

# Moderne Kommandozeilen Werkzeuge

Version 1.3

JETZT MIT  
NOCH MEHR  
TOOLS !!!11elf11!!!

DIGITAL NAIVES



18. Gulaschprogrammierenacht

10.-13. Mai 2018 | ZKM/HfG Karlsruhe  
entropia e.V. / CCC Karlsruhe | gulas.ch

#GPN18

@LEYRER

Alles, was zum Zeitpunkt unserer Geburt bereits  
vorhanden war, wird als Bestandteil der  
natürlichen Ordnung empfunden.

Alles, was in der Zeit zwischen dem fünfzehnten  
und fünfunddreißigsten Lebensjahr erfunden  
wurde, ist aufregend, revolutionär und fördert  
vielleicht sogar die eigene Karriere.

Alles, was nach unserem 35. Geburtstag erfunden wurde, verstößt gegen die natürliche Ordnung der Welt und wird abgelehnt.

“I've come up with a set of rules that describe our reactions to technologies:

1. Anything that is in the world when you're born is normal and ordinary and is just a natural part of the way the world works.
2. Anything that's invented between when you're fifteen and thirty-five is new and exciting and revolutionary and you can probably get a career in it.
3. Anything invented after you're thirty-five is against the natural order of things.”

Douglas Adams, *The Salmon of Doubt*

# Plan

Historie / Abgrenzung

systemd

dig

tracepath / mtr / oping

iproute2

tmux

zsh

ranger

HTTPIe / jq

aria2c

icdiff / colordiff

ripgrep / fd / z

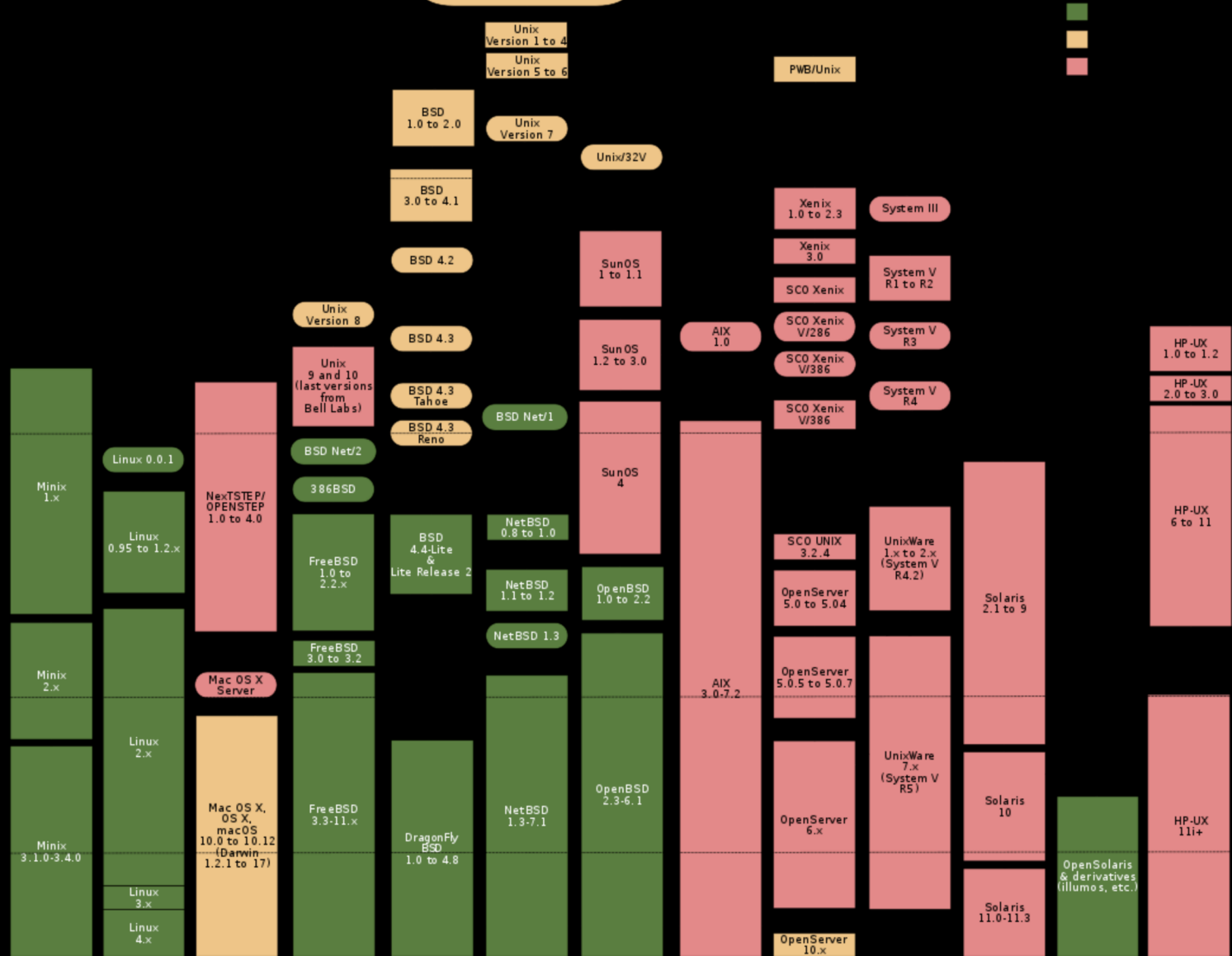
exa

fzf

pv / progress

Eure Vorschläge

Unnamed PDP-7 operating system





# The UNIX philosophy

Doug McIlroy, Bell System Technical Journal 1978

[http://emulator.pdp-11.org.ru/misc/1978.07\\_-\\_Bell\\_System\\_Technical\\_Journal.pdf](http://emulator.pdp-11.org.ru/misc/1978.07_-_Bell_System_Technical_Journal.pdf)

# The UNIX philosophy

Erstelle Programme so, dass sie eine Aufgabe richtig erfüllen. Wenn es eine neue Aufgabe gibt, beginne ein neues Programm anstatt das andere zu verkomplizieren.

# The UNIX philosophy

Gehe davon aus, dass die Ausgaben eines Programms die Eingabe eines anderen sein können, selbst wenn Du dieses noch nicht kennst. Programme sollten nicht schwafeln, halte die Ausgaben kurz und einfach verarbeitbar.

# The UNIX philosophy

Lass Computer-Tools die Arbeit für Dich machen,  
nicht die Hilfskräfte.

# The UNIX philosophy

Peter H. Salus in “A Quarter-Century of Unix” (1994):

- Write programs that do one thing and do it well.
- Write programs to work together.
- Write programs to handle text streams, because that is a universal interface.

