

Bootstrapping Intro – Current status

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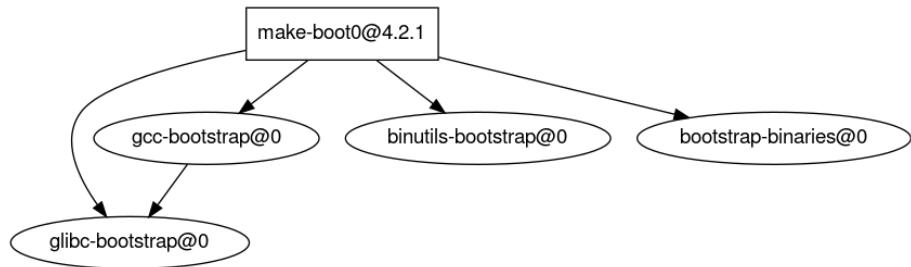
GNU Guix Days @FOSDEM'20

2020-01-30

Outline

- 1 Bootstrapping Guix v1.0
- 2 Aim for the Stars: Full Source Bootstrap

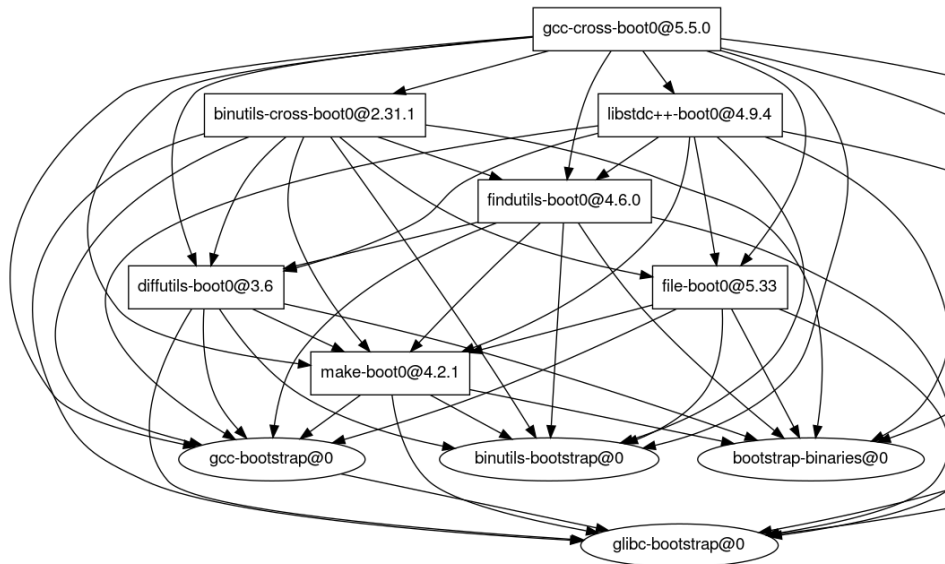
Guix v1.0: The First Package



Guix Graph

```
$ guix graph make
$ guix graph make | dot -T png > make.png
$ guix graph -e '(@@ (gnu packages commencement) gnu-make-bootC
```

Guix v1.0: The First GCC



Guix bootstrap tarballs

```
$ guix build bootstrap-tarballs
```

Guix v1.0 bootstrap binary seed

```
$ du -schx $(readlink $(guix build bootstrap-tarballs)/*)
2.1M /gnu/store/9623n4bq6iq5c8cwwdq99qb7d0xj93ym-binutils-static
18M /gnu/store/437xwygmmwwpkddcyy1qvjcv4hak89pb-gcc-stripped-ta
1.8M /gnu/store/55ccx18a0d1x5y6a575jff1yr0ywizvdg-glibc-stripped
5.7M /gnu/store/bqf0ajclbvnbm0a46819f30804y3ilx0-guile-static-s
5.8M /gnu/store/j8yzjmh9sy4gbdfwjrh46zca43aah6x-static-binarie
33M total
$ for i in $(readlink $(guix build bootstrap-tarballs)/*);\
do sudo tar xf $i; done
$ du -schx *
130M bin
13M include
54M lib
51M libexec
5.2M share
252M total
```

Reduce binary seeds to bare minimum

These big chunks of binary code are practically non-auditable which breaks the source to binary transparency that we get in the rest of the package dependency graph.

