Move Fast and Break Everything
Testing major changes to a core component of GNOME

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GUADEC 2020

Move Fast and Break Everything

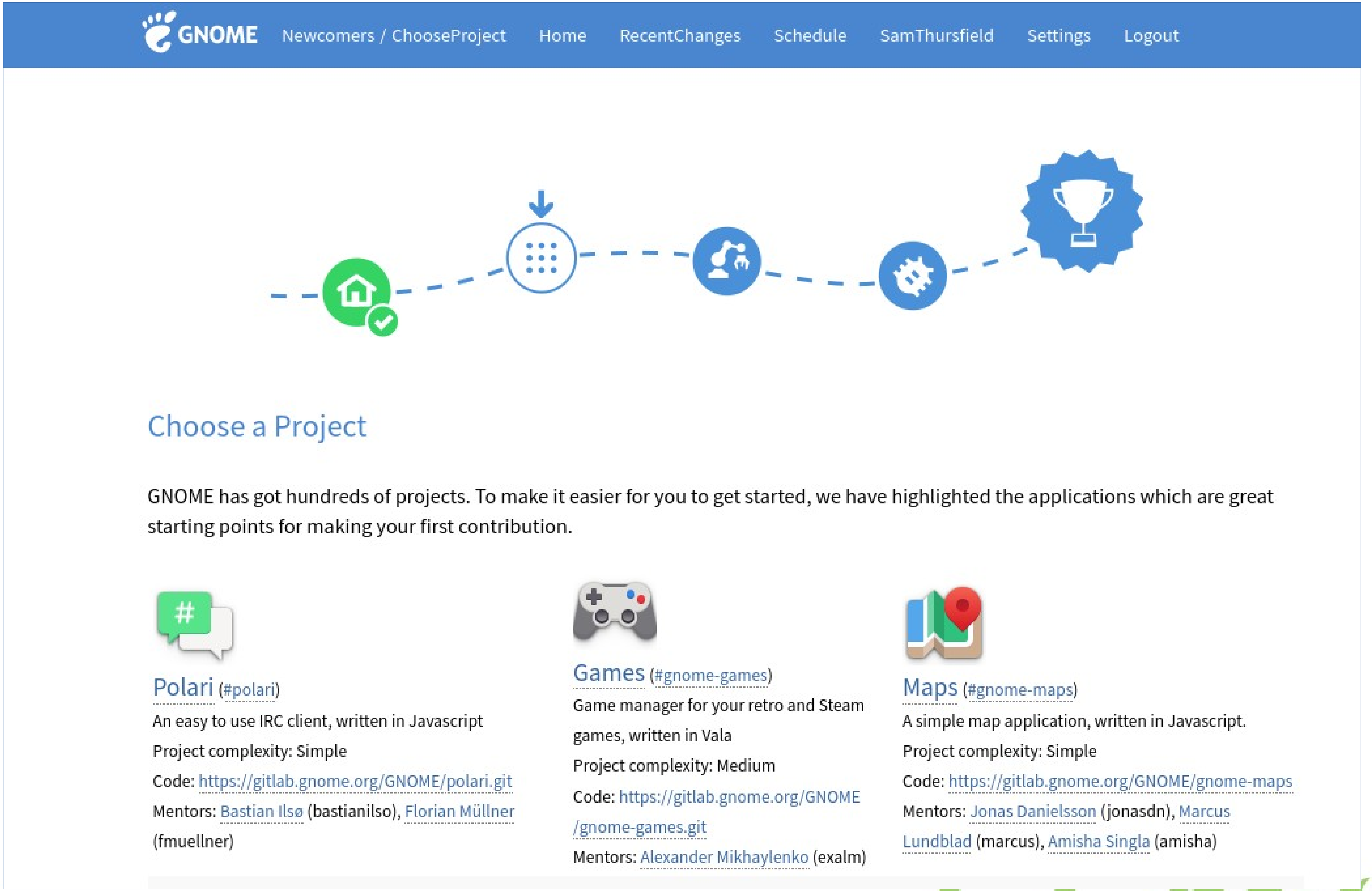
Part 1. Get to know your daemons

Why does GNOME provide system services?

Part 2. Learn to control them

Testing changes to the Tracker search engine

https://wiki.gnome.org/Newcomers/ChooseProject



Choose a Project

GNOME has got hundreds of projects. To make it easier for you to get started, we have highlighted the applications which are great starting points for making your first contribution.

