



Open Source and Linux

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Nebraska Digital
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Summit – 2004

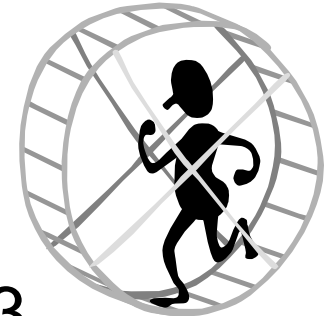


Agenda

- ? The Open Source Momentum
- ? Defining Open Source
- ? What is Available under Open Source?
- ? Sun's Contributions to Open Source Community
- ? Why Open Source?
- ? Open Source Considerations
- ? Linux Considerations
- ? The Tiered IT Architecture
 - ? Where Does Open Source Play?
- Q&A

The Open Source Momentum

- ? NASA Marshall Space Flight Center switches from Oracle to MySQL – 10/00
 - ? NASA Acquisition Internet Service
- ? Munich switches to Linux – 5/03
 - ? 14,000 desktops
 - ? OpenOffice instead of MS Office
- ? DoD approves Open Source use – 6/03
- ? OMB approves Linux for FEAP – 8/03
- ? Massachusetts adopts Open Source strategy – 9/03



The Open Source Momentum



- ? Worldwide governments “experimenting” with or implementing Open Source alternatives
 - ? Germany, France, Finland, Norway, Taiwan, China, Philippines, Thailand, Malaysia, Peru, ...
- ? US Federal Government using Open Source in selected areas
 - ? DoD, DoE, FAA, IRS, USPS, NWS ...
- ? State and local governments
 - ? Several bills initiated to consider Open Source as IT alternative – Oregon, Texas, California...
 - ? Early adopter phase

Background

- ? Monitors air quality and researches solutions
- ? Working with open source since 1995
- ? Mixture of open source and commercial products
- ? Used open source in small components of architecture
- ? Management culture embraces open source
- ? IT staff motivated to use open source

