Dracut

A Generic Initramfs Infrastructure
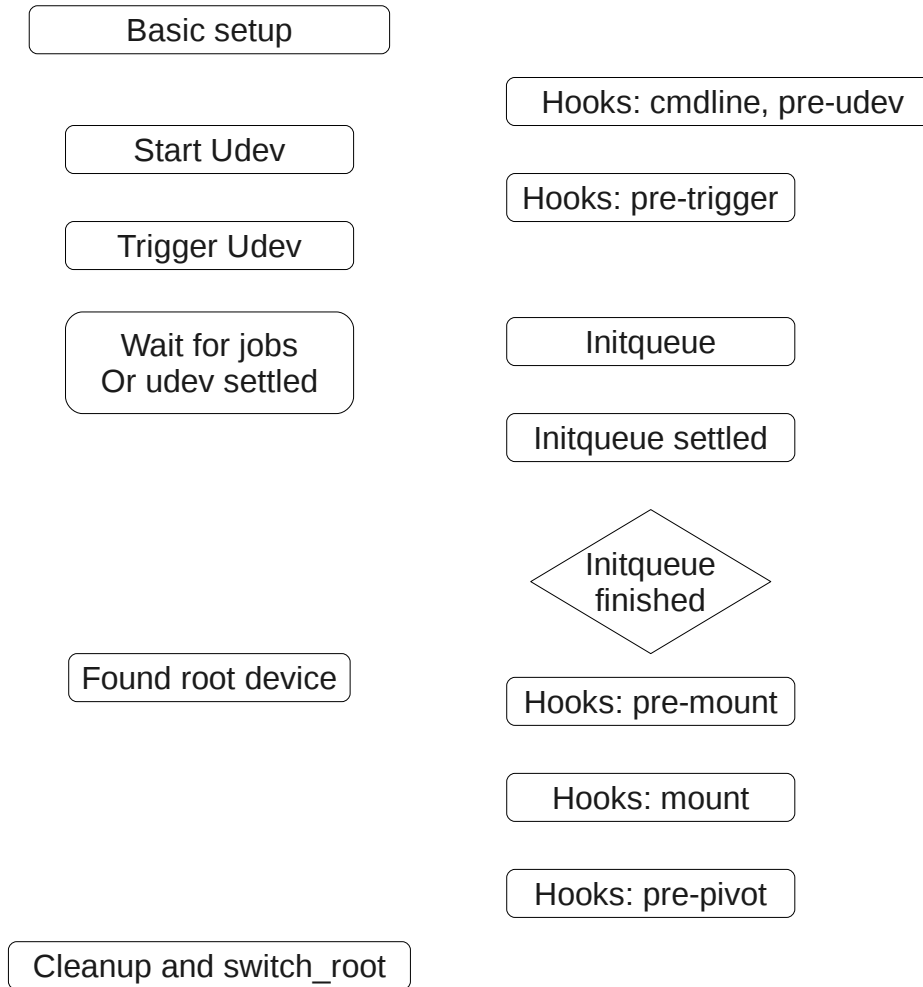
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Dracut

- Tools used on the system
- Event based with udev
- Generic across distributions
- Generic across hardware
- Nothing hardcoded

Targets

- Boot any system configuration on any hardware with the same initramfs image

- Easy to extend and customize

Overview

Basic setup

Hooks: cmdline, pre-udev

Start Udev

Hooks: pre-trigger

Trigger Udev

Wait for jobs
Or udev settled

Initqueue

Initqueue settled

Initqueue
finished

Found root device

Hooks: pre-mount

Hooks: mount

Hooks: pre-pivot

Cleanup and switch_root

Modules

- I18n
- Network
- Plymouth
- Crypt, DMraid, LVM, MDraid
- dmsquash-live
- FCoE, iSCSI, NBD, NFS
- resume, rootfs-block
- s390

Hooks

- Hooks: cmdline, pre-udev, pre-trigger, pre-mount, pre-pivot, emergency

- POSIX shell scripts ending with .sh in /$hookname

- rdbreak=$hookname

Queues

- Initqueue
- Initqueue-settled
- Initqueue-finished
- /sbin/initqueue
  - –onetime
  - –settled
  - –unique
  - –name

DMraid

- Udev rules match on ENV{ID_FS_TYPE}=="*_raid_member"

- $sys/$devpath/holders/dm-[0-9]*

- dmraid -ay -i -p --rm_partitions "$setname"

- GUID Partition Table (GPT):
  kpartx -a -p p "/dev/mapper/$setname"

MDraid

- ENV{ID_FS_TYPE}=="linux_raid_member|isw_raid_member"

- $sys/$devpath/holders/md[0-9]*

- RUN+="/sbin/mdadm -I --no-degraded $env{DEVNAME}"

- /sbin/mdadm -As --auto=yes –run

LVM

- ENV{ID_FS_TYPE}=="LVM2_member"
- Create /etc/lvm/lvm.conf
  filter = ["a|^/dev/DEVNAME$|", "r/.*/"]
- lvm vgscan
- lvm vgchange -ay

Network

- ip={dhcp|on|any}
- ip=<interface>:{dhcp|on|any}
- ip=<client-IP-number>:[<server-id>]:<gateway-IP-number>:<netmask>:<client-hostname>:<interface>:{none|off}
- ifname=<interface>:<MAC>
- ACTION=="add", SUBSYSTEM=="net", RUN+="/sbin/ifup $env{INTERFACE}"
- Match specific interfaces by name or MAC
- Run DHCP if needed

NFS

- root=[<server-ip>:]<root-dir>[:<nfs-options>]
- root=nfs:[<server-ip>:]<root-dir>[:<nfs-options>]
- root=nfs4:[<server-ip>:]<root-dir>[:<nfs-options>]
- Just try to mount it

NBD

- root=nbd:<server>:<port>[:<fstype>][:<mountopts>]
- nbd-client
- Wait for /dev/nbd0

iSCSI

- root=iscsi: [username:password[reverse:password]@] [<servername>]:[<protocol>]:[<port>]: [<LUN>]:<targetname> (rfc4173)

- Iscsistart from iscsi-initiator-utils (http://www.open-iscsi.org)

- SYMLINK=="disk/by-path/*-iscsi-*-<iscsi lun>"

- Problem without config files

FCoE

- fcoe=<networkdevice>:<dcb|nodcb>

  fcoe=<macaddress>:<dcb|nodcb>

- ACTION=="add", SUBSYSTEM=="net", NAME=="<ifacename>", RUN+="/sbin/fcoe-up $env{INTERFACE}"

- /sbin/ip link set "$netif" up

- echo -n "$netif" > /sys/module/fcoe/parameters/create

Plymouth

- Use /usr/libexec/plymouth/plymouth-populate-initrd

- Run a small udev trigger for graphic devices only

- Provides dialog for /sbin/cryptsetup luksOpen

Cryptoluks

- ENV{ID_FS_TYPE}=="crypto_LUKS"
- Runs in non-settled initqueue

DMSquash

- Used to find the Live CD

- Loop mounts images

- Sets up device mapper overlays

Debug

- rdinfo
- rdshell
- rdinitdebug
- rdbreak
- rdbreak={cmdline|pre-udev|pre-trigger|initqueue|pre-mount|mount|pre-pivot}
- rdudevinfo
- rdudevdebug
- rdnetdebug

Test Suite

- Uses qemu

- Covers basic modules like LVM, Dmraid, Mdraid, NBD, iSCSI, NFS

- Client, Server communication over qemu's internal network

Use Cases

- Cluster setups

- Rescue System

- Kexec crash dumps

Participate

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