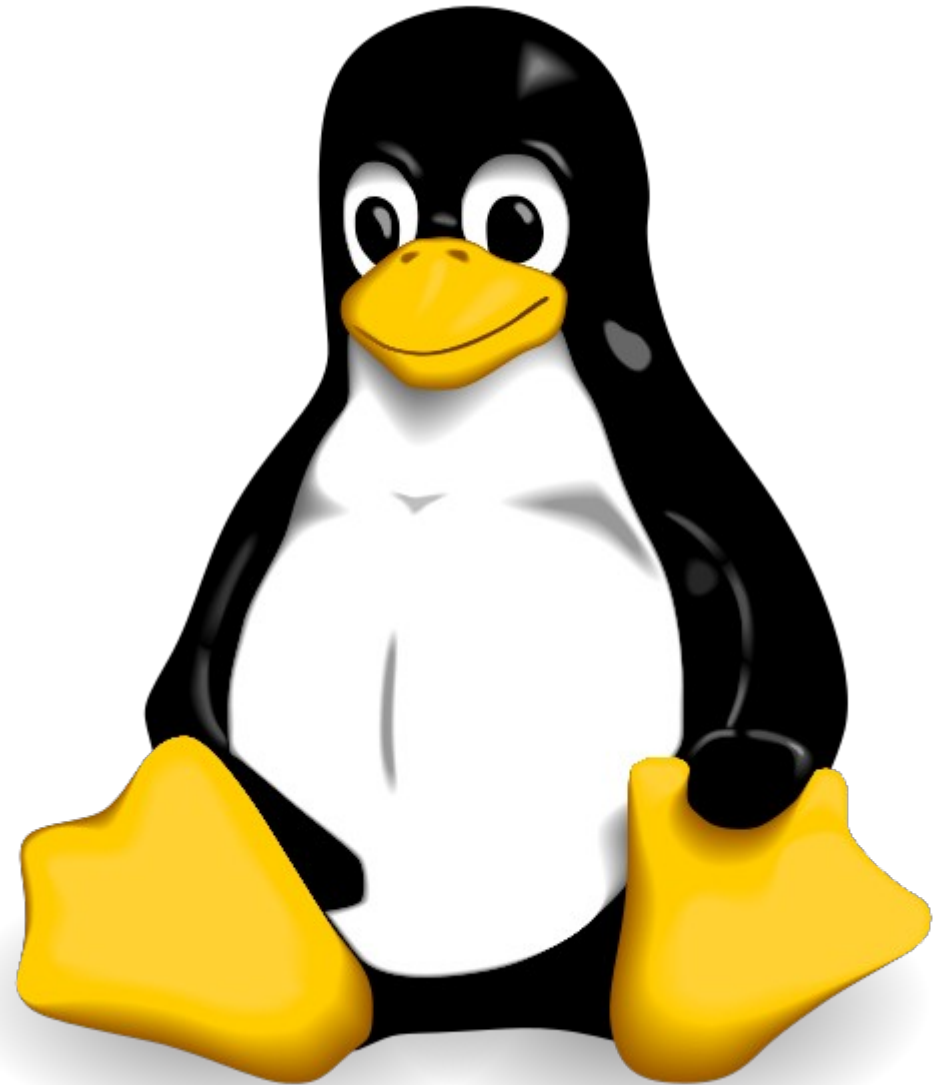


*Hacking the*  
**LINUX KERNEL**  
Introduction



Kurusa Levente  
<levex@linux.com>

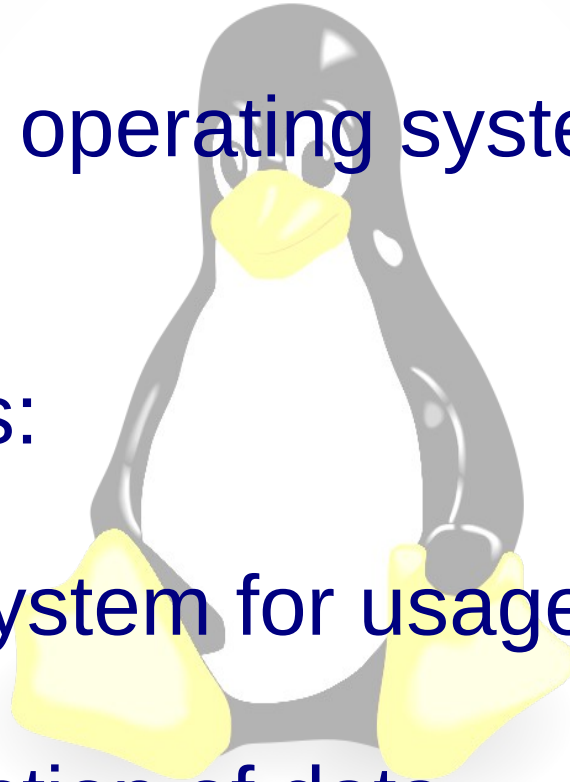
# A little bit of history...

