

# First on Boot Errors: Resolving SUSE Linux Enterprise Boot Issues

...and other nifty tricks

**Jörg Reuter**

Technical Support Engineer

SUSE

**Raúl Osuna Sánchez-Infante**

Technical Support Engineer

SUSE



# On Rescuing an Unbootable System

# Scenarios

- So I played with partitioning and now boot fails
- Somehow Grub doesn't start anymore
- Using the emergency shell of Dracut on SUSE Linux Enterprise Server 12

# Demo: Extending a KVM disk image

- Guest system running
- Extend image with `qemu-img` on the host
- Rescan disks on guest
- Change partitioning with `fdisk` (bad idea!)
- Oh, we need to reboot...
- ?!

# Demo: Extending a KVM disk image

- Rescue system to the rescue!
- Boot from DVD, select Rescue
- Log in as the `root` user
- Run `fdisk /dev/vda`
- Set boot flag on (exactly) one partition with the “a” command
- Use `yast2 disk` next time.

# Fixing the installed system

- Boot rescue system
- If LVM is used: check *LV Status* in `lvdisplay` output, run `vgchange -a y` on the volume group if not
- Mount root filesystem to `/mnt`, for example:  
`mount /dev/vda2 /mnt`
- Bind-mount `procfs`, `sysfs`, `devfs`:  
`mount -o bind /proc /mnt/proc`  
`mount -o bind /sys /mnt/sys`  
`mount -o bind /dev /mnt/dev`
- Change to the installed system:  
`chroot /mnt`

# Fixing the installed system

- Mount /boot manually, just in case:

```
mount /boot
```

- Mount everything else you might need:

```
mount -a
```

- Repair the system...

- Unmount everything again and exit the chroot:

```
umount -a
```

```
exit
```

- Unmount the bind mounts and /mnt:

```
for f in sys proc dev; umount /mnt/$f; done  
umount /mnt
```

# Demo:

## Somehow Grub doesn't start any more

- If Grub prints “error 17” it is an indication that the BIOS mapping of drives has changed
- System in the demo, however, is peculiar
- Let's try it with the rescue system first



# Demo:

## Somehow Grub doesn't start any more

- The demo system is a system with root on iSCSI
- Network setup is incomplete in the rescue image and needs manual set up
- The rescue system is lacking iSCSI tools
- What now?

# Upgrade system to the rescue!

- Since we have root on iSCSI, boot the installation system with the `withiscsi=1` option
- Configure network
- Connect iSCSI target(s)
- Select *Upgrade*
- Click through to installation overview page
- Switch to console 2 with Ctrl-Alt-F2
- `chroot /mnt`

# Upgrade system to the rescue!

- Fix system, in the demo:  
`grub </etc/grub.conf`
- Exit chroot
- Switch back to Installer with Ctrl-Alt-F7
- Select Abort, confirm you really want to
- Reboot

# Demo:

## Somehow Grub doesn't start any more

- Granted, we could've done it with the rescue system after all, as /boot is a local disk and writing the Grub boot code is almost trivial...

