LTSI workshop

Introduction of our test cases

Oct 25th, 2013
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whoami

- In-House Embedded Linux Distributor of Fujitsu
- Our Distribution includes LTSI Kernel and is built by Yocto Project
- Our Distribution is used for
  - Server System Controller
  - Storage System
  - Network Equipment
  - Printer
  - IVI etc.
Kernel test cases for Our Distribution

- LTP
- LSB
- IPv6 (IPv6 Ready Logo Conformance Test)
- Security Scanner (Nessus)
LTP

What’s LTP
http://ltp.sourceforge.net

Reason to use LTP

- Regression test at Kernel porting
  - Timer settings...
- Check for System calls are changed when Kernel version is upgraded
  - Return values of error are often changed
- Check for System calls differences of 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

Find a bug of distribution in LTP

- Float test cases are failed on PowerPC (e500mc core) in Kernel 3.0
- Optimize option “–02” 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 -02 -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 -L/home/ubinux/e500mc/target/lib -L../../../../include -L../../../../include -L/home/ubinux/e500mc/target/lib -L/home/ubinux/e500mc/target/lib/float_exp_log.c -lltp -lpthread -lm -o float_exp_log
```

-02 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!
Proposal to LTSI

- 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
What's LSB
https://wiki.linuxfoundation.org/en/LSB

LSB is test for distribution compatibility

Sometimes find a bug of Kernel
Case Study
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_BUFFERS (16)
-#define PIPE_DEF_BUFFERS       16
+#define PIPE_DEF_BUFFERS       16
Case Study

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 echoctl 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
Proposal to LTSI

- 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 Tests

- 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)
Case Study

Find a bug of Kernel in IPv6 tests

- Neighbor Discovery test cases are failed in Kernel 3.0
  Section 2: RFC 4861 – Neighbor Discovery for IPv6
    ✓ 145 Part A: Unspecified FAIL
    ✓ 147 Part A: Router Lifetime Updated with Same Lifetime FAIL
    ✓ 149 Part C: Router Lifetime Set to Five; Allowed to Expire FAIL

- Backport patches and local fix
  ✓ [Link to patch]
  ✓ [Link to local fix]
Proposal to LTSI

- 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
Security Scanner

- What’s Security Scanner
  - Nessus (Proprietary)
    http://www.tenable.com/products/nessus
  - OpenVAS (Nessus fork of Open Source)
    http://www.openvas.org

- Check for Known Vulnerability

- Proposal to LTSI
  - Should use Security Scanner
  - Should decide a release criteria
  - HTML formatted results should be opened to the public
Summary

- LTP, LSB, IPv6 tests and Security Scanner are
  - Valuable in Kernel
  - Run Automatic
  - HTML formatted results can be opened to the public easily

- Fujitsu will contribute to LTSI
FUJITSU

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