

Sharing & Reducing the test effort on AGL kernels by using LTSI and LTSI Test Framework

Jun 1st, 2015

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Fujitsu Computer Technologies Limited

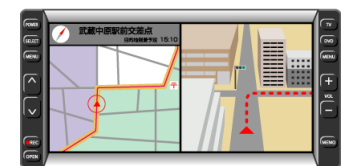
LINUX 4.0 anniversary T-shirt

FUJITSU



FUJITSU supports KAWASAKI FRONTALE football club,
FUJITSU supports LINUX 4.0!

- Embedded Linux development from 2013
- Born in China, live in Japan now
- In-House Embedded Linux Distributor of Fujitsu
- Our Distribution includes LTSI Kernel and is built with Yocto Project
- Our Distribution is used for
 - IVI
 - Server System Controller
 - Storage System
 - Network Equipment
 - Printer
 - etc.



IVI: In-Vehicle Infotainment

Agenda

- Introduction of LTSI
- Kernel Test Cases for our distro
- Introduction of LTSI Test Project
- Proposal for AGL

Introduction of LTSI

■ Mainline Kernel

Kernel Release	Version Date	Days of development
3.11	2013-09-02	64
3.12	2013-11-03	62
3.13	2014-01-19	77
3.14	2014-03-30	70
3.15	2014-06-08	70
3.16	2014-08-03	56
3.17	2014-10-05	63
3.18	2014-12-07	63
3.19	2015-02-09	65
4.0	2015-04-12	62
4.1-rc5	2015-05-25	43

- Over time, kernel development cycles have slowly been getting shorter. The average cycle is about 65 days.

<http://www.linuxfoundation.org/publications/linux-foundation/who-writes-linux-2015>

Stable Kernel

- Stable Kernel update ensures the patches will be made to fix the founded problems.

Kernel Release		Updates	Fixes
3.10	longterm	79	4,564
3.11		10	677
3.12	longterm	43	4,885
3.13		11	903
3.14	longterm	43	3,354
3.15		10	703
3.16		7	871
3.17		8	884
3.18	longterm	14	1,444
3.19		8	873

- Longterm Stable (LTS)

There are usually several "longterm maintenance" kernel releases provided for the purposes of backporting bugfixes for older kernel trees. **Only important bugfixes** are applied to such kernels and they don't usually see very frequent releases, especially for older trees.

<http://www.linuxfoundation.org/publications/linux-foundation/who-writes-linux-2015>
<https://www.kernel.org/category/releases.html>

What's LTSI

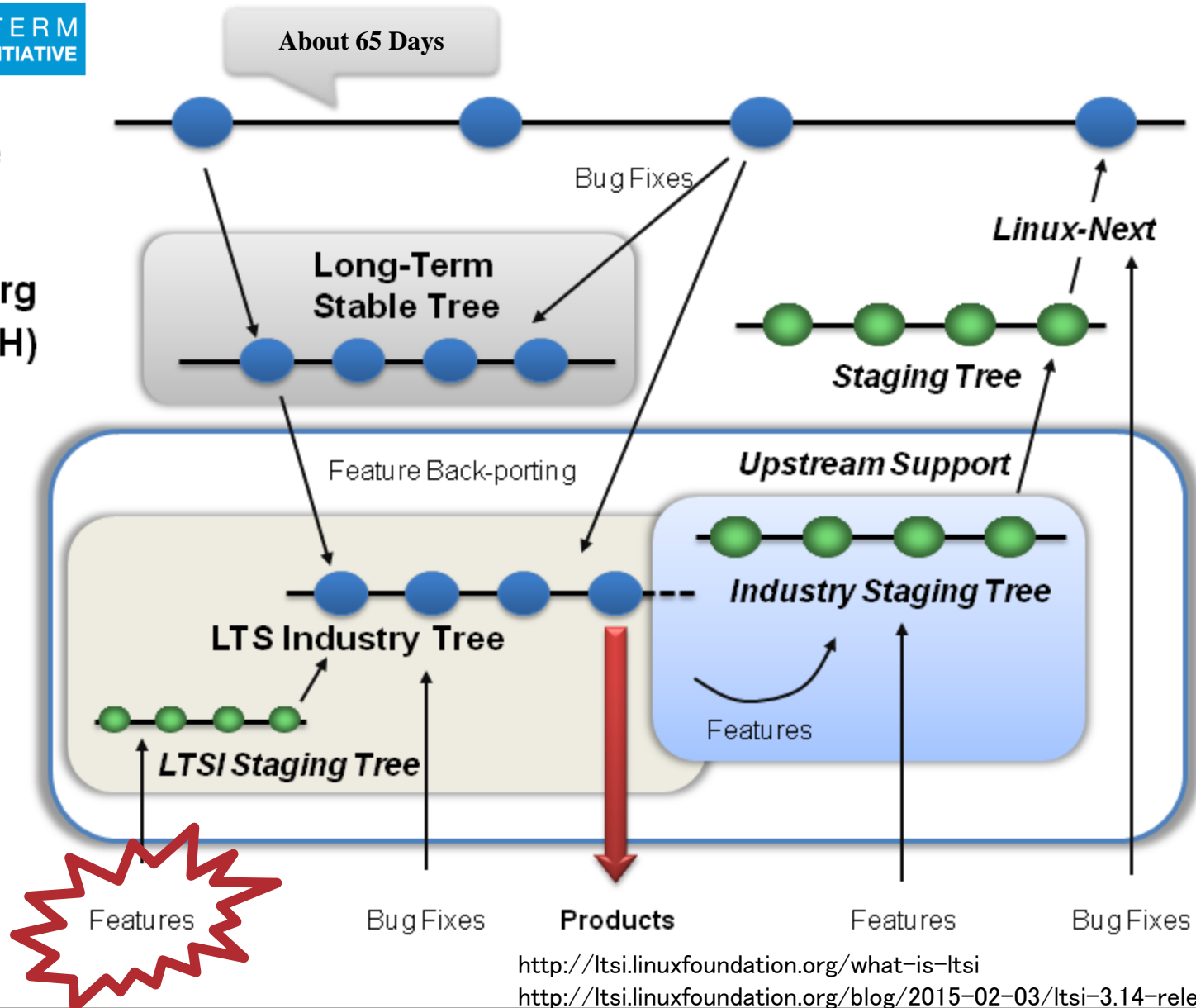


Kernel
Mainline

Kernel.org
(Greg K-H)