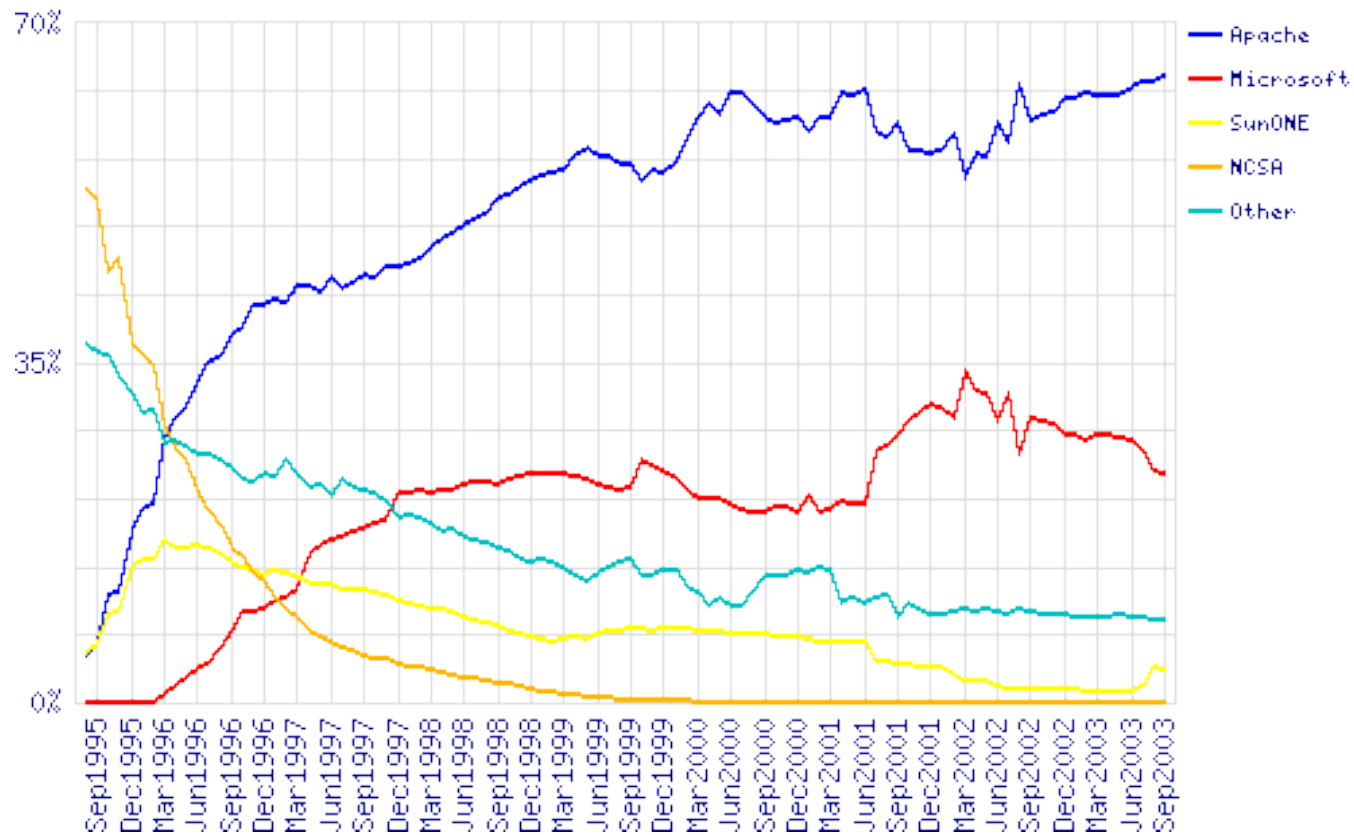
Open Source Replacements

<u>Applications</u>	<u>Commercial</u>	<u>Open Source</u>
Servers	HP, Sun	X86
OS	Solaris, HP-UX, Windows 2000	Linux
Data Base	Oracle	MySQL
Web Server	Oracle	Apache
Scripting	Jdeveloper	PHP
Office	Office 97	StarOffice, OpenOffice,
Email, Calender	Netscape	Mozilla

