Ein kleines UNIX

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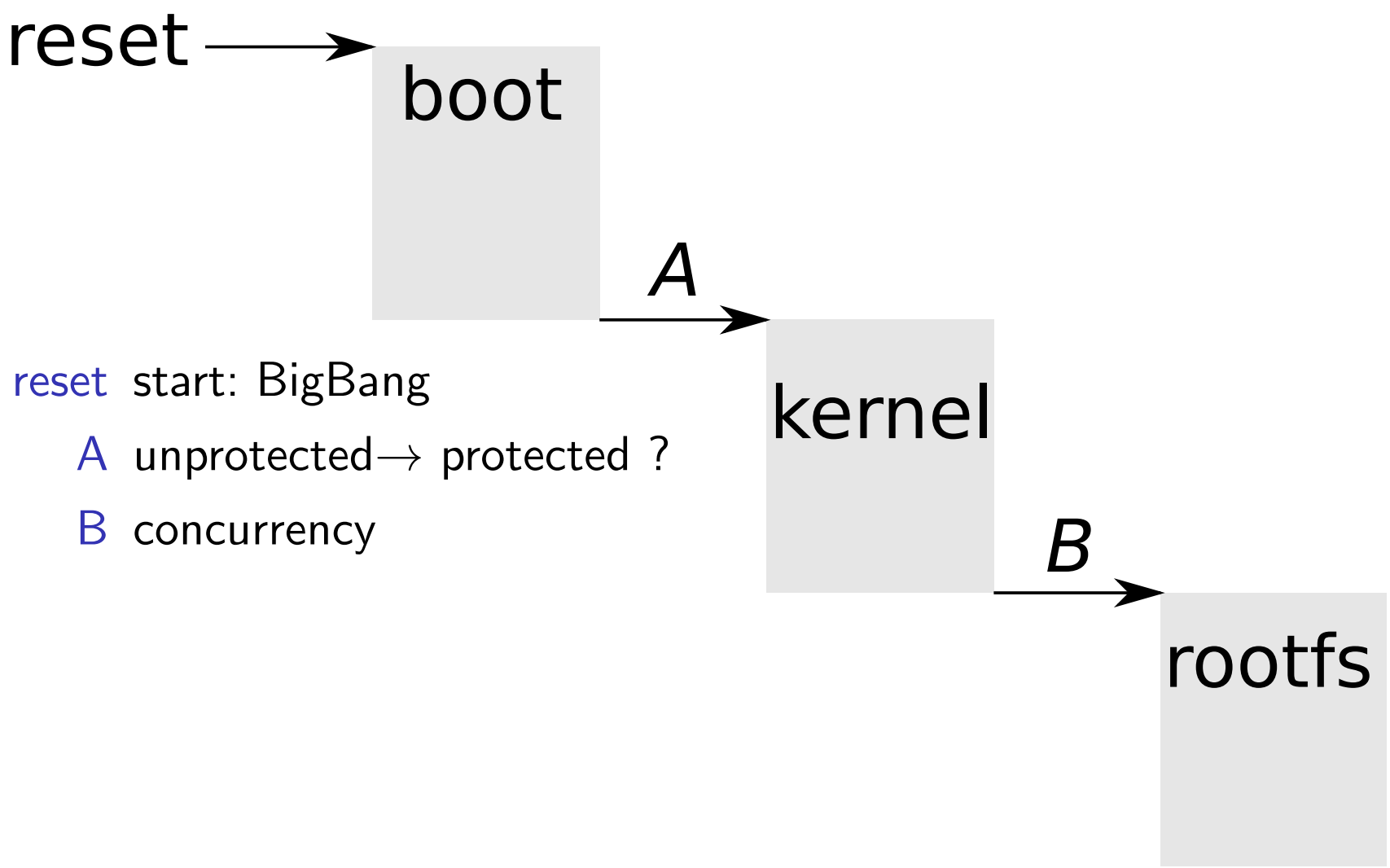
Ein kleines UNIX