- Development began in 1991 on behalf of Linus Torvalds
- UNIX clone
- Originally not meant to be portable



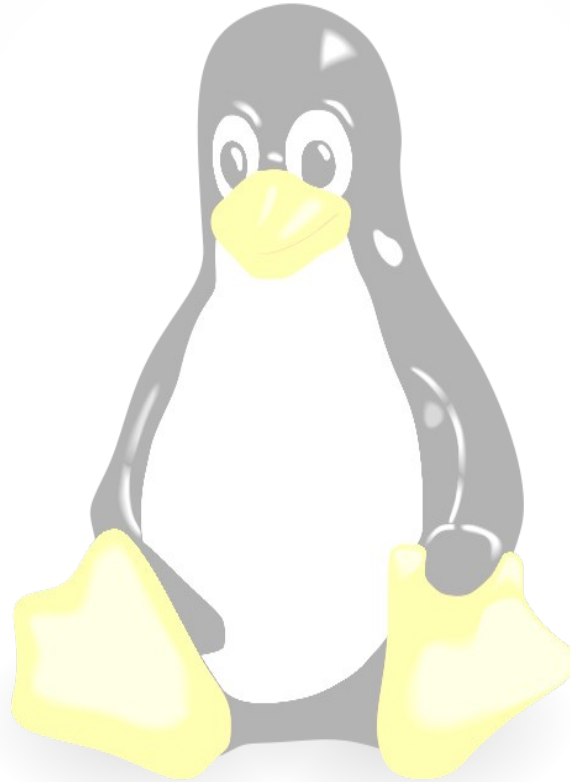
# What is a kernel and what is it for?

- The core of the operating system
- Responsibilities:
  - Initialize the system for usage
  - Minimal protection of data
  - Help development of software by abstractions.