# “simplel”

```
$ cat post-list.csv | split -l 30 -  
--filter='jq -R . | jq --slurp -c .'  
| xargs -d "\n" -I % sh -c 'curl -H  
"Content-Type: application/json" -X  
POST -d '""' '{"type":1,"entries":  
%}' '""' http://127.0.0.1:8080/purge-  
something && sleep 30'
```

# Single UNIX Specification

Product	Vendor	Architecture	UNIX V7	UNIX 03	UNIX 98	UNIX 95	UNIX 93
AIX	IBM Corporation	PowerPC	No	Yes	Yes	No	No
FTX	Cemprus LLC	PA-RISC	No	No	No	No	Yes
EulerOS	Huawei	x86-64	No	Yes	No	No	No
HP-UX	Hewlett-Packard Company	IA-64, PA-RISC	No	Yes	No	Yes	No
IRIX	Silicon Graphics, Inc.	MIPS	No	No	No	Yes	No
K-UX	Inspur	x86-64	No	Yes	No	No	No
macOS	Apple	x86-64	No	Yes	No	No	No
OpenServer	XinuOS	IA-32	No	No	No	No	Yes
Solaris	Oracle Corporation	IA-32, x86-64, SPARC	No	Yes	Yes	No	No
Tru64 UNIX	DEC	Alpha	No	No	Yes	No	No
UnixWare	XinuOS	IA-32	No	No	No	Yes	No
z/OS USS	IBM Corporation	z/Architecture	No	No	No	Yes	No



# IEEE Std 1003.1-2008 utilities

admin, alias, ar, asa, at, awk, basename, batch, bc, bg, cc/c99, cal, cat, cd, cflow, chgrp, chmod, chown, cksum, cmp, comm, command, compress, cp, crontab, csplit, ctags, cut, cxref, date, dd, delta, df, diff, dirname, du, echo, ed, env, ex, expand, expr, false, fc, fg, file, find, fold, fort77, fuser, gencat, get, getconf, getopts, grep, hash, head, iconv, id, ipcrm, ipcs, jobs, join, kill, lex, link, ln, locale, localedef, logger, logname, lp, ls, m4, mailx, make, man, mesg, mkdir, mkfifo, more, mv, newgrp, nice, nl, nm, nohup, od, paste, patch, pathchk, pax, pr, printf, prs, ps, pwd, qalter, qdel, qhold, qmove, qmsg, qrerun, qrls, qselect, qsig, qstat, qsub, read, renice, rm, rmdel, rmdir, sact, sccs, sed, sh, sleep, sort, split, strings, strip, stty, tabs, tail, talk, tee, test, time, touch, tput, tr, true, tsort, tty, type, ulimit, umask, unalias, uname, uncompress, unexpand, unget, uniq, unlink, uucp, uudecode, uuencode, uustat, uux, val, vi, wait, wc, what, who, write, xargs, yacc, zcat

# POSIX

- Portable Operating System Interface
- pahz-icks, as in positive, not poh-six
- Defines
  - application programming interface (API)
  - command line shells
  - utility interfaces

# Linux Standard Base (LSB)

- Basiert auf POSIX und der Single UNIX Specification
- The goal of the LSB is to develop and promote a set of open standards that will increase compatibility among Linux distribution ...
- ... few Linux distributions actually go through certification as LSB compliant

# LSB commands and utilities

[, dmesg, id, more, sleep, ar, du, install, mount, sort, at, echo, install\_initd, msgfmt, split, awk, ed, ipcrm, mv, strip, basename, egrep, ipcs, newgrp, stty, batch, env, join, nice, su, bc, expand, kill, nl, sync, cat, expr, killall, nohup, tail, chfn, false, ln, od, tar, chgrp, fgrep, locale, passwd, tee, chmod, file, localedef, paste, test, chown, find, logger, patch, time, chsh, fold, logname, pathchk, touch, cksum, fuser, lp, pax, tr, cmp, gencat, lpr, pidof, true, col, getconf, ls, pr, tsort, comm, gettext, lsb\_release, printf, tty, cp, grep, lsbinstall, ps, umount, cpio, groupadd, m4, pwd, uname, crontab, groupdel, mailx, remove\_initd, unexpand, csplit, groupmod, make, renice, uniq, cut, groups, man, rm, useradd, date, gunzip, md5sum, rmdir, userdel, dd, gzip, mkdir, sed, usermod, df, head, mkfifo, sendmail, wc, diff, hostname, mknod, sh, xargs, dirname, iconv, mktemp, shutdown, cd, getopt, read, umask, wait

# util-linux

addpart, agetty, blkdiscard, blkid, blockdev, cal, cfdisk, chcpu, chfn, chrt, chsh, col, colcrt, colrm, column, ctrlaltdel, delpart, dmesg, eject, fallocate, fdformat, fdisk, findfs, findmnt, flock, fsck, fsck.cramfs, fsck.minix, fsfreeze, fstab, fstrim, getopt, hexdump, hwclock, ionice, ipcmk, ipcrm, ipcs, isosize, kill, last, ldattach, line, logger, login, look, losetup, lsblk, lscpu[6], lslocks, lslogins, mcookie, mesg, mkfs, mkfs.bfs, mkfs.cramfs, mkfs.minix, mkswap, more, mount, mountpoint, namei, newgrp, nologin, nsenter, partx, pg, pivot\_root, prlimit, raw, readprofile, rename, renice, reset, resizepart, rev, RTCAlarm, runuser, script, scriptreplay, setarch, setpriv, setsid, setterm, sfdisk, su, sulogin, swplabel, swapoff, swapon, switch\_root, tailf, taskset, tunelp, ul, umount, unshare, utmpdump, uidd, uiddgen, vipw, wall, wdctl, whereis, wipefs, write, zramctl

# GNU Core Utilities commands

chcon, chgrp, chown, chmod, cp, dd, df, dir, dircolors, install, ln, ls, mkdir, mkfifo, mknod, mktemp, mv, realpath, rm, rmdir, shred, sync, touch, truncate, vdir, b2sum, base32, base64, cat, cksum, comm, csplit, cut, expand, fmt, fold, head, join, md5sum, nl, numfmt, od, paste, ptx, pr, sha1sum, sha224sum, sha256sum, sha384sum, sha512sum, shuf, sort, split, sum, tac, tail, tr, tsort, unexpand, uniq, wc, arch, basename, chroot, date, dirname, du, echo, env, expr, factor, false, groups, hostid, id, link, logname, nice, nohup, nproc, pathchk, pinky, printenv, printf, pwd, readlink, runcon, seq, sleep, stat, stdbuf, stty, tee, test, timeout, true, tty, uname, unlink, uptime, users, who, whoami, yes

# Regeln des Talks

1. Wir sprechen nicht über Tools, die am Rechner laufende Server brauchen.
2. Wir sprechen nicht über Tools, die am Rechner laufende Server brauchen.

# Full text searching Linux man pages with Elasticsearch

Apr 12, 2018 - 16:00 | tutorials

Tags: elasticsearch - linux - man-pages - opensource - tutorial - ruby

In this post we are going to play around with full text searching with Elasticsearch and Linux man pages.