- die einzelnen Komponenten
- für Test
- übersichtlich
- grosse Systeme haben ähnliche Komponenten

Die grossen Blöcke

Übergänge



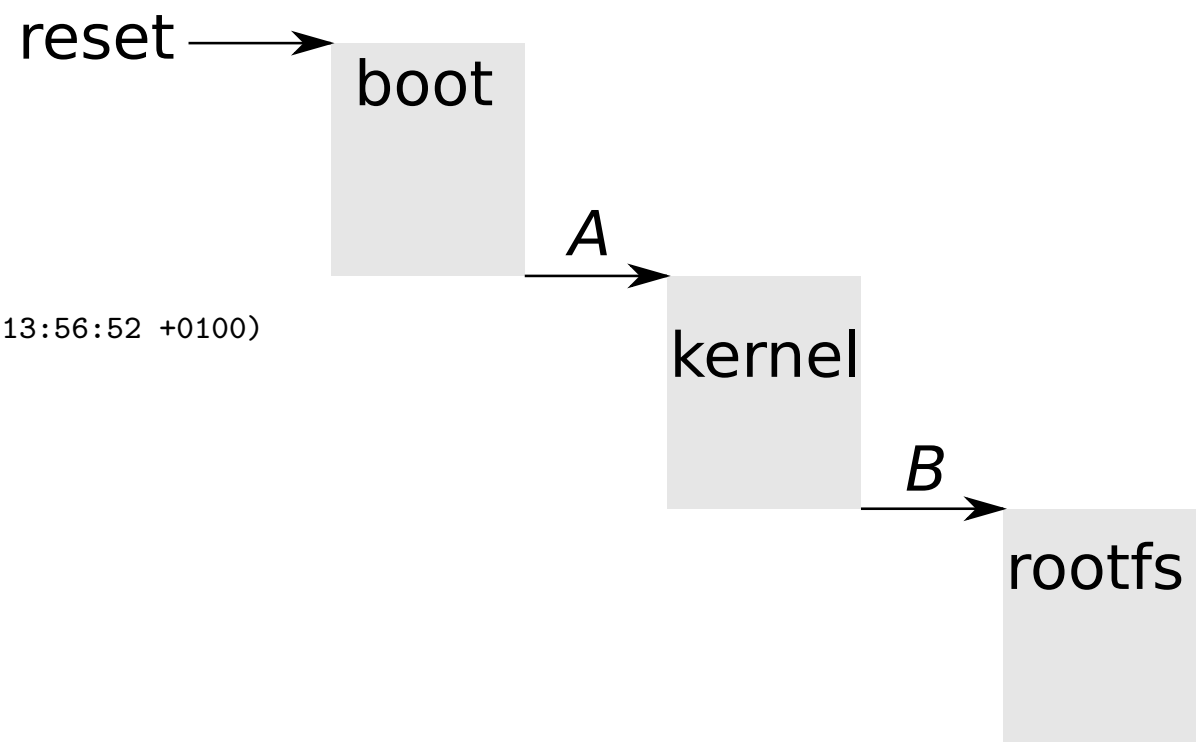
reset start: BigBang

A unprotected→ protected ?