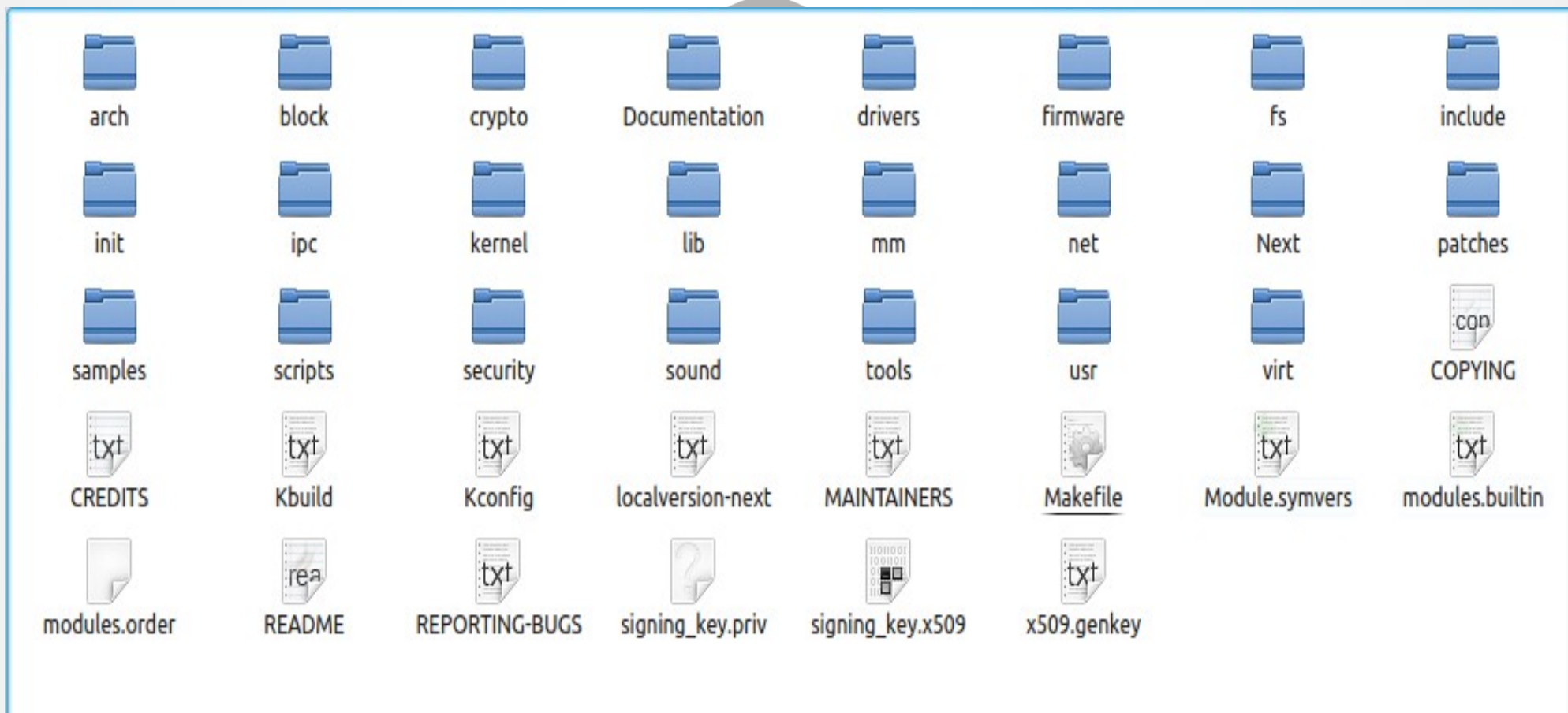


# What type of a kernel is Linux?

- Monolithic
- Modular
- Free software!



# Root of the kernel directory



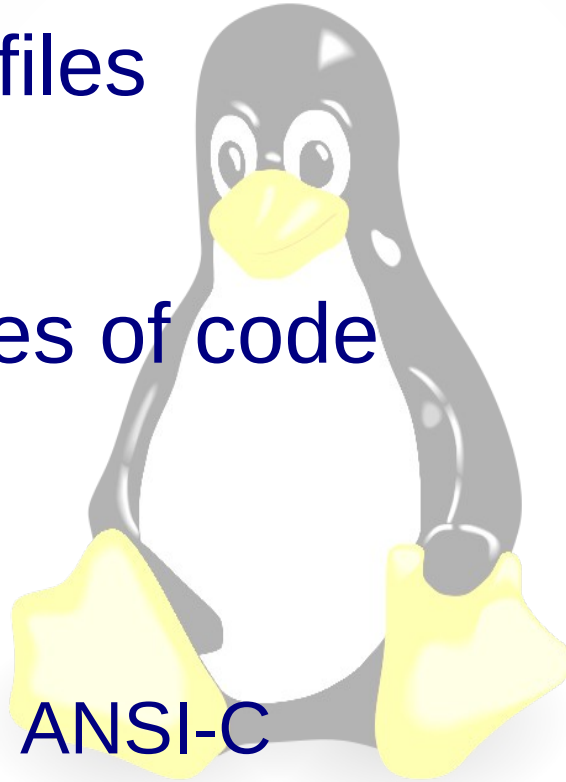
# Development statistics

- Since 2005, more than 10000 developers from 1000 companies
- Every 70 days a new release, this number was 80 days in 2012.
- Approx. 10000 modifications each release
- Every hour 7.14 modifications, this was 6.9 in 2012



# Code statistics

- Approx. 44000 files
- Approx 18M lines of code
- Languages:
  - 96.08% ANSI-C
  - 3.63 % Assembly
  - 0.10 % Perl

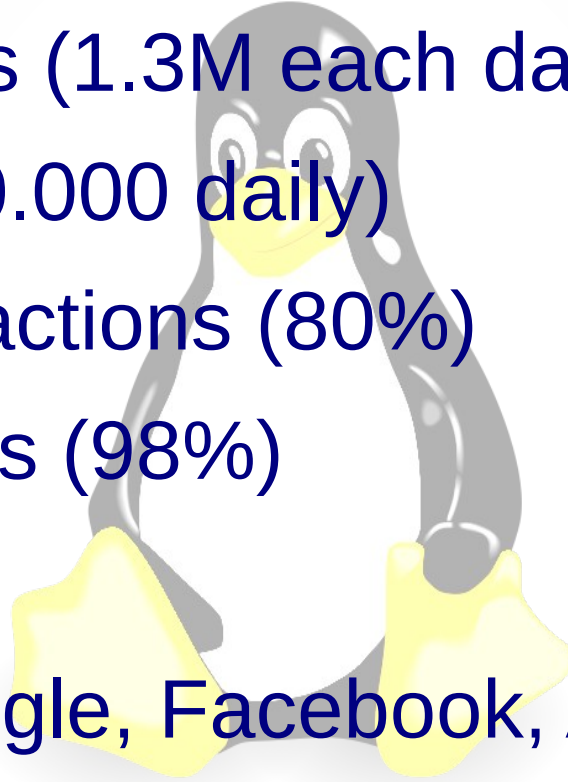


# Where is Linux mostly used?

- Android devices (1.3M each day)
- Smart TVs (700.000 daily)
- Financial transactions (80%)
- Supercomputers (98%)

És:

- The cloud (Google, Facebook, Amazon)
- Defence system
- Nuclear submarines
- Trains, airports, and more!