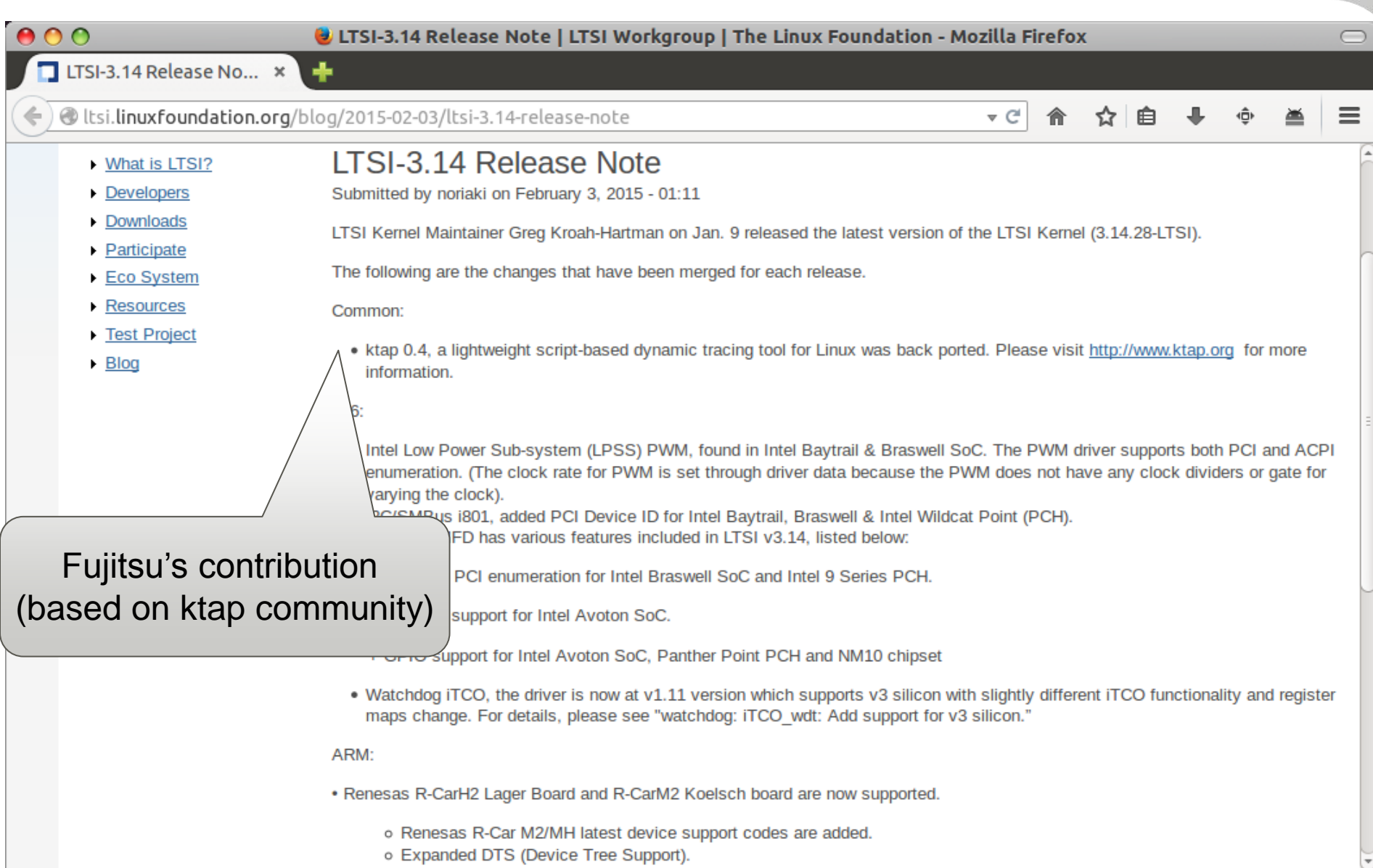
CE WG

Industry



<http://ltsi.linuxfoundation.org/what-is-ltsi>

<http://ltsi.linuxfoundation.org/blog/2015-02-03/ltsi-3.14-release-note>



LTSI-3.14 Release Note

Submitted by noriaki on February 3, 2015 - 01:11

LTSI Kernel Maintainer Greg Kroah-Hartman on Jan. 9 released the latest version of the LTSI Kernel (3.14.28-LTSI).

The following are the changes that have been merged for each release.

Common:

- ktap 0.4, a lightweight script-based dynamic tracing tool for Linux was back ported. Please visit <http://www.ktap.org> for more information.

6:

Intel Low Power Sub-system (LPSS) PWM, found in Intel Baytrail & Braswell SoC. The PWM driver supports both PCI and ACPI enumeration. (The clock rate for PWM is set through driver data because the PWM does not have any clock dividers or gate for varying the clock).

AC/SMPbus i801, added PCI Device ID for Intel Baytrail, Braswell & Intel Wildcat Point (PCH).

FD has various features included in LTSI v3.14, listed below:

- PCI enumeration for Intel Braswell SoC and Intel 9 Series PCH.
- support for Intel Avoton SoC.
- support for Intel Avoton SoC, Panther Point PCH and NM10 chipset

- Watchdog iTCO, the driver is now at v1.11 version which supports v3 silicon with slightly different iTCO functionality and register maps change. For details, please see "watchdog: iTCO_wdt: Add support for v3 silicon."

ARM:

- Renesas R-CarH2 Lager Board and R-CarM2 Koelsch board are now supported.
 - Renesas R-Car M2/MH latest device support codes are added.
 - Expanded DTS (Device Tree Support).

Advantages of LTSI

- Reduce Cost
- Increase Quality
- Minimize fragmentation



Kernel Test Cases for our distro

- LTP
- LSB
- IPv6

■ What's LTP

<http://ltp.sourceforge.net>

■ Reason to use LTP

■ Regression test at Kernel porting

➤ Timer settings...

■ Check for system calls are changed or not when Kernel version is upgraded

➤ Return values of error are often changed

■ Check for system calls differences among CPUs (x86, ARM, PowerPC, MIPS...)

➤ e.g. "getcontext" is not supported by ARM

■ Check for function differences of systems

➤ e.g. "splice" is not supported by NFS (now supported)

■ Case Study 1

Find a bug of distribution in LTP

- Float test cases are failed on PowerPC (e500mc core) in Kernel 3.0
- Optimize option “-O2” is turned off “-fcprop-register” flag in GCC 4.4.6

```
$ powerpc-e500mc-linux-gnu-gcc -I/home/ubinux/e500mc/target/usr/include -O -g -fsigned-char ¥  
-mcpu=e500mc -Wa, -me500mc -mhard-float -g -O2 -fno-strict-aliasing -pipe -Wall ¥  
-I/home/ubinux/e500mc/target/usr/include ¥  
-I/home/ubinux/e500mc/build/ltp-full-20101031/testcases/kernel/include ¥  
-I../../../../include -I../../../../include -L/home/ubinux/e500mc/target/lib ¥  
-L../../../../lib float_exp_log.c -lltp -lpthread -lm -o float_exp_log
```

-O2 turns on all optimization flags specified by -O. It also turns on the following optimization flags:

- fthread-jumps
- falign-functions -falign-jumps
- falign-loops -falign-labels
- fcaller-saves
- fcrossjumping
- fcse-follow-jumps -fcse-skip-blocks
- fdelete-null-pointer-checks
- fexpensive-optimizations
- fgcse -fgcse-lm
- findirect-inlining
- foptimize-sibling-calls
- fpeephole2
- fregmove
- freorder-blocks -freorder-functions
- frerun-cse-after-loop
- fsched-interblock -fsched-spec
- fschedule-insns -fschedule-insns2
- fstrict-aliasing -fstrict-overflow
- ftree-switch-conversion
- ftree-pre
- ftree-vrp

No -fcprop-register!

■ Case Study 2

- Conduct LTP test cases (float_bessel, float_exp_log, float_power)

