

Freedesktop SDK on RISC-V

Valentin David



May 14th
LAS 2021

Freedesktop SDK

- The main Flatpak runtime
- Base for GNOME SDK and KDE SDK
- Base for GNOME OS testing bootable image
- No dependency to distributions
- Built using BuildStream

This is not Freedesktop. It is a Freedesktop project.
The content of Freedesktop SDK is not an endorsement from Freedesktop.

- Opensource CPU instruction set architecture
- 32, 64, 128 bits
- Multiple extensions for multiple applications
- From micro controllers to super computers
- Including desktop!

The right time

- GNU binutils 2.28: March 6th 2017
- GCC 7.1: May 2nd 2017
- Linux 4.15: January 28th 2018
- glibc 2.27: February 1st 2018
- GDB 8.3: May 11th, 2019
- LLVM 9.0.0: September 19th 2019
- Rust 1.42.0 (tier 2, compiler+lib): March 12th 2020
- GO 1.16: February 17th 2021 (Not for Flatpak)

Also desktop capable experimental hardware is expected to be released.

Building it

- We target RV64GC, with lp64d ABI.
- Freedesktop SDK's bootstrap phase can be cross compiled.
- The rest needs to build on target architecture.
- No hardware: QEMU user mode emulation.

QEMU user mode vs system

- user mode does not need an OS image
- user mode allows building everything as one command
- user mode is faster
- user mode hangs...

`G_SLICE=always-malloc` and everything works

Outcome

Most upstreams with architecture specific handling already supported RISC-V

Mostly minor build fixes required

Missing from Freedesktop SDK:

- valgrind
- libunwind
- pcre2's JIT compiler

Nothing more will be missing from GNOME SDK

I want to build my Flatpak app for RISC-V!

- Install QEMU user for RISC-V and setup `binfmt_misc`
- Build Freedesktop SDK: `make ARCH=riscv64 export`
- Install Freedesktop SDK
- (Optional) Add “`G_SLICE=always-malloc`” build environment to your manifest
- `flatpak-builder --arch=riscv64 ...`

Then test it!

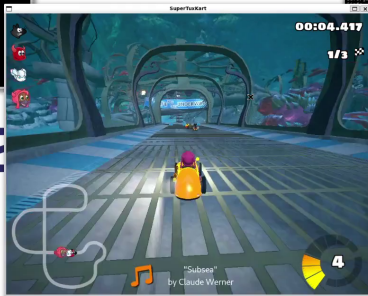
00 Thu Feb 16 02:43 PM

```
winston@winston:~/freedesktop-sdk$ ./bin/release
[winston@winston:~/freedesktop-sdk]$ cat /etc/os-release
NAME="Freedesktop.org"
VERSION="21.08-devel"
PRETTY_NAME="Freedesktop.org 21.08-devel (Playpak runtime)"

```

```
[jaffa@winston:~/freedesktop-sdk]$ ./bin/release
[winston@winston:~/freedesktop-sdk]$ cat /etc/os-release
NAME="Freedesktop.org"
VERSION="21.08-devel"
PRETTY_NAME="Freedesktop.org 21.08-devel (Playpak runtime)"

```



fre

op-sdk

Plans?

- Freedesktop SDK 21.08 for RISC-V will be published for testing
- Will run CI/CD more often when we get hardware
- Need to build builder images (they are built from Freedesktop SDK)
- Hardware for Flathub?

Aknowlegdements

Work done by engineers at Codethink. Special kudos to James Thomas.
We are hiring! <https://www.codethink.co.uk/join-us.html>

See you at GUADEC 2021 for more RISC-V stuff.