Polari (#polari)
An easy to use IRC client, written in Javascript
Project complexity: Simple
Code: https://gitlab.gnome.org/GNOME/polari.git
Mentors: Bastian Ilsø (bastianilso), Florian Müllner (fmuellner)

Games (#gnome-games)
Game manager for your retro and Steam games, written in Vala
Project complexity: Medium
Code: https://gitlab.gnome.org/GNOME/gnome-games.git
Mentors: Alexander Mikhaylenko (exalm)

Maps (#gnome-maps)
A simple map application, written in Javascript.
Project complexity: Simple
Code: https://gitlab.gnome.org/GNOME/gnome-maps
Mentors: Jonas Danielsson (jonasdn), Marcus Lundblad (marcus), Amisha Singla (amisha)

Part 1. Get to know your daemons

GNOME™

What is it?

Part 1. Get to know your daemons

GNOME™

Apps

Music, Photos, Web, …

Shell

Part 1. Get to know your daemons

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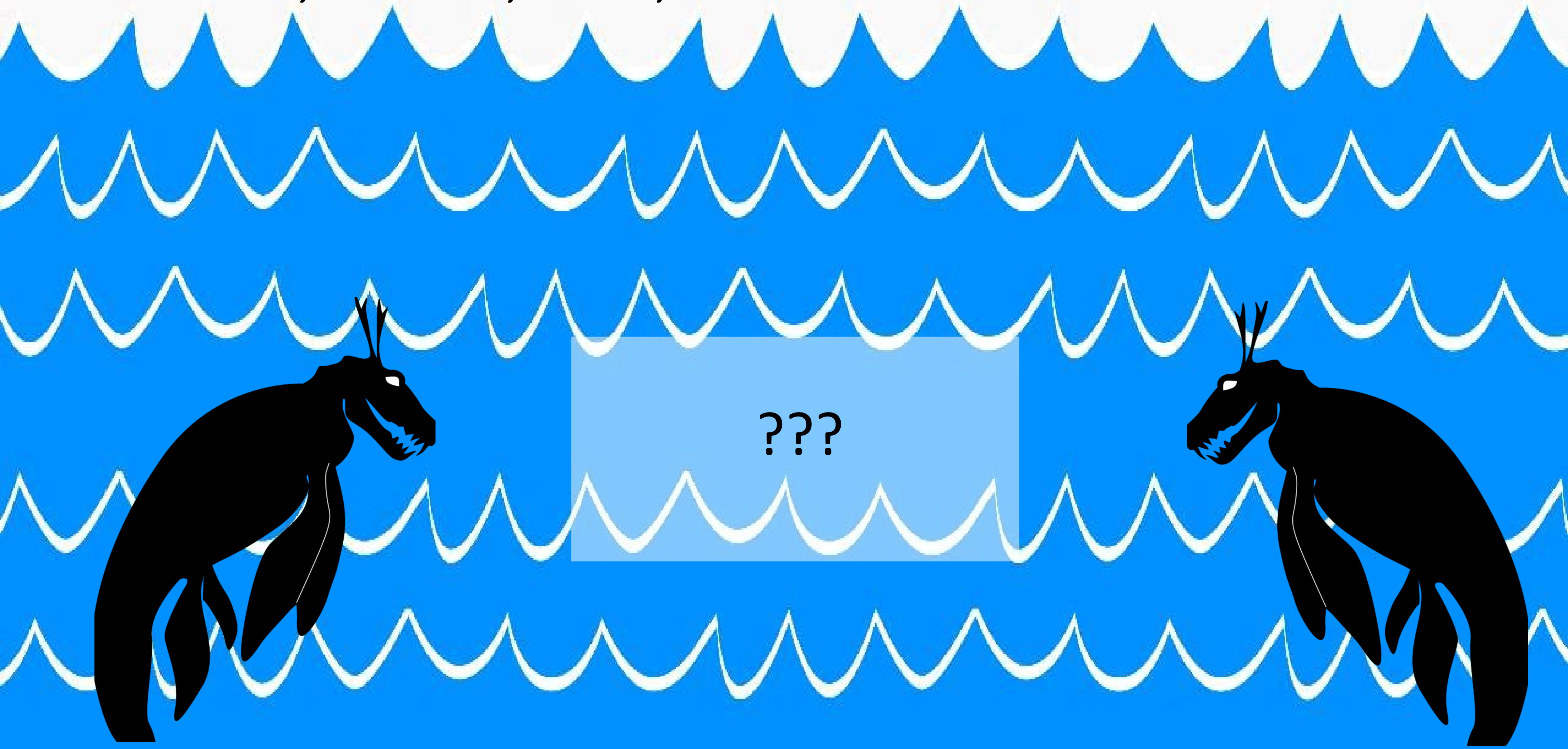


Part 1. Get to know your daemons

GNOME™

Apps

Music, Photos, Web, …

Shell

Libraries

GStreamer

GTK

PyGObject

libnotify

WebKitGTK

...and 100s more...

