The Open Source Automation Development Lab (OSADL) promotes and coordinates the development of Open Source software for the automation industry.

Carsten Emde

OSADL eG
Project Manager: "Here is a purchase order. Please delegate the development of a Linux driver for our new controller."

Purchase Department: "Okay. Assuming standard procedure. NDA - and the sources go into the company's safe?"

Project Manager: "Nope, that's Open Source - the sources go to the Internet."

Purchase Department: "What? The sources go to the Internet? So, why are just we paying for the development, while everybody can use the sources?"
Let's found a company to act as a “purchase community”

Open Source Development Lab

OSDL

Open Source Automation Development Lab

OSADL

Incorporated, Limited, Community, Foundation, Initiative, Cooperative?
What kind of company is best suitable to provide a “purchase community”?


"What is impossible for the individual, many can do."

CELF Embedded Linux Conference Europe 2007
Linz, Austria
The preamble of the OSADL articles of incorporation

“The automation industry and its suppliers are profiting greatly from open-source operating systems such as Linux since they guarantee long production cycles, rapid troubleshooting and the independence of individual software manufacturers. However, this branch requires specific expansions of the operating system such as real-time capability, the compatibility with these expansions must be certifiable, and standardized software interfaces must be available. The development of these requirements is the goal of the Open Source Automation Development Lab (OSADL).”
The organs of the OSADL cooperative

- **Member companies** elect
  - **Supervisory Board**
    - elects **Board of Directors**
    - employs **Manager**
OSADL Membership Levels

- **Bronze Member**: 8,000.00 Euro/year
- **Silver Member**: 16,000.00 Euro/year
- **Gold Member**: 24,000.00 Euro/year
OSADL Regular Members (1)

- Machine companies
- Hardware manufacturers
- Software manufacturers
- Software service providers
- Chip Manufacturers
- Distributors of embedded Linux
OSADL Academic Members

Lanzhou University, Lanzhou, P.R. China

ISW, University of Stuttgart, Germany

REDS, University of Vaud, Switzerland
OSADL Other Types of Membership

- Organizational membership
- Individual membership
OSADL Projects: Realtime Mainline Linux Kernel

- Close collaboration with RT-Preempt co-author Thomas Gleixner who also is OSADL's Software Maintainer
- Development, validation and application of defined test conditions and test suites
- Feedback of bug reports and traces from the OSADL community to the RT-Preempt developers
Example of "Latest stable" RT-Preempt Linux kernel:

OSADL recommends the RT-Preempt kernel 2.6.21.6-rt21 as latest stable version

Kernel:


RT-Preempt Patch:

www.kernel.org/pub/linux/kernel/projects/rt/older/patch-2.6.21.6-rt21

Kernel Virtual Machine (kvm):


RT-Preempt Patches for kernel 2.6.21.6-rt21 and kvm-28

svm.c vmx.c
OSADL Projects: Safety Critical Linux

- Professor Nicholas Mc Guire was named OSADL's Safety Coordinator.
- Kick-off phase of the OSADL Safety Critical Linux Working Group
- Provide documentation of the Linux development and maintenance strategy, “proven in use” cases and performance data to enable a “facilitated certification”
## OSADL Projects: Upstream Submission

<table>
<thead>
<tr>
<th>Project name</th>
<th>Controller, Patch</th>
<th>Related hardware product</th>
<th>Hardware manufacturer</th>
<th>Current status</th>
<th>Most recent posting</th>
<th>Scheduled mainline kernel</th>
</tr>
</thead>
<tbody>
<tr>
<td>mx6650</td>
<td>Maxim 6650, patch</td>
<td>CPX Base</td>
<td>Kontron Modular Computers, Kaufbeuren, Germany</td>
<td>6</td>
<td>lm_sensors</td>
<td>2.6.22</td>
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<td>lm93</td>
<td>National Semiconductor LM93, patch</td>
<td>F400</td>
<td>Eltec Elektronik AG, Mainz, Germany</td>
<td>5</td>
<td>lm_sensors</td>
<td>2.6.23</td>
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<tr>
<td>lm94</td>
<td>National Semiconductor LM94</td>
<td>S5000VSA</td>
<td>Intel</td>
<td>1</td>
<td>lm_sensors</td>
<td>n.a.</td>
</tr>
<tr>
<td>RBF file system</td>
<td>patch, script</td>
<td>n.a.</td>
<td>n.a.</td>
<td>1</td>
<td>n.a.</td>
<td>n.a.</td>
</tr>
</tbody>
</table>
OSADL Projects: BSP Conformance Issues of Patches

- Patch against "final" kernel version
- Use canonical patch format
- One patch per topic
- Do not remove unused kernel subtrees
- Specify the patch order
- Specify the patch originator
- Patches must not break other builds
OSADL Projects: BSP Conformance Levels (0 - 2)

Level 0
The BSP does boot on the target architecture but doesn't follow any particular rule of this specification. The patches are neither intended for upstream, nor do they follow the quality standards of this specification. This is the default conformance level of every BSP, even if it did not undergo the OSADL test procedure.

Level 1
The BSP only adds board specific code components and usually does not touch generic files, like source files in the kernel/, lib/ or mm/ directory. The only case where generic files are being touched is to provide generic patches for bugs or extensions.

Level 2
In addition to the level 1 requirements, the patches follow the kernel patch rules and the coding style. The BSP can be compiled with sparse check without warnings. The patches may or may not be reviewed by upstream parties.
OSADL Projects: BSP Conformance Levels (3-4)

**OBSPS Patch Level 3**

In addition to the level 2 requirements, the patches are continuously integrated with the mainline kernel (at least once per week). The continuous integration has to be documented by automatic protocols which show that the patches do apply to the upstream GIT trees; breakages have to be fixed as they do appear. Patches are actively code reviewed by the Linux community with regard to quality, realtime or security issues.

**OBSPS Patch Level 4**

The documented functionality of all components of the hardware platform is supported by a particular version and revision (or higher) of a released mainline kernel.

**"T" Suffix for Tainted Kernels**

In cases where the documented functionality cannot be completely deployed without additional components which are not available as Open Source software (example: proprietary kernel driver for advanced graphic boards or communication protocols), this must be clearly marked with a "T" (tainted), such as " Level 0T".
OSADL Projects: RTDM to RT-Preempt

Wolfgang Grandegger (Denx Software Engineering) ported the Real-Time Driver Model (RTDM) to RT-Preempt.

This makes it possible to use existing RTDM-based drivers in a native RT-Preempt kernel.

The project and a HOWTO are available on www.osadl.org for download.
OSADL Projects: Realtime-kvm

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OSADL Projects: More ...

- Migration tools, e.g. OS-9 to Linux, RBF file system for Linux
- Real-time Ethernet
- Coldfire (68knommu) port to Linux RT-Preempt
OSADL at SPS/IPC/Drives and Embedded World

SPS/IPC/Drives 2007
November 27 to 29, 2007

Embedded World 2008
February 26 to 28, 2008
All about OSADL

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