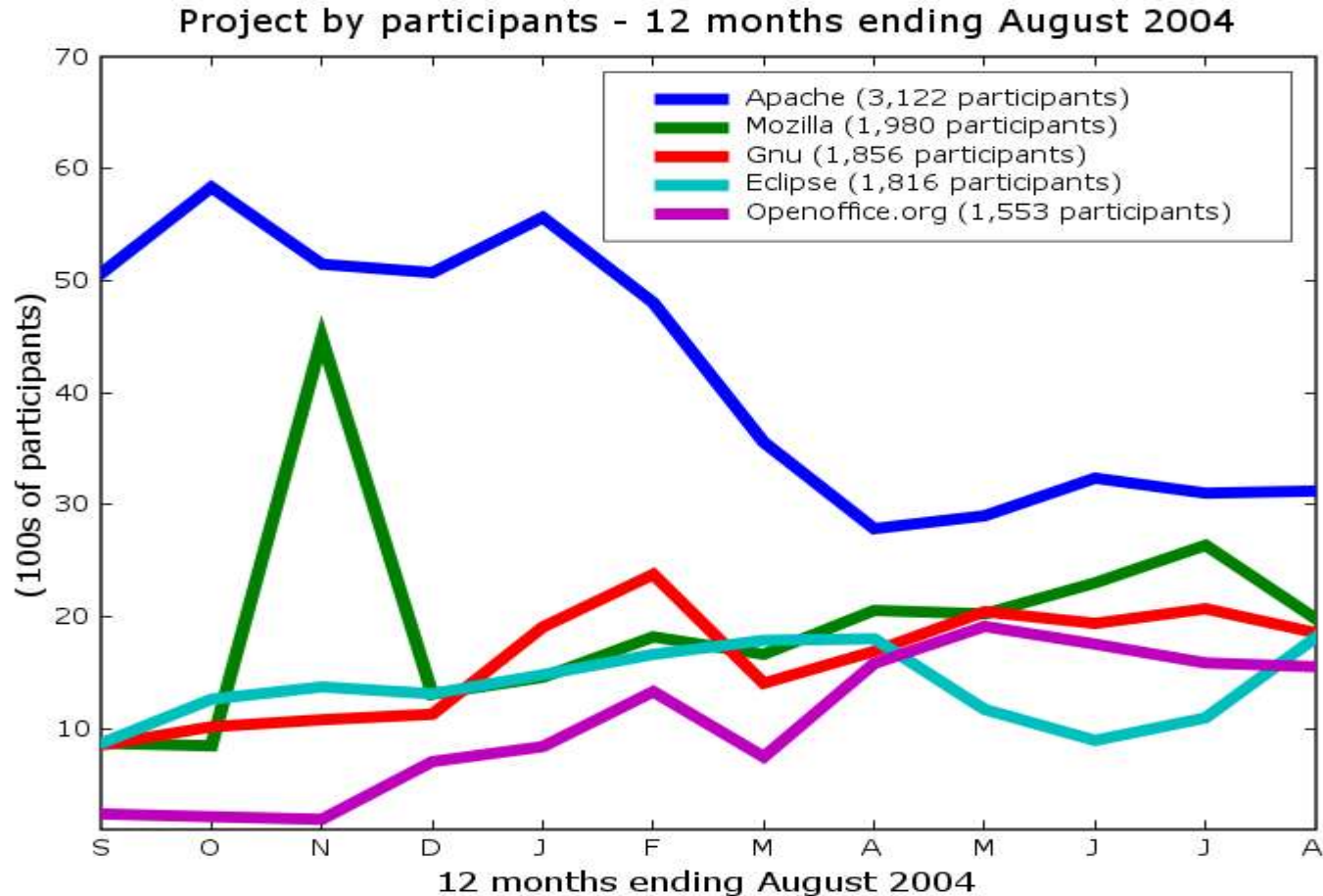
Results

- ? Cost savings
 - ? Emissions Inventory System (\$59 vs \$27,600)
 - ? Desktop Office Suite - \$735,000 Savings
 - ? Email Client - \$120,000 Savings
- ? Comparable or Better Performance
- ? Increased Systems Reliability
- ? Freedom From Vendor Licensing Strategies
- ? Increased Control Over Software and Upgrades
- ? Support From Variety of Suppliers and User Groups

Open Source on the Internet

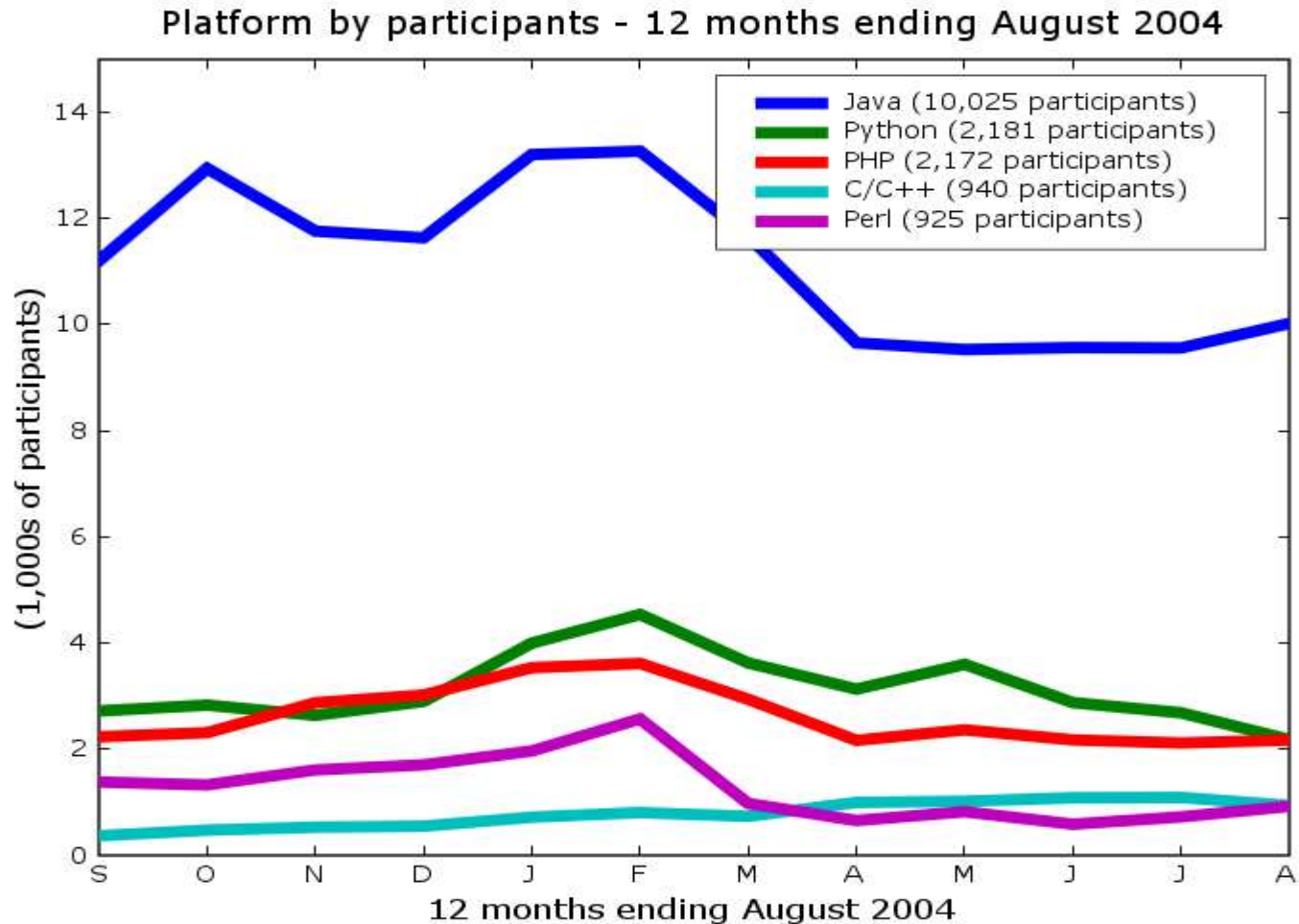


Open Source on the Internet



This chart shows overall developer activity based on weighted data from mailing lists, newsgroups and web forum messages, analysis of code submission logs ("CVS commits") and web robots.