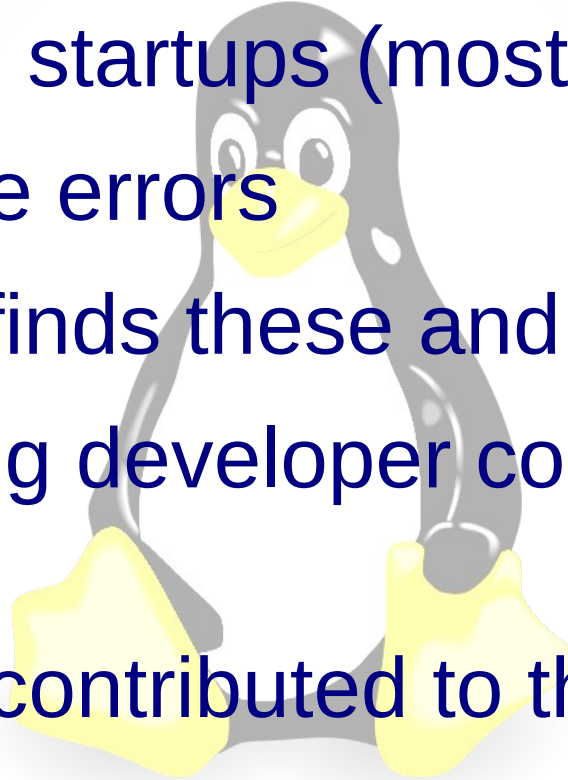
# Contribution

- This is the biggest collab project!
- The hackers have already found the easy but useful way.
- 'scripts/checkpatch.pl'
- With this script you can find common codestyle issues in the code




# Staging drivers

- Drivers of small startups (mostly)
- Full of codestyle errors
- Checkpatch.pl finds these and identifies them
- The volunteering developer corrects them! (patching)
- And they have contributed to the success of Linux! :-)



# Patch creation I.

- `git clone git://git.kernel.org/pub/scm/linux/kernel/git/next/linux-next.git`
- 'drivers/staging' exploration
- Select a file from this folder
- `'scripts/checkpatch.pl -f <file location>`



```
ERROR: do not initialise statics to 0 or NULL
#39: FILE: staging/ft1000/ft1000-usb/ft1000_usb.c:39:
+static bool gPollingfailed = false;
```

# Patch creation II.

- 'git commit -a' saves the changes

```
GNU nano 2.2.6           Fájl: .git/COMMIT_EDITMSG           Módosítva

Fix an error found by checkpatch.pl in ft1000_usb.c

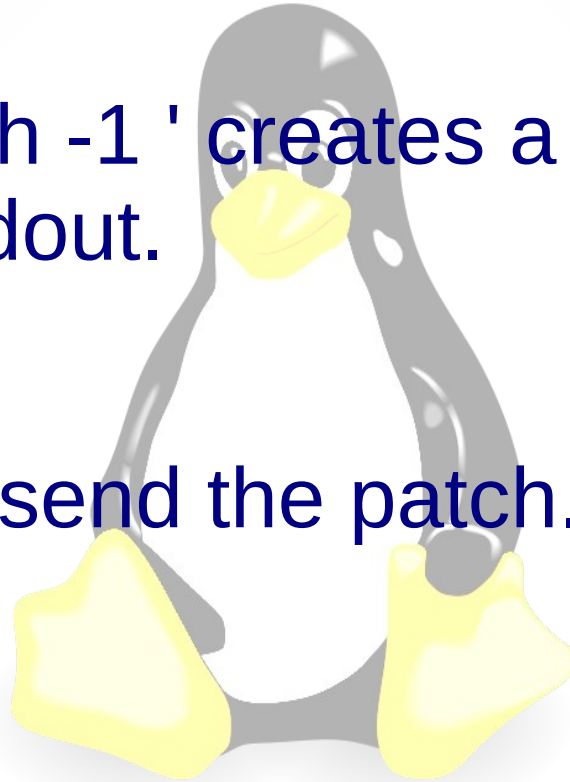
ERROR: do not initialise statics to 0 or NULL
#39: FILE: staging/ft1000/ft1000-usb/ft1000_usb.c:39:
+static bool gPollingfailed = false;

Signed-off-by: Levente Kurusa <levex@linux.com>
# Please enter the commit message for your changes. Lines starting
# with '#' will be ignored, and an empty message aborts the commit.
# On branch master
# Your branch and 'origin/master' have diverged,
# and have 1071 and 3887 different commits each, respectively.
#   (use "git pull" to merge the remote branch into yours)
#
# Changes to be committed:
#   (use "git reset HEAD <file>..." to unstage)
#
#       modified:   drivers/staging/ft1000/ft1000-usb/ft1000_usb.c
#
# Changes not staged for commit:
#   (use "git add <file>..." to update what will be committed)
#   (use "git checkout -- <file>..." to discard changes in working directory)
#
#       modified:   arch/x86/configs/i386_defconfig
#       modified:   arch/x86/kernel/cpu/mcheck/mce.c
#       modified:   drivers/acpi/proc.c
#       modified:   drivers/ata/ahci.c
#       modified:   drivers/ata/ata_piix.c
#       modified:   drivers/ata/libata-eh.c
#       modified:   drivers/ata/pata_cypress.c
#       modified:   drivers/base/regmap/regmap.c
#       modified:   drivers/pcmcia/ds.c
#       modified:   drivers/platform/x86/toshiba_acpi.c
#       modified:   drivers/tc/tc.c

^G Sùgó           ^O Mentés        ^R Beolvasás    ^Y Elözö old.   ^K Kivágás      ^C Pozíció
^X Kilépés       ^J Sorkizárás   ^W Keresés      ^V Köv. old.    ^U Beilleszté  ^T Helyes-e?
```

