratio, plus it's great to be able to customize any part of the operating system whenever we want to." - 2002-8-14, Sergey Brin, <http://www.wired.com/science/discoveries/news/2002/08/54504>
- **Intel** - "**Linux saved Intel 200 million dollars**", Doug Busch, Intel IT Vice President (*on moving from Unix to Linux*) - 2001-10-31 [http://www.cyber.com.au/cyber/about/linux\\_vs\\_windows\\_pricing\\_comparison.pdf](http://www.cyber.com.au/cyber/about/linux_vs_windows_pricing_comparison.pdf)
- **IBM** - 360,000 IBM workers told to stop using Microsoft Office and **switch to the Open Office-based software Symphony** - 2009-9-12 <http://www.linux-magazine.com/Online/News/IBM-Throws-Out-Microsoft-Office>
- **NSA created Security Enhanced Linux** - <http://www.nsa.gov/research/selinux/>
- **NASA used OSS development for Mars exploration**  
2008-5-25, Phoenix Mars Lander – A Victory for Open Source, <http://ostatic.com/blog/phoenix-mars-lander-a-victory-for-open-source>



# OSS Around the World

- **European Union actively promoting OSS**
  - UK – OSS policy and migration plan
  - Germany, France, & Sweden developing policies
  - 24 countries reviewing policies (June 2003)
- **Africa, Latin America, Asia moving toward OSS**
  - Cheaper
  - Improves local IT expertise
  - Avoids exporting capital

<http://ec.europa.eu/idabc/servlets/Doc?id=30253>

<http://ec.europa.eu/idabc/en/document/2627/5644>

[http://news.cnet.com/EU-site-pushes-open-source-education/2100-7344\\_3-5130665.html](http://news.cnet.com/EU-site-pushes-open-source-education/2100-7344_3-5130665.html)

[http://www.cabinetoffice.gov.uk/media/318020/open\\_source.pdf](http://www.cabinetoffice.gov.uk/media/318020/open_source.pdf)

[http://www.naci.org.za/pdfs/oss\\_v\\_1\\_0.pdf](http://www.naci.org.za/pdfs/oss_v_1_0.pdf)

**CTSF**



Future





# CTSF



## Red Hat vs. Microsoft Stock

2010-8-30 <http://www.google.com/finance?q=microsoft>

Microsoft Corporation (Public, NASDAQ:MSFT) [Watch this stock](#)

**23.74** **-0.19 (-0.79%)**

Range	23.65 - 23.82	Mkt cap	205.44B	Shares	8.65B
52 week	22.73 - 31.58	P/E	11.27	Beta	1.06
Open	23.74	Div/yield	0.13/2.19	Inst. own	-
Vol / Avg.	18.75M/61.91M	EPS	2.11		

Real-time: 1:05PM EDT

NASDAQ real-time data - [Disclaimer](#)

Compare:    Dow Jones  Nasdaq  GOOG  AAPL  IBM  NOVL  ORCL  YHOO  HPQ  NYSE:RHT

Zoom: [1d](#) [5d](#) [1m](#) [3m](#) [6m](#) [YTD](#) [1y](#) [5y](#) [10y](#) [All](#)

Sep 01, 2000 - Aug 30, 2010

● NYSE:RHT +48.78% ● MSFT -32.77%







# Global Trends

2000-7-15 Report to UNESCO, Christine Maxwell, Editor, The Internet Society, <http://www.isoc.org/isoc/unesco-paper.shtml>  
[http://webworld.unesco.org/infoethics2000/documents/study\\_maxwell.rtf](http://webworld.unesco.org/infoethics2000/documents/study_maxwell.rtf)

Use of OSS in less developed countries produces:

- Easier access to software products - for individuals and companies
- Cost-effective transfer of software technology
- Focus on **training** and localization of software
- Direct access to software technology **without expensive royalties.**



# 2009 Linux Adoption in a Global Recession

2009-3 IDC white paper, [http://www.novell.com/docrep/2009/03/White%20Paper%20-%20Linux%20Adoption%20in%20a%20Global%20Recession\\_en.pdf](http://www.novell.com/docrep/2009/03/White%20Paper%20-%20Linux%20Adoption%20in%20a%20Global%20Recession_en.pdf)

- IDC surveyed 330 organizations around the world – each with at least 100 employees
- 97% had some Windows installation
- **Economic downturns tend to accelerate emerging technologies**
- **Current economic downturn will drive Linux adoption**  
<http://www.zdnet.com/news/idc-downturn-to-drive-linux-adoption/279162>
- Worldwide Linux customers highly satisfied - will deploy more Linux instances
- Today's Linux distributions feature more mature management tools
- Linux strong in netbooks
- OEMs increasingly preloading Linux on devices
- Microsoft anti-piracy efforts create more favorable climate for Linux



# One Laptop Per Child (OLPC)

<http://laptop.org/en/>

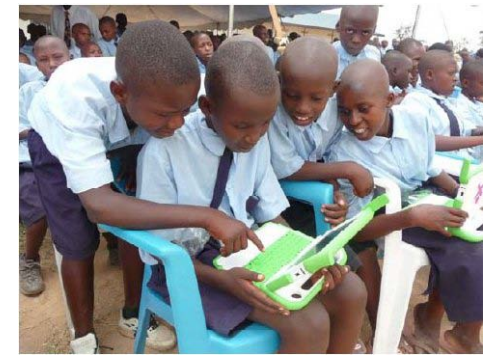
<http://www.youtube.com/watch?v=BBoghPvyhts&feature=mvst>