## The idea

We will:

1. setup an **Elasticsearch** instance locally
2. create an index for the data
3. feed the index with
4. create a search m
5. full text search th

```
search('edit image').each{ |a| puts "#{a[:command].ljust(20)} - #{a[:description]}"; nil
gimp-2.8           - an image manipulation and paint program.
gimp              - an image manipulation and paint program.
Image::Magick::Q16 - objected-oriented Perl interface to ImageMagick (Q16). Use it to create, edit, co
gimp-console-2.8  - an image manipulation and paint program.
gimp-console      - an image manipulation and paint program.
bitmap           - bitmap editor and converter utilities for the X Window System
bmtoa            - bitmap editor and converter utilities for the X Window System
atobm           - bitmap editor and converter utilities for the X Window System
mailcap.order    - the mailcap ordering specifications
ywd             - dump an image of an X window
```



# man -k

```
$ man -k edit image
```

```
Image::Grab (3pm) - Perl extension for Grabbing images off the Internet.
411toppm (1) - convert Sony Mavica .411 image to ppm
animate (1) - animates an image or image sequence on any X server.
animate-im6 (1) - animates an image or image sequence on any X server.
anytopnm (1) - attempt to convert an unknown type of image file to a portable anymap
atobm (1) - bitmap editor and converter utilities for the X Window System
bitmap (1) - bitmap editor and converter utilities for the X Window System
bless (1) - graphical hexadecimal Gtk# editor
bmp2tiff (1) - create a TIFF file from a Microsoft Windows Device Independent Bitmap image file
bmtoa (1) - bitmap editor and converter utilities for the X Window System
btrfs-image (8) - create/restore an image of the filesystem
btrfs-restore (8) - try to restore files from a damaged btrfs filesystem image
carousel (6x) - displays multiple images rotating in a circular formation
cinnamon-menu-editor (1) - Editor for the panel menu
cjpeg (1) - compress an image file to a JPEG file
compare (1) - mathematically and visually annotate the difference between an image and its ...
compare-im6 (1) - mathematically and visually annotate the difference between an image and its ...
composite (1) - overlaps one image over another.
composite-im6 (1) - overlaps one image over another.
convert (1) - convert between image formats as well as resize an image, blur, crop, despeck...
convert-im6 (1) - convert between image formats as well as resize an image, blur, crop, despeck...
```

# apropos

```
$ apropos edit image
Image::Grab (3pm) - Perl extension for Grabbing images off the Internet.
411toppm (1) - convert Sony Mavica .411 image to ppm
animate (1) - animates an image or image sequence on any X server.
animate-im6 (1) - animates an image or image sequence on any X server.
anytopnm (1) - attempt to convert an unknown type of image file to a portable anymap
atobm (1) - bitmap editor and converter utilities for the X Window System
bitmap (1) - bitmap editor and converter utilities for the X Window System
bless (1) - graphical hexadecimal Gtk# editor
bmp2tiff (1) - create a TIFF file from a Microsoft Windows Device Independent Bitmap image file
bmtoa (1) - bitmap editor and converter utilities for the X Window System
btrfs-image (8) - create/restore an image of the filesystem
btrfs-restore (8) - try to restore files from a damaged btrfs filesystem image
carousel (6x) - displays multiple images rotating in a circular formation
cinnamon-menu-editor (1) - Editor for the panel menu
cjpeg (1) - compress an image file to a JPEG file
compare (1) - mathematically and visually annotate the difference between an image and its ...
compare-im6 (1) - mathematically and visually annotate the difference between an image and its ...
composite (1) - overlaps one image over another.
composite-im6 (1) - overlaps one image over another.
convert (1) - convert between image formats as well as resize an image, blur, crop, despeck...
convert-im6 (1) - convert between image formats as well as resize an image, blur, crop, despeck...
cpaldjvu (1) - DjVuDocument encoder for low-color images.
dcfuiigreen (1) - Alternative processing for Fujifilm RAW images
```

# systemd

- Löst(e) UNIX System V init scripts ab
- Sorgt für “Spaß” am Gerät (yummv)
  - <https://twitter.com/systemdsucks>

# systemd

## Old and tired

```
/etc/init.d/tool start
```

```
/etc/init.d/tool stop
```

```
/etc/init.d/tool  
restart
```

```
/etc/init.d/tool  
status
```

## New Hotness

```
systemctl start tool
```

```
systemctl stop tool
```

```
systemctl restart tool
```

```
systemctl status tool
```

```
$ /etc/init.d/apache2 status  
* apache2 is running
```

apache2.service - LSB: Apache2 web server

Loaded: loaded (/etc/init.d/apache2)

Active: failed (Result: exit-code) since Wed 2016-03-09 10:32:34 GMT; 9s ago

Docs: man:systemd-sysv-generator(8)

Process: 3479 ExecStop=/etc/init.d/apache2 stop (code=exited, status=0/SUCCESS)

Process: 3503 ExecStart=/etc/init.d/apache2 start (code=exited, status=1/FAILURE)

Mar 09 10:32:34 Ubuntu14 apache2[3503]: \*

Mar 09 10:32:34 Ubuntu14 apache2[3503]: \* The apache2 configtest failed.

Mar 09 10:32:34 Ubuntu14 apache2[3503]: Output of config test was:

Mar 09 10:32:34 Ubuntu14 apache2[3503]: apache2: Syntax error on line 224 of...y

Mar 09 10:32:34 Ubuntu14 apache2[3503]: Action 'configtest' failed.

Mar 09 10:32:34 Ubuntu14 apache2[3503]: The Apache error log may have more i....

Mar 09 10:32:34 Ubuntu14 systemd[1]: apache2.service: Control process exite...=1

Mar 09 10:32:34 Ubuntu14 systemd[1]: Failed to start LSB: Apache2 web server.

Mar 09 10:32:34 Ubuntu14 systemd[1]: apache2.service: Unit entered failed state.

Mar 09 10:32:34 Ubuntu14 systemd[1]: apache2.service: Failed with result 'e...'.  
Hint: Some lines were ellipsized, use -l to show in full.

journalctl

```
leyrer@lww18demo:~% journalctl -u apache2.service
```

```
-- Logs begin at Sam 2018-03-31 12:24:35 CEST, end at Sam 2018-03-31 20:16:36 CEST.
```

```
--
```

```
Mär 31 12:25:02 Betty systemd[1]: Starting LSB: Apache2 web server...
```

```
Mär 31 12:25:02 Betty apache2[1256]: * Starting Apache httpd web server apache2
```

```
Mär 31 12:25:04 Betty apache2[1256]: AH00558: apache2: Could not reliably determine  
the server's fully qualified domain nam
```

```
Mär 31 12:25:05 Betty apache2[1256]: *
```

```
Mär 31 12:25:05 Betty systemd[1]: Started LSB: Apache2 web server.
```



