Fixing bugs once and for all

Preparations

- rustup update nightly
- git checkout https://github.com/oli-obk/rustfest2018_workshop.git
- (oli-obk/rustfest2018_workshop)
- cd rustfest2018_workshop
- rustup override set nightly
- cargo test
- Wifi: Ionis Portal
- user: event-epitech-prs
- pw: Pr$3p1t3ch

$whoami

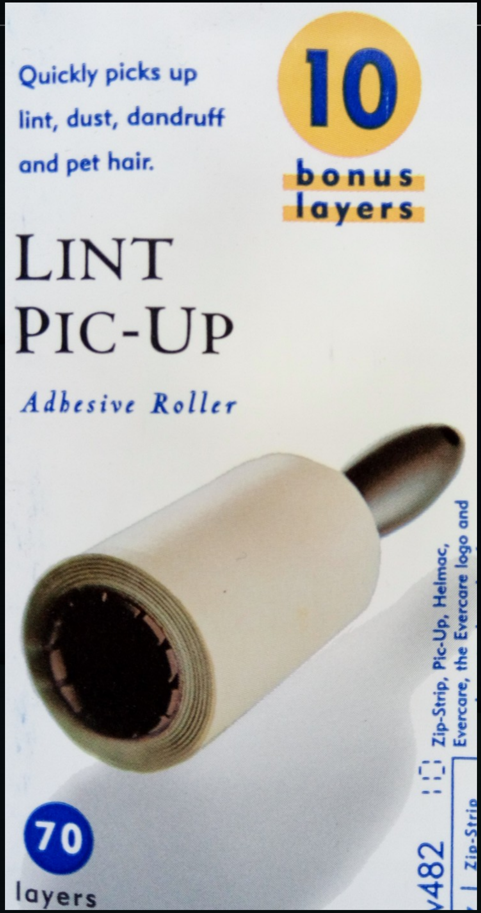
- Clippy
- Miri
- Serde

Ftp

- Wifi: Ionis Portal
- user: event-epitech-prs
- pw: Pr$3p1t3ch

What is clippy?

- A linter
- A static analysis tool
- Very annoying
- Very helpful


Quickly picks up lint, dust, dandruff and pet hair.
10
bonus layers
LINT PIC-UP
Adhesive Roller
70
layers
Zip-Strip, Pic-Up, Helmac, Evercare, the Evercare logo and

Static analysis

The process of obtaining information about the runtime behaviour of your program without acutally running your program

