From initramfs-tools to mkosi-initrd

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From initramfs-tools to mkosi-initrd

The question

How much work would be needed to switch to `mkosi-initrd` with no regressions?

Methodology

I had a look at each and every package in Debian unstable which installs files in
`/usr/share/initramfs-tools/`.
Then I grouped the packages in a few categories depending on what kind of integration with the initrd they need.

Supported by native systemd functionalities

Not needed

- kmod udev klibc-utils busybox toybox
- cloud-initramfs-growroot overlayroot yubikey-luks

The easy ones: these packages are either not needed or already integrated in a systemd-based initrd.

Little or no work needed (1)

File systems support

- `reiserfsprogs xfsprogs ntfs-3g btrfs-progs bcache-tools fuse3`
- `dmsetup lvm2 mdadm ltsp thin-provisioning-tools`

Hardware support

- `asahi-scripts azure-vm-utils librem-ec-acpi-dkms librem5-tweaks reform-tools qcom-firmware`
- `sg3-utils-udev v86d`

These packages install udev rules and/or force-load modules and/or copy configuration files.

Little or no work needed (2)

Copy or run some program or daemon

- `dropbear-initramfs` (can we just use OpenSSH?) `kxc brltty`
- `plymouth` (trivial to start, unsure about copying themes and fonts)

Network block devices

- `aoetools multipath-tools-boot nbd-client open-iscsi`
- NFS (built-in)

Generally, packages only installing an hook script will probably work as is.
On the other hand, often not everything from the package is needed in the initrd!
Split the packages? Install drop-ins to delete the rest?
What about integration with `systemd-networkd` or NetworkManager?

Uncommon use cases

Probably easy to reimplement

- `cloud-initramfs-dyn-netconf` (supported by NM)
  `cloud-initramfs-rescuevol cryptsetup-initramfs` (the secrets providers)
  `cryptsetup-nuke-password`

Live systems: these may require some work...

- `bilibop bootcd live-boot-initramfs-tools`

Mostly about encryption, complex integrations required

- `clevis mandos-client osk-sdl unl0kr`

Size matters (up to a point?)

The current output is 3x the size of `initramfs-tools`
- But almost half of it is firmwares!
- The initrd does not need sound chip modules and firmwares...
- It does not need `debconf` either, but how to remove it?

Ideally packages would ship their own drop-in `mkosi` configuration to prune what is copied to the initrd.

This is a regression!

Conclusions

My opinion: switching is possible, maybe not even hard

- Support can be implemented incrementally, starting from the common use cases.
- Nothing here is intrinsically impossible to convert.
- Most of the complex/weird parts are about encryption.

- Everything must be as good as in `initramfs-tools`!
- Reducing the output size cannot be an afterthought.

It can be done, **but other maintainers need to be persuaded about the benefits**.

`https://www.linux.it/~md/text/mkosi-initrd-asg2025.pdf`
(Google … Marco d'Itri … I'm feeling lucky)