Services

dconf

evolution-data-server

NetworkManager

GNOME Keyring

Tracker

upower

...and 10s more...

System services

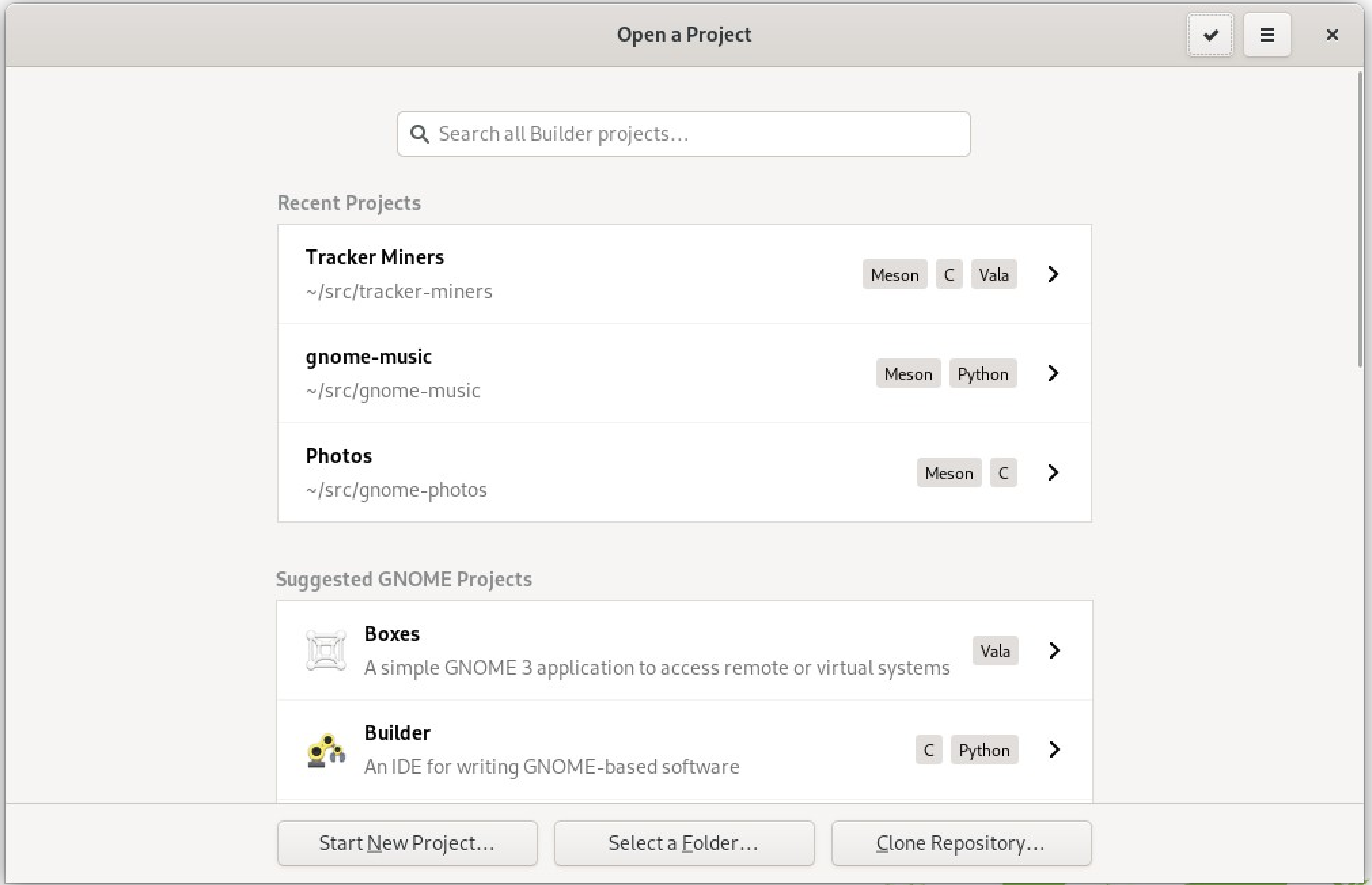
- May manage hardware, or a data store
- Communicate over D-Bus, or by a socket
- Apps access them directly or with a helper library

"Anything that wants to be running as a system service in combination with any kind of sandboxing system must have a protocol that is ABI stable and backwards compatible."

