Moving livepatch module building to kselftests

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1. **kselftests**  
   What are kselftests and its goal

2. **Livepatch testing modules**  
   How tests are run today

3. **Problems**  
   kselftests weak points

4. **Proposal**  
   Our approach the problem
Kselftests

What are kselftests and its goal
Kselftests

- Designed to exercise specific code paths in the kernel
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- Only userspace tests
  - (bpf kernel module ?)
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- Small programs
  - Shell scripts
  - Userspace programs
Kselftests

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- Only userspace tests
  - (bpf kernel module ?)
- Small programs
  - Shell scripts
  - Userspace programs
- Useful targets:
  - make kselftest TARGETS=livepatch
  - make -C tools/testing/selftests run_tests
Kselftests

- make -C tools/testing/selftest gen_tar
  - Packs compiled tests to be executed on different system
  - Only binaries
  - (And different systems...?)
Livepatch testing modules

How tests are run today
Livepatch testing modules

- Modules live on lib/livepatch
  - Only compiled on kernel build
  - CONFIG_TEST_LIVEPATCH=m
Livepatch testing modules

- Modules live on lib/livepatch
  - Only compiled on kernel build
  - CONFIG_TEST_LIVEPATCH=m
- How to run the tests on different systems without having the kernel source?
  - How to run the tests on distro kernels?
Livepatch testing modules

CONFIG_LIVEPATCH=y
CONFIG_TEST_LIVEPATCH=m

Kernel building

make modules_install
make install
reboot

make kselftest TARGETS=livepatch
Livepatch testing modules

- qa_test_klp (https://github.com/SUSE/qa_test_klp/)
  - Out-of-tree tests
  - Compiles the test modules on the fly
  - Used on SLE kernels
Problems

Kselftest weak points
Problems

- How to get the tests to run on different systems?
  - gen_tar only packs binaries
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- Currently kselftests doesn’t allow kernel modules
  - (bpf...?)
  - No rules to build modules
**Problems**

- How to get the tests to run on different systems?
  - `gen_tar` only packs binaries
- Currently `kselftests` doesn’t allow kernel modules
  - `(bpf...?)`
  - No rules to build modules
- When modules are built (with our proposal)
  - They can only run on machines with the same kernel version
Proposal

Our approach the problem
Proposal

- https://lore.kernel.org/live-patching/20231031-send-lp-kselftests-v3-0-2b1655c2605f@suse.com/T/#t
  - Already on v3
Proposal

- [https://lore.kernel.org/live-patching/20231031-send-lp-kselftests-v3-0-2b1655c2605f@suse.com/T/#t](https://lore.kernel.org/live-patching/20231031-send-lp-kselftests-v3-0-2b1655c2605f@suse.com/T/#t)
  - Already on v3
- Move modules from lib/livepatch to tools/testing/selftests/livepatch
Proposal

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- Move modules from lib/livepatch to tools/testing/selftests/livepatch
- Compile the modules before running the tests
  - Makes the tests system agnostic
  - Need kernel-headers
Proposal

- [https://lore.kernel.org/live-patching/20231031-send-lp-kselftests-v3-0-2b1655c2605f@suse.com/T/#t](https://lore.kernel.org/live-patching/20231031-send-lp-kselftests-v3-0-2b1655c2605f@suse.com/T/#t)
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- Port the remaining tests from qa_test_klp
Proposal

- Future work:
  - Add option to `gen_tar` to enable building the sources on the target
Thank you