Rust

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May 18, 2022

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Figure: Rust logo

Figure: Ferris the crab. Unofficial mascot

History

Personal project · Mozilla sponsoring · First appearing · Pre-alpha release · Rust 1.0 · COVID-19 layoffs · Rust Foundation

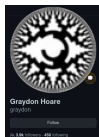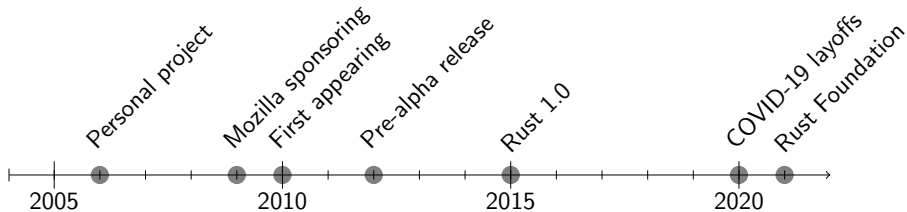2005   2010   2015   2020

Figure: Graydon Hoare

Figure: Rust Foundation founding members

Features

- Low-level
- Compiled
- Performance: no garbage collector
- Type system and ownership model guarantee:
    - Memory-safety
    - Thread-safety
- Cargo: cargo build, cargo fmt...
- Crates: crates.io

Features. Ownership

```rust
fn main() {
    let mut tribe_name = String::from("Backend"); // Mutable
    println!("Hi {}!", tribe_name); // Hi Backend!
    tribe_name.push_str(" Tribe");
    println!("Hi {}!", tribe_name); // Hi Backend Tribe!
    greet_borrowing(&tribe_name); // Hi Backend Tribe!
    println!("Hi {}!", tribe_name); // Hi Backend Tribe!
    greet_ownership(tribe_name); // Hi Backend Tribe!
    //println!("Hello {} Tribe!", tribe_name); // ERROR
}

fn greet_borrowing(name: &String) {
    println!("Hi {}!", name);
}

fn greet_ownership(name: String) {
    println!("Hi {}!", name);
}
```

```
fn main() {
    let mut buffer = format!("Hello");
    let slice = &buffer; // buffer borrowed here
    //buffer.push_str(" World"); // ERROR. Cannot mutate while
        shared
    //slice.push_str(" World"); // ERROR. Cannot mutate through a
        shared ref
    println!("{:?}", slice); // reading slice ok while shared
    buffer.push_str(" World"); // after last use of slice, buffer
        is mutable again
}
```

Adoption

- WebAssembly
- Integration with other languages
- Universities: data processing speed
- Dropbox's new sync engine Nucleus: Rust's type system detects errors at compile time, helping with synchronization complexity
- Support for Android as an alternative to C/C++
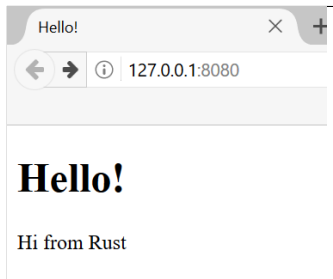- Cloud: AWS and Microsoft Azure build software with Rust

Demo

Figure: Web Server

- Single-Threated
- Multithreated

References

- History and adoption
  https://en.wikipedia.org
- Features
  https://www.rust-lang.org
  https://www.youtube.com
  https://crates.io
- Why scientists are turning to Rust
  https://www.nature.com
- Dropbox adoption
  https://dropbox.tech
- Demo web server
  https://doc.rust-lang.org
- Presentation and code
  https://github.com/CarlosAMolina/workshop-rust-web-server

References. Images

- Rust logo
  https://foundation.rust-lang.org
- Ferris the crab, unofficial mascot
  https://rustacean.net
- Graydon Hoare
  https://github.com/graydon
- Rust Foundation founding members
  https://foundation.rust-lang.org
- Multithreaded Web Server
  https://doc.rust-lang.org

Thank you!