Try this at home: pstree

```
systemd─┬─ModemManager───2*[{ModemManager}]
        ├─NetworkManager───2*[{NetworkManager}]
        ├─abrt-dbus───2*[{abrt-dbus}]
        ├─3*[abrt-dump-journ]
        ├─abrtd───2*[{abrtd}]
        ├─accounts-daemon───2*[{accounts-daemon}]
        ├─alsactl
        ├─auditd─┬─sedispatch
        │        └─2*[{auditd}]
        ├─avahi-daemon───avahi-daemon
        ├─colord───2*[{colord}]
        ├─crond
        ├─cupsd
        ├─dbus-broker-lau───dbus-broker
        ├─2*[dnsmasq───dnsmasq]
        ├─earlyoom
        ├─firewalld───{firewalld}
```

Part 2: Control your daemons
...or better yet, hack on them.


Open a Project

Search all Builder projects…

Recent Projects

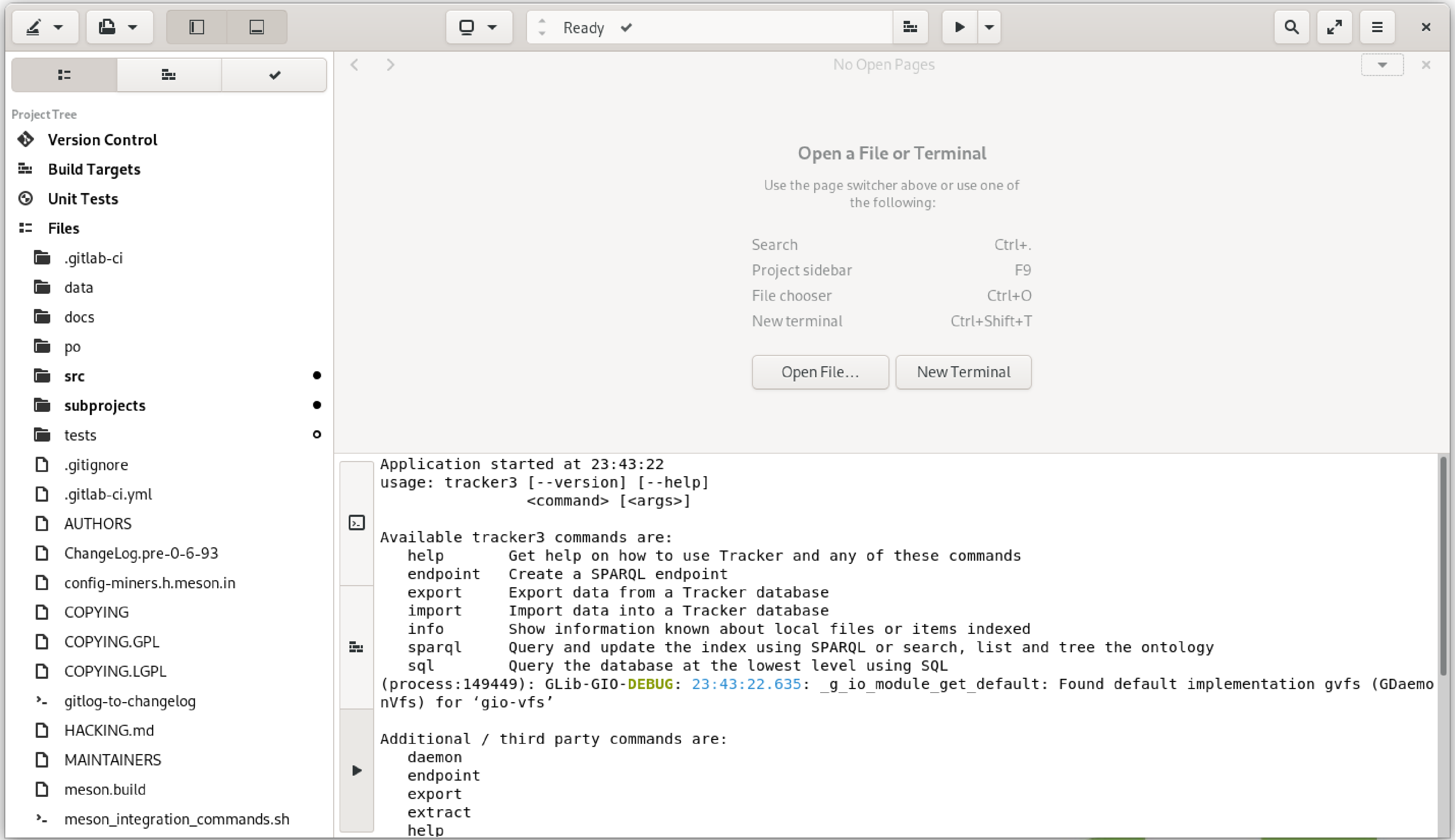
Tracker Miners ~/src/tracker-miners	Meson C Vala
gnome-music ~/src/gnome-music	Meson Python
Photos ~/src/gnome-photos	Meson C

