Running systemd integration tests with mkosi
About Me

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Motivation

- How do we run systemd’s integration tests without bricking the host machine?
- How do we minimize the requirements to run systemd’s integration tests?
- How do we avoid host system details leaking into test execution?
- How do we safely parallelize integration test execution?
- How do we make it easy to run systemd’s integration tests?
- How do we make it easy to write new integration tests?
What is mkosi?
Quick Start

mkosi -d arch -p systemd -p linux --autologin -f qemu
CentOS Stream 9
Kernel 5.14.0-350.el9.x86_64 on an x86_64

localhost login: root (automatic login)
Last login: Wed Aug 9 12:44:36 on tty1
[root@localhost ~]# 

Debian GNU/Linux trixie/sid localhost ttyS0

localhost login: root (automatic login)
Linux localhost 6.4.0-1-amd64 #1 SMP PREEMPT_DYNAMIC Debian 6.4.4-2 (2023-07-30) x86_64
The programs included with the Debian GNU/Linux system are free software; the exact distribution terms for each program are described in the individual files in /usr/share/doc/*/copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent permitted by applicable law.
Last login: Wed Aug 9 10:30:29 UTC 2023 on tty1
root@localhost:~ # 

Arch Linux 6.4.8-arch1-1 (ttyS0)
archlinux login: root (automatic login)
[root@archlinux ~]# 

Fedora Linux 39 (Rawhide Prerelease)
Kernel 6.5.0-0.rc5.36.fc39.x86_64 on an x86_64 (ttyS0)
fedora login: root (automatic login)
[root@fedora ~]# 

Ubuntu 23.04 localhost ttyS0

localhost login: root (automatic login)
Welcome to Ubuntu 23.04 (GNU/Linux 6.2.0-1009-kvm x86_64)
* Documentation:  https://help.ubuntu.com
* Management:     https://landscape.canonical.com
* Support:        https://ubuntu.com/advantage
Last login: Wed Aug 9 10:25:24 UTC 2023 on ttyS0
root@localhost:~ # 

No root privileges required!
Configuration

```
[Match]
Distribution=fedora

[Distribution]
Release=rawhide

[Content]
Packages=kernel-core
        systemd
        systemd-boot
        udev
        util-linux
        grub2-pc
```
Current Situation

- Tests exist outside systemd’s meson build system
- Test are independent from development environment (mkosi)
- Custom test runner using make
- Test are implemented as systemd units that execute a test script
- Test specific dependencies have to be explicitly added to the image
- Any customization requires modifying bash scripts
- Running a test:

```
sudo make -C test/TEST-50-DISSECT BUILD_DIR=$PWD/build/ clean setup run
```
Current Situation
Goal

- Tests are part of systemd’s meson build system
- Tests reuse development environment (mkosi)
- Tests are executed using meson’s test runner
- Tests mostly reuse the same image
- Customization can be done by writing mkosi config dropin files
- Running a test:

  meson test -C build -v TEST-50-TMPFILES
Running integration tests in VMs with systemd
SSH over VSOCK

```
Host unix/* vsock/*
   ProxyCommand {{LIBEXECDIR}}/systemd-ssh-proxy %h %p
   ProxyUserFdpass yes
   CheckHostIP no

   # Disable all kinds of host identity checks, since these addresses are generally ephemeral.
   StrictHostKeyChecking no
   UserKnownHostsFile /dev/null
```