Live-sculpting a
Genode-based operating system

Norman Feske
<norman.feske@genode-labs.com>
Outline

1. Base system
2. Storage, networking
3. Extending the system
4. Road Map for 2018
1. Base system

2. Storage, networking

3. Extending the system

4. Road Map for 2018
System overview

Drivers

Leitzentrale

Runtime

static system

Microkernel / Core

Live-sculpting a Genode-based operating system
Static part of the system

Drivers
Leitzentrale
Runtime

static system

Microkernel / Core

Live-sculpting a Genode-based operating system
Static part of the system

Drivers
Leitzentrale
Runtime

Nitpicker
GUI Server
Report
ROM
Global Policy
Report FS
Config FS
Report FS
Config FS

initial config
Drivers subsystem

Drivers

ACPI Discovery
Platform Driver
PS2 Driver
USB Driver
Driver Manager
Dynamic Init
Framebuffer Driver
Block Driver
Input Filter

I/O MEM
I/O PORT
IRQ

Microkernel / Core
Leitzentralele subsystem

Drivers

Leitzentrale

Runtime

static system

Microkernel / Core

Init

Init

Init
Leitzentrale subsystem

- Recompiled Unix program
  - FreeBSD libc
    - libc plugin
  - Noux session
    - open read write
    - select ioctl
    - stat readdir
- I/O channels
- Terminal
- VFS
- TarFS
- Init
- Terminal session
- ROM session

Live-sculpting a Genode-based operating system
Leitzentrale subsystem

Live-sculpting a Genode-based operating system
Tweaking and inspecting the system
Runtime subsystem

Drivers

Leitzentrale

Runtime

static system

Microkernel / Core

Live-sculpting a Genode-based operating system
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Preparing the disk

Drivers
- Framebuffer Driver
- Block Driver
- Dynamic Init
- Input Filter

Runtime
- Noux /dev/block
- Terminal
- Nit FB
- Init

Static system
- Nitpicker
- bash
- coreutils
- e2fsprogs

Global policy
- driver-manager policy
- runtime policy
- global policy
File-system access

- **Static system**
- **Init**
- **Nit FB**
- **Terminal**
- **Noux**
- **/config**
- **/rw**

- **VFS**
- **Server**
- **NetBSD Rump kernel**
- **VFS plugin**

- **Runtime**
- **Nitpicker**
- **Config FS**
- **Block**

- **Live-sculpting a Genode-based operating system**
Connecting to a wireless network

Drivers

- Device PD
- Device PD
- Device PD

Platform Driver

Runtime

- subinit/default_nic.config
- Wifi Driver
  - Intel Wireless stack
  - WPA supplicant
  - libcrypto

- Init
- Init

Platform

- Config ROM
  - wifi.config
- Report FS
  - nic/wlan_accesspoints
Making customizations permanent

Noux with mounted config FS and default FS

```
cp /config/<customized>.config /rw/config/
cp /config/runtime/<customized>.config /rw/config/runtime/
cp /config/subinit/<customized>.config /rw/config/subinit/
```

Config FS

Default FS
Restoring customizations after boot

Noux with mounted config FS and default FS

```
cp /rw/config/* /config/
cp /rw/config/runtime/*.config /config/runtime/
cp /rw/config/subinit/*.config /config/subinit/
```

Default FS  Config FS

For convenience → config/runtime/load.config
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Downloading files

Live-sculpting a Genode-based operating system
Installing software

Prerequisites

- Storage location for downloads
- Storage location for installed software
- Download URL
- Public key of software producer
Installing software

- What's missing?
- Get download info
- Fetch
- Verify
- Extract
- Archive list
- Download Manager
- Archive content
- download URL, public key
- archives, signatures
- good or bad
Installing software

- What's missing?
- Get download info
- Fetch
- Verify
- Extract

- Depot Query
- Dynamic Init
- Download Manager

- missing content
- state
- config (installation)
- read-only

- network
- file system /public
- file system /depot
Installing software

- What's missing?
- Get download info
- Fetch
- Verify
- Extract

Dynamic Init
Download Manager
Depot Query

Public key, URL
State
Config
Network
File system /public
File system /depot
Read-only

Live-sculpting a Genode-based operating system
Installing software

What's missing?
Get download info
Fetch
Verify
Extract

Dynamic Init
Download Manager
fetchurl
  libcurl
  libssl
  TCP/IP

state
config
write

network
file system /
/public
file system /
/depot
Installing software

What’s missing?
Get download info
Fetch
Verify
Extract

Dynamic Init

Download Manager

verify
GnuPG
libgcrypt

state
good / bad

config
read-only

network

file system
/public

file system
/depot

Live-sculpting a Genode-based operating system
Installing software

1. What's missing?
2. Get download info
3. Fetch
4. Verify
5. Extract

- **extract**
  - libarchive
  - liblzma

- **chroot**
  - /<origin>

- **Download Manager**
- **Dynamic Init**

- **state**: write
- **config**: read-only
- **file system**
  - /public
  - /depot

- **network**: read-only
Outline

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Road Map for 2018

Sculpt for Early Adopters (EA)
→ 18.02 (end of February)

Sculpt for The Curious (TC)
→ 18.05 (end of May)

Sculpt by Visual Composition (VC)
→ 18.08 (end of August)

Sculpt as a Community Experience (CE)
→ 18.11 (end of the year)

Details at https://genode.org/about/road-map
Thank you

Genode OS Framework
https://genode.org

Genode Labs GmbH
https://www.genode-labs.com

Source code at GitHub
https://github.com/genodelabs/genode