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Defining Open Source

Summary Definition of open source

- The license must not restrict the parties to whom the code may be licensed, the uses to which it is put, the software of which it may become part, nor the pricing of any software built using the licensed code.
- The source for the licensed code must be made easily and inexpensively available, and modification to the source must be permitted at least to the degree that patches are permitted.
- The license must not affect the licenses of other code that is distributed with the licensed software.
 - Open Source Initiative (opensource.org)

Defining Open Source

Open Source \neq Open Standards
(although they can co-exist)

Open Source \neq Linux
(Linux is only the beginning)

Open Source \neq Freeware

Open Source = Source

Defining Open Source

- ? Key aspects of open source
 - Royalty free access to source code under specific conditions
 - Permits licensee to use and modify source and redistribute binaries without payment to licensor
 - Author retains copyright and ownership of source – not public domain software
- License to protect source code while granting:
 - Right to **inspect**
 - Right to **modify**
 - Right to **redistribute**
 - Right to **fork**

Defining Open Source

- ? Different from
 - Community source licensing (Java)
 - Shared source licensing (.Net)
 - Freeware – free software executables (Internet Explorer, RealPlayer, Acrobat Reader)
 - Public domain software (not copyrighted)

Open Source Licensing

- ? Free Software Foundation GNU General Public License (GPL)
- ? Free Software Foundation GNU Library “Lesser” General Public License (LGPL)
- ? Berkeley Software Distribution (BSD)
- ? Apache Software License
- ? Mozilla Public License (MPL)
- ? Others from Sun, IBM, CA, Apple, Intel, Lucent, Sybase, RealNetworks, Nokia, Ricoh ...

Over 40 + Types of Licenses with more to come, however GPL, LGPL, and BSD make up 80%

Comparison of Open Source Licenses



	Proprietary	GPL	LGPL	BSD	Public Domain
Can be mixed with proprietary software	X			X	X
IP made in contributions must be made available to all developers		X	X		
Modifications must be published		X	X		
When incorporated into a larger work license covers entire work		X			
Can include and enforce compatibility requirements	X				
Original developer has special rights	X				
Can redistribute binaries		X	X	X	X
Can redistribute source code		X	X	X	X

What is Available?

Portfolio growing rapidly, expanding functions

? Infrastructure

- ? Operating systems – Linux, FreeBSD
- ? Database – MySQL, PostgreSQL, Ingres
- ? J2EE application server – JBoss
- ? Web server – Apache
- ? Mail server – Sendmail, Postfix
- ? Content manager/ Portal – Zope, Metadot
- ? Grid computing – Grid Engine
- ? File system/ services – NFS, Samba
- ? Directory server – OpenLDAP

What is Available?

Open Source resurgence on the desktop

? Desktop

- ? Office productivity – OpenOffice
- ? PIM - Evolution
- ? Browser – Mozilla
- ? Multimedia – Helix, Vorbis
- ? Project manager – MrProject
- ? Window manager – GNOME, KDE
- ? Imaging – GIMP
- ? IM – GAIM, Jabber

What is Available?

Application development made easier

? Development Tools

- ? Compilers – gcc
- ? IDE framework – NetBeans, Eclipse
- ? Programming and scripting languages
(Perl, PHP, Python, ...)
- ? Utilities
- ? Source repositories – SourceForge, OSDN

Sun Contributions to Open Source

? One of the largest contributors to the Open Source community

- GNOME internationalization (desktop)
- OpenOffice.org (office suite)
- Grid Engine (grid computing)
- NetBeans (Java development)
- Project JXTA (P2P computing)
- Mozilla (web browser)
- WBEM (web based enterprise mgmt)
- Apache (web server)
- NFS (network file system)



Why (or Why Not) Open Source

- Cost
- Availability
- Quality
- Performance
- Interoperability
- Security

Cost

Pros

- Lower initial acquisition cost - free!
- Lower development costs – (could be) free!
- Lower ownership costs – no license fees

Cons

- Potentially higher TCO
 - Cost of implementation
 - Cost of conversion
 - Cost of admin support (familiarity)
 - Cost of user re-training

Availability

Pros

- Open source – available from community, not dependent on single company – reduces risk
- Availability of close substitutes – e.g. Sendmail/Postfix, GNOME/KDE, various Linux distros

