

ISPRAS Report

June 05, 2008 - July 11, 2008

Abstract

This document presents top-level monthly report on ISPRAS results in the LSB Infrastructure program (which is run jointly with the Linux Foundation).

Revision History

Date	Version	Description
2008-07-14	0.1	Initial version

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ISPRAS Activities Overview

The current ISPRAS scope in the LSB Infrastructure Program includes the following areas:

1. Development, maintenance and maturing of **LSB informational systems & tools**:
 - a) The main **LSB Database** (both schema and data) - 74 tables with over 25 million records in total.
 - b) Over 40 **Database Scripts** (including libtodb2 tool for importing libraries).
 - c) Linux developer portal - **LSB Navigator** (<http://linux-foundation.org/navigator/>).
 - d) **LSB Certification System** (<http://linux-foundation.org/lsb-cert/>).
 - e) **LSB Sample Implementation Tools**.
 - f) **LSB SDK Tools**.
2. Development, maintenance and maturing of **automated test execution and result analysis frameworks**:
 - a) **LSB ATK Manager** for testing and analyzing *applications*.
 - b) **LSB DTK Manager** for testing and analyzing *distributions*.
3. Development, maintenance and maturing of **automated test development frameworks** for different cost & value grades:
 - a) **UniTESK** for deep testing.
 - b) **T2C** for normal testing.
 - c) **Azov** for shallow testing.
4. Development of **new tests** for LSB interfaces in various quality grades:
 - a) Deep tests.
 - b) Normal tests.
 - c) Shallow tests.
5. **Analytical and community collaboration** tasks:
 - a) When developing tests we inspect corresponding specifications and Linux implementations (both manually and by tests) - we analyze, additionally annotate and publish all found issues at http://linuxtesting.org/results/impl_reports and http://linuxtesting.org/results/std_reports, and then cooperate with corresponding authors to make specifications and upstream components finally get fixed.
 - b) We are actively involved in discussing / problem solving of LSB / Linux issues of various kinds in mailing lists, conference calls and irc.
 - c) We promote and advance LSB and Linux/Open Source in general through participating in Russian government official working groups (to define federal policies), speaking at conferences, publishing papers, organizing events.

Please find more info about the LSB Infrastructure program at <http://ispras.linuxfoundation.org/>.

Achievements for the period

Detailed list of completed tasks can be extracted from the weekly reports at the <http://www.linux-foundation.org/en/ENG:Status> page (see ISPRAS section). The sections below highlight only most important / higher level things.

LSB Database

1. DB Infrastructure (schema, scripts, general issues):
 - a) Released **LSB DB & Scripts Update 1.4** with fully implemented multi-version LSB SDK, community tables schema improvements (new tables – DistrVendor, AppInterpreter and ApprovedLibrary, possibility to set architecture for every particular library) as well as new cache tables for Navigator speed up.
 - b) Improved class names extractor in the community data upload tools.
2. LSB Database Data:
 - a) Added libcairo to LSB.
 - b) Added functions implementing true long-double support on ppc* and s390* architectures to LSB.
 - c) Proceeded with libc analysis – processed **103** more functions not included in LSB but used by applications. Added recommendations with rejection reasoning and suggested alternatives for **93** of them.
 - d) Collected data for **12** new distributions.
 - e) Prepared fixes for **24** X11 headers. **7** generated X11 headers are already used in the LSB SDK instead of the system ones.
3. LSB Bugzilla Activity:
 - a) **21** new bugs identified and filed (**13** concerning libc analysis).
 - b) Patches for **30** bugs created (**16** concerning libc analysis, **5** concerning new multi-version LSB SDK).
 - c) Investigations conducted and suggestions submitted for **7** bugs.

LSB Navigator

1. Released **LSB Navigator 1.9** with usage statistics of interpreters, community data completeness representation and more consistency checks.
2. Added cross-links to class home pages on home pages of all class members.

