FUEGO: LTP improvements

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Background

LTP: Linux Test Project

- **Main goal:**
  - Validate the reliability, robustness, and stability of Linux

- **Tests groups (each group has multiple tests):**
  - 80 LTP native groups:
    - syscalls, fs, ipc, containers, filecaps, nfs, tracing, rpc, cpuhotplug, dio, …
  - 8 Open Posix testsuite groups:
    - AIO, MEM, MSG, SEM, SIG, THR, TMR, TPS
  - 17 Real-time testsuite groups
    - latency, measurement, hrtimer-prio, gtod_latency, periodic_cpu_load, pthread_kill_latency, sched_football, pi-tests, thread_clock, rt-migrate, matrix_mult, prio-preempt, prio-wake, pi_perf, sched_latency, async_handler, sched_jitter

- **References:**
  - LTP GitHub repository
  - LTP Test Writing Guidelines
  - LTP Mailing list
State of LTP in FUEGO

Available tests

- 0.3/80 LTP native groups
  - 24/61 of fs + 1/14 test from kernel_misc
- 7/8 Open Posix testsuite groups
  - THR and some tests disabled
  - Isn’t ““Functional.posixtestsuite” redundant?
- 0/17 Real-time testsuit groups

No post-processing

- You need to go through the test logs
  - Your customer wants to know the test results
New LTP improvements

Added Functional.LTP
- 100/100 test groups!
- Uses the latest LTP
- Allows choosing which tests to run using checkboxes

Post-processing tool
- Summarizes the results of all tests
  - Creates a spreadsheet (results.xlsx)
Target preparation

Kernel configuration

- See ltp/README.kernel_config
  - Example: CONFIG_NAMESPACES=y
  - ★ Not complete: CONFIG_FILE_LOCKING=y (required by ltp-pan)

Root filesystem

- Command tools
  - Sar, losetup (required by runltp) ..
  - Bash may be required (checkbashisms.pl) in root

- RW filesystem
  - This can be substituted with a tmpfs folder fuego.. But some tests (e.g.: dio) do not work

- Users
  - Nobody, bin, daemon, users, sys

- Others
  - If glibc version is too old some tests will fail (syscalsl/madvice04, containers/mountns*, ...)
### Test Selection

#### Project Functional.LTP

This test run requires parameters:

- **Device**: `qemu-test-arm`
  - (target)

- **Reboot**
  - If checked, the target device will be rebooted before running the test.

- **Rebuild**
  - If checked, all existing build instances of the test suite will be deleted and the test suite will be rebuilt from scratch.

- **Target Cleanup**

- **TESTPLAN**: `testplan_default`

#### Test Items:

- **lptlite**
  - Selection of tests

- **syscalls**
  - Kernel system calls

- **syscalls-ipc**

- **quickhit**

- **fs**
  - Filesystem stress tests

- **fs_readonly**

- **fs_perms_simple**
  - These tests are setting file permissions/group/uid and are trying to open/write/execute the file.

- **fs_bind**
  - Bird mounts and shared subtrees

- **ipc**
  - Interprocess communication stress
<table>
<thead>
<tr>
<th>Test Case</th>
<th>Result Value</th>
<th>Result Output</th>
<th>Result Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>clock_settime02</td>
<td>0</td>
<td>Spawned, 144, 21:50:15, 21:50:22, clock_settime02, clock_settime02.c:126: Error Setting Time, errno=22</td>
<td>WARN</td>
</tr>
<tr>
<td>clock_settime03</td>
<td>0</td>
<td>Spawned, 145, 21:50:15, 21:50:22, clock_settime03, clock_settime03.c:126: Error Setting Time, errno=22</td>
<td>PASS</td>
</tr>
<tr>
<td>timer_create02</td>
<td>0</td>
<td>Spawned, 146, 21:50:15, 21:50:22, timer_create02, timer_create02.c:126: Error Setting Time, errno=22</td>
<td>PASS</td>
</tr>
<tr>
<td>timer_create03</td>
<td>0</td>
<td>Spawned, 147, 21:50:15, 21:50:22, timer_create03, timer_create03.c:126: Error Setting Time, errno=22</td>
<td>PASS</td>
</tr>
<tr>
<td>timer_create04</td>
<td>0</td>
<td>Spawned, 148, 21:50:15, 21:50:22, timer_create04, timer_create04.c:126: Error Setting Time, errno=22</td>
<td>PASS</td>
</tr>
<tr>
<td>timer_delete02</td>
<td>0</td>
<td>Spawned, 149, 21:50:15, 21:50:22, timer_delete02, timer_delete02.c:126: Error Setting Time, errno=22</td>
<td>PASS</td>
</tr>
<tr>
<td>timer_delete03</td>
<td>0</td>
<td>Spawned, 150, 21:50:15, 21:50:22, timer_delete03, timer_delete03.c:126: Error Setting Time, errno=22</td>
<td>PASS</td>
</tr>
<tr>
<td>timer_settime02</td>
<td>0</td>
<td>Spawned, 151, 21:50:15, 21:50:22, timer_settime02, timer_settime02.c:126: Error Setting Time, errno=22</td>
<td>PASS</td>
</tr>
<tr>
<td>timer_settime03</td>
<td>0</td>
<td>Spawned, 152, 21:50:15, 21:50:22, timer_settime03, timer_settime03.c:126: Error Setting Time, errno=22</td>
<td>PASS</td>
</tr>
<tr>
<td>log_timer</td>
<td>0</td>
<td>Spawned, 153, 21:50:15, 21:50:22, log_timer, log_timer.c:126: Error Setting Time, errno=22</td>
<td>PASS</td>
</tr>
</tbody>
</table>
TODO list

Some things that need to be improved

- Use GIT instead of tarballs
  - I discovered some bugs that were already fixed upstream
- Network tests
  - Make it automatic for the user
- LTP extra tests
  - Some hidden tests exist (tomoyo..)
- Detail the target dependencies to run each test group
  - Kernel and rootfs

Contribute to LTS

- Unify test interface
- Remove bashisms
- Improve error messages
- Not all RT tests put a clear FAIL/PASS message