libratbag
a way to configure your input devices
whoami

- Filipe Laíns
- Likes beer!
- Student (2\textsuperscript{nd} year Computer Engineering)
- Arch Linux packager
ToC

- What is libratbag?
- Status of the project
- Future?
- HID protocol
- libratbag driver structure
- Questions
libratbag

- DBus daemon to configure input devices (mostly gaming mice)
- Created in 2015
  - Benjamin Tissoires (kernel HID subtree)
  - Peter Hutterer (libinput, libevdev, etc)
- Vendor agnostic
  - Etekcity (1 device)
  - G.Skill (1 device)
  - Logitech (53 devices)
  - Roccat (2 devices)
  - Steelseries (7 devices)
libratbag

- What can you configure?
  - Resolutions (DPI)
  - Report rate
  - Buttons (macros)
  - LEDs
libratbag

- Clients
  - ratbagctl (CLI, mostly intended for debug)
  - Piper (GTK)
libratbag (status)

- It works
- No stable API yet
- Issues?
  - Limited time
  - Hard to maintain
    - Can be complex
    - Limited access to hardware
libratbag (future)

- Continuous Integration (CI)
  - Device emulation
    - We have a working prototype!
- Color synchronization
  - libratbag vs external daemon
HID protocol

- Human Interface Device
  - Defined in the USB spec
- Used by input devices (mice, keyboards, etc.) to interface with the host
HID protocol

- **Report descriptors**
  - Describe the format of the packets to be sent to the host

```
report_descriptor = [
    0x05, 0x01,         # Usage Page (Generic Desktop)
    0x09, 0x02,         # Usage (Mouse)
    0xa1, 0x01,         # Collection (Application)
    0x09, 0x02,         # Usage (Mouse)
    0xa1, 0x02,         # Collection (Logical)
    0x09, 0x01,         # Usage (Pointer)
    0xa1, 0x00,         # Collection (Physical)
    0x05, 0x09,         # Usage Page (Button)
    0x19, 0x01,         # Usage Minimum (1)
    0x29, 0x03,         # Usage Maximum (3)
    0x15, 0x00,         # Logical Minimum (0)
    0x25, 0x01,         # Logical Maximum (1)
    0x75, 0x01,         # Report Size (1)
    0x95, 0x03,         # Report Count (3)
    0x81, 0x02,         # Input (Data,Var,Abs)
    0x75, 0x05,         # Report Size (5)
    0x95, 0x01,         # Report Count (1)
    0x81, 0x03,         # Input (Cnst,Var,Abs)
    0x05, 0x01,         # Usage Page (Generic Desktop)
    0x09, 0x30,         # Usage (X)
    0x09, 0x31,         # Usage (Y)
    0x15, 0x81,         # Logical Minimum (-127)
    0x25, 0x7f,         # Logical Maximum (127)
    0x75, 0x08,         # Report Size (8)
    0x95, 0x02,         # Report Count (2)
    0x81, 0x06,         # Input (Data,Var,Rel)
    0xc0,               # End Collection
    0xc0,               # End Collection
    0xc0,               # End Collection
]```
HID protocol

- Vendor messages
  - Allows the device to send arbitrary messages to the host
libratbag drivers

```c
struct ratbag_driver example_driver = {
    .name = "Example Driver",
    .id = "example_driver",
    .probe = example_probe,
    .remove = example_remove,
    .commit = example_commit,
};
```
Questions?