Linux Application Checker (formerly ATK Manager)

1. LSB ATK Manager 2.0.0-1 prototype is out. Major changes are:
 - a) new Application Components approach (all-in-one);
 - b) completely new design of the Test Report page, which now includes information about various aspects of cross-distro compatibility.
2. LSB ATK Manager 2.0.0-3 prototype is out. Major changes are:
 - a) improved work when cookies are disabled;
 - b) added filter on the *Installed Packages* tab of the *Choose Components* dialog;
 - c) improved distribution selector on the Required Libraries tab of the Test Report page (grouping).
3. Finished re-branding *ATK Manager* into *Linux Application Checker*.

4. Completely new *Required Interfaces* analysis.
5. Redesigned the *Results History* page according to changed priorities from LSB to general cross-distro compatibility.
6. Updated interface for *Distribution Compatibility* tab of the *Test Report* page:
 - a) expandable table showing by default only general compatibility status;
 - b) information about interfaces is added.
7. Improved algorithm for calculation of the summary status.
8. Numerous minor bugfixes and improvements.
9. Fixes and improvements in LSB Appchk-sh, incl. significantly improved quote-parsing.

LSB Eclipse Plug-in

1. Refactored source code to the "org.linux_foundation.cdt.lsb" path.
2. LSB Toolchain was moved from new type of project "LSB Executable"/"LSB Shared Library" to standard "Executable"/"Shared Library".
3. New type of projects was created — "LSB Static Library".
4. Application check when multiple projects selected.
5. Improved behavior of the toolbar button and popup menu item according to the current project selection and active perspective.

LSB Sample Implementation (SI) Tools

1. Released the first prototype (0.1) and an improved version (0.2) of the LSB SI Tools.
2. Organized auto building of the SI tools in rpm, deb and tar.gz package formats.
3. Resolved the problem with launching SI without password for all 'not root' users.
4. Resolved the problem with access permissions for SI chroot environment (mount, cp and editing files) via creation of 'lsbsi' group.
5. Implemented 2 scripts for configuring SI chroot environment at every launch.
6. Resolved the problem with launching GUI applications in the SI chroot environment.
7. Added new fonts into SI chroot packages.
8. Improved the way of writing in and cleaning of /etc/sudoers - all new records are allocated in separate block.
9. Developed system of remote launching chroot environment via ssh connection.

Deep Testing

1. Community preview of LSB Core deep tests released as **OLVER 1.4**:
 - a. requirements catalogue completely finished;
 - b. unusual code blocks were cleaned up;
 - c. **3** Linux bugs were detected during stabilization.
2. Tests for **5** interfaces upgraded to the deep level (util.regex). **92** new requirements are now covered by improved test scenarios.
3. 2 subsystems were investigated (util.regex, locale.textdomain), formal model state was developed for locale.textdomain, util.regex was finished.

Normal Testing

T2C Infrastructure / Technology

1. The implementation of T2C API was revisited. A few problems concerning ABORT_xxx and RETURN macros as well as message output functions were fixed.
2. Several improvements were made in the user interface of T2C Editor and T2C Journal Viewer plug-ins for Eclipse.
3. Fixed a problem in ReqMarkup: incorrect handling of multiple substitutions with the same name in a single "define"-block.

Test Development

OpenGL

1. Stabilization of the tests on different hardware architectures is now in progress. A lot of the tests were revisited; several problems that appear on ppc32 / 64 architectures were fixed. A number of excessive test cases were removed from the suite; about **95** new test cases for **40** of 450 interfaces were added.

Now the status of normal test development for OpenGL is as follows:

Library	Tested interfaces	Number of test cases
libGL	167	6090

The remaining **283** interfaces from this library are covered with shallow-normal quality (see below).

Gdk-pixbuf-xlib

1. **139** test cases have been developed for all **27** documented interfaces from the library libgdk-pixbuf-xlib-2.0. Stabilization of these tests on different architectures was performed.