# Patch creation III.

- 'git format-patch -1 ' creates a patch file, name is shown on stdout.
- Next step is to send the patch.



# Sending the patch

- Setting up SMTP

```
levex@levex-pc:~/Dev/kernel/linux-next$ git config --global sendemail.smtpserver smtp.gmail.com
levex@levex-pc:~/Dev/kernel/linux-next$ git config --global sendemail.smtpuser ilevex.linux@gmail.com
levex@levex-pc:~/Dev/kernel/linux-next$ git config --global sendemail.from "Levente Kurusa <levex@linux.com>"
levex@levex-pc:~/Dev/kernel/linux-next$
```

- Find out the maintainers:  
'scripts/get\_maintainer.pl <patchfile>'

```
levex@levex-pc:~/Dev/kernel/linux-next$ scripts/get_maintainer.pl 0001-Fix-an-error-found-by-checkpatch.pl-in-ft1000_usb.c.patch
Marek Belisko <marek.belisko@gmail.com> (odd fixer:STAGING - FLARION...)
Greg Kroah-Hartman <gregkh@linuxfoundation.org> (supporter:STAGING SUBSYSTEM,commit_signer:5/6=83%)
Ondrej Zary <linux@rainbow-software.org> (commit_signer:2/6=33%,authored:2/6=33%,added_lines:19/33=58%,removed_lines:17/27=63%)
Levente Kurusa <levex@linux.com> (commit_signer:1/6=17%,authored:1/6=17%,added_lines:2/33=6%)
Alexey Khoroshilov <khoroshilov@ispras.ru> (commit_signer:1/6=17%,authored:1/6=17%,added_lines:8/33=24%,removed_lines:2/27=7%)
Rashika Kheria <rashika.kheria@gmail.com> (commit_signer:1/6=17%,authored:1/6=17%,added_lines:3/33=9%,removed_lines:3/27=11%)
Joe Perches <joe@perches.com> (authored:1/6=17%,removed_lines:4/27=15%)
devel@driverdev.osuosl.org (open list:STAGING SUBSYSTEM)
linux-kernel@vger.kernel.org (open list)
levex@levex-pc:~/Dev/kernel/linux-next$
```

- 'git send-email --to=\$maintainer --cc="Levente Kurusa <levex@linux.com>" <patchfile>'

# We are done! :-)



2013-11-23 18:11, Levente Kurusa:

```
> ERROR: do not initialise statics to 0 or NULL  
> +static bool gPollingfailed = false;  
>  
> Signed-off-by: Levente Kurusa <levex@linux.com>
```

Thanks! Applied to -ley!

--

Regards,  
Levente Kurusa

# Postscript

- Hopefully when you go home, you create a patch like this! :-)
- After that, welcome to the group of Kernel Hackers!



# Thank you for your attention!

- Kernel panic – not syncing: Reached end of presentation.

