



Boot Process

BIOS #Boot steps:
#EFI is successor for e.g. IAA4,
#Extensible Firmware Interface

mbr #Create backup (if is input file, of=output)
dd if=/dev/hda of=/tmp/mbr bs=512 count=1
file /tmp/mbr #Check -> x86 boot sector
hexdump /tmp/mbr #See inside copied mbr
khexdump /tmp/mbr #Install via: yast2 -i kdeutils-extra, or
ghex2 /tmp/mbr #Package: rpm -q \$(which ghex2)
#Last 2 Bytes 'magic number': 55 AA
#GRUB or LILO.

boot loader #GRUB supports TFTP network boot, serial console, shell:
#In bootgui: press <Esc>, <C> grub command line, or grub from Linux CLI
help #Show GRUB commands
find /boot/vmlinuz #Returns partition with kernel
find /etc/fstab #Returns / partition (Starts with 0, not 1)
#Tip: Hardcode IDE disks in BIOS, not on 'automatic'
#Kernel options:
less /usr/src/linux/Documentation/kernel-parameters.txt
vi /boot/grub/device.map #Map GRUB names to Linux names, e.g.:
(hd0) /dev/hda
grub-md5-crypt #Create encrypted password for menu.lst
init #PID 1

Software RAID

#Mirror of /boot: LILO only, not GRUB!
#Hardware RAID is prefer., if not SATA, e.g. Hi Point or Promise Fast Track.
#Primary partitions are preferred, because setup is in mbr and easy to copy
#Erase former partitions; sometimes required for new clean install:
dd if=/dev/zero of=/dev/hda count=4 bs=512
#Use vi /etc/raidtab (raid... cmds) or mdadm as a front end to setup RAID
#Demo Software RAID 1 on an installed system with one disk, e.g.:
dd if=/dev/zero of=disk1.img bs=10M count=5
dd if=/dev/zero of=disk2.img bs=10M count=5
losetup /dev/loop1 disk1.img #Use file1 as a 'disk'
losetup /dev/loop2 disk2.img #Use file2 as a 'disk'
mdadm --create /dev/md0 --level=1 --raid-devices=2 /dev/loop1 \\
/dev/loop2
cat /proc/mdstat #Monitor disk status, and fdisk -l
mkreiserfs /dev/md0 #Format 'disk'
mount /dev/md0 /local #Use 'disk'
watch cat /proc/mdstat #Show continuous RAID statistics
mdadm --manage --set-faulty /dev/md0 /dev/loop2
mdadm /dev/md0 -r /dev/loop2 #Remove 'disk'
mdadm /dev/md0 -a /dev/loop2 #Hot add 'disk'
mdadm --stop /dev/md0 #Stop mirroring
#What driver to use? #Look for 'Driver Activation Cmd':
hwinfo --storage-ctrl
modinfo ipr ; grep ^parm #Show module start options

Single user mode

#'Safe mode', init 1, or while booting:
#GRUB boot menu: Press <Esc> to leave the boot GUI,
#<e> to edit menu, select kernel line, <e> to edit kernel line,
#type <space><1><enter>, type for boot. root will be logged in,
#Red Hat: without password
#SUSE: with password or add init /bin/sh at kernel line

Recover from an unknown root password

#1) Start single user mode, then passwd
#2) Boot from a Linux CD, su -, mount / partition: mount /dev/hda3 /mnt
Remove the x in the /mnt/etc/passwd file (second field on the root line)
#3) Run passwd in the Rescue Mode
#4) Add kernel boot parameter: init=/bin/sh
#See also: [Lab ad endum](#) at [Roberts Quick References](#)

Fix bootloader

#Start in Rescue Mode, and at the first prompt:
#Type zast or yast #German keyboard work around :-)
#System, Boot Loader Configuration, Reset <Alt-e>,
#Propose New Configuration, Finish <Alt-f>

YaST boot into system

#To live with a damaged boot loader
#Start from (any version) CD1
#Start Installation, License Agreement, Language, Boot Installed System

Rescue Mode

#Change setup of a non bootable machine:
#Boot from CD1 (any version, highest SP for driver support)
#Select Rescue System, and login as root
grub #Find the / partition:
find /etc/fstab
exit
mount /dev/hda3 /mnt #Mount / partition
mount -o bind /proc /mnt/proc #Optional
mount -o bind /sys /mnt/sys #Optional
chroot /mnt; mount -a #All commands are executed on the non
bootable machine, e.g. passwd to change password of root, or
mkinitrd #Recreate initrd, See also:
grep MODULES /etc/sysconfig/kernel
vi \$(which mkinitrd) #Checkout the mkinitrd script


Fix non booting system

#Start from (any version) CD1
#Start Installation, License Agreement, Language, Repair Installed System,
#Automatic is all from Custom: #Expert Tools:
#Check Partition Tables #Install New Boot Loader
#Check Swap Areas #Start Partition Tool
#Check File Systems #Repair File System
#Check fstab Entries #Recover Lost Partition
#Check Package Database #Save System Setting to Floppy
#Check Minimal Package Selection #Verify Installed Software
#Verify Base Packages
#Check Boot Loader Configuration


YOU

#YaST Online Update
uname -a #Show kernel version
ll /lib/modules #Show available module versions
#A new kernel can generate 2 issues:
#without reboot: New modules cannot load (older ones are deleted)
#with reboot: Some modules need recompiling, e.g. VMware, nvidia
#Prevent e.g. new kernel(s) ('kernel-default') in YOU automatic mode:
yast2, Software, Install and Remove, Select package, Actions menu, Taboo
Yes, or select 'Protected—Do Not Modify' in GUI.