Now the status of normal test development for this library is as follows:

Library	Tested interfaces	Number of test cases
libgdk-pixbuf-xlib-2.0	27	139

Glib, gmodule and gobject

1. Another review of the test for these libraries was performed. About **40** test cases for the interfaces from these libraries were revisited: the requirements for these interfaces are now being checked more thoroughly by the tests, more use cases of these interfaces are taken into account.

See the status of test development for these libraries in "ISPRAS Normal Tests Summary" below.

X11

1. **174** new test cases have been developed for **87** more interfaces from X11 libraries (currently - libX11, libIce, libXext).

Now the status of test development for X11 is as follows:

Library	Tested interfaces	Number of test cases
X11 libraries	276	624

C++

1. **858** test cases have been prepared for **106** new interfaces (methods of locale and several facet classes dealing with input and output of numerical information as well as string manipulation and stream functions).

Now the status of test development for libstdcxx is as follows:

Library	Tested interfaces	Number of test cases
libstdcxx	354	1585

ISPRAS Normal Tests Summary

Now the "Desktop-T2C" test suite developed by ISPRAS (numbers are in total since the beginning) contains nearly **11000** "normal"-quality test cases for **2075** interfaces from the following libraries:

Library	Tested interfaces	Number of test cases
libglib-2.0	828	1938
libgthread-2.0	2	2
libgmodule-2.0	8	37
libatk-2.0	222	564
libfontconfig	160	325
libgdk-pixbuf-2.0	71	343
libgdk-pixbuf-xlib-2.0	27	139
libgobject-2.0	314	919
libGL ¹	167	6090
X11 libraries	276	624
Total	2075	10981

Additionally, "Cpp-T2C" test suite contains about **1600** test cases for more than **350** interfaces:

Library	Tested interfaces	Number of test cases
libstdcxx	354	1585

Normal Testing - NECSV Team (Vietnam)

Freetype2

1. **83** test cases have been developed for **10** interfaces from libfreetype2. The tests are now being reviewed by ISPRAS team.

The current status of normal test development for this library is as follows:

Library	Tested interfaces	Number of test cases
libfreetype2	10	83

¹ Also see shallow-normal tests below for other libGL interfaces.

Shallow-Normal Testing²

OpenGL

The "Desktop-T2C" test suite (numbers are in total since the beginning) contains shallow-normal tests for **283** interfaces from the libGL library. There are also 167 interfaces covered with normal tests.

Shallow Testing

1. Made new shallow tests for **308** *Qt3 Support* methods in the Qt4 library.
2. Adapted Azov tools for generation, building and launching shallow tests in t2c-format for the Qt4 library.
3. Prepared descriptions for the [#2185](#) and [#2191](#) bugs.
4. Corrected **24** tests of 'unknown crash' type.

Community Tasks

1. Usual participation in the lsb-* lists and conference calls.
2. We are working with Keith Packard to integrate our tests into the official Fontconfig upstream development cycle.
3. Found, analyzed and published **4** confirmed problems in Linux upstream components and specifications - see:
 - http://linuxtesting.org/results/impl_reports - Implementation Problems.
 - http://linuxtesting.org/results/std_reports - Specification Problems.
4. Talked at "XXVII Methods and Tools for Computer Security" conference (St-Petersburg, Russia) on "*Standardization and Testing as Important Security Assurance Factors for Linux*".
5. Published a special volume of ISPRAS Proceedings on the topic of Linux Testing.

² Based on the latest experience we introduced an intermediate level of testing quality – *shallow-normal*. The reason is that the high speed of shallow testing development using Azov technology is not achievable for all types of libraries. Sometimes it is wiser to use T2C technology to develop "shallow-normal" tests when we need to speed up – the full T2C technology is used but with relaxed requirements to the number of things to be checked. Especially this is important when we create both normal and shallow tests inside the same library. Azov and T2C are completely different technologies and different skills are needed. But in the "shallow-normal" approach the development for particular library stays within the same group of people (so we reuse library and technology expertise). Also, "shallow-normal" tests are easy to upgrade to normal when we have time in future.