Arch	x86	ARM	PowerPC
3.10-ltsi	PASS	PASS	PASS
3.14-ltsi	PASS	PASS	FAIL

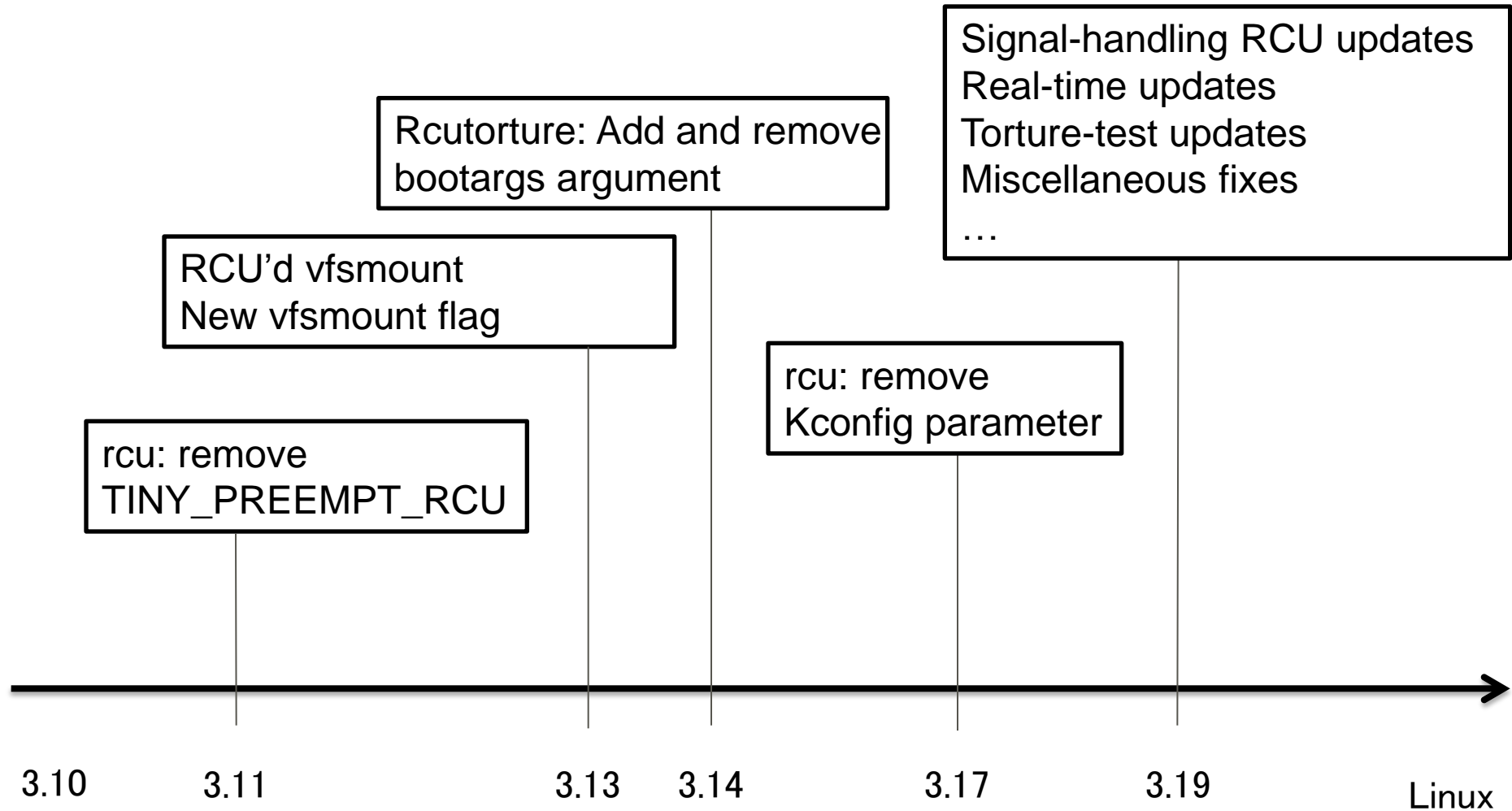
- Conduct LTP on the same PowerPC platform with different hardware

CPU	P2020 (memory 1GB)	P1020 (memory 512MB)
3.14-ltsi	PASS	FAIL

■ RCU Implementation is changed

- from 3.10 to 3.11
- the sys_prctl is heavily used to get/set the floating point exception mode.

■ RCU(read-copy-update) implementation is changing



<https://git.kernel.org/cgit/linux/kernel/git/torvalds/linux.git/commit/?id=c30110608cfba7efff3a5e71914aee7c816115c5>

- In PowerPC arch, unnecessary memory is allocated and released heavily.
- We find a patch to solve this problem.

```
commit 6d6f3328422a3bc56b0d8dd026a5de845d2abfa7
Author: Tetsuo Handa <penguin-kernel@I-love.SAKURA.ne.jp>
Date: Tue Jul 22 21:20:01 2014 +0900
```

```
commoncap: don't alloc the credential unless needed in cap_task_prctl
```

In function `cap_task_prctl()`, we would allocate a credential unconditionally and then check if we support the requested function. If not we would release this credential with `abort_creds()` by using RCU method. But on some archs such as powerpc, the `sys_prctl` is heavily used to get/set the floating point exception mode. So the unnecessary allocating/releasing of credential not only introduce runtime overhead but also do cause OOM due to the RCU implementation.

This patch removes `abort_creds()` from `cap_task_prctl()` by calling `prepare_creds()` only when we need to modify it.

Different platform and hardware will have different test result.
Variety of test environments is important.

<https://github.com/torvalds/linux/commit/6d6f3328422a3bc56b0d8dd026a5de845d2abfa7>

■ Case Study 3

- TLS (Thread Local Storage) test case on x86 platform, the test result is fail

V3.14	V3.14.28
PASS	FAIL

- Check the change between v3.14 and v3.14.28

e990e54 x86/tls: Don't validate lm in set_thread_area() after all
643152b x86/tls: Disallow unusual TLS segments
aeb83c0 x86/tls: Validate TLS entries to protect espfix

The implementation of TLS is changed !

- Backport these patches, the test result is pass
- Fixed in 4.0.0-rc6, confirmed fixed in 3.14.37

- What's LSB

<https://wiki.linuxfoundation.org/en/LSB>

- LSB is test for distribution compatibility

- Sometimes find a bug of Kernel

■ Case Study 1

Find a bug of distribution in LSB

- fpathconf test case is failed in Kernel 2.6.36
- include/linux/pipe_fs_i.h was changed in 2.6.34..2.6.35
- Problem of combination with Glibc

```
commit 35f3d14dbbc58447c61e38a162ea10add6b31dc7
Author: Jens Axboe <jens.axboe@oracle.com>
Date: Thu May 20 10:43:18 2010 +0200

    pipe: add support for shrinking and growing pipes

    This patch adds F_GETPIPE_SZ and F_SETPIPE_SZ fcntl() actions for
    growing and shrinking the size of a pipe and adjusts pipe.c and splice.c
    (and relay and network splice) usage to work with these larger (or smaller)
    pipes.

    Signed-off-by: Jens Axboe <jens.axboe@oracle.com>

diff --git a/include/linux/pipe_fs_i.h b/include/linux/pipe_fs_i.h
index b43a9e0..65f4282 100644
--- a/include/linux/pipe_fs_i.h
+++ b/include/linux/pipe_fs_i.h
@@ -3,7 +3,7 @@
#define PIPEFS_MAGIC 0x50495045

-#define PIPE_BUFFERS (16)
+#define PIPE_DEF_BUFFERS 16
```

■ Case Study 2

Find a bug of Kernel in LSB

- c_lflag test case is failed in Kernel 2.6.31
- n_tty driver has degraded in 2.6.28..2.6.29
- Fixed in 2.6.31..2.6.32

```
commit ee5aa7b8b98774f408d20a2f61f97a89ac66c29b
Author: Joe Peterson <joe@skyrush.com>
Date:   Wed Sep 9 15:03:13 2009 -0600

    n_tty: honor opost flag for echoes

    Fixes the following bug:

        http://bugs.linuxbase.org/show_bug.cgi?id=2692

    Causes processing of echoed characters (output from the echo buffer) to
    honor the O_OPOST flag, which is consistent with the old behavior.

    Note that this and the next patch ("n_tty: move echocrl check and
    clean up logic") were verified together by the bug reporters, and
    the test now passes.

    Signed-off-by: Joe Peterson <joe@skyrush.com>
    Cc: Linux Torvalds <torvalds@linux-foundation.org>
    Signed-off-by: Greg Kroah-Hartman <gregkh@suse.de>

diff --git a/drivers/char/n_tty.c b/drivers/char/n_tty.c
```

Sometimes find a bug of Kernel

- What's IPv6 Ready Logo
<https://www.ipv6ready.org>
- IPv6 Ready Logo test suite
<http://www.tahi.org>
- Conformance test suite of IPv6 specification
- Test for IPv6 protocol stack (only Kernel)