# nslookup / dig

- DNS Abfragen
- Hostnamen, IP-Adressen, MX-Records, etc.

```
$ dig www.entropia.de
```

```
; <<>> DiG 9.10.3-P4-Ubuntu <<>> www.entropia.de
```

```
;; global options: +cmd
```

```
;; Got answer:
```

```
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 57566
```

```
;; flags: qr rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 0
```

```
;; QUESTION SECTION:
```

```
;www.entropia.de.      IN A
```

```
;; ANSWER SECTION:
```

```
www.entropia.de.59 IN A  188.40.158.213
```

```
;; Query time: 2 msec
```

```
;; SERVER: 127.0.1.1#53(127.0.1.1)
```

```
;; WHEN: Wed May 09 13:40:18 CEST 2018
```

```
;; MSG SIZE rcvd: 49
```

```
; <<>> DiG 9.10.3-P4-Ubuntu <<>>  
www.entropia.de  
;; global options: +cmd
```

```
;; Got answer:  
;; ->>HEADER<<- opcode: QUERY, status: NOERROR,  
id: 57566  
;; flags: qr rd ra; QUERY: 1, ANSWER: 1,  
AUTHORITY: 0, ADDITIONAL: 0
```

;; QUESTION SECTION:

;www.entropia.de. IN A

;; ANSWER SECTION:

www.entropia.de. 59 IN A 188.40.158.213

```
;; Query time: 2 msec  
;; SERVER: 127.0.1.1#53(127.0.1.1)  
;; WHEN: Wed May 09 13:40:18 CEST 2018  
;; MSG SIZE rcvd: 49
```

```
$ dig www.entropia.de
```

```
; <<>> DiG 9.10.3-P4-Ubuntu <<>> www.entropia.de
```

```
;; global options: +cmd
```

```
;; Got answer:
```

```
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 57566
```

```
;; flags: qr rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 0
```

```
;; QUESTION SECTION:
```

```
;www.entropia.de.      IN A
```

```
;; ANSWER SECTION:
```

```
www.entropia.de.59 IN A  188.40.158.213
```

```
;; Query time: 2 msec
```

```
;; SERVER: 127.0.1.1#53(127.0.1.1)
```

```
;; WHEN: Wed May 09 13:40:18 CEST 2018
```

```
;; MSG SIZE rcvd: 49
```

```
$ dig +short www.entropia.de  
188.40.158.213
```



```
$ nslookup www.entropia.de
Server: 127.0.1.1
Address: 127.0.1.1#53
```

```
Non-authoritative answer:
Name: www.entropia.de
Address: 188.40.158.213
```

```
$ dig www.entropia.de
```

```
;; ANSWER SECTION:
```

```
www.entropia.de. 4 IN A 188.40.158.213
```

```
$ nslookup -q=mx entropia.de
```

```
Server: 127.0.1.1
```

```
Address: 127.0.1.1#53
```

```
Non-authoritative answer:
```

```
entropia.de mail exchanger = 1
```

```
mail.entropia.de.
```

```
Authoritative answers can be found from:
```

```
entropia.de nameserver = ns1.entropia.de.
```

```
entropia.de nameserver = ns0.entropia.de.
```

```
$ dig entropia.de MX
```

```
;; ANSWER SECTION:
```

```
entropia.de. 29INMX1 mail.entropia.de.
```

# tracpath

- Userspace Version von traceroute
- Kann die "Path MTU" ermitteln

```
$ tracepath -b www.entropyia.de
1?: [LOCALHOST] pmtu 1440
1: 172.18.0.1 (172.18.0.1) 6.505ms
1: 172.18.0.1 (172.18.0.1) 4.543ms
2: 10.255.255.1 (10.255.255.1) 43.744ms
3: 192.168.64.3 (192.168.64.3) 49.401ms asymm 4
4: 46.183.103.29 (46.183.103.29) 59.269ms
5: bb1-euraix.relaix.net (93.159.250.170) 1624.794ms
6: hetzner.interxionfra4.nl-ix.net (193.239.117.110) 71.908ms
7: core22.fsn1.hetzner.com (213.239.224.245) 73.069ms
8: no reply
9: no reply
10: web.entropyia.de (188.40.158.213) 72.856ms reached
Resume: pmtu 1440 hops 10 back 10
```

# mtr - My Traceroute

- Kombiniert ping und traceroute
- Aktualisiert sich laufend
- Bietet auch GUI-Varianten (ncurses, Gtk)

\$ mtr --report www.entropia.de

Start: Wed May 9 13:46:37 2018

HOST: Betty

	Loss%	Snt	Last	Avg	Best	Wrst	StDev
1.  -- 172.18.0.1	0.0%	10	20.6	13.3	0.8	102.1	31.8
2.  -- 10.255.255.1	20.0%	10	57.9	611.4	47.0	2707.	1021.8
3.  -- 192.168.64.3	10.0%	10	58.7	605.7	53.3	2613.	908.0
4.  -- 46.183.103.29	10.0%	10	93.2	584.7	69.9	2529.	867.9
5.  -- bb1-euraix.relaix.net	0.0%	10	82.1	579.2	59.2	2627.	901.0
6.  -- hetzner.interxionfra4.nl-	10.0%	10	80.0	552.2	80.0	2337.	776.2
7.  -- core22.fsn1.hetzner.com	0.0%	10	78.0	784.1	78.0	3219.	1099.9
8.  -- ex9k1.dc13.fsn1.hetzner.c	0.0%	10	71.5	819.1	65.0	3251.	1169.9
9.  -- vmhost.entropia.de	0.0%	10	66.4	786.1	66.4	3173.	1130.7
10.  -- web.entropia.de	0.0%	10	90.9	1016.	77.6	3777.	1379.4



# oping

- ping gegen multiple host
- hübsche grafiken
- noping ist das ncurses Frontend dafür

```
56 bytes from www.entropia.de (188.40.158.213): icmp_seq=136 ttl=55 time=63,58 ms
56 bytes from www.ccc.de (213.73.89.123): icmp_seq=136 ttl=56 time=77,51 ms
56 bytes from easterhegg.eu (88.198.54.132): icmp_seq=136 ttl=56 time=352,94 ms
56 bytes from 8.8.8.8 (8.8.8.8): icmp_seq=136 ttl=58 time=73,51 ms
56 bytes from 1.1.1.1 (1.1.1.1): icmp_seq=136 ttl=57 time=76,58 ms
56 bytes from www.orf.at (194.232.104.141): icmp_seq=136 ttl=50 time=352,24 ms
```

#### www.entropia.de ping statistics

```
136 packets transmitted, 131 received, 3,68% packet loss, time 9510,6ms
RTT[ms]: min = 59, median = 64, p(95) = 98, max = 452
```

#### www.ccc.de ping statistics

```
136 packets transmitted, 131 received, 3,68% packet loss, time 10297,5ms
RTT[ms]: min = 62, median = 72, p(95) = 105, max = 452
```

#### easterhegg.eu ping statistics

```
136 packets transmitted, 99 received, 27,21% packet loss, time 33043,4ms
RTT[ms]: min = 105, median = 306, p(95) = 575, max = 882
```

