

# Jeden Linux

na różnych platformach sprzętowych

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***One** Ring to rule them all,  
**One** Ring to find them,  
**One** Ring to bring them all,  
and in the darkness bind them.*

The Lord of the Rings  
J. R. R. Tolkien

- Sprzęt
- Dystrybucje Linuksa
- Source-based dystrybucje
- Wiwisekcja
- KaNaPi - WTF?

- Wondermedia WM8650, ARM 926EJ (Android 2.2)
- Raspberry Pi B+, ARM1176JZ-F
- Tablet Lenovo S8-50F, Intel Atom Z3745 (Android 4.4)
- Tablet/Laptop Asus T100TA, Intel Atom Z3740 (Windows 8.1)
- Laptop Levovo G510, Intel i5-4200M
- Telefon Samsung S3, ARM (Android 4.3)

- Wondermedia WM8650
  - Debian (demo)
  - Arch
- Raspberry Pi
  - Raspbian (demo)
  - [http://elinux.org/RPi\\_Distributions](http://elinux.org/RPi_Distributions)
- OpenSUSE
- Ubuntu
- Fedora
- CentOS
- Slackware
- Arch

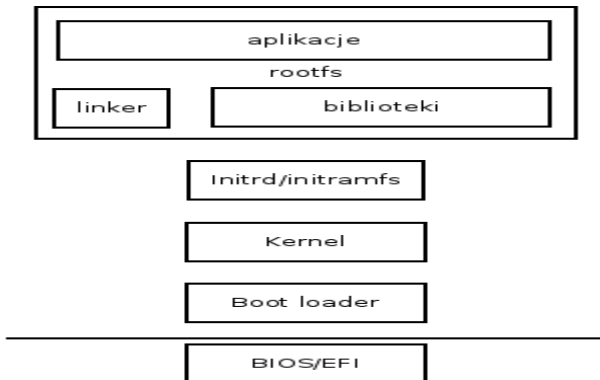
- Linux from scratch (Cross Linux from Scratch)
- Gentoo
- Yocto
- Buildroot

- `git clone git://git.yoctoproject.org/poky`
- `cd poky; git checkout -b jethro origin/jethro`
- `source oe-init-build-env`
- `bitbake core-image-minimal`
- `build/tmp/deploy/images/qemux86`
  - `core-image-minimal-qemux86-20160309104131.rootfs.ext4 (9MB)`
  - `bzImage-4.1.17+git0+46bb64d605_2e0ac7b6c4-r0-qemux86-20160309104131.bin`
  - `modules-4.1.17+git0+46bb64d605_2e0ac7b6c4-r0-qemux86-20160309104131.tgz`
- `build/tmp/deploy/rpm`
  - 3611 pakietów rpm (1292 glibc-\*)

- `git://git.buildroot.net/buildroot`
- `cd buildroot`
- `make menuconfig`
- `make`
- `make -C ../buildroot O='pwd'`
- `images/rootfs.tar` (1.5MB)
- Demo



- Zabieg operacyjny dokonywany na żywym zwierzęciu w celach naukowych lub doświadczalnych [SJP. PWN]



- Lenovo S8-50F
  - efibootmgr (XDA-developers - Accessing the Lenovo TAB S8-50 UEFI Setup)
  - active USB hub
  - Demo
- Asus T100TA (demo)

- grub (EFI)
- syslinux (Bios)
- U-Boot (WM8650)
- R-PI

- partycja vfat
- EFI/BOOT/bootia32.efi
- EFI/BOOT/bootia64.efi
- boot/grub/grub.cfg

```
set default=0
set timeout=10
menuentry "KaNaPi 0.5 for i686" {
    linux /kernel clock=tsc acpi_backlight=vendor
    initrd /initrd_0.5_i686
}
```

- Demo: Asus T100TA

- partycja vfat
- ldlinux.sys
- Boot sektor (MBR)
- syslinux.cfg

```
default kanapi
prompt 1
timeout 30
font lat2_16.psf
display start.msg
F1 help.txt
```

```
label kanapi
    kernel /kernel
    append initrd=/initrd_0.5_i686
```