<http://www.youtube.com/watch?v=QQiA5F6AjcQ&feature=related>

- Begun Jan 2005 by MIT Media Lab
- Low cost "XO" laptop for world's children
- 2 million produced by mid 2010, 40 countries, 25 languages, 2 million free books
- **Fedora Linux**
  - Each machine full-time wireless router, creates own mesh network out of the box, normally consumes less than 2 watts
  - 256MB RAM, 1GB SLC NAND flash memory, no hard drive to crash
  - SD slot, 2 USB 2.0 ports, webcam



Mongolia



Rwanda



Ethiopia



Arahuay School Break

Peru





# Future Trends – China

- Chinese Academy of Sciences promotes Red Flag Linux

2009-10-25, Red Flag Linux with Moblin stack helps boost rural China development, Feb 2009 Chinese government offers subsidies up to 13%  
[http://moblinzone.com/top\\_stories/726/34/Moblin\\_Helps\\_Boost\\_Rural\\_China\\_Development](http://moblinzone.com/top_stories/726/34/Moblin_Helps_Boost_Rural_China_Development)

2010-6-30, Red Flag demonstrated 10.1 inch table running MeeGo Linux version of Midinux 3.0, Npad, <http://thetechjournal.com/electronics/tablet/meego-tablet-unveiled-in-china.xhtml>

- Chinese military developing special Kylin OS

2009-5-13, Kylin operating system based on Mach and FreeBSD, developed by National University of Defense Technology, approved for use by People's Liberation Army, <http://en.wikipedia.org/wiki/Kylin>, <http://www.zdnet.com/blog/security/chinas-secure-os-kylin-a-threat-to-us-offensive-cyber-capabilities/3385>

- Many new PCs shipping with Linux

2005-9-6, Microsoft fights piracy in China, Linux wins, all new machines must ship with legal OS, <http://www.informationweek.com/news/global-cio/trends/showArticle.jhtml?articleID=170700943>

2009-1-1, Chinese government copyright enforcement actually pushing more people to Linux, <http://www.entrepreneur.com/tradejournals/article/190874900.html>

- Legal versions of Windows NOT selling in China

2007-04-18, Microsoft sells 20 million copies of Vista globally in one month, but only 244 copies in China, [http://www.newlaunches.com/archives/only\\_244\\_copies\\_of\\_genuine\\_windows\\_vista\\_sold\\_in\\_china.php](http://www.newlaunches.com/archives/only_244_copies_of_genuine_windows_vista_sold_in_china.php)  
<http://labnol.blogspot.com/2007/04/windows-vista-sales-in-china-make.html>

- New Chinese super computers run Linux

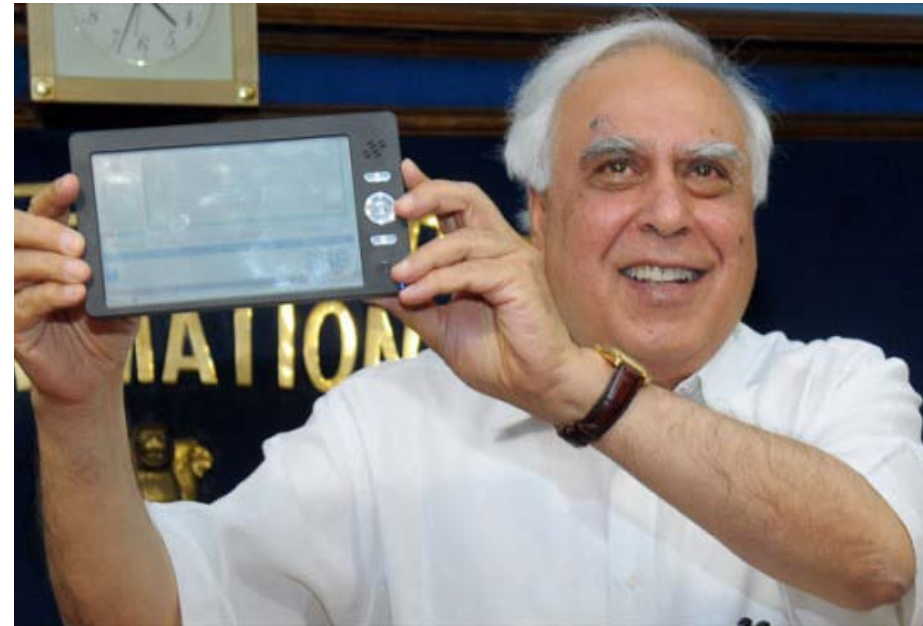
2010-1-19, China Details Homemade Supercomputer Plans, <http://www.technologyreview.com/computing/24374/page1>

**CTSF**



# 2010 India Unveils \$35 Linux Tablet Computer for Students

CNN, 23 July 2010 <http://www.cnn.com/2010/WORLD/asiapcf/07/23/india.thirty.five.dollar.laptop/index.html?iref=NS1>  
<http://cnn.mv/video/#/video/bestoftv/2010/08/01/gps.last.look.ipad.cnn>  
<http://www.youtube.com/watch?v=Ok4z9Xpapzc>



Human Resource Development Minister Shri Kapil Sibal unveils prototype touch screen tablet

7 inch color screen, 2 GB storage, WiFi, Ethernet, 2 watts power consumption, solar charging option





# 2010 \$150 Android Tablet at Kmart

2010-07-29, <http://www.cnn.com/2010/TECH/mobile/07/29/android.tablet.gahran/index.html>

2010-8-2, <http://www.youtube.com/watch?v=pfha5r6law0>

7 inch screen, 2 GB storage, 256 MB RAM, Wi-Fi, micro SD slot, 800 MHz



AUGEN



2010-8-2, <http://androidandme.com/2010/08/news/q2-report-android-largest-smartphone-platform-in-u-s/>  
 2010-8-2, <http://www.businessinsider.com/android-soars-past-rim-and-apple-in-q2-now-the-uss-top-selling-smartphone-platform-2010-8>

## Q2 report: Android largest smartphone platform in U.S.

Taylor Wimberly on Aug 02 at 11:50 am 48 comments

Tagged #android #canalys #q2 #q2 results #smartphone market share



A new report from [Canalys](#) shows that Android grew an impressive 886% in Q2 2010 and became the largest smartphone platform in the United States. The U.S. smartphone market grew 41% year over year and it is the largest in the world. Approximately 14.7 million smartphone units were sold in the U.S., which accounts for 23% of the global market.