Every unauditable binary leaves us vulnerable to compiler backdoors as described by Ken Thompson in the 1984 paper [Reflections on Trusting Trust](#).

Thus, our goal is to reduce the set of bootstrap binaries to the bare minimum. – Ludovic Courtès (GNU Guix documentation, December 2017)

Guix Reduced Binary Seed

```
$ du -schx $(readlink $(guix build bootstrap-tarballs)/*)
5.7M /gnu/store/9f8gi8raqfx9j3l9d00qrrc0jg3r1kyj-guile-static-s
80K /gnu/store/b6rjl52hibhmvyw4dg8678pwryhla0h2-linux-libre-hea
12K /gnu/store/d7zlxsjcnqilmvqwx7scija9x9bjw8cw-mescc-tools-sta
428K /gnu/store/n7zc4kpi8ny6jlfaikkzxlwhc5fvr1vr-mes-minimal-st
6.0M /gnu/store/nv4djwlrlljfqmynqr2cqvf wz0ydx7kxb-static-binarie
13M total
```

```
$ for i in $(readlink $(guix build bootstrap-tarballs)/*);\  
do sudo tar xf $i; done
```

Password:

```
$ du -schx *
93M bin
700K include
38M lib
14M share
145M total
```

Guix Scheme-only bootstrap

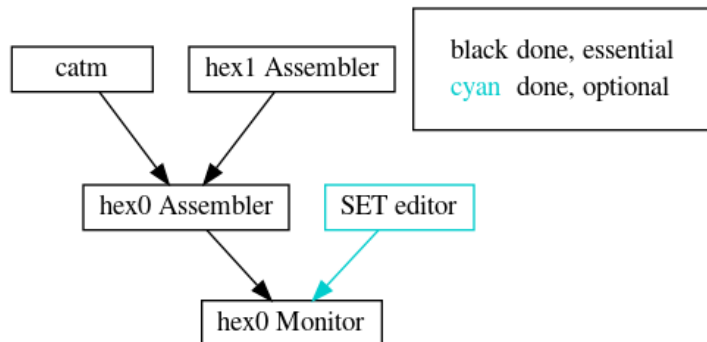
```
$ du -schx $(readlink $(~/src/guix/wip-bootstrap/pre-inst-env g
5.7M /gnu/store/1mq2pcd2h7g54xpi2jrgj6ibbi4lgi3c-guile-static-s
80K /gnu/store/bl1r2bpbk6fam8r2gjvr5mvr48i3dm2hn-linux-libre-hea
12K /gnu/store/w0dlz486dhh8aiq8pxm5akllz628fqin-mescc-tools-sta
428K /gnu/store/15j6l18q44ymlrh1cfp4s4hc9835xic5-mes-minimal-st
6.2M total
$ for i in $(readlink $(~/src/guix/wip-bootstrap/pre-inst-env g
  do sudo tar xf $i; done
$ du -schx *
4.9M bin
700K include
38M lib
14M share
57M total
```