- Demo

```
qemu-system-i386 -hda /dev/sdc -m 512
```

- partycja vfat
- wmt\_scriptcmd
- kernel
- `mkimage -A arm -O linux -T script -C none -a 1 -e 0 -n "script image" -d cmd.fromsd wmt_scriptcmd`
- cmd.fromsd

```
display init force
mmcinit 0
textout -1 -1 \"Loading kernel...\" FFFFFFFF
fatload mmc 0 0 kernel
textout -1 -1 \"Starting KaNaPi...\" FFFFFFFF
setenv bootargs 'mem=214M root=/dev/mmcblk0p2 console=tty0 \
noinitrd rw rootfstype=ext3 rootdelay=1'
bootm 0
```

- Demo

- partycja vfat
- bootcode.bin
- fixup.dat
- start.elf
- kernel.img
  - <https://github.com/raspberrypi/tools>
  - `imagetool-uncompressed.py arch/arm/boot/Image`
- cmdline.txt

```
dwc_otg.lpm_enable=0 console=tty1 root=/dev/mmcblk0p2 \
rootfstype=ext4 elevator=deadline rootwait
```
- Demo



<b>Sprzęt</b>	<b>Kernel</b>	<b>Architektura CPU</b>
WM8650	3.16.0-ltv8	armv5tejl
R-Pi	3.12.28+	armv6l
Lenovo S8-50F	4.1.0	x86
Asus T100TA	4.1.0/4.5-rc7	x86/x86_64
Lenovo G510	4.1.0	x86/x86_64

- Struktura katalogów
- Wybrane pakiety
- Biblioteka C, linker
- `find . -print | cpio -o -Hnewc > ../initrd`

Architektura	Linker
arm	/lib/ld-linux.so.3
x86	/lib/ld-linux.so.2
x86_64	/lib64/ld-linux-x86-64.so.2

```
gcc -dumpspecs | \
sed "s@/${L_PATH}/${L_NAME}@${PREFIX}/lib/${L_NAME}@g" \
> ${GCC_BASE}/lib/gcc/${TARGET_NAME}/${gcc_ver}/specs
```

- `gcc -print-file-name=libc.so`
- `export LD_DEBUG=help`
- `LD_PRELOAD=/libs/test.so /bin/test`
- `export LD_LIBRARY_PATH=/kanapi_packages/libs`
- `./ldd /kanapi_0.5/i686/packages/bash-4.3/bin/bash`  
`linux-gate.so.1 (0xb77cb000)`  
`libdl.so.2 => /kanapi_0.5/x86_64/cross/i686/glibc-2.23/lib/libdl.so.2`  
`libc.so.6 => /kanapi_0.5/x86_64/cross/i686/glibc-2.23/lib/libc.so.6`  
`/kanapi_0.5/x86_64/cross/i686/glibc-2.23/lib/ld-linux.so.2`

- Build system
  - x86
  - x86\_64
- Target
  - arm
  - x86
  - x86\_64
- cross-compilers
- machine-vendor-operating\_system
- build
- host
- target
  - arm-kanapi-linux-gnueabi
  - i686-kanapi-linux-gnu
  - x86\_64-kanapi-linux-gnu

- pkg\_kanapi
  - download
  - prepare
  - configure
  - build
  - install
  - clean
  - test
- pkg\_kanapi binutils.kanapi download

```
PACKAGE_NAME=binutils  
VER=2.26  
URL="http://ftp.gnu.org/gnu/binutils"  
EXT=tar.bz2
```

```
. ../settings
```

```
pkg_prepare() {  
    pkg_tar_bz2  
}
```

```
pkg_configure() {  
    pkg_configure_target  
}
```

- KaNaPi - x86 (> 600 pakietów x86)
- KaNaPi - x86\_64 (> 100 nowych pakietów x86\_64)



- Nowy build system
- 2 pliki Makefile, skrypty bash
- Automatyczna kompilacja dla i686/x86\_64/arm
- Źródła ściągane w czasie budowania
- System zależności pomiędzy budowanymi pakietami
- Jedna komenda do budowania wszystkiego

- configs
- packages
- scripts
- tests
- arm, x86, x86\_64
- Demo

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- `/data/local/kanapi_0.5`
- Link `/kanapi_0.5` – `> /data/local/kanapi_0.5`
- Demo