Canalys VP and Principal Analyst, Chris Jones, explained the results by saying, "In the United States, for example, we have seen the largest carrier, Verizon Wireless, heavily promoting high-profile Android devices, such as the Droid by Motorola and the Droid Incredible by HTC. These products have been well received by the market, with consumers eager to download and engage with mobile applications and services, such as Internet browsing, social networking, games and navigation."

## Android Soars Past RIM And Apple In Q2: Now The U.S.'s Top-Selling Smartphone Platform

Dan Frommer | Aug. 2, 2010, 12:02 PM | 6,584 | 66

Email

A A A

It's happening, Apple!

Google's free and open-source Android operating system shot past its competitors last quarter to become the top-selling U.S. smartphone OS, according to research firm Canalys.

Android accounted for 34% of the 14.7 million smartphones sold in the U.S. last quarter, while RIM was 32.1% of the market and Apple was 21.7%, Canalys estimates. That's a huge victory for Google, which was zero two years ago. **(Related: "Congratulations, Google: Android Is A HUGE Success So Far.")**



GOOG Aug 2 2010, 08:10 PM EDT

490.41

Change

% Change  
0.00%



# Why OSS is the Future – Economic Forces

2010-8-18, "Linux has crossed the chasm to mainstream adoption", Forrester Research,

<http://itmanagement.earthweb.com/osrc/article.php/3898206/LinuxCon-Analysts-Linux-Is-Winning.htm>

- Low cost mechanism for **transferring wealth** to developing nations
- **IT work shifting** to lower cost areas e.g., India, Singapore, China
- Standards used in those areas will become **world standards**.
- Developing nations **contribute** to technology development, not just use
- U.S. cannot remain isolated island





## Why OSS is the Future – Superior Quality

- Open standards and specifications lead to greater system interoperability !!!!
- Diverse, flexible, scalable
- Reliable & secure
- Faster release rate than COTS
- Code reuse
- Customizable
- No upgrade and license lock ins