#### 8.8.8.8 ping statistics

```
136 packets transmitted, 131 received, 3,68% packet loss, time 8848,2ms
RTT[ms]: min = 52, median = 62, p(95) = 96, max = 442
```

#### 1.1.1.1 ping statistics

```
136 packets transmitted, 132 received, 2,94% packet loss, time 11249,3ms
RTT[ms]: min = 57, median = 76, p(95) = 117, max = 469
```

#### www.orf.at ping statistics

```
136 packets transmitted, 91 received, 33,09% packet loss, time 29803,3ms
RTT[ms]: min = 91, median = 309, p(95) = 577, max = 649
```

# iproute2 (ip)

- Löst ifconfig, route, ... ab

- Konsistenter:

ip addr [befehl] [argumente]

- ip link – L2: MTU, VLANs, bridges, ...
- ip addr – L3 addresses
- ip neigh – ARP/ND
- ip route – Routing + MPLS

# Geräte und Konfiguration

**Old and tired**

`ifconfig`

**New Hotness**

`ip addr show`

`ip link show`

```
$ ip addr show
```

```
...
```

```
3: wlan0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1440 qdisc mq  
state UP group default qlen 1000
```

```
link/ether a4:4e:31:95:9f:58 brd ff:ff:ff:ff:ff:ff
```

```
inet 172.18.251.101/16 brd 172.18.255.255 scope global wlan0  
    valid_lft forever preferred_lft forever
```

```
inet6 fe80::a64e:31ff:fe95:9f58/64 scope link  
    valid_lft forever preferred_lft forever
```

```
$ ip link show
```

```
...
```

```
3: wlan0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1440 qdisc mq  
state UP mode DORMANT group default qlen 1000  
    link/ether a4:4e:31:95:9f:58 brd ff:ff:ff:ff:ff:ff
```

# NIC up/down

**Old and tired**

```
ifconfig eth0 up
```

```
ifconfig eth0 down
```

**New Hotness**

```
ip link set eth0  
up
```

```
ip link set eth0  
down
```

# IP Adresse setzen

## Old and tired

```
ifconfig eth0  
192.168.0.42  
netmask  
255.255.255.0  
broadcast  
192.168.0.255
```

## New Hotness

```
ip addr add  
192.168.0.42/24  
broadcast  
192.168.0.255 dev  
eth0
```



# IP Adresse löschen

**Old and tired**

**New Hotness**

```
ip addr del  
192.168.0.42/24  
dev eth0
```

# ARP Eintrag hinzufügen

## Old and tired

```
arp -i eth0 -s  
192.168.0.1  
00:11:22:33:44:55
```

## New Hotness

```
ip neigh add  
192.168.0.1 lladdr  
00:11:22:33:44:55  
nud permanent dev  
eth0
```

# Route anzeigen

**Old and tired**

route

**New Hotness**

ip route show

# Route hinzufügen

## Old and tired

```
route add -net  
192.168.3.0/24 dev  
eth3
```

## New Hotness

```
ip route add  
192.168.3.0/24 dev  
eth3
```

# Mehr route2 Magie

@BarbarossaTM:

Contemporary Linux Networking

<https://www.slideshare.net/BarbarossaTM/contemporary-linux-networking>

# tmux

- Terminalmultiplexer
- Gemeinsames Arbeiten in einer Session
- Aktive weiterentwickelt (wird screen – mittlerweile auch wieder)
- Mehr und modernere Funktionen

15:41:13 ~

\$

```

1  [||| ] 5 [||| ]
2  [||| ] 6 [||| ]
3  [||| ] 7 [||| ]
4  [||| ] 8 [||| ]
Mem[|||||||6653]
Swp[ ]
Tasks: 214, 1022 thr; 1 running
Load average: 0.81 0.63
Uptime: 04:12:11

```

PID	USER	PRI	NI	VIRT	RES	SHR	S	CPU%	MEM%	TIME+	Comm
4010	at007489	20	0	917M	198M	32708	S	13.3	0.8	3:46.34	/usr
4196	at007489	20	0	1966M	252M	96788	S	5.1	1.1	10:31.27	comp
5218	at007489	20	0	32896	5080	2992	R	4.4	0.0	0:01.08	htop
4246	at007489	20	0	1326M	281M	39340	S	3.2	1.2	1:03.35	/usr
1928		20	0	789M	240M	206M	S	2.5	1.0	11:33.06	/usr
4029	at007489	20	0	917M	198M	32708	S	2.5	0.8	1:03.00	/usr

F1 Help F2 Setup F3 Search F4 Filter F5 Tree F6 SortBy F7 Nice - F8 Nice + F9 K

^C

15:41:22 x ~

\$ tail -F /var/log/syslog

```

Mar 29 15:38:19 mother acvpnagent[2770]: Function: tableCallbackHandler File: RouteMgr.cpp Line: 1723 Invoked Function: recv Return Code
11 (0x0000000B) Description: unknown
Mar 29 15:38:48 mother hddtemp[2441]: /dev/sdb: ST9500420AS: 35 C
Mar 29 15:39:12 mother wpa_supplicant[4758]: wlan0: CTRL-EVENT-SCAN-STARTED
Mar 29 15:39:18 mother hddtemp[2441]: /dev/sdb: ST9500420AS: 35 C
Mar 29 15:39:19 mother acvpnagent[2770]: Function: tableCallbackHandler File: RouteMgr.cpp Line: 1723 Invoked Function: recv Return Code
11 (0x0000000B) Description: unknown
Mar 29 15:39:19 mother acvpnagent[2770]: Function: tableCallbackHandler File: RouteMgr.cpp Line: 1723 Invoked Function: recv Return Code
11 (0x0000000B) Description: unknown
Mar 29 15:39:48 mother hddtemp[2441]: /dev/sdb: ST9500420AS: 35 C
Mar 29 15:40:48 mother hddtemp[2441]: message repeated 2 times: [ /dev/sdb: ST9500420AS: 35 C]
Mar 29 15:41:12 mother wpa_supplicant[4758]: wlan0: CTRL-EVENT-SCAN-STARTED
Mar 29 15:41:18 mother hddtemp[2441]: /dev/sdb: ST9500420AS: 35 C

```

# zsh

- Interaktive Login-Shell
- Kommandozeileninterpreter für Shellskripte
- Erweiterte Bourne-Shell
- Erweiterbar !!!1111elf111!!!!!!



