

Libre Software beyond Linux: Introduction to OpenSolaris

Master on Free Software – LibreSoft

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GSyc

LibreSoft

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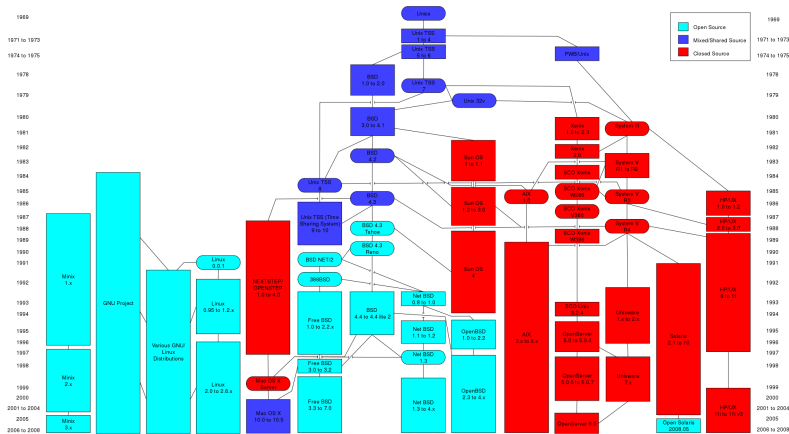
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What is Solaris?

- Unix-based operating system developed by Sun as proprietary software.
- Originally released by Sun in 1991 to replace SunOS (1982, retroactively named Solaris 1).
- System V Release 4 (SVR4) derived: named Solaris 2 (internally “SunOS 5”)
- After Solaris 2.6, Sun dropped the “2.” (Solaris 7, 8, etc.)
- Solaris 10 is latest release, it incorporates SunOS 5.10 kernel.
- It supports SPARC-based and x86 architectures.
- Single UNIX Specification (SUS qualify for the name “Unix”)

A brief history about Unix and SunOS/Solaris



What is Solaris?

What is OpenSolaris?

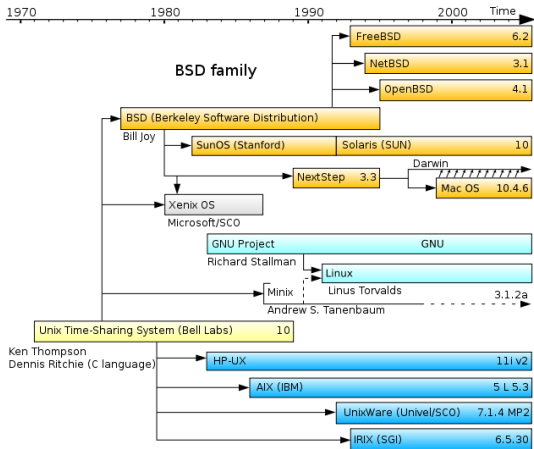
OpenSolaris Code

OpenSolaris distributions

OpenSolaris community

Clarifying GPL/CDDL Incompatibility

A brief history about Unix and SunOS/Solaris



System III & V family

Linux and Solaris



Mozilla Firefox, Mozilla Thunderbird, OpenOffice.org, ...

GNOME

X Window System

GNU Utilities

UNIX Utilities

POSIX + Extensions

System Libraries

POSIX

Linux Kernel

Solaris Kernel

Hardware

What is OpenSolaris?

- A new FLOSS operating system based on source code of Solaris.
- Planning for OpenSolaris started in early 2004.
- Jan. 2005: Sun announce Solaris would be released under the CDDL license.
- The bulk of the Solaris system code was released on June 14, 2005
- The only libre software SVR4 derivative available.
- An attempt to use a community development model to develop Solaris.
- Supported by Sun, but independent (Charter, Community Advisory Board).
- Future commercial versions of Solaris will be based around OpenSolaris code!

Licensing: Common Development and Distribution License

- Most of the Solaris source code is released under CDDL.
- CDDL is based on the Mozilla Public License (MPL).
- Approved as an open source license by the OSI (Jan. 2005)
- Weak copyleft: CDDL code can be combined with files licensed under other licenses. Proprietary extensions are possible.
- Incompatible with the GPL.
- Includes an explicit patent license for code released under CDDL.
- Examples under CDDL: DTrace, ZFS, NetBeans IDE, GlassFish, Java Web Services Development Pack, Project DReaM. . .