**CTSF**

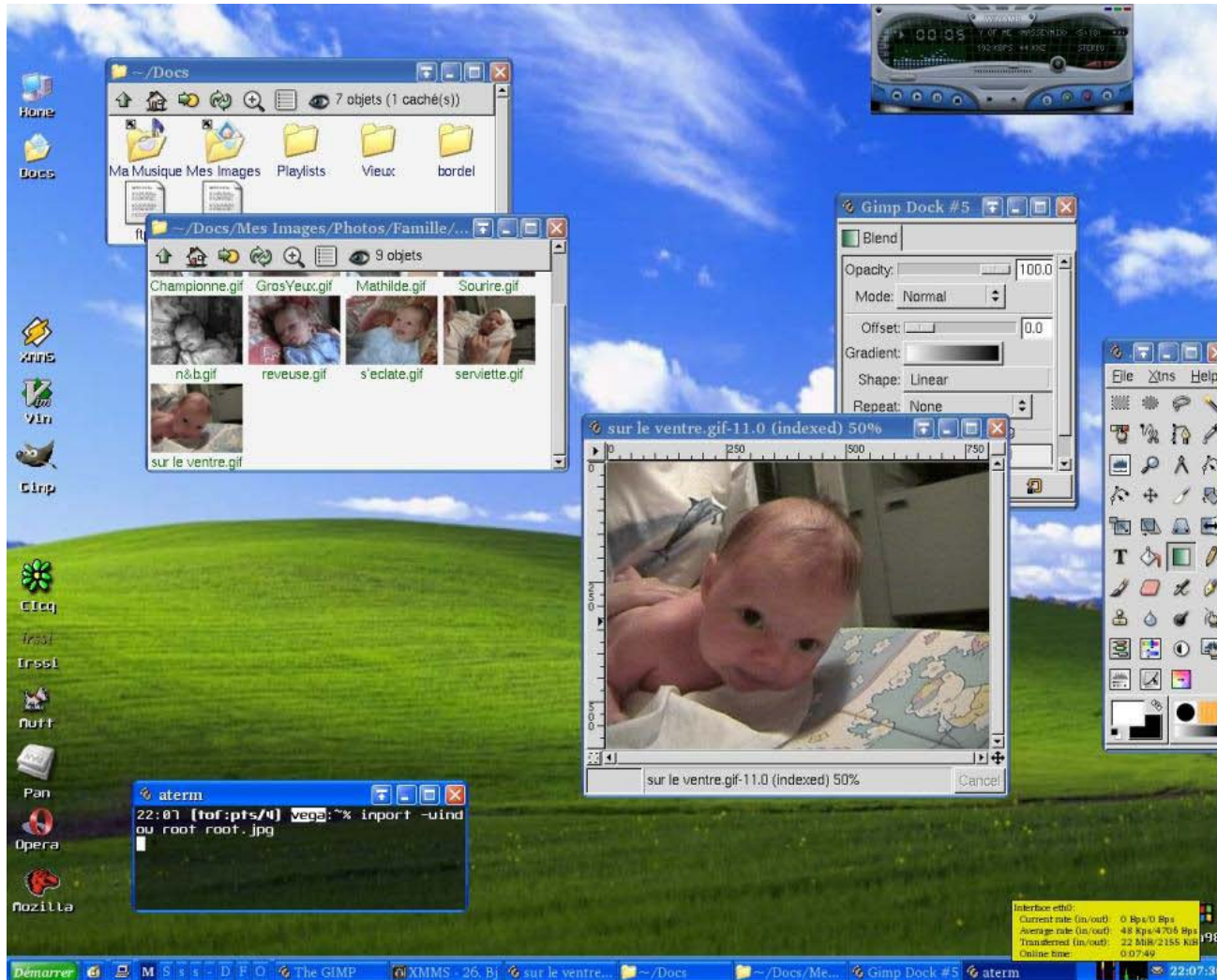


# Linux Desktop Examples



# Windows Look & Feel – Linux XP

<http://www.linux-xp.com/>



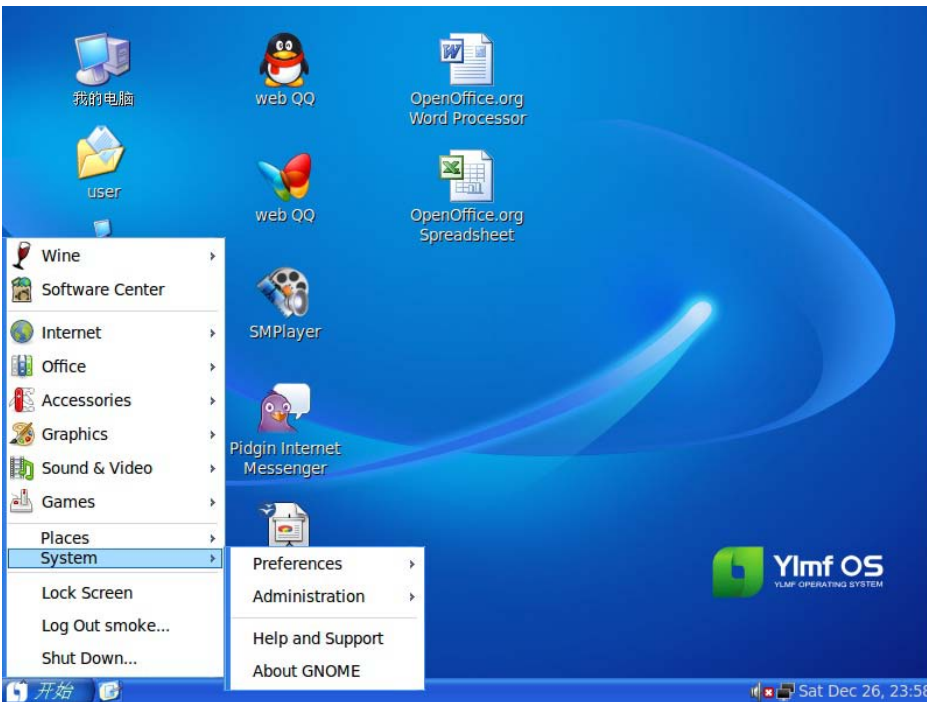
# CTSF



# Windows Look & Feel – Ylmf OS

<http://www.ylmf.org/en/index.html>

[http://www.youtube.com/watch?v=Ncldo1mDhkY&feature=player\\_embedded](http://www.youtube.com/watch?v=Ncldo1mDhkY&feature=player_embedded)