Scheme-only bootstrap: Gash Core Utils

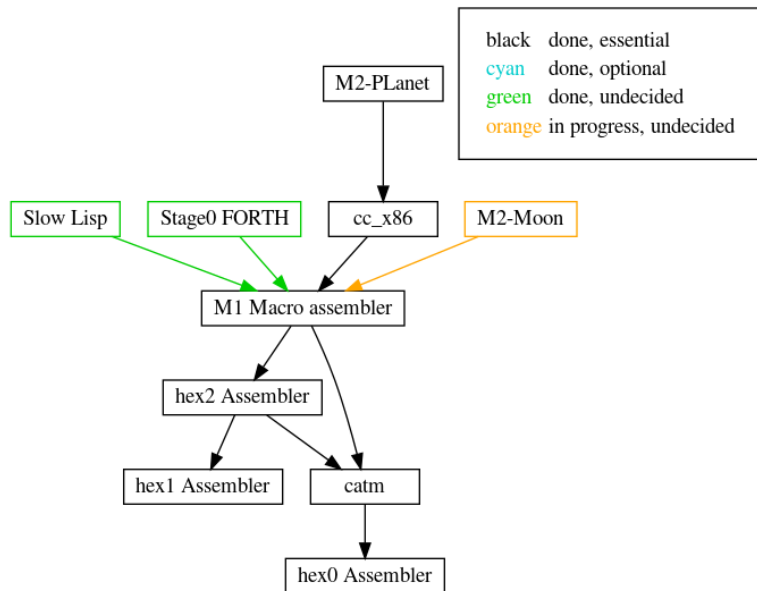
| | | | | | |
|----------|---------|-------|--------|-------|-------|
| awk | cp | gash | mv | sleep | uname |
| basename | cut | grep | pwd | sort | uniq |
| bash | diff | gzip | reboot | tar | wc |
| cat | dirname | head | rm | test | which |
| chmod | expr | ln | rmdir | touch | |
| cmp | false | ls | sed | tr | |
| compress | find | mkdir | sh | true | |



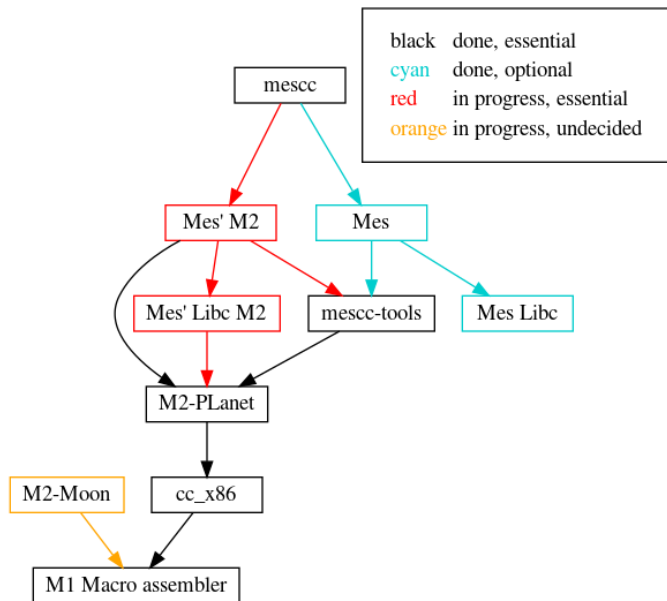
Full Source Bootstrap: Stage 0



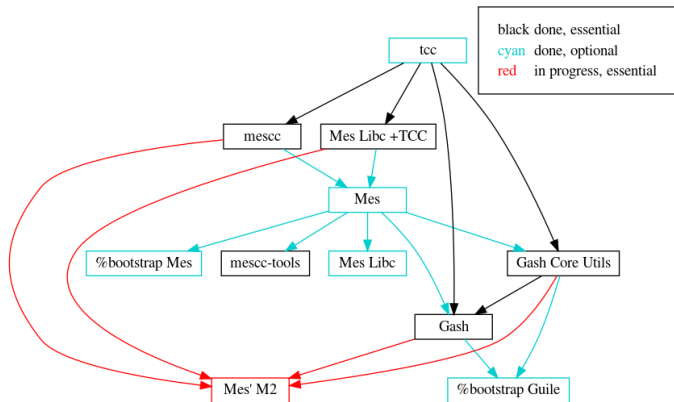
Full Source Bootstrap: Stage 1



Full Source Bootstrap: Stage 2



Full Source Bootstrap: Stage mes



Full Source Bootstrap: Stage mesboot