Suggested GNOME Projects

Boxes A simple GNOME 3 application to access remote or virtual systems	Vala
Builder An IDE for writing GNOME-based software	C Python

Part 2. Control your daemons

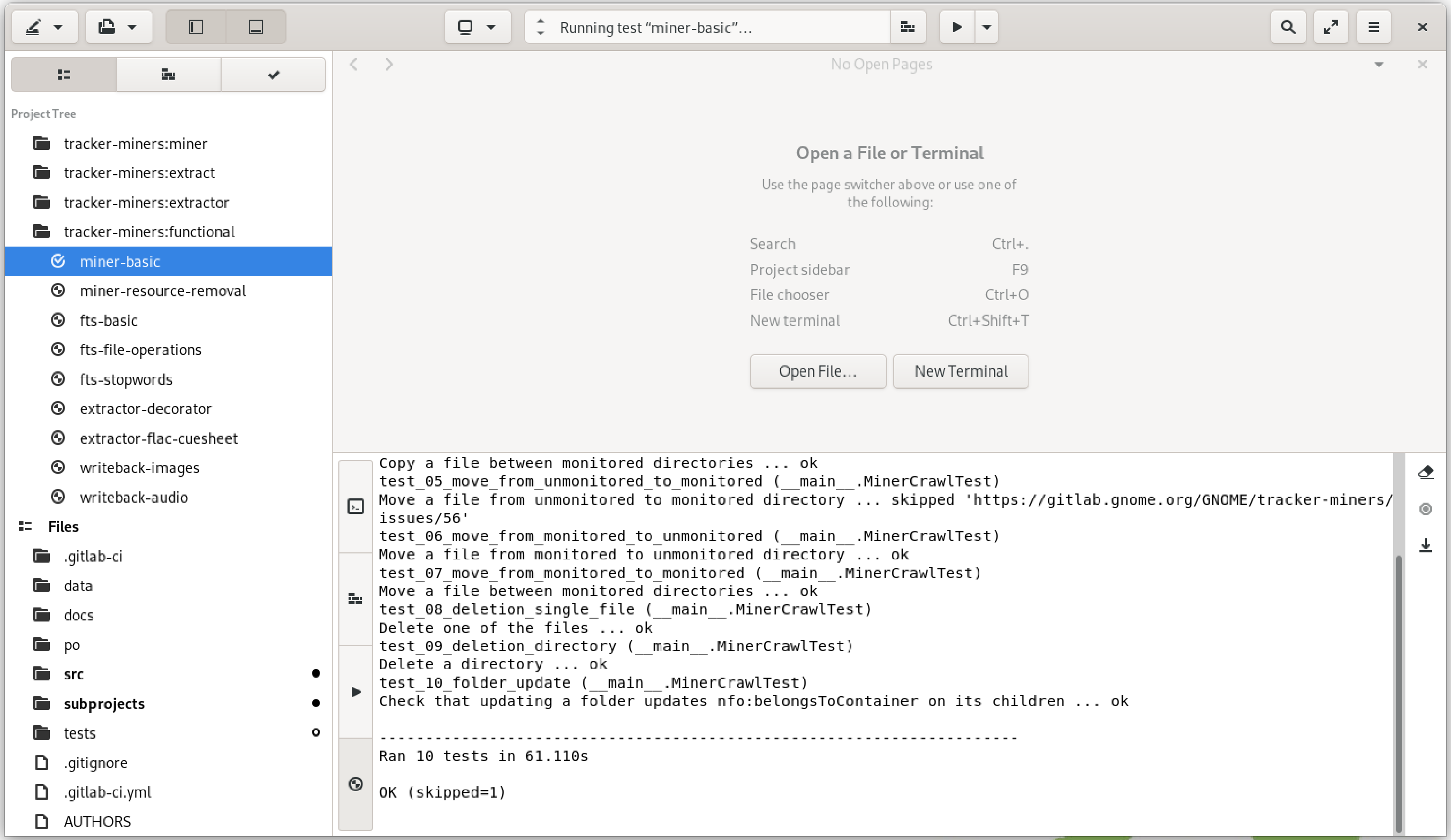
Building and running Tracker with GNOME Builder



```
Application started at 23:43:22
usage: tracker3 [--version] [--help]
                <command> [<args>]

Available tracker3 commands are:
   help       Get help on how to use Tracker and any of these commands
   endpoint   Create a SPARQL endpoint
   export     Export data from a Tracker database
   import     Import data into a Tracker database
   info       Show information known about local files or items indexed
   sparql     Query and update the index using SPARQL or search, list and tree the ontology
   sql        Query the database at the lowest level using SQL
(process:149449): GLib-GIO-DEBUG: 23:43:22.635: _g_io_module_get_default: Found default implementation gvfs (GDaemo
nVfs) for 'gio-vfs'

Additional / third party commands are:
   daemon
   endpoint
   export
   extract
   help
```