- Aka error messages

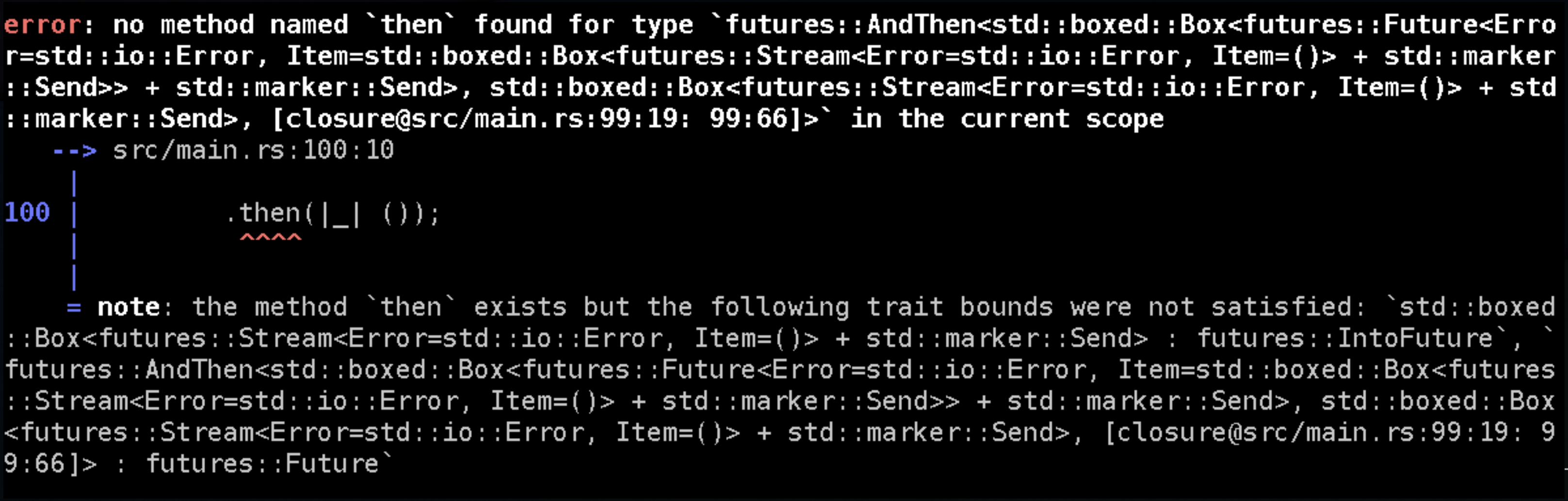
That‘s great…

everything already exists…

So you may be asking yourself:

...why am I here?

Project specific static analyses

- Servo
  - Garbage collection is hard
  - Encoding it in the type system produces e.g.
  - 

```
error: no method named `then` found for type `futures::AndThen<std::boxed::Box<futures::Future<Error=std::io::Error, Item=std::boxed::Box<futures::Stream<Error=std::io::Error, Item=()> + std::marker::Send>> + std::marker::Send>, std::boxed::Box<futures::Stream<Error=std::io::Error, Item=()> + std::marker::Send>, [closure@src/main.rs:99:19: 99:66]>` in the current scope
   --> src/main.rs:100:10
    |
100 |         .then(|_| ());
    |          ^^^^
    |
    = note: the method `then` exists but the following trait bounds were not satisfied: `std::boxed::Box<futures::Stream<Error=std::io::Error, Item=()> + std::marker::Send> : futures::IntoFuture`, `futures::AndThen<std::boxed::Box<futures::Future<Error=std::io::Error, Item=std::boxed::Box<futures::Stream<Error=std::io::Error, Item=()> + std::marker::Send>> + std::marker::Send>, std::boxed::Box<futures::Stream<Error=std::io::Error, Item=()> + std::marker::Send>, [closure@src/main.rs:99:19: 99:66]> : futures::Future`
```

How does it all work?

- Step 1
  - Create a new rustc binary that has more lints than the vanilla one
- Step 2
  - Use that rustc binary instead of the vanilla one by setting RUSTC_WRAPPER=my_awesome_rustc

Fin

Just kidding – Let‘s do this

- There are 150 lines of boilerplate
  - (without code for even a single lint)
  - I abstracted them away for you
- Now it‘s three lines of code:

```
rustfest2018_workshop::run_lints(|ls| {
    ls.register_early_pass(None, false, box NoTransmute);
});
```

early_pass? What‘s going on?

Two kinds of lints (actually 3, but not today)

- EarlyLintPass
  - Syntactic lints, no types available
- LateLintPass
  - Lowered Datastructures (no for/while, just loop+if)
  - Types!

Declaring a lint

- declare_lint! macro
- 3 arguments:
  - pub LINT_NAME
  - Lint level (Allow, Warn, Deny, Forbid)
  - A short description

Lint structure

- pub struct HelperType;
- impl LintPass for HelperType { … }
- choose one:
  - impl EarlyLintPass for HelperType { … }
  - impl LateLintPass for HelperType { … }

LintPass Boilerplate

```
fn get_lints(&self) -> LintArray {
    lint_array!(LINT_NAME)
}
```

Documentation

- forge.rust-lang.org
- „The rustc API docs are hosted here“
- Search for „EarlyLintPass“
- Big list of methods!
  - Implement only those you want to run checks for