Cons

- Availability (and support) of older versions
- Version control

Quality

Pros

- High quality – massive peer review
- Trustworthy – can review yourself
- Quick bug fixes

Cons

- Appropriateness or fit of product to your business objectives: open source vs COTS vs custom
- Timeliness of new feature addition – community driven – balance demands of disparate groups

Performance

Pros

- Excellent performance for volume platforms
- Many developers working on optimization
 - Best approach “wins”

Cons

- Middling performance for non-volume platforms
- Not optimal performance because of need to address multiple platforms
 - Windowing performance vs MS Windows, multithreading scalability vs Solaris

Interoperability

Pros

- Use of industry standard interfaces/APIs to ensure interoperability across platforms
==> by definition, nothing is proprietary

Cons

- Not all the pieces fit together seamlessly
 - Different developers, tools, release schedules
- No one company responsible for testing all combinations of product mixes
 - Customer as QA department

Security

Pros

- High security through massive peer review
- Trustworthy – can review yourself
- Quick turnaround for security fixes

Cons

- Everyone can see and exploit weaknesses (at least until it gets fixed)

Open Source Considerations

- Business Application Availability
 - ERP, CRM, Transaction Processing, Knowledge Management, etc...
- Enterprise Ready
 - Support
 - Security
 - Standards
 - Desktop application interoperability
- TCO for Enterprise Implementation
- Cost of Management
- Training



Barriers for Using Open Source Software

- Incompatibilities with critical applications
- Software drivers not available for new hardware
- Application needs more than 4 CPUs
- OSS licensing issues
- Open Source != Free
 - Migration Costs
 - Implementation Costs
 - Training Costs (Users & Admins)
- Linux apps are kernel and distribution dependent

Legal Risks for Open Source Software

- ? OSS can contain code that has a Copyright, IP, Software Patent
- ? Legal Risks involve:
 - ? Contamination
 - ? Software derived from GPL software
 - ? Indemnification
 - ? SCO Lawsuits vs IBM, RedHat, Autozone and others over UNIX copyright violation in Linux
 - ? Kodak vs Sun over Java

Linux Considerations



- Compatibility
 - Between versions
 - Kernel recompilations
 - Driver support
 - Between Linux distros (i.e., Red Hat – SuSE)
 - Admin tools, interfaces, installation procedures
 - Between applications (different/no interfaces)
 - Different developers, tools, release schedules

Linux Considerations



- Support – who do you call for support?
- Maintenance – who maintains – your staff or community?
- Implementation – Cost of Professional Services
- Training – need to retrain admins and users
- Security – tradeoff between security and ease-of-use due to more available features/options