yast versus vi #Yet another Setup Tool 
 #If both methods are mixed to change /etc files (editable text configuration):
 #Generally: yast is preferred., except for files in /etc/sysconfig (vi).
 #If yast claims the file in the header, and vi is still used, then the next yast session will **not** overwrite the conf file. YaST will create a separate file and #will notify the user.
 /sbin/yast -l #List yast modules
 /sbin/yast2 ntp-client help #Show yast CLI help
 /sbin/yast2 ntp-client add help #Show yast CLI option help
 /sbin/yast2 ntp-client xmlhelp #Show autoyast CLI example XML feed

Supported or not #Check support level modules/packages
 modinfo tg3 #Supported: yes
 modinfo bcm5700 #Supported: no
 #support.novell.com/products/linuxenterpriseserver/supported__packages
 #L1 #Problem determination only
 #L2 #Problem resolution, but without engin.
 #L3 #Problem resolution with engineering
<http://support.novell.com/lifecycle> #Support period per OS and per product


Tainted Kernel #An example: 
 Use of the latest HP Proliant Support Pack (PSP) Linux drivers is not encouraged, but e.g. if the HP **SAN support matrix**, or monitoring requirements, requires a driver which is not in the Linux kernel, then downloading the HP driver, compiling and using it, will **NOT** end Novell support. Novell has an internal escalation path to **WorldWide Support** and will resolve any issue working close together with HP support. Novell will not ship the OEM modified drivers by e.g. IBM, DELL, HP. The customer may install the required drivers and has to compile the modules again every time a new updated kernel is loaded.
 Novell Consulting and HP recommend to use only one (virtual) server for adding the kernel-sources and gcc to compile the custom modules. The compiled custom modules can be centrally deployed to every updated server. Linux modules 'tainting' the kernel are allowed, e.g. self compiled modules. This will **not** break the Novell Technical Support Agreements for the kernel or other Novell shipped and normally supported software running on the server(s) with an issue. Using a 'tainting' module could result in:
 1. a request to recreate the error on a machine without the tainting module.
 2. a third party for supporting the module.
 This flexible form of Novell support is a result of:
[The Partner Linux Driver Process](#) #See also: TID [3582750](#) **Tainted Kernel**

System and Library Tracing #See man strace or man ltrace
 strace -o output.txt -tt -T ./executable
[less output.txt](#) #Look for open, write, ..., <time> on eol

Extend LVM on line #YaST or 2 CLI steps (shrink is off line):
 lvextend -L +500M /dev/system/optlv
 resize_reiserfs -s+500M /dev/system/optlv
 #SLES9: ext3 cannot extend on line, first umount, SLES10:
 ext2online /dev/system/optlv #Extend ext3 file system without umount
 xfs_growfs -d /dev/system/optlv #Extend xfs file system without umount

Debugging LVM #Data needed in bug reports
 cat /etc/lvm
 vgscan -vv
 vgsdisplay -v
 #The output of the failing LVM command plus option -vv
 dmsetup ls #Before and after the failing command
 dmsetup info #Before and after the failing command
 dmsetup table #Before and after the failing command
 cat /proc/partitions
 cat /proc/mounts
 cat /proc/swaps
 cat /proc/mdstat

Debugging EVMS #Data needed in bug reports
 tail -f /var/log/evms-engine* #Use log level to debug in /etc/evms.conf
 find /dev/evms -ls
 dmsetup ls #Before and after the EVMS configuration
 dmsetup info #Before and after the EVMS configuration
 dmsetup table #Before and after the EVMS configuration
 cd /proc
 #Identical to lvm: #cat partitions, mounts, swaps, & mdstat

Extra's #Different category tips
 SPident -vv #Display Support Pack status (SLES/DES)
 config.sh #Get info tool: novell.com/cool-solutions
 free #Display usage of mem/swap space
 cat /etc/passwd #Too much info?:
 ^cat less #Replace cat from former cmd with less 
 #RPM installations via YaST are always checked by signature.
 #Enable routing:
 echo 1 > /proc/sys/net/ipv4/ip__forward
 rpm -q --changelog rpmname #What is changed? What bugs are fixed?
 rpm -qa --last #What are the release dates?
 rpm -qf \$(which command) #Find package name of command
 #Search for options, parameters and syntax:
 yast2 -i kernel-source #Install kernel sources
 grep -r 'text' /usr/src/linux/Documentation
 less /usr/src/linux/Documentation/packageName
 grep -r 'text' /usr/src/linux
 #'kernel-source' and 'gcc' are required for VMware
 #Linux for S/390 #IBM Redbook sg244987.pdf

Submit a bug #Goto <http://support.novell.com>
 Interact menu #Menu to the left, e.g.
 - Open/Check Request ... #Subscription or support contract needed
 - Submit or Share Information, #No support contract or subscript. needed
 Report a bug #No support! Or use Share a Tip, Trick,
 #Submit an enhancement Request,
 #Report a software vulnerability
<http://bugzilla.novell.com> #No guaranteed feedback, not all products

Kernel dump howto's
 #TID [3301593](#) #Linux system hangs or is unstable
 #TID [3314462](#) #Configure kernel core dump capture
 #TID [3456486](#) #Configuring Remote Serial SLES Console
 #TID [3458354](#) #Troubleshooting a Domo Xen kernel
 #TID [3044267](#) (SLES9) #Capture a kernel core dump with lkcd