Part 2. Control your daemons

Running an automated test



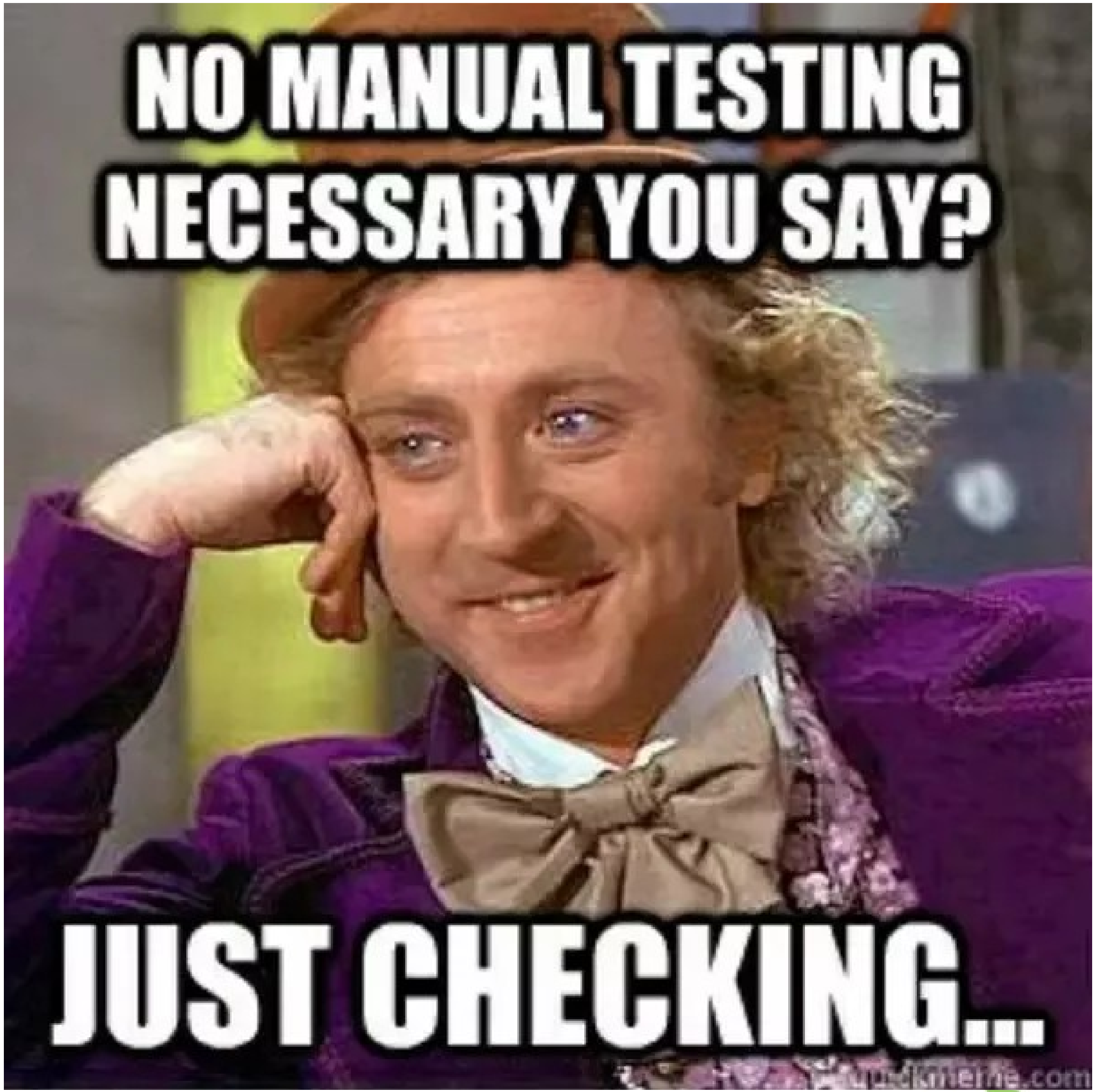
```
Copy a file between monitored directories ... ok
test_05_move_from_unmonitored_to_monitored (__main__.MinerCrawlTest)
Move a file from unmonitored to monitored directory ... skipped 'https://gitlab.gnome.org/GNOME/tracker-miners/
issues/56'
test_06_move_from_monitored_to_unmonitored (__main__.MinerCrawlTest)
Move a file from monitored to unmonitored directory ... ok
test_07_move_from_monitored_to_monitored (__main__.MinerCrawlTest)
Move a file between monitored directories ... ok
test_08_deletion_single_file (__main__.MinerCrawlTest)
Delete one of the files ... ok
test_09_deletion_directory (__main__.MinerCrawlTest)
Delete a directory ... ok
test_10_folder_update (__main__.MinerCrawlTest)
Check that updating a folder updates nfo:belongsToContainer on its children ... ok

----------------------------------------------------------------------
Ran 10 tests in 61.110s

OK (skipped=1)
```