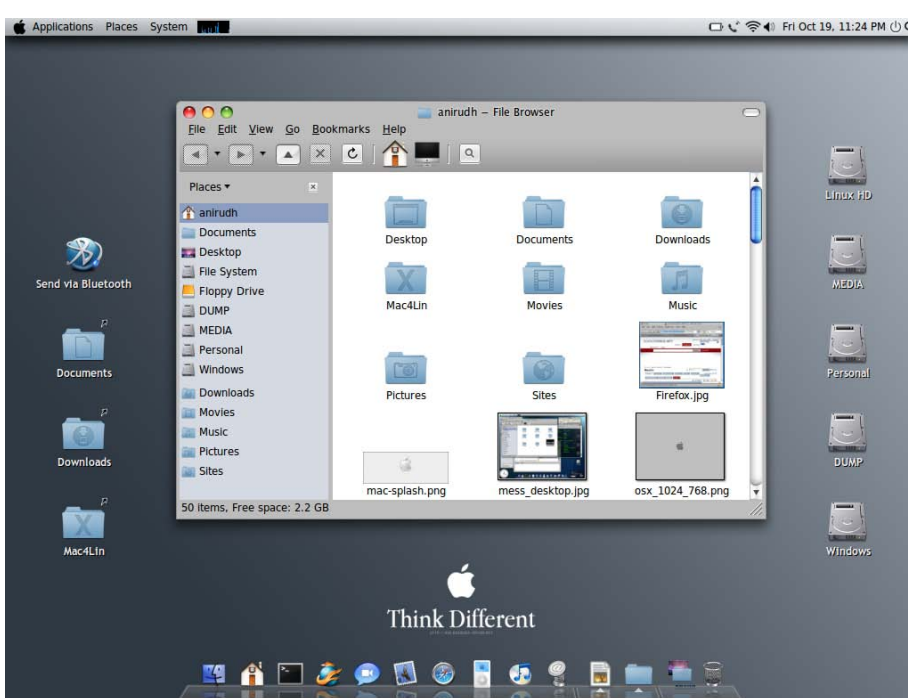


# CTSF



## Mac Look & Feel – Mac4lin

<http://sourceforge.net/projects/mac4lin/>





## Ubuntu 10.04 64-bit Linux with Gnome

<http://www.youtube.com/watch?v=VvfRpmqKRbs>





# Additional References

- **A Business Case Study of Open Source Software MP 01B000048** , Carolyn A. Kenwood, July 2001, MITRE Corporation, [http://www.mitre.org/work/tech\\_papers/tech\\_papers\\_01/kenwood\\_software/kenwood\\_software.pdf](http://www.mitre.org/work/tech_papers/tech_papers_01/kenwood_software/kenwood_software.pdf)
- **An Empirical Study of the Reliability of UNIX Utilities**, B.P. Miller, L. Fredriksen, and B. So, *Communications of the ACM* 33, 12 (December 1990), <http://portal.acm.org/citation.cfm?id=96267.96279>
- **An Empirical Study of the Robustness of Windows NT Applications Using Random Testing**, J.E. Forrester and B.P. Miller, *4th USENIX Windows Systems Symposium*, Seattle, August 2000, <http://citeserx.ist.psu.edu/viewdoc/download?doi=10.1.1.127.4701&rep=rep1&type=pdf>
- **Breaking Barriers, The Potential of Free and Open Source Software for Sustainable Human Development**, HNPD-APDIP ICT4D Series, UNDP Asia-Pacific Development Information Programme, United Nations, [http://portal.unesco.org/ci/en/ev.php-URL\\_ID=23858&URL\\_DO=DO\\_TOPIC&URL\\_SECTION=201.html](http://portal.unesco.org/ci/en/ev.php-URL_ID=23858&URL_DO=DO_TOPIC&URL_SECTION=201.html)
- **Clarifying Guidance Regarding Open Source Software (OSS)**, Department of Defense CIO Memorandum, 16 October 2009, <http://cio-nii.defense.gov/sites/oss/index.shtml>
- **DoD Open Source Software (OSS) FAQ**, <http://cio-nii.defense.gov/sites/oss/index.shtml>
- **Department of the Navy Open Source Software Guidance**, Department of the Navy CIO Memorandum, 5 June 2007, [http://oss-institute.org/Navy/DONCIO\\_OSS\\_User\\_Guidance.pdf](http://oss-institute.org/Navy/DONCIO_OSS_User_Guidance.pdf)
- **Free and Open Source Software Overview and Preliminary Guidelines for the Canadian Forces**, David Demers, Robert Charpentier, Richard Carbone, Defense R&D Canada, 2005, [http://www.dodccrp.org/events/10th\\_ICCRTS/CD/presentations/227.pdf](http://www.dodccrp.org/events/10th_ICCRTS/CD/presentations/227.pdf)
- **Fuzz Revisited: A Re-examination of the Reliability of UNIX Utilities and Services**, B.P. Miller, D. Koski, C.P. Lee, V. Maganty, R. Murthy, A. Natarajan, and J. Steidl,, *Computer Sciences Technical Report #1268*, University of Wisconsin-Madison, April 1995, <http://www.eecs.northwestern.edu/~robby/courses/395-495-2009-fall/fuzz-revisited.pdf>
- **Global Trends that will Impact Universal Access to Information Resources**, submitted to UNESCO, July 15th, 2000, Christine Maxwell, Editor, The Internet Society, <http://www.isoc.org/isoc/unesco-paper.shtml>





# Additional References

- How Open-Source and Commercial Software Compare: A Quantitative Analysis of TCP/IP Implementations in Commercial Software and in the Linux Kernel, technical white paper, 2006, Reasoning, LLC, <http://www.reasoning.com>
- How Open-Source and Commercial Software Compare: MySQL 4.0.16, technical white paper, 2006, Reasoning, LLC, <http://www.reasoning.com>
- Information Management, Information Assurance, Department of the Army, Army Regulation 25-2, 23 March 2009, [http://www.army.mil/usapa/epubs/pdf/r25\\_2.pdf](http://www.army.mil/usapa/epubs/pdf/r25_2.pdf)
- Linux vs. Windows, The Bottom Line, An Examination of the purchase and license cost differences between Linux & Open Source platforms and the Microsoft platforms, Cybersource Pty. Ltd., 2001, Version 0.9.5, 10 October 2005, [http://www.cyber.com.au/cyber/about/linux\\_vs\\_windows\\_pricing\\_comparison.pdf](http://www.cyber.com.au/cyber/about/linux_vs_windows_pricing_comparison.pdf)
- Microsoft, A History of Anticompetitive Behavior and Consumer Harm, European Committee for Interoperable Systems, (ECIS) 2009-3-31, [http://www.ecis.eu/documents/Finalversion\\_Consumerchoicepaper.pdf](http://www.ecis.eu/documents/Finalversion_Consumerchoicepaper.pdf)
- Open Technology Development, Roadmap Plan, April 2006, Deputy Under Secretary of Defense, Advanced Systems and Concepts, <http://www.acq.osd.mil/jctd/articles/OTDRoadmapFinal.pdf>
- Software Acquisition, Office of Management and Budget Memorandum M-04-16, 1 July 2004, <http://www.omb.gov>, [http://www.whitehouse.gov/omb/memoranda\\_fy04\\_m04-16/](http://www.whitehouse.gov/omb/memoranda_fy04_m04-16/)
- The Future of Capitalism, Lester C. Thurow, 1996, Penguin Books
- The World is Flat, A Brief History of the Twenty-first Century, Thomas L. Friedman, 2005, Farrar, Strauss and Giroux
- Use of Free and Open-Source Software (FOSS) in the U.S. Department of Defense, Version 1.2.04, multiple authors, 2 January 2003, MITRE Corporation, <http://www.mitre.org>, <http://www.owlriver.com/casestudy/dodfoss.pdf>
- Why Open Source Software / Free Software (OSS/FS, FLOSS, or FOSS)? Look at the Numbers!, David A. Wheeler, Revised as of April 16, 2007, <http://www.dwheeler.com/contactme.html>
- Windows Desktop Application, Security Technical Implementation Guide, Version 3, Release 1, 9 March 2007, Developed by DISA for the DoD, <http://iase.disa.mil/stigs/stig/Desktop-Applications-STIG-V3R1.pdf>