■ Test result

v3.10.31-ltsi

Section	RFC	Summary	Total	Pass	Fail	N/A
Section 1	RFC 2460	IPv6 Specification	54	53	0	1 _(*)
Section 2	RFC 4861	Neighbor Discovery for IPv6	236	214	14	8
Section 3	RFC 4862	IPv6 Stateless Address Autoconfiguration	45	44	1	0

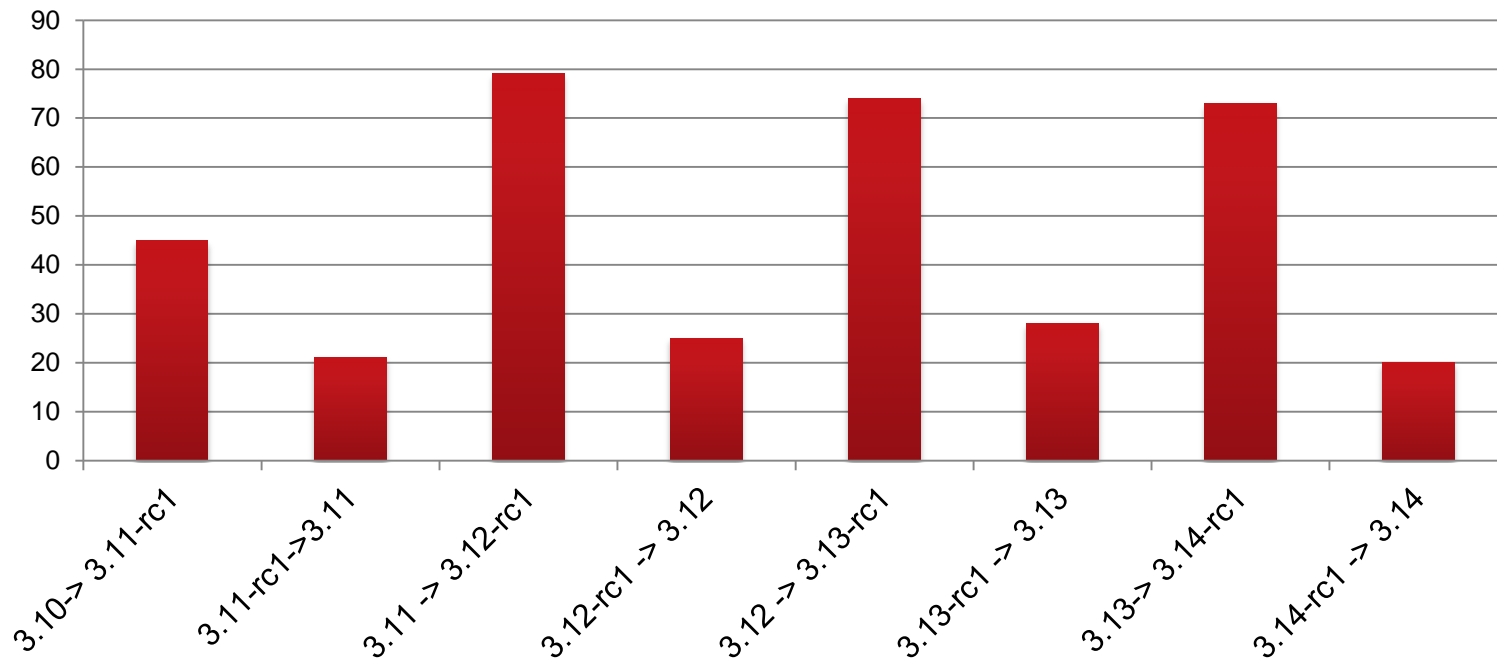
■ Analysis of section 2 (Neighbor Discovery for IPv6)

- Received Redirect ICMP Message with no Redirected Header option
- EchoReply has not been forwarded to the next hop that is specified

■ IPv6 stack has a lot of changes

```
% git log --oneline v3.10..v3.14 -- net/ipv6 | wc -l  
364
```

■ Number of Changes (-- net/ipv6)



■ Result of Section 2 Test(Neighbor Discovery for IPv6)

21 Changes



No.	v3.10	v3.11-rc1	v3.11
185	FAIL	FAIL	PASS
187	FAIL	FAIL	PASS
189	FAIL	FAIL	PASS
190	FAIL	FAIL	PASS
200	FAIL	FAIL	PASS
201	FAIL	FAIL	PASS
202	FAIL	FAIL	PASS
203	FAIL	FAIL	PASS
204	FAIL	FAIL	PASS
206	FAIL	FAIL	PASS
210	FAIL	FAIL	PASS
215	FAIL	FAIL	PASS
220	FAIL	FAIL	PASS
225	FAIL	FAIL	PASS

■ Found a patch

```
commit c92a59eca86f5d13ae4d481c3bae6b54609fe006
```

```
Author: Duan Jiong <duanj.fnst@cn.fujitsu.com>
```

```
Date: Thu Aug 22 12:07:35 2013 +0800
```

ipv6: handle Redirect ICMP Message with no Redirected Header option

rfc 4861 says the Redirected Header option is optional, so the kernel should not drop the Redirect Message that has no Redirected Header option. In this patch, the function `ip6_redirect_no_header()` is introduced to deal with that condition.

Signed-off-by: Duan Jiong <duanj.fnst@cn.fujitsu.com>

Acked-by: Hannes Frederic Sowa hannes@stressinduktion.org

■ Backport to v3.10.57 and Retry the Section 2



1 change

No.	v3.10.57	v3.10.57 + Patch
185	FAIL	PASS
187	FAIL	PASS
189	FAIL	PASS
190	FAIL	PASS
200	FAIL	PASS
201	FAIL	PASS
202	FAIL	PASS
203	FAIL	PASS
204	FAIL	PASS
206	FAIL	PASS
210	FAIL	PASS
215	FAIL	PASS
220	FAIL	PASS
225	FAIL	PASS

■ LTP

- Should use LTP, and decide GCC, Binutils, Glibc versions
- Should decide a release criteria
 - e.g. All of Syscalls test cases are passed on x86 and ARM boards
- HTML formatted results should be opened to the public

■ LSB

- Should use LSB test suites with Yocto Project
- Should decide a release criteria
 - e.g. All of Core test cases are passed
- HTML formatted results should be opened to the public

■ IPv6

- Should use IPv6 tests
- Should decide a release criteria
 - e.g. All of Core and IPsec test cases are passed
- HTML formatted results should be opened to the public

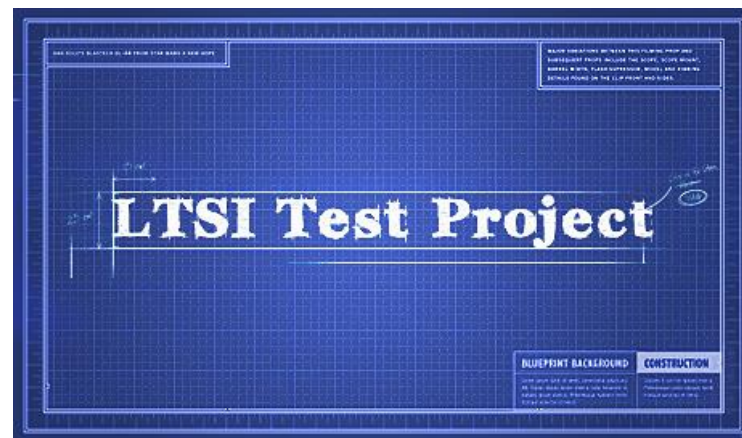
Introduction of LTSI Test Project

LTSI Test Project

- A project to create a “common test platform” which anyone can use and reduce a lot of **duplicated** effort.
- Gather test cases from companies to try to find the common test elements among the companies.
- Based on the gathered test cases, create “LTSI Common Test Platform”
- <http://ltsi.linuxfoundation.org/ltsi-test-project>