# oh-my-zsh

- Themes
- Plugins
- Updates (!)
- <http://ohmyz.sh/>

# oh-my-zsh Plugins

apache2-macports archlinux asdf aterminal autojump autopep8 aws bower brew  
bundler cabal cake capistrano cask cating celery chruby chucknorris command-not-  
found Composer cloudapp coffee common-aliases compleat cpanm debian dircycle  
dirhistory dirpersist django dnf docker encode64 fabric fbterm Forklift fasd gas  
geeknote gem gpg-agent git gitfast git-extras git-flow git-flow-avh git-hubflow  
git\_remote\_branch github gradle grails httpie history jira jsontools knife laravel4 last-  
working-dir lein lighthouse lol macports mercurial meteor mvn mysql-macports nanoc  
ng node npm nyan osx pass per-directory-history perl perms pep8 phing pip pod pow  
powify pyenv pylint python rails rand-quote redis-cli repo ruby rvm sbt scala screen  
sprunge ssh-agent sublime sudo supervisor suse svn svn-fast-info symfony2  
systemd taskwarrior terminalapp terminator textmate tig thor tmux tmuxinator tugboat  
urltools vagrant vi-mode virtualenvwrapper web-search yarn yii yii2 yum zeus wd

# ranger

- Dateimanager mit “Miller Columns”
- VI key bindings
- Launcher: rifle
  
- <http://ranger.github.io/>

```

hut@debatom:~/ranger/human_readable.diff
bin      doc          6   ranger/ext/human_readable.py | 36 ++++++++
code     ranger       17  1 files changed, 19 insertions(+), 17 deletions(-)
crypt    test        39
dl       CHANGELOG   595 B diff --git a/ranger/ext/human_readable.py b/ranger/e
foo      COPYING    34.32 K index beeaf6d..d482ba7 100644
gnu      HACKING    2.60 K --- a/ranger/ext/human_readable.py
hut      human read  1.54 K +++ b/ranger/ext/human_readable.py
img      info       1.26 K @@ -13,24 +13,26 @@
ranger   INSTALL    1.36 K # You should have received a copy of the GNU Genera
uni      loc.rb     313 B # along with this program. If not, see <http://www
wine     loc.sh     64 B
2010-06-1 Makefile   3.53 K -import math
2010-06-1 pro       108.21 K -
2010-06-1 pro.txt   97.70 K -ONE_KB = 1024
cl       profile.py 190 B -UNITS = 'BKMGTp'
crypt2   push.sh    212 B -MAX_EXPONENT = len(UNITS) - 1
doctest.p ranger-1 149.19 K -
image.jpg ranger.py  1.75 K def human_readable(byte, seperator=' '):
-rw-r--r-- 1 hut hut 2010-05-24 18:56 411.34K, 115.86G Top

```

# HTTPIe

- cURL wrapper
- Auto-Formatierung
- Farben
- Einfacher Aufruf
- <https://httpie.org/>

```
01:14:35 ~
$ http https://gulas.ch
HTTP/1.1 302 Moved Temporarily
Connection: keep-alive
Content-Length: 154
Content-Type: text/html
Date: Thu, 10 May 2018 23:14:39 GMT
Location: https://entropia.de/GPN18
Server: nginx
Strict-Transport-Security: max-age=15768000
X-Content-Type-Options: nosniff
X-Frame-Options: DENY
```

```
<html>
<head><title>302 Found</title></head>
<body bgcolor="white">
<center><h1>302 Found</h1></center>
<hr><center>nginx</center>
</body>
</html>
```

```
01:14:40 ~
$ █
```

# HTTPIe & JSON

```
$ http PUT example.org name=John email=john@example.org
```

```
PUT / HTTP/1.1
```

```
Accept: application/json, */*
```

```
Accept-Encoding: gzip, deflate
```

```
Content-Type: application/json
```

```
Host: example.org
```

```
{  
  "name": "John",  
  "email": "john@example.org"  
}
```

# jq

- „sed für JSON“
- Anzeigen, Verändern
- <https://stedolan.github.io/jq/>



curl

```
'https://entropia.de/GPN18:Fahrplan:JSON?action=raw' | jq '. |  
  { TITEL: ..|.["title"]? } |  
  select(.TITEL != null)'
```

```
}
}
}

```

"TITEL": "K/B"

```
}
}
}

```

"TITEL": "FlipFloater (Ambient)"

```
}
}
}

```

"TITEL": "bam"

```
}
}
}

```

"TITEL": "FlipFloater (Beat)"

```
}
}
}

```

"TITEL": "Cybermorningshow"

```
}
}
}

```

"TITEL": "Infrastructure Review and Closing"

```
}
}
}

```

"TITEL": "Rope Advance"

```
}
}
}


```

"TITEL": "Tschunkelmusik"

```
}
}
}

```

"TITEL": "Project Poltergeist"

01:11:29 

```
$ curl 'https://entropia.de/GPN18:Fahrplan:JSON?action=raw' | jq '. | { TITEL: ..|.[ "title" ]? } | select ( .TITEL != null )' █
```

# aria2

- Download Utility
- Multi-source
- Multi-protocol
  - HTTP/HTTPS
  - FTP
  - SFTP
  - BitTorrent
  - Metalink

```
$ aria2c -c -j 2 -x 10  
https://archive.org/download/upd-gold/UPD%20Gold  
%20%281995%29%28Weird%20Science%29%28Disc  
%201%20of%204%29%5B%21%5D.iso
```

# icdiff

- ergänzt diff
- klein
- simpel
  
- <https://www.jefftk.com/icdiff>

Terminal — bash — 48x14

```
~ $ diff button-{a,b}.css
```

```
2c2
```

```
< width: 350px;
```

```
---
```

```
> width: 400px;
```

```
4,6c4,6
```

```
< margin: 0px;
```

```
< padding: 0px;
```

```
< margin-bottom: 15px;
```

```
---
```

```
> font-size: 30px;
```

```
> margin: 0;
```

```
> padding: 0;
```

```
~ $ █
```

Terminal — bash — 48x14

```
~ $ icdiff button-{a,b}.css
```

```
button-a.css
```

```
#input, #button {
```

```
width: 350px;
```

```
height: 40px;
```

```
margin: 0px;
```

```
padding: 0px;
```

```
margin-bottom: 15px;
```

```
text-align: center;
```

```
}
```

```
~ $ █
```

```
button-b.css
```

```
#input, #button {
```

```
width: 400px;
```

```
height: 40px;
```

```
font-size: 30px;
```

```
margin: 0;
```

```
padding: 0;
```

```
text-align: center;
```

```
}
```

# colordiff

- wrapper um diff
- diff mit mehr Farbe, keine Umgewöhnung
- `sudo apt install colordiff`

```
@@ -656,20 +656,20 @@ msgstr "Prowl API Key"
#: html/push-area.php:15
#, php-format
msgid "%sCreate a key now%s"
-msgstr "%sJetzt einen Key generieren%s"
+msgstr "%sCreate a key now%s"

#: html/push-area.php:18
msgid "In order to enable Prowl notifications, you must create a Prowl account,
-msgstr "Um Prowl Benachrichtigungen zu nutzen, musst du einen Prowl Account erze
+msgstr "In order to enable Prowl notifications, you must create a Prowl account,

#: html/push-area.php:19
msgid "Next, visit the Prowl website and generate your API key, which we use to
-msgstr "Besuche jetzt die Prowl Webseite und erzeuge deinen API Key, um eine sic
+msgstr "Next, visit the Prowl website and generate your API key, which we use to

#: html/push-area.php:21
#, php-format
msgid "%sVisit the Prowl Website%s"
-msgstr "%sBesuche die Prowl Webseite%s"
+msgstr "%sVisit the Prowl Website%s"

#: html/push-area.php:21
#, php-format
```