**CTSF**



# Backup Slides



## Firefox 3.1 vs. IE 8

<http://www.youtube.com/watch?v=73A5lxEoDiM>



- IE only runs on Windows
- Both - fast, filtering, private browsing
- IE 8 Javascript compatibility problems
- IE8 transparency problems
- Firefox has all the addons
- Much better memory management in Firefox (3 tabs, 60 megs vs. 3 tabs 360 megs)
- Microsoft hides bugs – security through obscurity



## Firefox 3.7 vs. IE9

<http://blog.internetnews.com/skerner/2010/03/internet-explorer-9-vs-firefox.html>

<http://en.wikipedia.org/wiki/Acid3>

- IE 9 seems to lack tabs, back button, or address bar
- Firefox 3.7 real browser, testing new plugins
- IE9 won't run on XP
- IE9 has worst Acid3 score

# CTSF

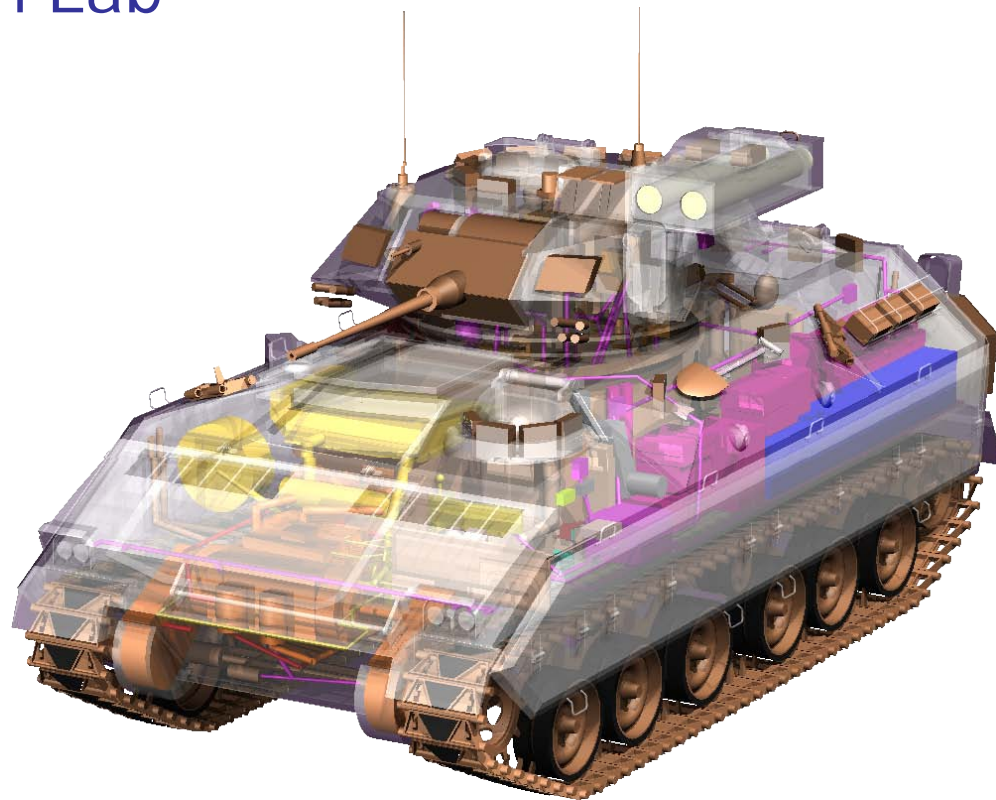
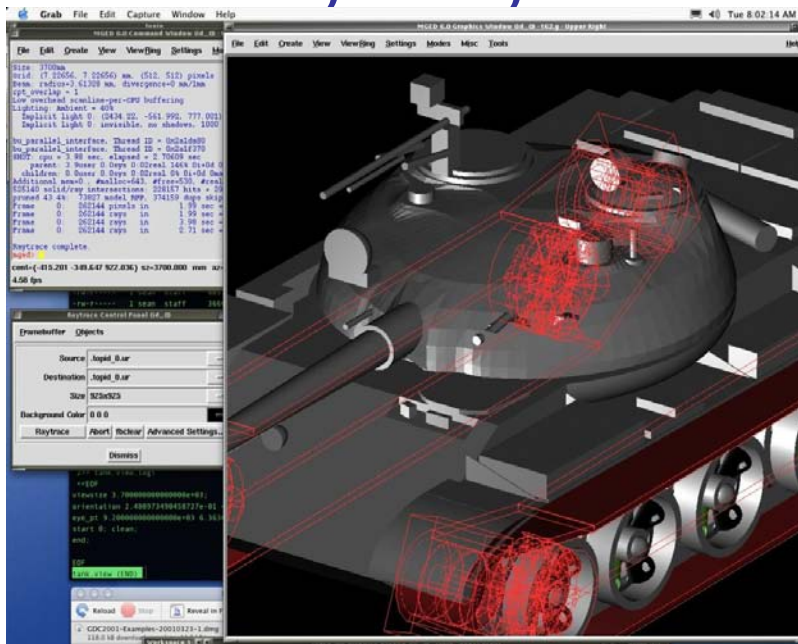


## BRL-CAD

<http://brlcad.org/>  
<http://en.wikipedia.org/wiki/BRL-CAD>



- Powerful cross-platform open source solid modeling system
- Run by Army Research Lab