- **Gaps with my expectation**

- The existing test cases is not enough.
- Test results also have not been shared



Practice with LTSI Test Project

■ Installation

- Download from bitbucket

<https://bitbucket.org/cogentembedded/jta-public/>

- Install JTA and configure the Environment variables

About 10 minutes

■ Configuration

- Install the cross compiler
- Add the board file
- Add the test plan file

About 2 hours

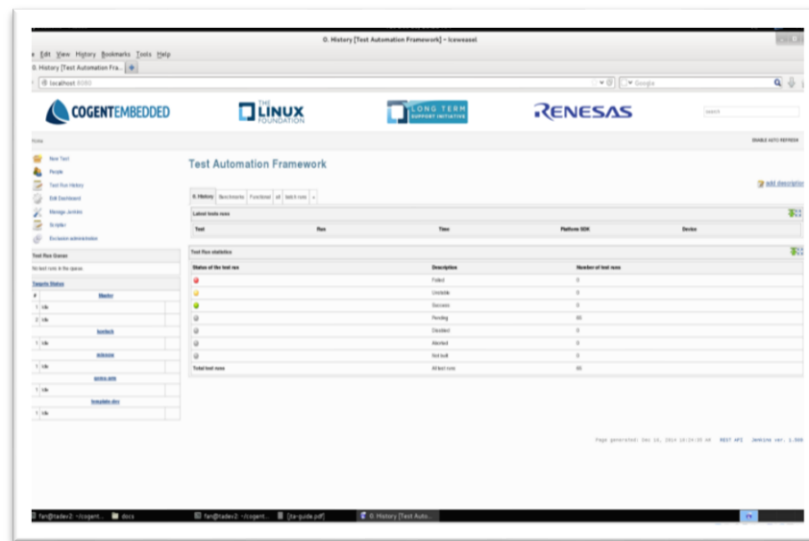
■ Run the test

Host Environment

OS	Debian Wheezy
Architecture	AMD 64

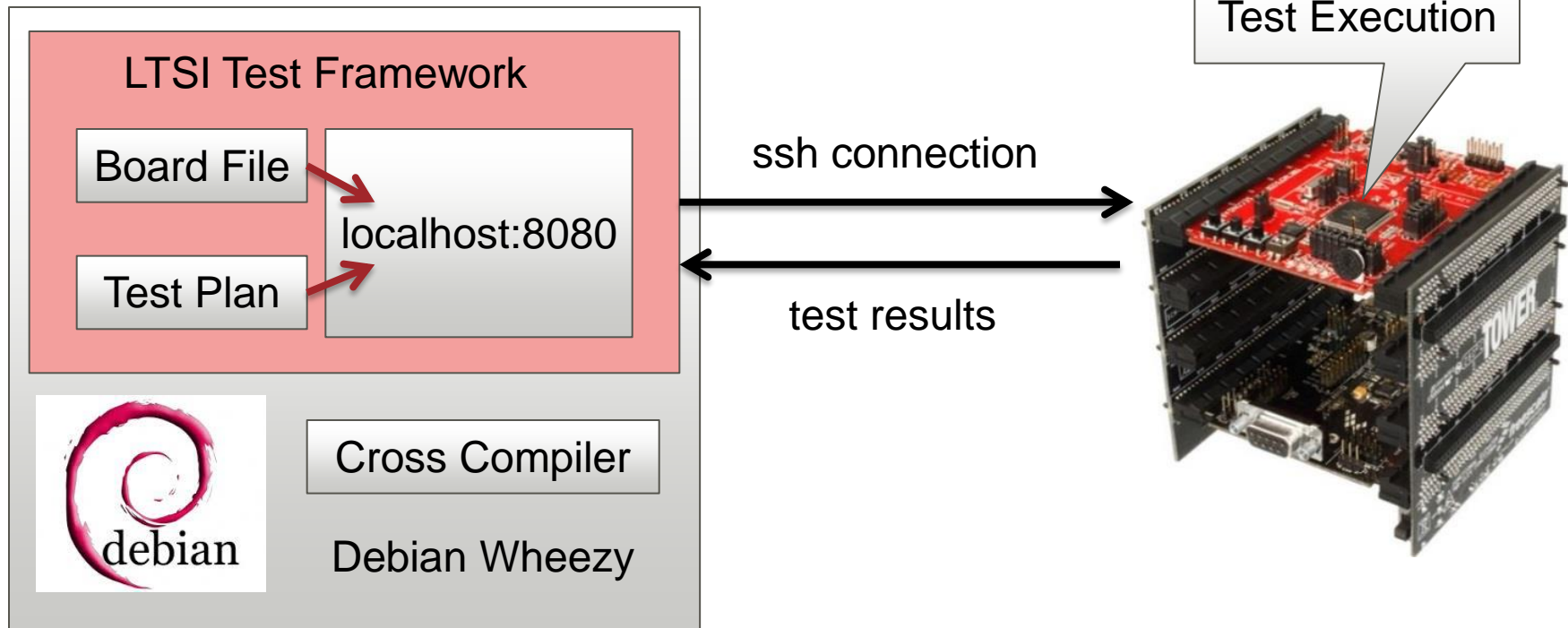
Browser Environment

Web browser	Javascript and CSS support
-------------	----------------------------



JTA: Jenkins-based Test Automation

- Target Device : Freescale Vybrid VF-6xx (Cortex-A5) Tower System



How to run test

- Conduct the bc computing test case
- Confirm the test environment easily and make a quick start

Project test-arm2

This test run requires parameters:

Device (target)

Reboot ☐ If checked target device will be rebooted

Rebuild ☐ If checked all existing build instances of

Target_Cleanup ☒

TESTPLAN

```
Reading reference data from /home/jenkins/tests/te  
  
result2  
['4']  
4 0  
For test result2 current value is 4, reference val  
Comparison criteria is "greater or equal".  
  
result1  
['4']  
4 0  
For test result1 current value is 4, reference val  
Comparison criteria is "greater or equal".
```

Test Run History (trend)

	#18	Dec 16, 2014 5:19:00 PM	test-arm / 3.0.15-vybrid
			bc simple benchmark
			Graphs
	#17	Dec 16, 2014 5:18:08 PM	test-arm / 3.0.15-vybrid
			bc simple benchmark
			Graphs
	#16	Dec 16, 2014 5:15:57 PM	minnow / unknown
	#15	Dec 16, 2014 5:05:08 PM	test-arm / 3.0.15-vybrid
	#14	Dec 16, 2014 4:44:30 PM	test-arm / 3.0.15-vybrid
	#13	Dec 16, 2014 4:33:33 PM	test-arm / 3.0.15-vybrid
	#12	Dec 16, 2014 3:08:22 PM	test-arm / 3.0.15-vybrid
	#11	Dec 16, 2014 2:59:08 PM	test-arm / 3.0.15-vybrid