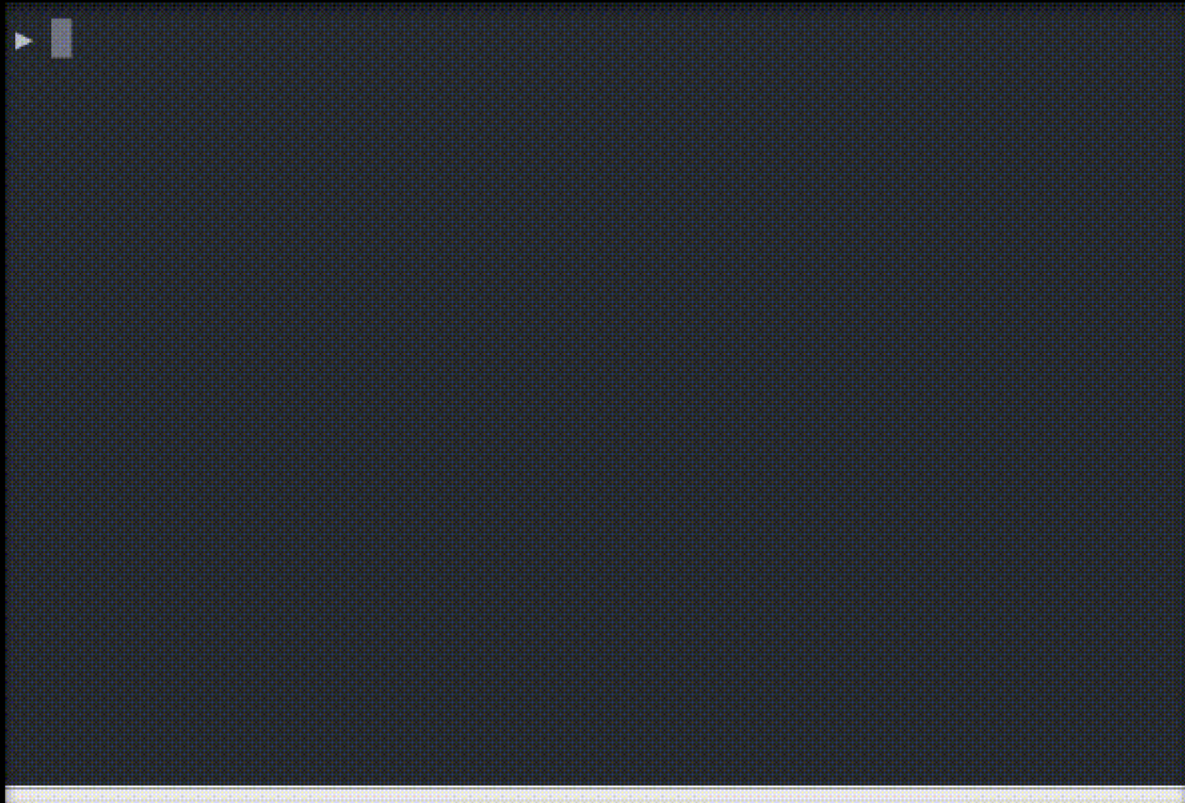
# ripgrep

- rekursives regex grep
- berücksichtigt .gitignore files
- SCHNELL
- <https://github.com/BurntSushi/ripgrep>

<b>Tool</b>	<b>Command</b>	<b>Line count</b>	<b>Time</b>
ripgrep (Unicode)	rg -n -w '[A-Z]+_SUSPEND'	450	0.106s
git grep	LC_ALL=C git grep -E -n -w '[A-Z]+_SUSPEND'	450	0.553s
The Silver Searcher	ag -w '[A-Z]+_SUSPEND'	450	0.589s
git grep (Unicode)	LC_ALL=en_US.UTF-8 git grep -E -n -w '[A-Z]+_SUSPEND'	450	2.266s
sift	sift --git -n -w '[A-Z]+_SUSPEND'	450	3.505s
ack	ack -w '[A-Z]+_SUSPEND'	1878	6.823s
The Platinum Searcher	pt -w -e '[A-Z]+_SUSPEND'	450	14.208s

# fd

- “Einfacher” als find
  - **fd PATTERN** statt **find -iname '\*PATTERN\*'**
- Smart Case
- Unicode Aware
- Parallelisierbar
- Bunt
  
- <https://github.com/sharkdp/fd>



# z - jump around

- „AI“ für Verzeichnispfade
- Muss trainiert werden
- Matcht angegebenen Pfadteil mit Regex auf die „beliebtesten“ Verzeichnisse
- <https://github.com/rupa/z>

# z - Beispiele

- `z foo`      `cd` to most frequent dir matching `foo`
- `z foo bar`    `cd` to most frequent dir matching `foo`, then `bar`
- `z -r foo`      `cd` to highest ranked dir matching `foo`
- `z -t foo`      `cd` to most recently accessed dir matching `foo`
- `z -l foo`      list all dirs matching `foo` (by frequency)

# exa

- ersetzt/erweitert ls
- bunt
- rekursiv
- unterstützt git
- <https://the.exa.website/>

```

exa — fish /Users/ben/Code/exa/exa

[ben ~/C/e/exa:master]
$ exa
Cargo.lock LICENCE README.md generate-testcases.sh src
Cargo.toml Makefile contrib screenshot.png target

[ben ~/C/e/exa:master]
$ exa -l
.rw-r--r-- 11k ben 18 Nov 18:28 Cargo.lock
.rw-r--r-- 549 ben 15 Nov 18:38 Cargo.toml
.rw-r--r-- 1.1k ben 23 Nov 2014 LICENCE
.rw-r--r-- 775 ben 2 Aug 15:28 Makefile
.rw-r--r-- 2.7k ben 19 Nov 13:18 README.md
drwxr-xr-x - ben 7 Jun 16:45 contrib
.rwxr-xr-x 3.1k ben 3 Sep 13:26 generate-testcases.sh
.rw-r--r-- 382k ben 8 Jun 21:00 screenshot.png
drwxr-xr-x - ben 18 Nov 18:55 src
drwxr-xr-x - ben 3 Nov 0:48 target

[ben ~/C/e/exa:master]
$ exa -abghllis
  inode Permissions Links Size Blocks User Group Date Modified Name
30030336 .rw-r--r-- 1 6.0Ki 16 ben staff 23 Nov 0:31 .DS_Store
1971258 drwxr-xr-x 15 - - ben staff 19 Nov 13:21 .git
30048390 .rw-r--r-- 1 20 8 ben staff 2 Nov 20:45 .gitignore
30163566 .rw-r--r-- 1 200 8 ben staff 4 Nov 16:55 travis.yml
31959543 .rw-r--r-- 1 11Ki 24 ben staff 18 Nov 18:28 Cargo.lock
31959544 .rw-r--r-- 1 549 8 ben staff 15 Nov 18:38 Cargo.toml
1971322 .rw-r--r-- 1 1.1Ki 8 ben staff 23 Nov 2014 LICENCE
23377412 .rw-r--r-- 1 775 8 ben staff 2 Aug 15:28 Makefile
30163567 .rw-r--r-- 1 2.6Ki 8 ben staff 19 Nov 13:18 README.md
12375448 drwxr-xr-x 4 - - ben staff 7 Jun 16:45 contrib
24377288 .rwxr-xr-x 1 3.1Ki 8 ben staff 3 Sep 13:26 generate-testcases.sh
20087308 .rw-r--r-- 1 373Ki 752 ben staff 8 Jun 21:00 screenshot.png
1971325 drwxr-xr-x 11 - - ben staff 18 Nov 18:55 src
30083756 drwxr-xr-x 3 - - ben staff 3 Nov 0:48 target

[ben ~/C/e/exa:master]
$ █