What's new in OpenSolaris (1/2)

- **Service Manager Facility** (SMF): service management system to replace init.d (SVR4) scripts.
- **Image Packaging System** (aka IPS or pkg): package manager exploiting ZFS for rollbacks and transactional actions. Legacy support for SVR4 packages.
- **ZFS** (Zettabyte File System): native file system for OpenSolaris that provides simple administration, transparent encryption, logical volume management, snapshots and copy-on-write clones, data integrity check, RAID-Z, native NFSv4 ACLs and immense scalability. Under CDDL, so Linux no-compatible (via FUSE ported).
- **DTrace**: dynamic tracing for troubleshooting kernel and application problems on production systems in real time.

What's new in OpenSolaris (2/2)

- **Solaris Containers** (including **Solaris Zones**): operating system-level virtualization. Zones act as completely isolated virtual servers within a single operating system instance.
- **Slim Installer**: install a full system in only 6 steps in primary Solaris partition or full disk.
- **Sun xVM**: 4 technologies to address desktop and server virtualization: *Sun xVM Server* (Xen based), *Sun xVM VirtualBox*, *Sun xVM Ops Center* (Datacenter automation), *Sun VDI software* (Virtual Desktop Infrastructure).

Features on the Desktop

- Install to a HD from live session.
- Basic software included: OpenOffice 3, Firefox 3, Thunderbird, Evince...
- Network Auto-magic.
- Automatically snapshot with Time Slider.
- Suspend and Resume to RAM.
- Package manager.
- Gnome 2.24: Gnome/compiz desktop. Accelerated video driver.
- More linux familiarity: top, sudo, slocate...
- For developers: NetBeans 6.5, Eclipse, Improved Web Stack (Drupal, Django, new DTrace probes), Distribution Constructor.

Development Model of OpenSolaris

- Much more than just core system.
- Installers, desktops, documentation, layered software such as OHAC. . .
- Binary build scheduled every two weeks, feature planning bound according to the schedule (currently at 128, 129, 130. . .).
- Browse the code: <http://src.opensolaris.org>

OpenSolaris Development Process

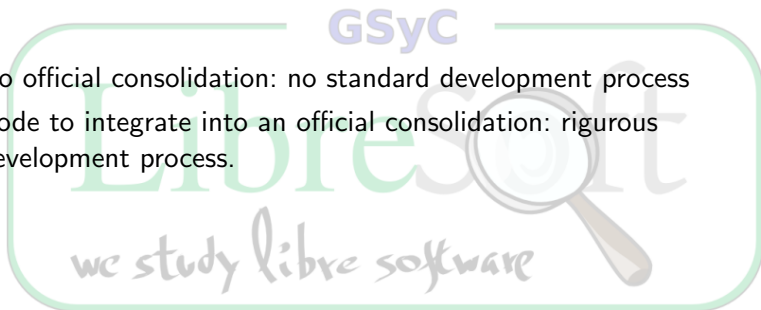
- No notion of “committers” (select group permitted to integrate code)
- Anyone can integrate code if follow the process and submit a signed Sun Contributor Agreement: http://sun.com/software/opensource/contributor_agreement.jsp)
- Every checkin to the repository is connected to a bug # and has undergone a peer review.
- Significant changes to the system need to have an ARC (Architecture Review Committee) case approved first.

Consolidations

- Code base is divided into major areas (**consolidations**)
- Each “consolidation” has its own source-code repository.
- The OpenSolaris core consolidations is ON (Operating System/Networking): kernel, userland libraries and tools.
- Other consolidations: Dev Pro (developer products), Documentation and G11N (Globalization Support).

Development Process

- No official consolidation: no standard development process
- Code to integrate into an official consolidation: rigorous development process.
-



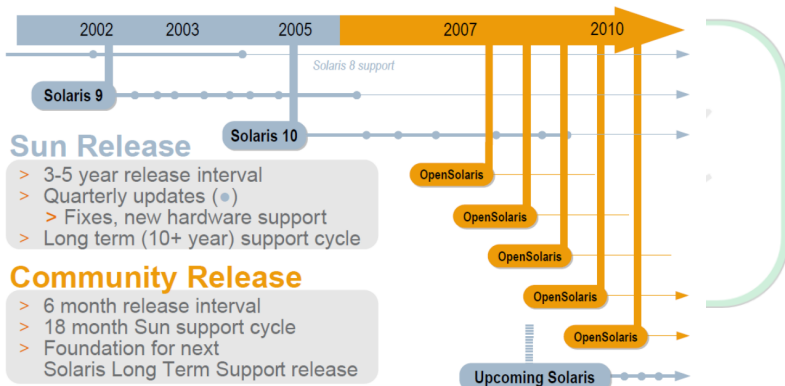
Standard contribution process

- **Initiation**: propose a project
- **Architecture review**: Architecture Review Committee (ARC)
- **Design**: written documentation about the code design
- **Development**
- **Code reviews**: at least two people, experts in that area
- **Integration approval**: C-Team (currently, Sun-internal)
- **File request to integrate (RTI)**: formal mechanism for obtaining the final integration approval
- **Integrate**