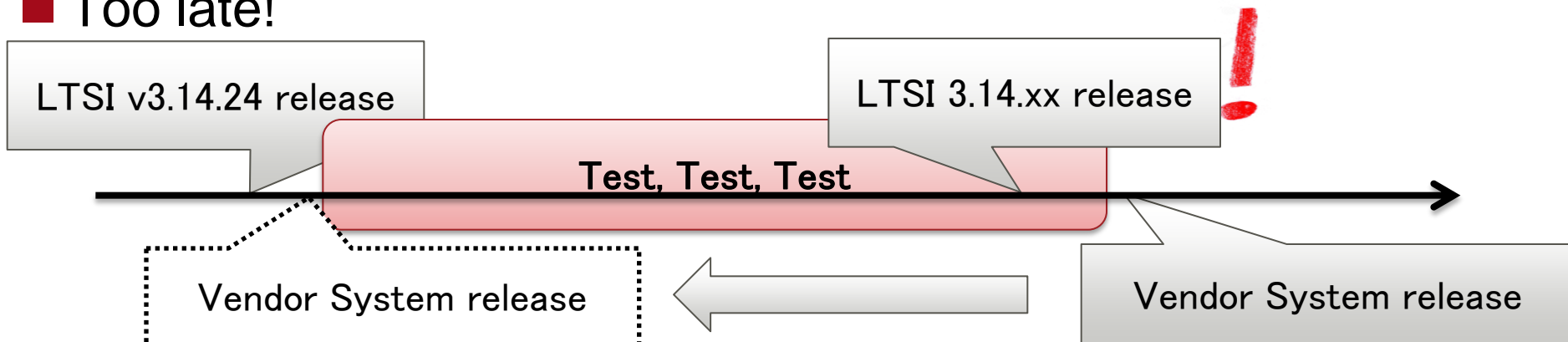
- Takes 4 hours from install to finish the first simple test
- Easy to use, prefer a video demonstration, more platforms

Release Time Gap

- The LTSI is released frequently

tags			
4 months ago	v3.14.28-ltsi	This is the 3.14.28-ltsi release	tag commit shortlog log
5 months ago	v3.14.24-ltsi-rc1	This is the 3.14.24-rc1-ltsi release	tag commit shortlog log
12 months ago	v3.4.91-ltsi	This is the 3.4.91-ltsi release	tag commit shortlog log
14 months ago	v3.10.31-ltsi	This is the v3.10.31-ltsi release	tag commit shortlog log
14 months ago	v3.4.81-ltsi	This is the v3.4.81-ltsi release	tag commit shortlog log
14 months ago	v3.0.101-ltsi	This is the v3.0.101-ltsi release	tag commit shortlog log
15 months ago	v3.10.28-ltsi-rc1	This is the 3.10.28-ltsi-rc1 release	tag commit shortlog log
2 years ago	v3.4.46-ltsi	This is the 3.4.46-ltsi release	tag commit shortlog log
2 years ago	v3.0.79-ltsi	This is the 3.0.79-ltsi release	tag commit shortlog log
2 years ago	v3.4.25-ltsi	This is the v3.4.25-ltsi release	tag commit shortlog log
2 years ago	v3.0.38-ltsi	LTSI 3.0.38 release	tag commit shortlog log

- After LTSI releases, the vendor has to conduct a series of tests to validate and then release their systems.
- This procedure takes few months or more.
- Too late!



Our contribution to LTSI Test Project

■ As the first step, we contribute our ethtool test set to LTSI Test Project

■ ethtool

- A utility for Linux kernel-based operating system for displaying and modifying some parameters of network interface controllers (NICs) and their device drivers.

- <https://www.kernel.org/pub/software/network/ethtool/>

■ Advantages

- Common test element
- Easy to check each hardware support features
- Useful for not only person but also the vendors which provide systems for multiple platforms

[LTSI-dev] Ethtool test suite for LTSI Test Project

Bian, Naimeng biannm@cn.fujitsu.com
Mon Nov 3 01:07:51 UTC 2014

- Next message: [\[LTSI-dev\] To enquire LTSI submission requirement](#)
- Messages sorted by: [\[date\]](#) [\[thread\]](#) [\[subject\]](#) [\[author\]](#)

Hi all,

As I know, the LTSI Test Project is collecting test cases.
I provide our test set of ethtool.

We have implemented test cases of 50/67 ETHTOOL COMMANDS.
You can obtain details from README in attached archive.

Let's test together!

Questions or comments?

Regards
Bian

----- next part -----

A non-text attachment was scrubbed...

Name: testset-ethtool-0.1.tar.gz

Type: application/x-gzip

Size: 18989 bytes

Desc: testset-ethtool-0.1.tar.gz

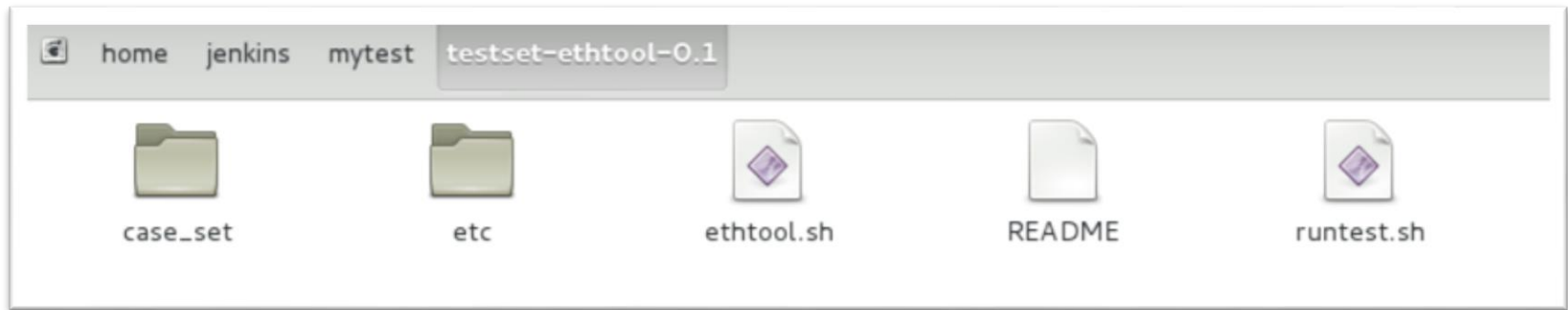
URL: <http://lists.linuxfoundation.org/pipermail/ltsi-dev/attachments/20141103/0a0ffcae/attachment.gz>

- Next message: [\[LTSI-dev\] To enquire LTSI submission requirement](#)
- Messages sorted by: [\[date\]](#) [\[thread\]](#) [\[subject\]](#) [\[author\]](#)

[More information about the LTSI-dev mailing list](#)

Quick Start of ethtool test set

ethtool test set



Create New Test



Change script name to ethtool.sh



Make Directory : /home/jenkins/tests/test-ethtool



Decompress testset-ethtool-0.1 to
/home/jenkins/tests/test-ethtool



Start Test

Quick Start of ethtool test set (contd.)

- We can use this test case to check whether the ethtool in kernel is support commands or not.
- There are too many commands and we pickup some of them with high frequency to test.

```
jenkins@tadevz:/home/jenkins/mytest/testset-ethtool-0.1/case_set$ ls
ETHTOOL_FLASHDEV  ETHTOOL_GFLAGS  ETHTOOL_GREGS  ETHTOOL_GSG  ETHTOOL_RESET  ETHTOOL_SMSGLVL  ETHTOOL_SSET
ETHTOOL_GCHANNELS  ETHTOOL_GGRO  ETHTOOL_GRINGPARAM  ETHTOOL_GSSET_INFO  ETHTOOL_SCHANNELS  ETHTOOL_SPAUSEPARAM  ETHTOOL_SSG
ETHTOOL_GCOALESCE  ETHTOOL_GGSO  ETHTOOL_GRXCLSRLL  ETHTOOL_GSTATS  ETHTOOL_SCOALESCE  ETHTOOL_SPFLAGS  ETHTOOL_STSO
ETHTOOL_GDRVINFO  ETHTOOL_GLINK  ETHTOOL_GRXCLSRCNT  ETHTOOL_GSTRINGS  ETHTOOL_SEEE  ETHTOOL_SRINGPARAM  ETHTOOL_STXCsum
ETHTOOL_GEEE  ETHTOOL_GMODULEEEPROM  ETHTOOL_GRXCLSRULE  ETHTOOL_GTSO  ETHTOOL_SEEPROM  ETHTOOL_SRXCLSRDEL  ETHTOOL_SUFO
ETHTOOL_GEEPROM  ETHTOOL_GMODULEINFO  ETHTOOL_GRXCsum  ETHTOOL_GTXCsum  ETHTOOL_SET_DUMP  ETHTOOL_SRXCLSRINS  ETHTOOL_SWOL
ETHTOOL_GET_DUMP_DATA  ETHTOOL_GMSGLVL  ETHTOOL_GRXFH  ETHTOOL_GUFO  ETHTOOL_SFEATURES  ETHTOOL_SRXCSUM  ETHTOOL_TEST
ETHTOOL_GET_DUMP_FLAG  ETHTOOL_GPAUSEPARAM  ETHTOOL_GRXFHINDIR  ETHTOOL_GWOL  ETHTOOL_SFLAGS  ETHTOOL_SRXFH  ETHTOOL_SRXFHINDIR
ETHTOOL_GET_TS_INFO  ETHTOOL_GPERMADDR  ETHTOOL_GRXRINGS  ETHTOOL_NWAY_RST  ETHTOOL_SGRO  ETHTOOL_SRXFHINDIR
ETHTOOL_GFEATURES  ETHTOOL_GPFLAGS  ETHTOOL_GSET  ETHTOOL_PHYS_ID  ETHTOOL_SGSO  ETHTOOL_SRXNTUPLE
```

