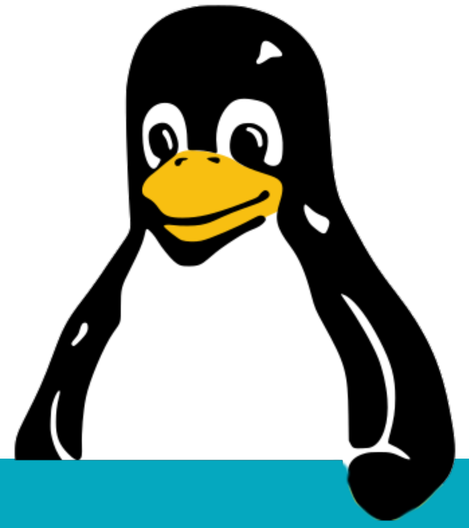
Linux, day 7



Objectives covered

Objective	Summary	Boek
1.1	Basic boot process	5
1.1	Kernel panic	5
1.7	Configure kernel options	14

LAB: The Linux boot process

Fedora: enable boot menu (1/2)

- Edit "*/etc/default/grub*" and set these (no quotes!):
  - *GRUB_TIMEOUT=5*
  - *GRUB_TIMEOUT_STYLE=menu*
  - *GRUB_TERMINAL=console*
  - *GRUB_TERMINAL_OUTPUT=console*
  - *GRUB_DISABLE_SUBMENU=false*

Fedora: enable boot menu (2/2)

- Then run:
  - *sudo grub2-mkconfig -o /boot/grub2/grub.cfg*
  - *sudo grub2-mkconfig -o /boot/efi/EFI/fedora/grub.cfg*

Ubuntu: enable boot menu (1/2)

- Edit "*/etc/default/grub*" and set these (no quotes!):
  - *GRUB_TIMEOUT=5*
  - *GRUB_TIMEOUT_STYLE=menu*
  - *GRUB_TERMINAL=console*
  - *GRUB_TERMINAL_OUTPUT=console*
  - *GRUB_DISABLE_SUBMENU=false*

Ubuntu: enable boot menu (2/2)

- Then run:
  - *sudo grub-mkconfig -o /boot/grub/grub.cfg*

Seeing the bootup

- Some Linuxen have "splash screens" or quiet boot.
- Reboot your VM and interrupt the GRUB2 menu.
- Select the default kernel, then press "e" to edit.
  - Remove the words "quiet", "rhgb" and "splash".
  - Continue booting

Logs once the host is up

```
$ dmesg | less

$ journalctl --list-boots          # Modern
$ journalctl -b                    # Modern

$ tail -500 /var/log/messages      # Older
$ tail -500 /var/log/syslog        # Older
```

LAB: The Linux boot process

(╥﹏╥) I've lost my root!

- Oh no! We're locked out of our root account!
  - And our system refuses to boot.
- How we fix this, differs per distro...
- For safety, first make a snapshot of your VM.

Again, a warning!!

- For safety, first make a snapshot of your VM.

Note: UTM on *aarch64*

- Students who use UTM on MacOS.
  - For this lab, add extra hardware to the VM.
  - Shutdown the Linux OS.
  - Then add a "Serial" device in UTM settings.
  - The serial port will have your console.

RHEL, CentOS, Fedora (1)

- Reboot your VM and go into the GRUB2 editor.
- Edit the line with boot parameters:
  - Remove "*quiet*" and "rhgb"
  - Add "*init=/bin/bash*"
- Boot up...
- Mount / as writable: "*mount -o rw,remount /*"

RHEL, CentOS, Fedora (2)

- Go into */etc*.
- Make a backup copy of the "*shadow*" file.
- **Either** Run: "*passwd root*", with a real password.
- **Or** use nano or vi to blank-out the root password.
- Run: "*touch /.autorelabel*"

See: SELinux and passwd in rescue mode

RHEL, CentOS, Fedora (3)

- Run: "*sync; sync; mount -o ro,remount /*"
- Reset the VM.
  - The first boot will take much longer!
- Test your root account afterwards.
  - The password should be blank/empty,
  - Or the new value you gave with *passwd*.

Debian, Ubuntu, Kali (1)

- Reboot your VM and go into the GRUB2 editor.
- Edit the line with boot parameters:
  - Remove "*quiet*" and "rhgb"
  - Add "*init=/bin/bash*"
- Boot up...
- Mount / as writable: "*mount -o rw,remount /*"

Debian, Ubuntu, Kali (2)

- Make a backup copy of the "*/etc/shadow*" file.
- **Either** Run: "*passwd root*", with a real password.
- **Or** use nano or vi to blank-out the root password.
- Run: "*sync; sync; mount -o ro,remount /*"
- Reboot
- Test your new root password afterwards.

LAB: Kernel modules

Assignment

- Shutdown your VM.
- Add a new NIC to your VM (in Virtualbox).
  - You can put it in the NAT network.
  - This time, use another hardware type! Not e1000.

Assignment

- Boot the VM again.
- Check with "*dmesg*" if the hardware was seen.
  - Check if the right driver was loaded.
- Check with "*lsmod*" if you can see the driver.

Closing

Homework

- Reading:
  - Chapters 28, 29 and 30.

- Practice exam
  - Link will be shared in Teams.

Homework

- Go do:
  - Check your VMs: how many kernels do they have?
  - Install a second, or third kernel version.
  - Use GRUB2 to test booting the installed kernel.

Reference materials

Resources

- Don't use NSCD
- Anatomy of a Linux DNS lookup
- The Linux boot process
- Step by step: Linux boot process explained
- EFI System Partition
- Initramfs, Dracut and the Dracut rescue shell

Resources

- Changing GRUB entries at boot
- Resetting passwords in single-user-mode
- SELinux and passwd in rescue mode
- What is the Linux kernel and what does it do?