DistroWatch.com: Put the fun back into computing. Use Linux, BSD, - Windows Internet Explorer provided by US Army - Fort Hood N

http://distrowatch.com/

hidebound - Google Search




**Linux Identity - Ubuntu 10.04 Magazine**  
Ubuntu, Kubuntu, Xubuntu, Mythbuntu  
2 multi-boot DVDs for 32-bit and 64-bit systems

**Latest Distributions**

- 10/04 [MINIX](#) • 3.1.8
- 10/04 [Salix](#) • 13.1.1-beta5 (KDE)
- 10/04 [Toorox](#) • 09.2010 (KDE)
- 10/04 [Devil-Linux](#) • 1.4-rc6
- 10/04 [Peppermint](#) • Ice-10012010
- 10/03 [Tiny Core](#) • 3.2-rc2
- 10/03 [Clonezilla](#) • 1.2.6-28
- 10/03 [Chakra](#) • 0.2.3
- 10/03 [PCop](#) • 1.9.16
- 10/02 [CRUX](#) • 2.7
- 10/02 [GParted](#) • 0.6.4-1
- 10/01 [Lubuntu](#) • 10.10-beta2
- 09/30 [openSUSE](#) • 11.4-milestone2
- 09/30 [Ubuntu Studio](#) • 10.10-rc
- 09/30 [Mythbuntu](#) • 10.10-rc
- 09/30 [Edubuntu](#) • 10.10-rc
- 09/30 [Xubuntu](#) • 10.10-rc
- 09/30 [Ubuntu](#) • 10.10-rc
- 09/30 [Kubuntu](#) • 10.10-rc
- 09/30 [StressLinux](#) • 0.6.101
- 09/30 [Sabayon](#) • 5.4
- 09/28 [RHELinux](#) • 10.9
- 09/28 [Fedora](#) • 14-beta


**Latest Packages**

**2010-10-05** [Distribution Release: iMagic OS 10](#)

 **iMagic OS**


Carlos La Borde has announced the release of [iMagic OS 10](#), a commercial desktop Linux distribution based on Ubuntu, but featuring the KDE 3 desktop: "Welcome to iMagic OS 10. Intuitive, fast, and smart. Based on the latest Linux technology, with upgraded software, a faster boot time, parental web filtering, and loaded with codecs and innovations, iMagic OS 10 sports an improved KDE 3.5 interface with easier file management and better magicOnline support. Features: magicOnline - improved and running smoother than ever, iMagic OS users can head over to magicOnline and browse from an extensive online catalog of hundreds of free, commercial and proprietary programs, games and drivers; Windows Software - iMagic OS comes with an updated Windows application installer based on WINE framework..." Read the rest of the [release announcement](#) for more details. iMagicOS 10 is available from purchase and immediate download from the distribution's [online store](#) (US\$19.99).

**2010-10-03** [Distribution Release: CRUX 2.7](#)

 **CRUX**


Tilman Sauerbeck has announced the release of [CRUX 2.7](#), a minimalist Linux distribution designed for intermediate and advanced users: "I'm announcing the release of CRUX 2.7. Release notes: toolchain updates - CRUX 2.7 includes glibc 2.12.1, GCC 4.5.1 and Binutils 2.20.1; Linux kernel 2.6.35.6; X.Org 7.5 and X.Org Server 1.9.0; to save space, all packages shipped with the image are compressed with xz, which requires a new version of pkgutils, a gz compressed package of pkgutils has been placed the /tools subdirectory; besides the usual ISO image, an image suitable for USB thumb drives is available from our download mirrors. New features in pkgutils: in addition to gzip, pkgmk has been enhanced to optionally compress newly built packages with bzip2 or xz; pkgutils can read packages that have been compressed with bzip2 and xz in addition to gzip..." Read the [release announcement](#) and [release notes](#) for further information. [Download: crux-2.7.iso](#) (226MB, [MD5](#), [torrent](#)).

**2010-09-30** [Development Release: Ubuntu 10.10 RC](#)

 **ubuntu**

Robbie Williamson has announced the availability of the release candidate for [Ubuntu 10.10](#), code name "Maverick Meerkat": "We formally announce Ubuntu 10.10 Release Candidate. Code-named "Maverick Meerkat", 10.10 continues Ubuntu's proud tradition of integrating the latest and greatest open-source technologies into a high-quality, easy-to-use Linux distribution." The release includes new Ubuntu font family, the just-released GNOME 2.32, Shotwell as the default photo manager, the brand-new Unity interface for the netbook edition, KDE 4.5.1 in Kubuntu, Linux kernel 2.6.35, and many other new features. Read the [release announcement](#) and [release notes](#) for a detailed list of improvements as well as known issues. [Download \(SHA256\): ubuntu-10.10-rc-desktop-i386.iso](#) (696MB, [torrent](#)), [ubuntu-10.10-rc-desktop-amd64.iso](#) (697MB, [torrent](#)). Other members of the Ubuntu family were also updated to RC status today: [Kubuntu](#) ([download](#), [release notes](#)), [Xubuntu](#) ([download](#)), [Edubuntu](#) ([download](#), [release announcement](#)), [Mythbuntu](#) ([download](#), [release announcement](#)) and [Ubuntu Studio](#) ([download](#)).