```

```

exa — fish /Users/ben/Code/exa/exa

[ben ~/C/e/exa:master]
$ exa --long --grid src/
.rw-r--r-- 4.8k ben 18 Nov 18:55 colours.rs      .rw-r--r--@ 4.4k ben 15 Nov 18:38 main.rs
.rw-r--r-- 2.9k ben 4 Nov 11:59 dir.rs      .rw-r--r--@ 29k ben 19 Nov 12:45 options.rs
drwxr-xr-x - ben 4 Nov 16:55 feature      drwxr-xr-x - ben 18 Nov 18:28 output
.rw-r--r-- 19k ben 15 Nov 18:37 file.rs      .rw-r--r--@ 1.7k ben 4 Sep 11:30 term.rs
.rw-r--r-- 4.5k ben 2 Sep 16:13 filetype.rs

[ben ~/C/e/exa:master]
$ exa --long --tree src
drwxr-xr-x - ben 18 Nov 18:55 src
.rw-r--r-- 4.8k ben 18 Nov 18:55 | colours.rs
.rw-r--r-- 2.9k ben 4 Nov 11:59 | dir.rs
drwxr-xr-x - ben 4 Nov 16:55 | feature
.rw-r--r-- 3.3k ben 4 Nov 11:59 | | git.rs
.rw-r--r-- 604 ben 26 Aug 12:19 | | mod.rs
.rw-r--r-- 7.2k ben 4 Nov 16:55 | | xattr.rs
.rw-r--r-- 19k ben 15 Nov 18:37 | file.rs
.rw-r--r-- 4.5k ben 2 Sep 16:13 | filetype.rs
.rw-r--r-- 4.4k ben 15 Nov 18:38 | main.rs
.rw-r--r-- 29k ben 19 Nov 12:45 | options.rs
drwxr-xr-x - ben 18 Nov 18:28 | output
.rw-r--r-- 5.6k ben 18 Nov 19:02 | | column.rs
.rw-r--r-- 35k ben 16 Nov 3:05 | | details.rs
.rw-r--r-- 1.2k ben 3 Nov 11:12 | | grid.rs
.rw-r--r-- 4.1k ben 15 Nov 18:37 | | grid_details.rs
.rw-r--r-- 384 ben 29 Jun 14:50 | | lines.rs
.rw-r--r-- 1.3k ben 18 Nov 18:27 | | mod.rs
.rw-r--r-- 1.7k ben 4 Sep 11:30 | term.rs

[ben ~/C/e/exa:master]
$ █

```



# fzf

- Kommandozeilen fuzzy finder
- schnell
- praktisch
- unterstützt vim, tmux, ...
- <https://github.com/junegunn/fzf>

```
src/util/eventbox_test.go
src/curses/curses_test.go
src/util/atomicbool.go
src/util/util_test.go
src/tokenizer_test.go
src/chunklist_test.go
src/algo/algo_test.go
src/util/eventbox.go
src/curses/curses.go
src/pattern_test.go
src/options_test.go
src/history_test.go
src/reader_test.go
src/merger_test.go
src/cache_test.go
src/util/util.go
src/tokenizer.go
src/item_test.go
src/constants.go
src/chunklist.go
src/ansi_test.go
src/algo/algo.go
src/terminal.go
src/fzf/main.go
src/pattern.go
> src/options.go
src/matcher.go
src/history.go
src/reader.go
src/merger.go
src/cache.go
src/item.go
src/core.go
src/ansi.go
35/63
> .go$
```

```
package fzf

import (
    "fmt"
    "os"
    "regexp"
    "strconv"
    "strings"
    "unicode/utf8"

    "github.com/junegunn/fzf/src/curses"
    "github.com/junegunn/go-shellwords"
)

const usage = `usage: fzf [options]

Search
-x, --extended      Extended-search mode
                    (enabled by default; +x or --no-extended to disable)
-e, --exact         Enable Exact-match
-i                 Case-insensitive match (default: smart-case match)
+i                 Case-sensitive match
-n, --nth=N[,...]  Comma-separated list of field index expressions
                    for limiting search scope. Each can be a non-zero
                    integer or a range expression ([BEGIN]..[END]).
--with-nth=N[,...] Transform the presentation of each line using
                    field index expressions
-d, --delimiter=STR Field delimiter regex (default: AWK-style)
+s, --no-sort       Do not sort the result
--tac               Reverse the order of the input
--tiebreak=CRI[,..] Comma-separated list of sort criteria to apply
                    when the scores are tied [length|begin|end|index]
                    (default: length)
```

# progress - Coreutils Progress Viewer

- fokussiert auf coreutils Kommandos (cp, mv, dd, tar, gzip/gunzip, cat, ...)
- zeigt Fortschritt an
- <https://github.com/Xfennec/progress>

```
% dd if=/dev/urandom bs=1M count=500 | pv -petra -s 500m | dd
of=/dev/null
500+0 records in/s] [ 150MiB/s] [=====> ] 90% ETA
0:00:00
500+0 records out
524288000 bytes (524 MB, 500 MiB) copied, 3,33126 s, 157 MB/s
0:00:03 [ 150MiB/s] [ 150MiB/s] [=====>] 100%
1024000+0 records in
1024000+0 records out
524288000 bytes (524 MB, 500 MiB) copied, 3,33104 s, 157 MB/s
```

08:33:47 > ...Documents/Presentations/2018-05 Linuxwochen Wien  
\$ cp -f ~/Downloads/lww18.bin ~/temp

[24548] cp /home/leyrer/Downloads/lww18.bin  
54.9% (1.7 GiB / 3.1 GiB) 41.2 MiB/s remaining 0:00:34

# Fragen, Anregungen, weitere Tools?

Martin Leyrer

<https://martin.leyrer.priv.at>

@leyrer on Twitter