B concurrency

Boot:u-boot

Zwei Files



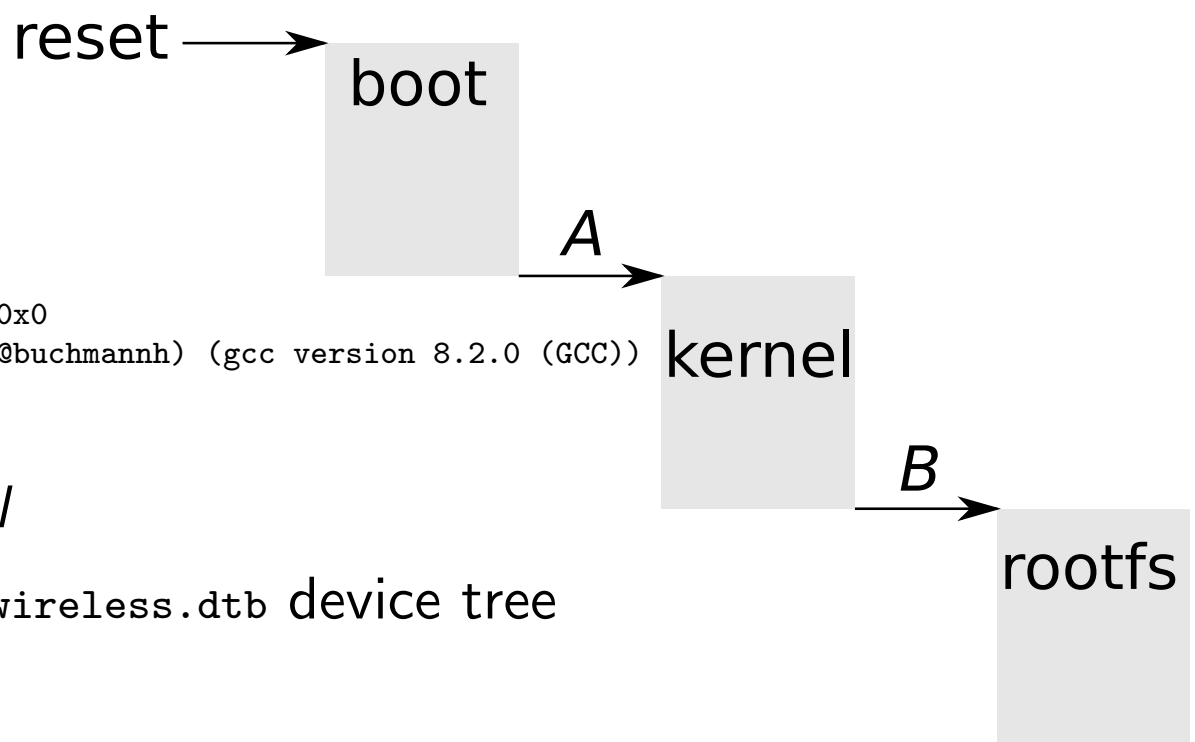
reset

```
U-Boot 2018.09 (Dec 18 2018 - 13:56:52 +0100)
```