Linux Directions

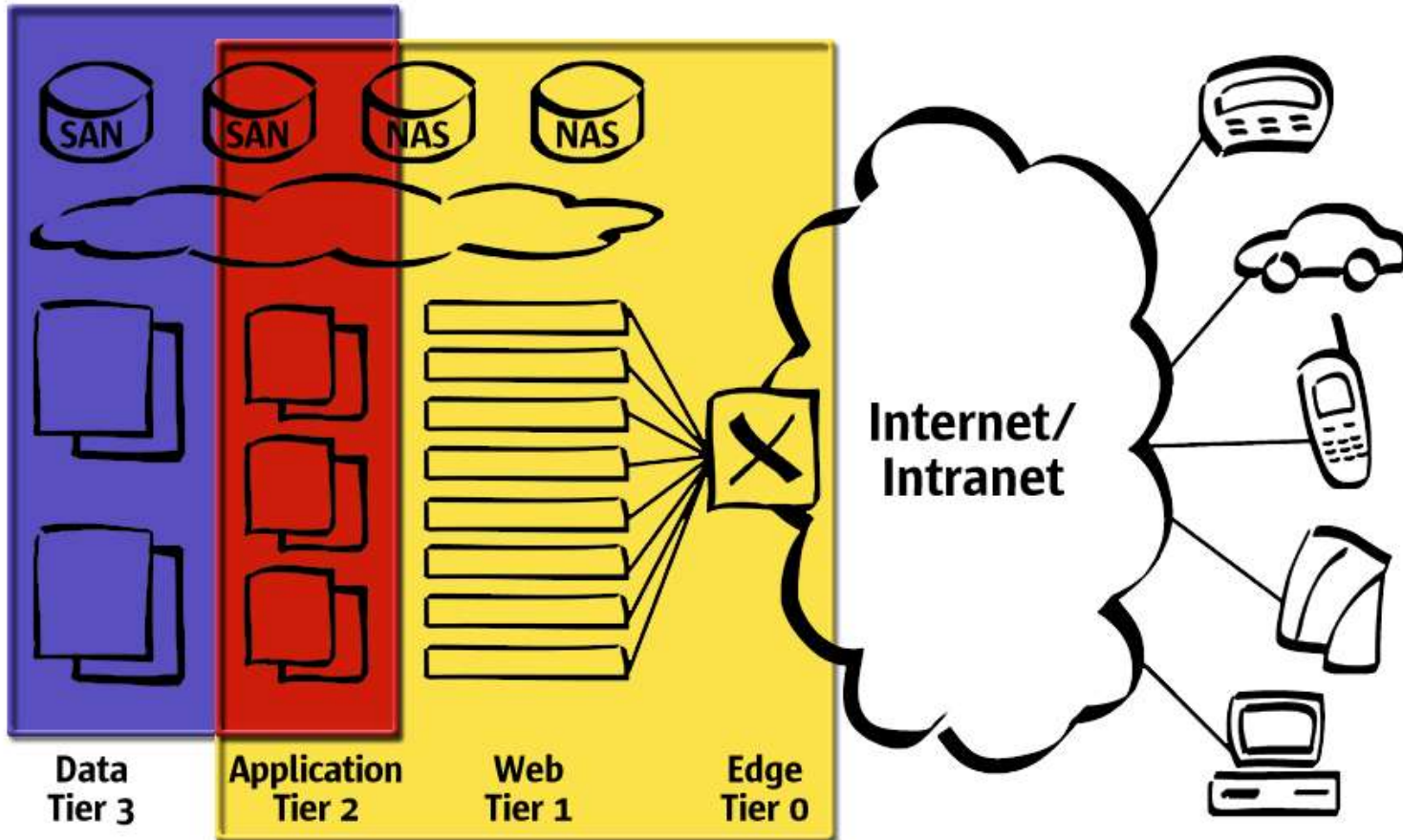


- Adoption accelerating in government and businesses, but “trouble” may be looming on horizon:
 - Major distributors (Red Hat, SuSE) no longer free
 - Focus on enterprise products which cost \$\$\$
 - Enterprise products no longer compatible and becoming proprietary – fragmenting like UNIX?
- More enterprise application availability: Oracle, Sun, BEA, IBM middleware and business apps
 - Shift from infrastructure (web, mail) to business app
- Increasing deployment on desktop (Sun JDS, Lindows, Novell, Lycoris, ...)