- We finished 50/67 feature support tests in provided test set.

```
...
|62 |ETHTOOL_SSG |Set Scatter-gather |PASS
|63 |ETHTOOL_STSO |Set TCP Segmentation Offload |PASS
|64 |ETHTOOL_STXCsum |Set RX Checksumming |PASS
|65 |ETHTOOL_SUFO |Set TCP Fragmentation Offload |FAIL
|66 |ETHTOOL_SWOL |Set Wake-on-lan Mode |PASS
...
```

Part of test log

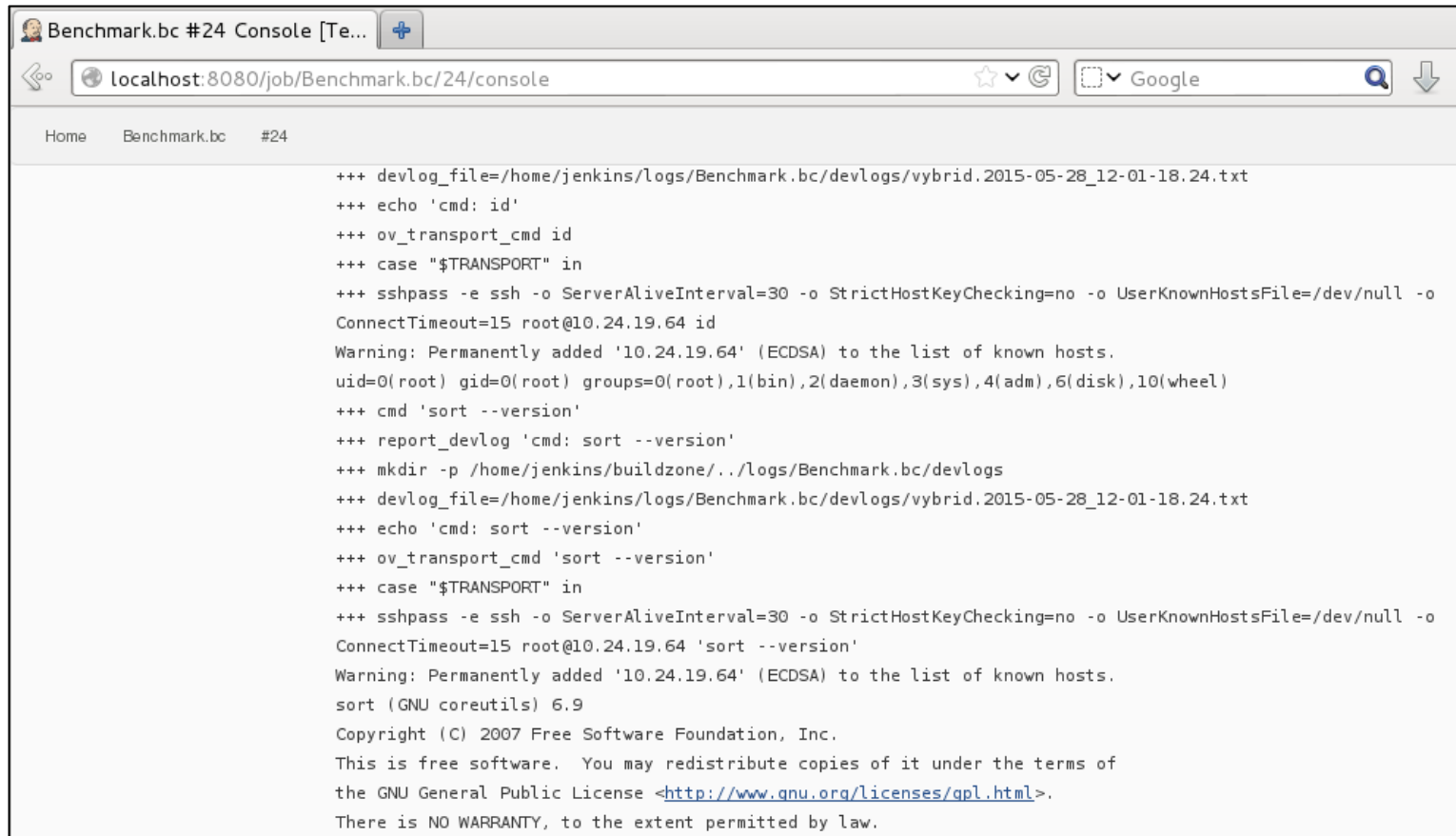
notice: this test set needs
serial connection

- We conduct the ethtool test set on the following platform to test our distribution.

Ethtool commnad	MinnowBoard MAX (x86-64)	Helio (ARM)	P1020RDB (PowerPC)
ETHTOOL_GEEE	UNSUPPORTED	PASS	UNSUPPORTED
ETHTOOL_GPERMADDR	PASS	FAIL	PASS
ETHTOOL_GRXCLSRULE	UNSUPPORTED	UNSUPPORTED	FAIL
ETHTOOL_GRXCSUM	PASS	PASS	PASS
ETHTOOL_SPAUSEPARAM	PASS	PASS	FAIL
ETHTOOL_GRXFHINDIR	UNSUPPORTED	UNSUPPORTED	UNSUPPORTED

- Easy understand result about the features on different hardware.
- Next Step
 - Need analysis for the result data
 - Public the test result

- Not only kernel, LTSI Test Framework also could be used for userland test.