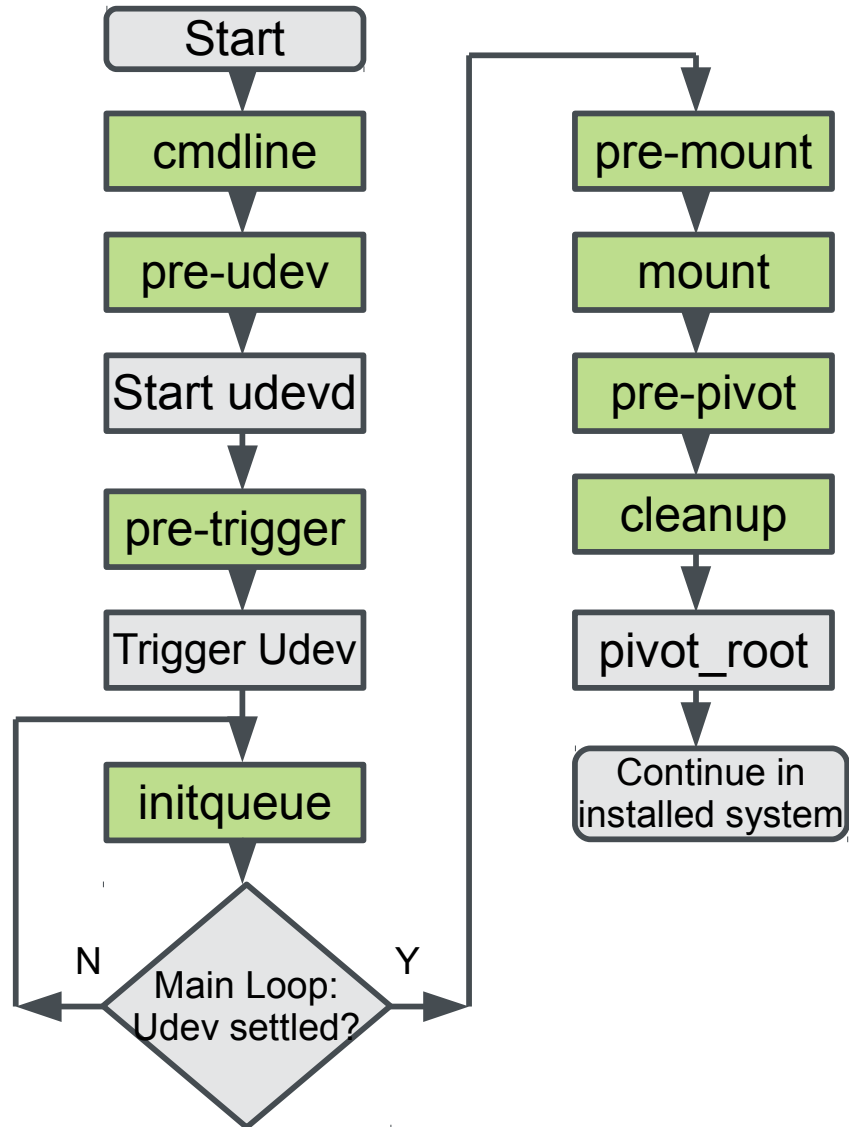
# On SUSE Linux Enterprise Server 12

- Basically the same
- Upgrade is a separate item in the DVD boot menu
- The upgrade system does not bind mount /dev to /mnt/dev, needs to be done manually
- Anything requiring systemd may not work in chroot
- Restarting with systemd on installed system doesn't work

# Dracut boot options

- Most repair tasks on SUSE Linux Enterprise Server 12 can be done from the emergency shell of the `initrd`
- Use `rd.shell` boot parameter to fall to shell instead of a hanging system if the `initrd` fails (i.e., rootfs not mountable)
- Use `rd.break` to interrupt the `initrd` at a certain point:  
`rd.break` – drop to shell at the end of `initrd`  
`rd.break=option` – drop to shell at a certain point

# Dracut boot process



Hook  
Dracut builtin

# Dracut boot options

- Options for rd.break:  
cmdline, pre-udev, pre-trigger,  
initqueue, pre-mount, pre-pivot, cleanup
- See dracut.modules(7) for details
- Most useful:  
pre-mount, cleanup, maybe pre-trigger



Where did the root filesystem go?

# Demo: using dev-names instead of dev-by-(uu)id

- System has 2 disks. OS is in “/dev/sdb”
- Kernel cannot guarantee the disk recognition will always take place in the same order. Names could switch
- Moreover, we could remove “/dev/sda”. “/dev/sdb” wouldn't make sense any more.
- How to fix it and how to prevent this from happening: (uu)id's

# Use-case: server with multipath not booting

- OS is NOT using multipath.
- System doesn't boot: multipath drivers freeze system.
- Disable multipath from the rescue system as workaround:
  - `chkconfig boot.multipath off`
  - `chkconfig multipathd off`
- Fix conflicting drivers and enable multipath again once it's working

# Use-case: uuid also changed!

- Customer changed a RAID controller.
- As a result, the uuid was different: system doesn't boot.
- How to fix this:
  - Start rescue system
  - Change /etc/fstab entries
  - Check bootloader configuration

Still Questions? Shoot Now!

Want more from SUSE  
support? Visit:  
[www.suse.com/support](http://www.suse.com/support)

Thank you.



# SUSE® Presentation (44pt)

Subhead and/or Second Line (22pt)

**Insert Presenter's Name (16pt)**

Insert Presenter's Title (14pt)

Insert Company/Email (14pt)



# Title of No-Logo Slide Here (32pt)

- First-level bullet (24pt)
  - Second-level bullet (20 pt)
    - Third-level bullet (16pt)
      - Fourth-level bullet (14pt)



# Title of Logo Slide Here (32pt)

Subtitle Here (20pt)

- First-level bullet (24pt)
  - Second-level bullet (20 pt)
    - Third-level bullet (16pt)
      - Fourth-level bullet (14pt)

# Title of Logo Slide Here (32pt)

Subtitle Here (20pt)


Section Break Text Here (32pt)

Call to action line one  
and call to action line two  
[www.calltoaction.com](http://www.calltoaction.com)

Thank you.







**Corporate Headquarters**  
Maxfeldstrasse 5  
90409 Nuremberg  
Germany

+49 911 740 53 0 (Worldwide)  
[www.suse.com](http://www.suse.com)

Join us on:  
[www.opensuse.org](http://www.opensuse.org)

## **Unpublished Work of SUSE LLC. All Rights Reserved.**

This work is an unpublished work and contains confidential, proprietary and trade secret information of SUSE LLC. Access to this work is restricted to SUSE employees who have a need to know to perform tasks within the scope of their assignments. No part of this work may be practiced, performed, copied, distributed, revised, modified, translated, abridged, condensed, expanded, collected, or adapted without the prior written consent of SUSE. Any use or exploitation of this work without authorization could subject the perpetrator to criminal and civil liability.

## **General Disclaimer**

This document is not to be construed as a promise by any participating company to develop, deliver, or market a product. It is not a commitment to deliver any material, code, or functionality, and should not be relied upon in making purchasing decisions. SUSE makes no representations or warranties with respect to the contents of this document, and specifically disclaims any express or implied warranties of merchantability or fitness for any particular purpose. The development, release, and timing of features or functionality described for SUSE products remains at the sole discretion of SUSE. Further, SUSE reserves the right to revise this document and to make changes to its content, at any time, without obligation to notify any person or entity of such revisions or changes. All SUSE marks referenced in this presentation are trademarks or registered trademarks of Novell, Inc. in the United States and other countries. All third-party trademarks are the property of their respective owners.