Part 2. Control your daemons

Automated testing of daemons...

- Use `dbus-run-session` to create a throwaway message bus.
- Use `umockdev` to simulate real hardware.
- Write tests in Python (test your bindings and/or D-Bus API for free!)

See Tracker's `tests/functional-tests` for a complex example.


NO MANUAL TESTING
NECESSARY YOU SAY?
JUST CHECKING...
quickmeme.com

The best way to deploy a test build?

Run from source tree

Install into /usr

Install into /opt (jhbuild)

Use distro packaging tools

Use BuildStream to build a VM image

Run from the source tree

- Unlikely to work, but try it!
- Project can provide a helper script.

https://gitlab.gnome.org/GNOME/tracker-miners/-/blob/master/run-uninstalled.in

Install into /usr

- Fast, easy and simple
- It will break the host OS.

Install into /opt

- Fast, and safe-ish
- System integration won’t work as normal.

```
export XDG_DATA_DIRS=/opt/tracker3/share:/usr/share
dbus-run-session /opt/tracker3/bin/tracker3 search Foo
```

- jhbuild can help, but you might not need it.

Use distro packaging tools

- Reproducible and safe-ish
- Use PPA for Ubuntu, COPR for Fedora, …
- Turnaround time is slow (at least a few minutes)

Use BuildStream

- Reproducible and safe
- You need a VM (bst shell isn't magic)
- Building and deploying VM update took me ~20 mins
- Work is ongoing to improve "GnomeOS" testing images *(see Valentin's talk)*

More details:

The best way to deploy a test build?

	Fast	Reproducible	No extra codepaths needed	No extra computer or VM needed
Run from source tree	✓	✓		✓
Install into /usr	✓		✓	
Install into /opt (jhbuild)	✓			✓
Use distro packaging tools		✓	✓	~
Use BuildStream to build a VM image		✓	✓	

In summary...

- Contributing to daemons shouldn’t be scary.
  - *Do you maintain a daemon? Update the README :)*
- Automated testing is best
  - *If a service project doesn’t have functional testing, look at how to add it!*
- Manual testing is often needed too.
  - *How can we make sure it’s frictionless?*