Tiered Architecture

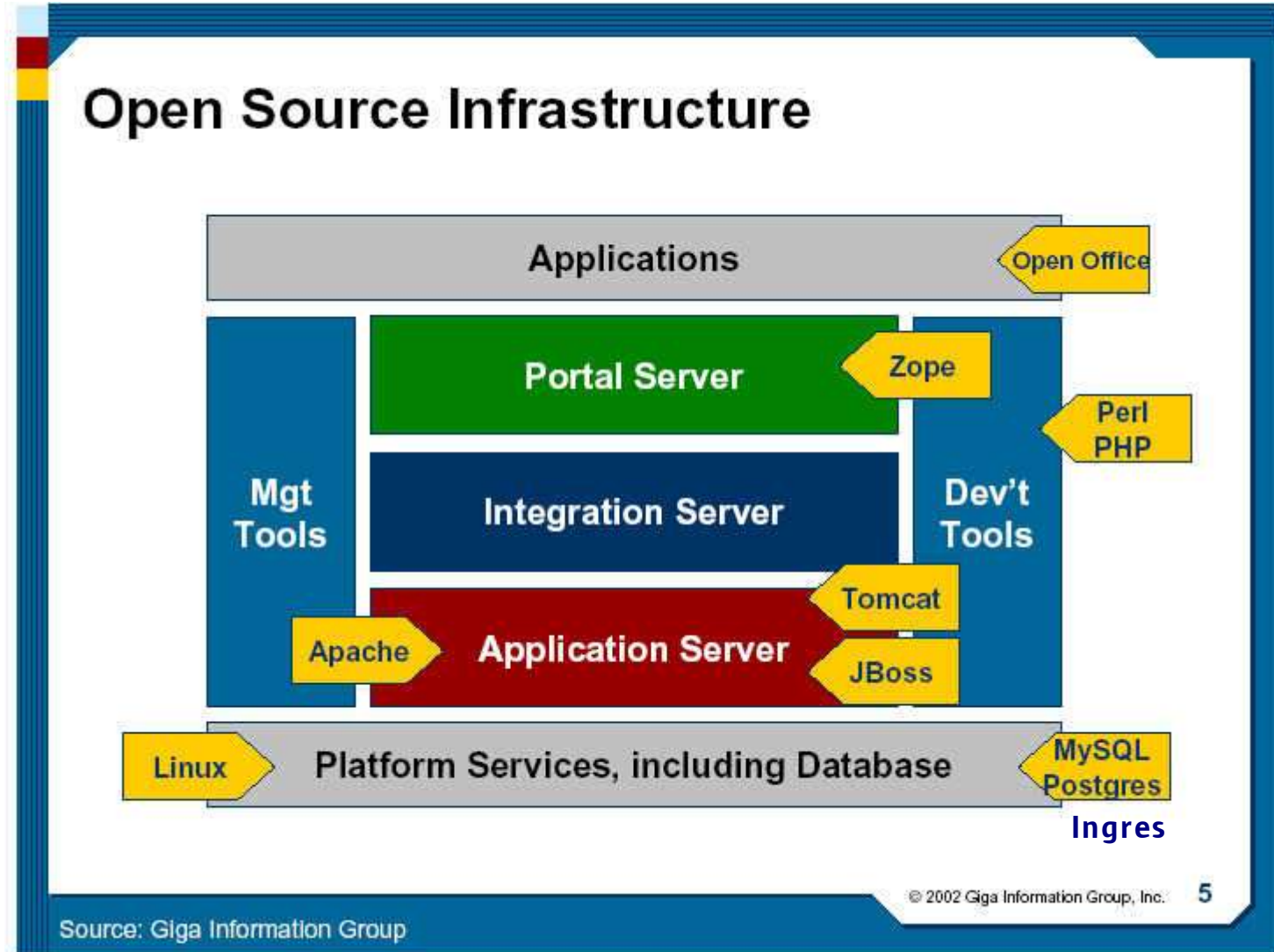
Data Facing Systems

Clients



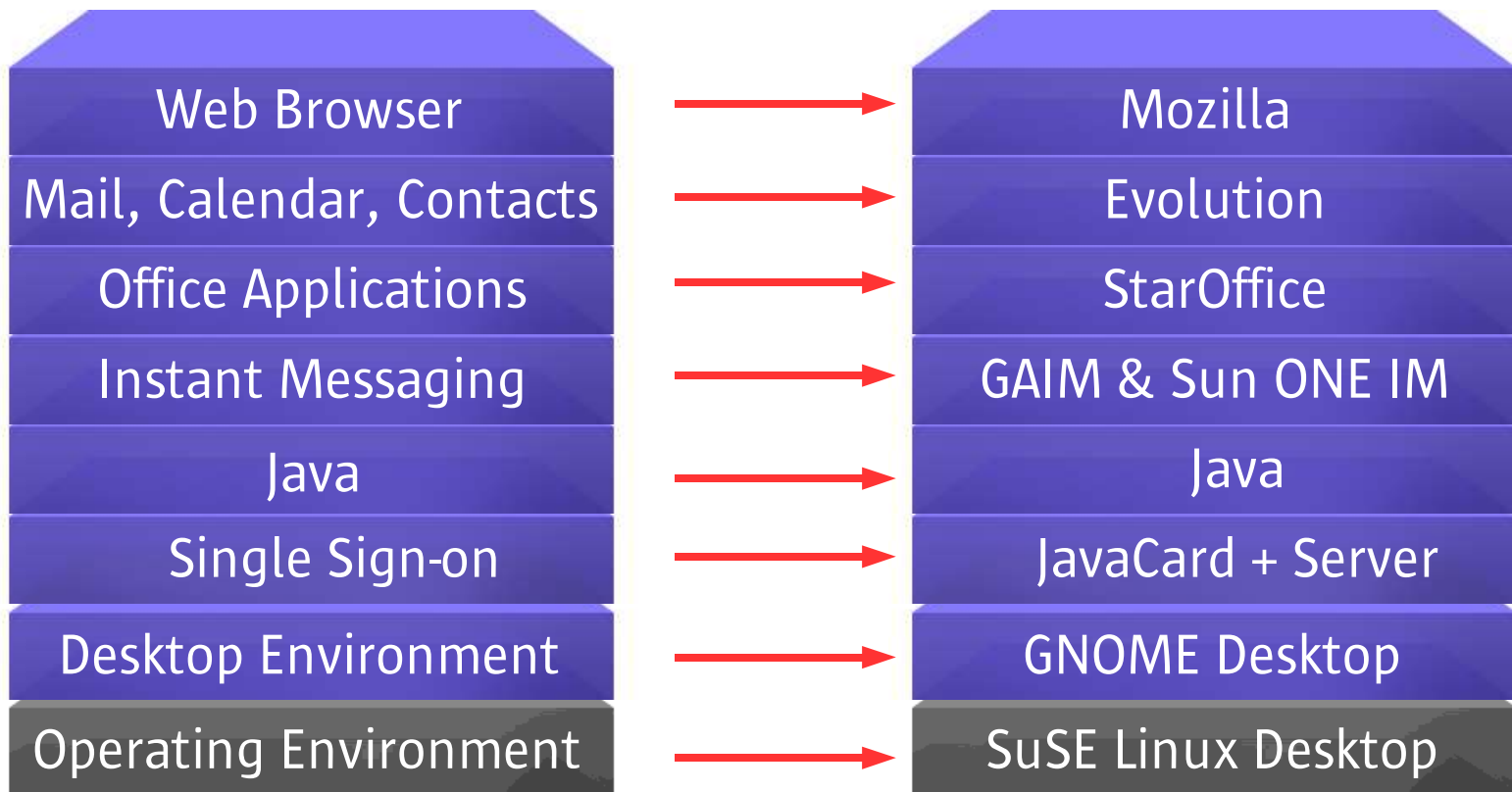
Network Facing Systems

Possible Open Source Stack



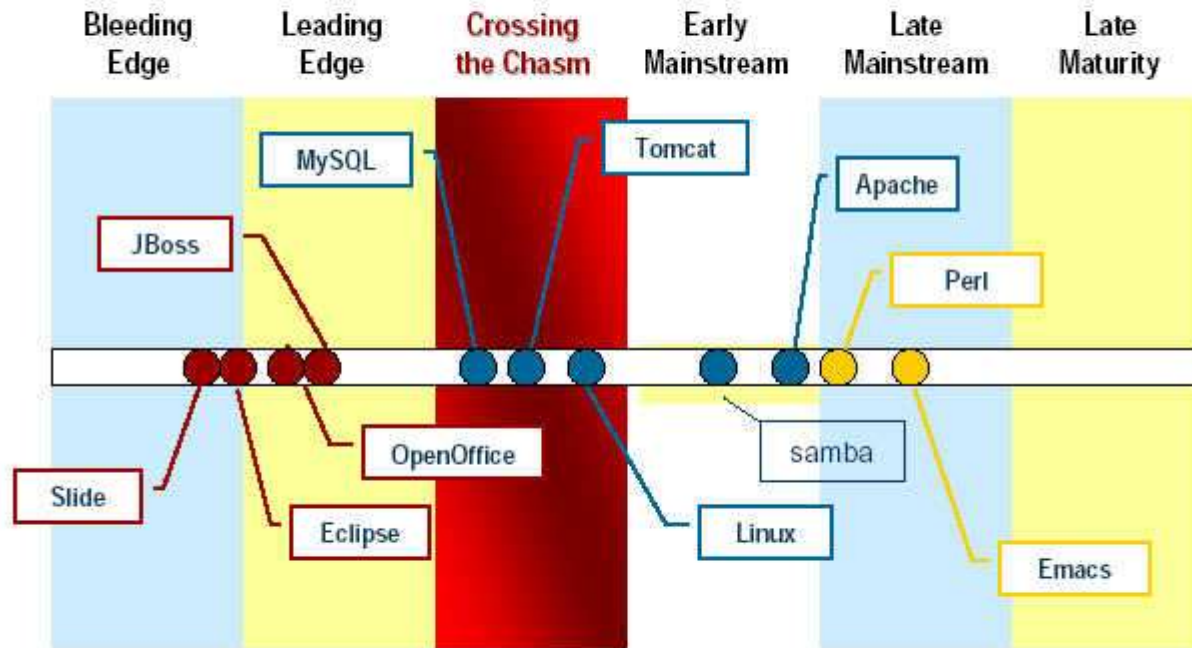