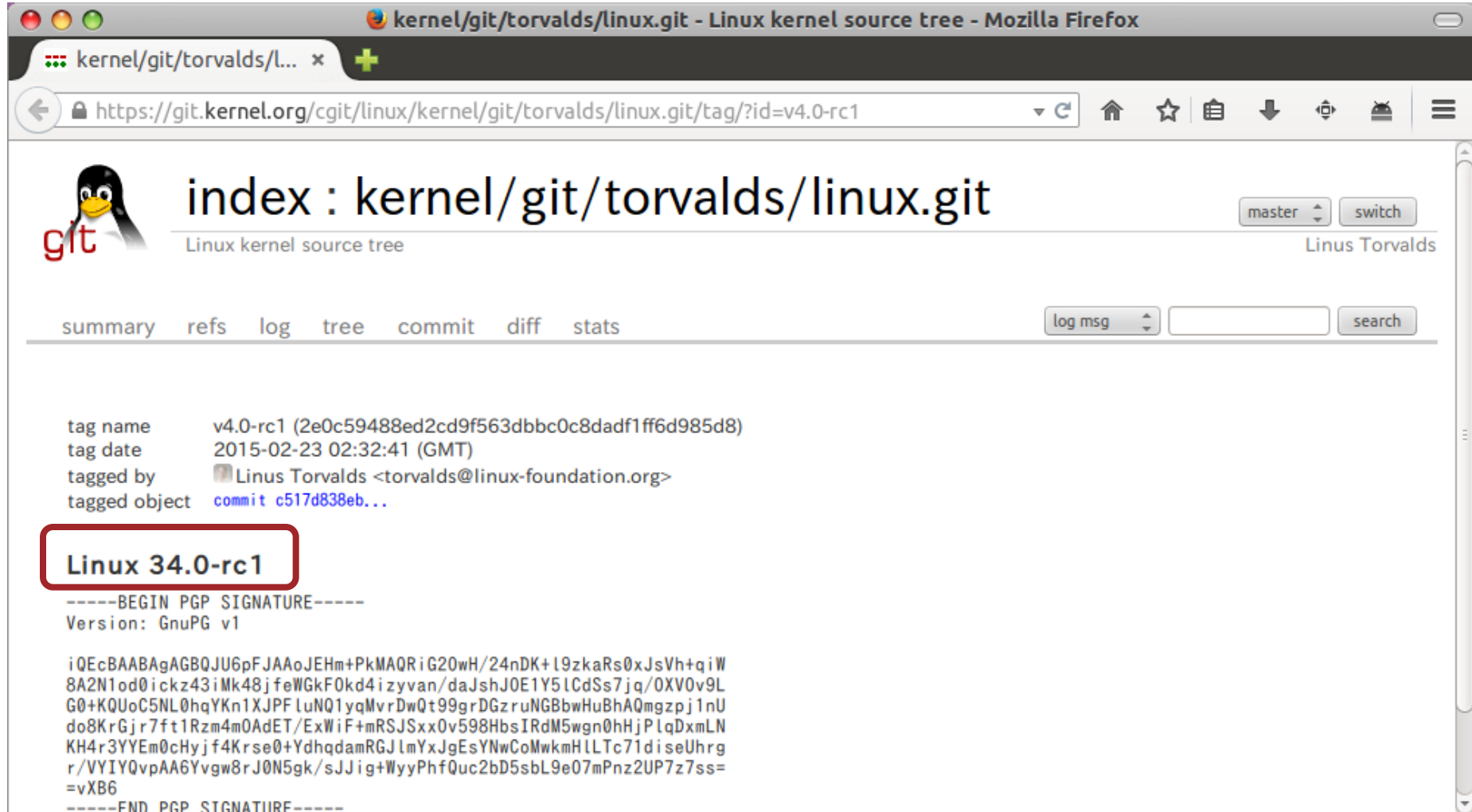
```
Benchmark.bc #24 Console [Te... +]
localhost:8080/job/Benchmark.bc/24/console
Home Benchmark.bc #24

+++ devlog_file=/home/jenkins/logs/Benchmark.bc/devlogs/vybrid.2015-05-28_12-01-18.24.txt
+++ echo 'cmd: id'
+++ ov_transport_cmd id
+++ case "$TRANSPORT" in
+++ sshpass -e ssh -o ServerAliveInterval=30 -o StrictHostKeyChecking=no -o UserKnownHostsFile=/dev/null -o
ConnectTimeout=15 root@10.24.19.64 id
Warning: Permanently added '10.24.19.64' (ECDSA) to the list of known hosts.
uid=0(root) gid=0(root) groups=0(root),1(bin),2(daemon),3(sys),4(adm),6(disk),10(wheel)
+++ cmd 'sort --version'
+++ report_devlog 'cmd: sort --version'
+++ mkdir -p /home/jenkins/buildzone/./logs/Benchmark.bc/devlogs
+++ devlog_file=/home/jenkins/logs/Benchmark.bc/devlogs/vybrid.2015-05-28_12-01-18.24.txt
+++ echo 'cmd: sort --version'
+++ ov_transport_cmd 'sort --version'
+++ case "$TRANSPORT" in
+++ sshpass -e ssh -o ServerAliveInterval=30 -o StrictHostKeyChecking=no -o UserKnownHostsFile=/dev/null -o
ConnectTimeout=15 root@10.24.19.64 'sort --version'
Warning: Permanently added '10.24.19.64' (ECDSA) to the list of known hosts.
sort (GNU coreutils) 6.9
Copyright (C) 2007 Free Software Foundation, Inc.
This is free software. You may redistribute copies of it under the terms of
the GNU General Public License <http://www.gnu.org/licenses/gpl.html>.
There is NO WARRANTY, to the extent permitted by law.
```

- We contribute our test set to community.
- Furthermore, by using our test set, more hardware platforms could be validated and evaluated.
- Finally, it is convenient for the customer to select and evaluate various kinds of hardware platforms.

Proposal for AGL

Who makes this mistake?



The screenshot shows a web browser window displaying the Linux kernel source tree on GitHub. The browser's address bar shows the URL `https://git.kernel.org/cgit/linux/kernel/git/torvalds/linux.git/tag/?id=v4.0-rc1`. The page title is "index : kernel/git/torvalds/linux.git" and the subtitle is "Linux kernel source tree". The page features a navigation bar with links for "summary", "refs", "log", "tree", "commit", "diff", and "stats". A "log msg" button and a search bar are also present. The main content area displays the tag information for "v4.0-rc1" (2e0c59488ed2cd9f563dbbc0c8dadf1ff6d985d8), tagged by Linus Torvalds on 2015-02-23 02:32:41 (GMT). The tagged object is commit c517d838eb... A red box highlights the text "Linux 34.0-rc1" in the commit message. The commit message itself is a PGP signature block starting with "-----BEGIN PGP SIGNATURE-----" and ending with "-----END PGP SIGNATURE-----".

index : kernel/git/torvalds/linux.git

Linux kernel source tree

summary refs log tree commit diff stats

tag name v4.0-rc1 (2e0c59488ed2cd9f563dbbc0c8dadf1ff6d985d8)

tag date 2015-02-23 02:32:41 (GMT)

tagged by Linus Torvalds <torvalds@linux-foundation.org>

tagged object commit c517d838eb...

Linux 34.0-rc1

-----BEGIN PGP SIGNATURE-----

Version: GnuPG v1

iQEcBAABAgAGBQJU6pFJAAoJEHm+PkMAQRiG20wH/24nDK+l9zkaRs0xJsVh+qiW
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=vXB6

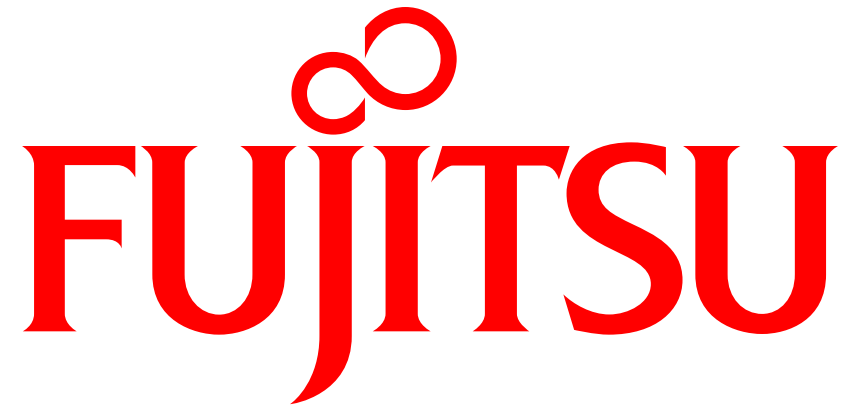
-----END PGP SIGNATURE-----

Testing is necessary because we all make mistakes.

- We practice the LTSI Test Project and contribute our test set to the community. Fujitsu will continue to contribute to LTSI Test Framework.
- Future Work
 - Contribute more test sets to community
 - Validate the LTSI Test Project on more platforms
- Let's contribute test cases together!

**Sharing & Reducing the test effort on AGL kernels
by using LTSI and LTSI Test Framework**

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