- `MLO` Wegen TI
- `u-boot.img`

Kernel

Zwei Files



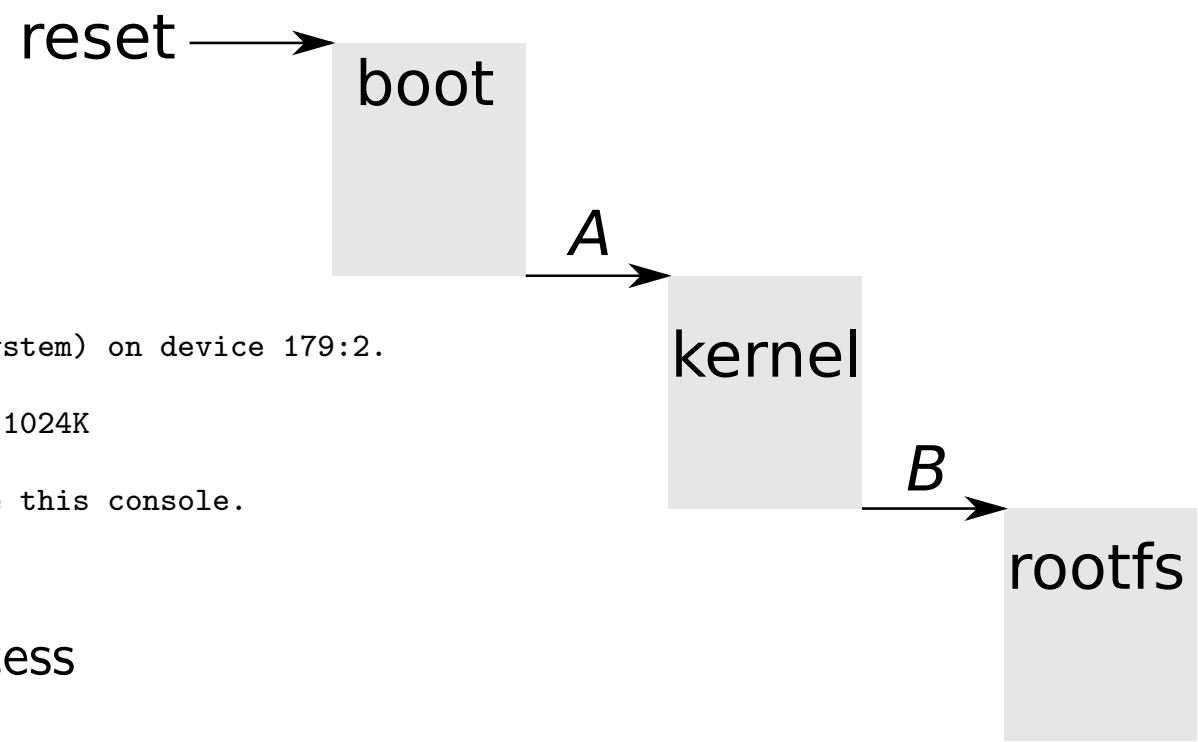
A

```
Booting Linux on physical CPU 0x0
Linux version 4.19.5 (buchmann@buchmannh) (gcc version 8.2.0 (GCC))
```

- `zImage` Der *kernel*
- `am335x-boneblack-wireless.dtb` device tree

RootFS: Viele Files

Unser Interesse



B

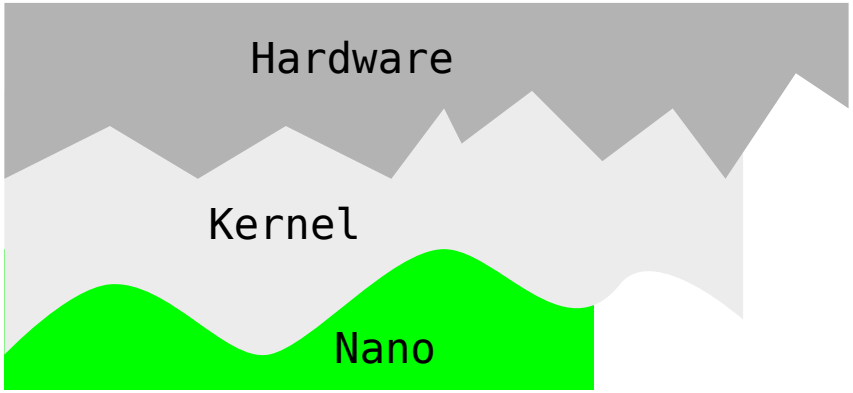
```
VFS: Mounted root (ext4 filesystem) on device 179:2.
devtmpfs: mounted
Freeing unused kernel memory: 1024K

Please press Enter to activate this console.
```

- `linuxrc` Init-Process
- ...