Java Desktop System Distribution

Major Components

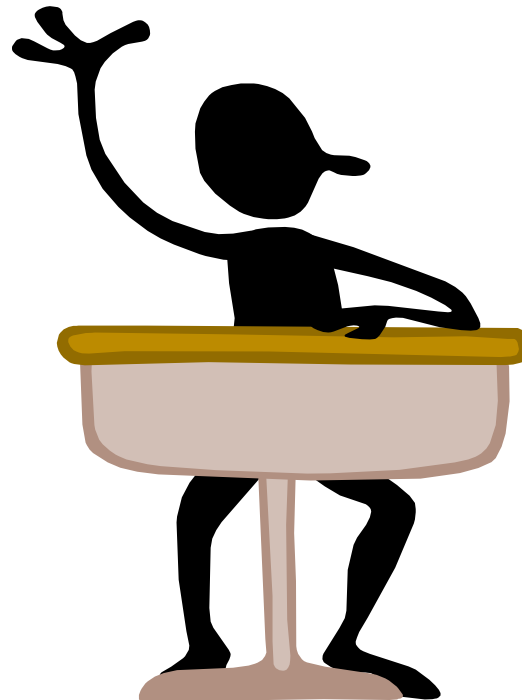


Open Source Adoption Cycle

Open Source Technology Map



Questions ?





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