Boot Loader Spec + sd-boot

Tübix, 2019

July 2019

Boot Loader Specification?

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https://systemd.io/BOOT_LOADER_SPECIFICATION.html

sd-boot?

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https://www.freedesktop.org/software/systemd/man/systemd-boot.html

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Used to be: gummiboot

Boot Loader Spec

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Generic Specification, any platform, any firmware

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Located below $BOOT

Option A: $BOOT = Partition of type `0xEA` on MBR

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File system: vfat recommended (but not required)

In case of option A, systemd mounts this automatically to /boot

In case of option A, systemd mounts this automatically to `/boot`

In case of option B, systemd mounts this automatically to `/efi`

Two types of drop-ins:

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Type #1: `$BOOT/loader/entries/*.conf`

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Type #1: $BOOT/loader/entries/*.conf

Simple text files, describing kernel, initrd, name, other metadata

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Type #2: $BOOT/EFI/Linux/*.efi

Unified EFI binaries: kernel, initrd, metadata all linked into one PE
binary

Type #1: Generic, flexible (use your text editor!)

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Type #2: Simple, sign-as-one, specific to UEFI, one-file updates

Example for Type #1

```
title      Fedora 30 (Workstation Edition)
version    5.0.17-300.fc30.x86_64
machine-id 42bafdfed44f4575bc0826ded44cd661
options    root=UUID=6c6f8b82-6446-455c-b71e-e7ce108e1d12 ro rhgb quiet audit=0
linux      /42bafdfed44f4575bc0826ded44cd661/5.0.17-300.fc30.x86_64/linux
initrd     /42bafdfed44f4575bc0826ded44cd661/5.0.17-300.fc30.x86_64/initrd
```

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One boot loader, many cooperating players

Boot Loader Specification is implementable by any boot loader

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Implemented by:

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Implemented by:

sd-boot + systemd's `kexec` reboot

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Not actually a boot loader, more a boot menu

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Plus EFI Shell, Boot into Firmware Menu, ditto

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Plus Windows and MacOS, discovered automatically

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Just runs EFI executables

Installed via `bootctl install`

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Updated via `bootctl update`

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Show status via `bootctl status`

Other features:

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Command line editor

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EFI variables to select entry to use on next boot, all future boots

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https://systemd.io/BOOT_LOADER_INTERFACE.html

Automatic Boot Assessment

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https://systemd.io/AUTOMATIC_BOOT_ASSESSMENT.html

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$BOOT/loader/entries/foobar+3.conf

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On failure: $BOOT/loader/entries/foobar+2-1.conf

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On failure: $BOOT/loader/entries/foobar+0-3.conf

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On failure: $BOOT/loader/entries/foobar+1-2.conf

On failure: $BOOT/loader/entries/foobar+0-3.conf — BAD!

On success: $BOOT/loader/entries/foobar.conf

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On failure: `$BOOT/loader/entries/foobar+1-2.conf`

On failure: `$BOOT/loader/entries/foobar+0-3.conf` — BAD!

On success: `$BOOT/loader/entries/foobar.conf`

Userspace assessment logic: part of systemd

Bonus:

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systemctl kexec

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sytemctl reboot --boot-loader-entry=...

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sytemctl reboot --boot-loader-entry=. . .

sytemctl reboot --boot-loader-menu=. . .

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sytemctl reboot --boot-loader-entry=...

sytemctl reboot --boot-loader-menu=...

systemd-analyze

Packaged on Fedora and most other distributions

Summary:

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Support the Boot Loader Interface

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That's all, folks!