Solaris release model

Solaris Release Model

20 Years, One Development Train



OpenSolaris distributions

- OpenSolaris binary distribution from Sun (current release: 2009.06): opensolaris.com
- NexentaCore: Debian/Ubuntu-based with ZFS, Sun-independent project. The first distribution combines gcc library and userland with OpenSolaris kernel.
- Belenix (live CD), developed by India Engineering Centre of Sun, it is community-maintained.
- OpenSolaris for System z, for IBM mainframes.
- SchilliX, just another operating system based on OpenSolaris.

Project Indiana (1/2)

- Effort to produce a complete OpenSolaris “distro”.
- March 2007: Ian Murdock joins Sun to lead Project Indiana.
- First release: May 2008 (“2008.05 release”).
- Can be booted as a Live CD or installed directly.
- Short release cycle (every 6 months).
- 18 month Sun support cycle (future LTS release).

Project Indiana (2/2)

- Indiana is a binary distribution built out of the OpenSolaris source code.
- Live CD install image, fully libre software.
- Simplified install and upgrade, Gnome and “userland” tools from GNU.
- Easy to maintain (Image Package System).
- Latest OpenSolaris innovations (ZFS, Dtrace, SMF, Zones, xVM...).
- Project Indiana is now known simply as “OpenSolaris release”.
- Releases: 2008.05, 2008.11 and 2009.06. Next Release: 2010.03

OpenSolaris Communities

- OpenSolaris communities (opensolaris.org) are techno-social groups around Opensolaris source and distributions.
- Technical communities maintain kernel, userland and launch new technology projects.
- Members have representation in the governance process (Governing Board).
- Communities endorse technical projects: ZFS, SMF, Xen, Drivers, Performance, Documentation, Zones... or country portals (Open Solaris Hispano).
- Sun and non-Sun developers collaborate on projects.
- There are more than 50 communities hosted and dozens of projects.

Interaction with FLOSS Community

- OpenSolaris is developed by “communities” working in the different projects.
- Include reviewers from the community.
- Community Advisory Board (CAB): OpenSolaris Governance to drive consensus within the community.
- All governance proposals are debated, iterated, and ratified in public, and community members can participate in those conversations.
- First CAB: 2 from Sun, 2 from the OpenSolaris community and 1 from the open source community (Roy Felding, co-founder and director of the Apache Foundation).
- The current OGB (2009/2010): 8 members

Getting involved in OpenSolaris

- Running OpenSolaris. <http://hub.opensolaris.org/bin/view/Main/downloads>
- Participating in discussion lists:
opensolaris-help@opensolaris.org,
opensolaris-announce@opensolaris.org,
ogb-discuss@opensolaris.org,
advocacy-discuss@opensolaris.org
- Areas of interest: indiana-discuss@opensolaris.org,
dtrace-discuss@opensolaris.org,
haclusters-discuss@opensolaris.org, etc.
- Finding OpenSolaris user groups or starting local OSUGs.
- Contributing to OpenSolaris (bugs, requests, code...).

Goals and future directions

- Community-developed Operating System
- Stable, well-designed binary distribution of OpenSolaris.
- Preserve the high quality and popularity of Solaris 10: stability, scalability, etc.
- Continue expand base of users. A profitable product model. Support for Sparc platforms.
- Add useful features, uniques to OSOL and from popular Linux distros.

Clarifying GPL / CDDL Incompatibility

CDDL-licensed code cannot be redistributed under any license that imposes restrictions that are not present in CDDL:

CDDL, section 3.4 “Application of Additional Terms”

You may not offer or impose any terms on any Source Code version that alters or restricts the applicable version of this License or the recipients' rights hereunder.

The “rights hereunder” (*) include the right granted to recipients to link CDDL “Covered Code” with private non-MPL code to form a “Larger Work” (CDDL sect. 3.6 “Larger Works”). GPL does not give recipients any such right. Therefore, the recipient cannot change the licensing terms to apply the GPL instead of CDDL.

(*) *Hereunder*: “Under or below this; subsequent to this.”