RootFS

Flavours

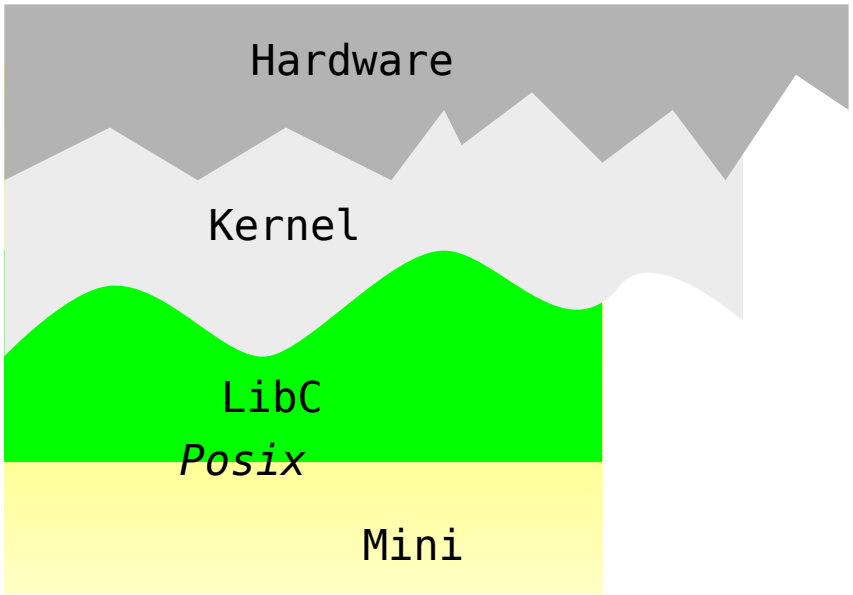
- nano
  - Assembler ohne *libraries* `s-nano.S`
  - **C** fast ohne *libraries* `c-nano.c`
- mini
  - *libraries*
    - static
    - dynamic
- full
  - `busybox`
  - `ssh`
  - ...



- `config/Makefile`
- `src/s-nano.S`

  target-root nichts
- `src/c-nano.c`

  target-root `libc.a` wegen `syscall`



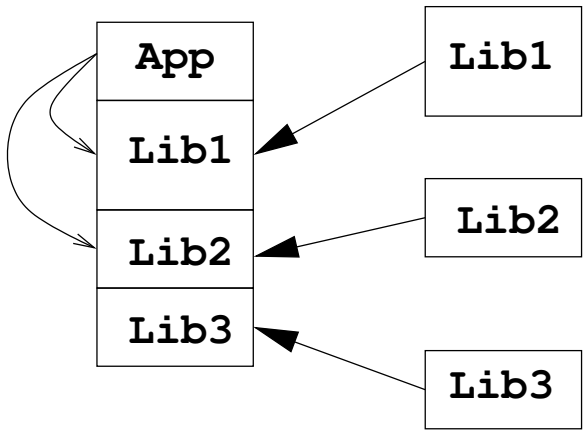
- `config/Makefile`
- `src/mini.c`
  - static
    target-root `libc.a`
  - dynamic
    target-root `libc.so`, `loader`

Statische/Dynamische Bibliothek

Kopie vs. Referenz

Static

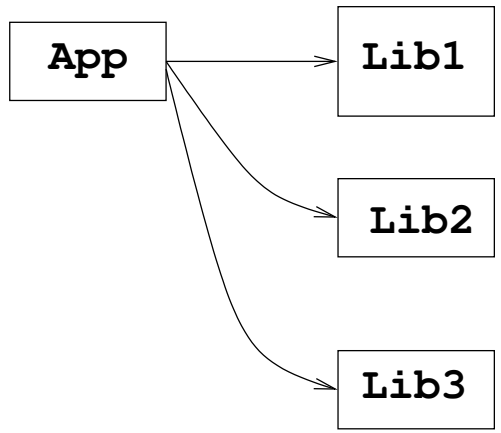
- UNIX



- frühes Binden

Dynamic

- UNIX



- spätes Binden

Dynamische Bibliothek:der Loader

am Beispiel `mini.c`

- wir sind in `work`
- `gcc ../src/mini.c -o mini`
- `file mini`
- start loader
- start loader mit *executable*

Verzeichnisstruktur

Siehe *17-build*

Aufgaben

- Erzeugen Sie ein:
  - **s-nano**
  - **c-nano**
  - **mini-static**
  - **mini-dynamic**

  auf dem **BBW** `RootFS`
- ändern Sie den `Makefile` so ab, dass er **s-nano**, **c-nano**, **mini-static** und **mini-dynamic** auf den *Host* erzeugt