**2010-09-30** [Distribution Release: Sabayon Linux 5.4](#)

 **sabayon**

Fabio Erculiani has announced the release of [Sabayon Linux 5.4](#): "On the behalf of the Sabayon Linux team, we are happy to announce the immediate availability of Sabayon Linux 5.4 KDE and GNOME editions. Features: more than 1,000 updated packages since Sabayon 5.3 and more than 100 bugs (stability, usability and performance) fixed; shipped with desktop-optimized Linux kernel 2.6.35; providing extra server-optimized, OpenVZ-enabled and VServer-enabled kernels in repositories; installable in 10 minutes; fast boot time and lightweight default system; ext4 file system as default, official Btrfs file system support; encrypted file system support; featuring X.Org 7.5 and up-to-date open-source, NVIDIA and AMD video drivers; containing GNOME 2.30 (with GNOME Shell) and KDE 4.5.1..." The complete [release announcement](#) can be found on the project's user forum. [Download: Sabayon Linux 5.4 x86\\_K.iso](#) (1,904MB, [MD5](#), [torrent](#)), [Sabayon Linux 5.4 x86\\_G.iso](#) (1,486MB, [MD5](#), [torrent](#)), [Sabayon Linux 5.4 amd64\\_K.iso](#) (2,048MB, [MD5](#), [torrent](#)), [Sabayon Linux 5.4 amd64\\_G.iso](#) (1,619MB, [MD5](#), [torrent](#)).

**2010-09-28** [Development Release: Fedora 14 Beta](#)

**Page Hit Ranking**

Data span: [Last 6 months](#) [Refresh](#)

Rank	Distribution	H.P.D*
1	<a href="#">Ubuntu</a>	2192▲
2	<a href="#">Fedora</a>	1469→
3	<a href="#">Mint</a>	1365▼
4	<a href="#">openSUSE</a>	1214▲
5	<a href="#">Debian</a>	993→
6	<a href="#">PCLinuxOS</a>	958▼
7	<a href="#">Mandriva</a>	820▼
8	<a href="#">Arch</a>	724→
9	<a href="#">Sabayon</a>	723▲
10	<a href="#">Puppy</a>	683→
11	<a href="#">Lubuntu</a>	670▲
12	<a href="#">Slackware</a>	563→
13	<a href="#">CentOS</a>	511→
14	<a href="#">MEPIS</a>	485▼
15	<a href="#">Ultimate</a>	481▼
16	<a href="#">FreeBSD</a>	476▼
17	<a href="#">Tiny Core</a>	398→
18	<a href="#">Gentoo</a>	370→
19	<a href="#">CrunchBang</a>	357▼
20	<a href="#">Zenwalk</a>	356▼
21	<a href="#">Vector</a>	348→
22	<a href="#">Dreamlinux</a>	348▼
23	<a href="#">Peppermint</a>	340▲
24	<a href="#">Kubuntu</a>	340→
25	<a href="#">aptosid</a>	333→
26	<a href="#">PC-BSD</a>	318▼
27	<a href="#">Red Hat</a>	307▼
28	<a href="#">Chakra</a>	306▲
29	<a href="#">Salix</a>	303▲
30	<a href="#">ClearOS</a>	272→
31	<a href="#">KNOPPIX</a>	264▼
32	<a href="#">Ubuntu Studio</a>	258→
33	<a href="#">Xubuntu</a>	240→





# 2009 DoD Memo Written by Daniel Risacher

- 2001-2002 DISA certifying RHEL as compliant with the Common Operating Environment, (DoD version of LSB), OS vendor (popular in the desktop space) drafted unsolicited memo for the DoD CIO to ban OSS.
- DoD CIO John Stenbit refused to roll over, through DISA commissioned a survey of OSS use in DoD, study farmed out to MITRE, Terry Bollinger, results DoD using lots of OSS, in some cases for mission-critical things, extensively by the information assurance community. (e.g. snort)
- Stenbit wrote new memo, signed in 2003, OSS is okay, it's just like other software, but make sure that you get approval before you use it, Stenbit retired from gov't in 2004.
- April 2008, Deputy CIO (Dave Wennergren) decided to update DoD guidance on Open Source Software, suggested by Scott McNealy (Sun), Art Money (former DoD CIO from 1999-2001), and Bill Vass (Sun, but former gov't executive under the DoD CIO). Daniel Risacher on CIO staff chosen to write
- Risacher was CS major at MIT, class of '95; worked down the hall from Richard Stallman, on ROTC scholarship and later served about 6 years as an active-duty officer. Started as government civilian 2002, 2004 I took a position with the office of DoD CIO
- drafted the memo, with help from lots of folks, including David Wheeler, John Scott, LtCol John Barrette, Dave Emery, Terry Bollinger, MaryAnn Kiefer, Roger Loeb, Frank Petroski, Monique Pryce, JC Herz, and others, briefed concept to Wennergren. Got feedback. Revised. Sent out to other offices in the Office of the Secretary of Defense (OSD) for coordination. Sent to the Military Department CIO offices for coordination. Spent many, many hours coordinating and revising with the Office of General Counsel (OGC) for the OSD, the Army, USAF, and Dept of Navy
- One paragraph in memo traceable to licensing debacle with a particular software vendor (not Microsoft) that affected a particular software project, and could have been avoided by using OSS.
- lawyers biggest delay, couldn't reference Open Source Definition (published by the Open Source Initiative), considered endorsement of a non-federal entity, violate the Joint Ethics Regulation, eviscerates the authority granted to the CIO by the Clinger-Cohen Act, final memo does not reference the OSI.
- no direct involvement by White House in 2009 memo, but favorable attitude from the current administration toward "openness" meant that I (and I think Mr. Wennergren) felt a pro-open memo would be well received, but we didn't consult with the WH, nor does the WH get that deep into agency policy - even for an agency as big as DoD. If the WH wanted to push policy on OSS, they'd do it through OMB for the whole executive branch. There was a rumor for a while that the WH might pick a former Microsoft exec as the DoD CIO, which might have scuttled the effort, but that hasn't happened.