Clarifying GPL / CDDL Incompatibility

GPL-licensed code cannot be redistributed under any license that imposes restrictions that are not present in GPL, or that does not support rights granted in GPL:

GPLv2, section 6

Each time you redistribute the Program (or any work based on the Program), the recipient automatically receives a license from the original licensor to copy, distribute or modify the Program subject to these terms and conditions. You may not impose any further restrictions on the recipients' exercise of the rights granted herein.

Clarifying GPL / CDDL Incompatibility

CDDL permits recipients to subvert the fundamental GPL right “to copy, distribute or modify the Program”. In addition to allowing linkage with proprietary code, CDDL permits the recipient to relicense binaries:

CDDL, section 3.5. “Distribution of Executable Versions”

You may distribute the Executable form of the Covered Software under the terms of this License or under the terms of a license of Your choice, which may contain terms different from this License, provided that You are in compliance with the terms of this License and that the license for the Executable form does not attempt to limit or alter the recipient’s rights in the Source Code form from the rights set forth in this License.

Clarifying GPL / CDDL Incompatibility

This section (3.5), in turn, fails to satisfy the requirements of GPLv2 section 3, which states:

The source code for a work means the preferred form of the work for making modifications to it. For an executable work, complete source code means all the source code for all modules it contains, plus any associated interface definition files, plus the scripts used to control compilation and installation of the executable.

CDDL only requires that the source code to the covered code (including any modifications to the covered code) be made available, which is not sufficient to ensure that the recipient can actually modify a real program.

Clarifying GPL / CDDL Incompatibility

The GPL license applies to entire works. When you modify a work by adding code, the additional code becomes part of the work (although only when it is distributed as part of the work), and as such must continue to be GPL-licensed. GPL 2 states:

These requirements apply to the modified work as a whole. If identifiable sections of that work are not derived from the Program, and can be reasonably considered independent and separate works in themselves, then this License, and its terms, do not apply to those sections when you distribute them as separate works. But when you distribute the same sections as part of a whole which is a work based on the Program, the distribution of the whole must be on the terms of this License, whose permissions for other licensees extend to the entire whole, and thus to each and every part regardless of who wrote it.

Clarifying GPL / CDDL Incompatibility

The GPL states:

GPLv2, section 2

If identifiable sections of that work are not derived from the Program, and can be reasonably considered independent and separate works in themselves, then this License, and its terms, do not apply to those sections when you distribute them as separate works. But when you distribute the same sections as part of a whole which is a work based on the Program, the distribution of the whole must be on the terms of this License, whose permissions for other licensees extend to the entire whole, and thus to each and every part regardless of who wrote it.

However, the CDDL states:

CDDL, section 3.4

You may not offer or impose any terms on any Covered Software in Source Code form that alters or restricts the applicable version of this License or the recipients' rights hereunder.

Clarifying GPL / CDDL Incompatibility

One of these “recipients’ rights” is:

CDDL, section 3.6

You may create a Larger Work by combining Covered Software with other code not governed by the terms of this License and distribute the Larger Work as a single product. In such a case, You must make sure the requirements of this License are fulfilled for the Covered Software.

But the GPL terms forbids the user to combine any part of software with (for example) closed source software, thereby “restricting the recipients’ rights” and meaning that the CDDL terms of the included module have not been followed.

GPL / CDDL Incompatibility: Conclusions

- A software containing a part CDDLed code and a part GPLed couldn't be legally delivered.
- This incompatibility is not immediately obvious.

The FSF states about CDDL:

This is a free software license. It has a copyleft with a scope that's similar to the one in the Mozilla Public License, which makes it incompatible with the GNU GPL. This means a module covered by the GPL and a module covered by the CDDL cannot legally be linked together.

Resources

- The OpenSolaris developer community website:
<http://opensolaris.org>
- FAQs about CDDL license:
http://opensolaris.org/os/about/faq/licensing_faq/
- About MPL and GPL incompatibility issues:
<http://www.tomhull.com/ocston/docs/mozgpl.html>
- OpenSolaris Communities:
<http://opensolaris.org/os/communities>
- Source code browse/search engine (OpenGrok):
<http://cvs.opensolaris.org/source/>
- Crosbow Architecture:
<http://opensolaris.org/os/project/crossbow>
- OpenSolaris Hispano: <http://es.opensolaris.org/>
- Mailing Lists: opensolaris-discuss@opensolaris.org,
indiana-discuss@opensolaris.org, ug-sposug@opensolaris.org
(Open Solaris Hispano User Group)

Questions?

