



Eliminando Gargalos de Processamento Utilizando Rust

Johnathan Fercher

1. Introdução
2. Quem usa? E para que?
3. Sugestões de regras do Velocity
4. Mostre-me o código
5. Curiosidades
6. Material de estudos

Introdução

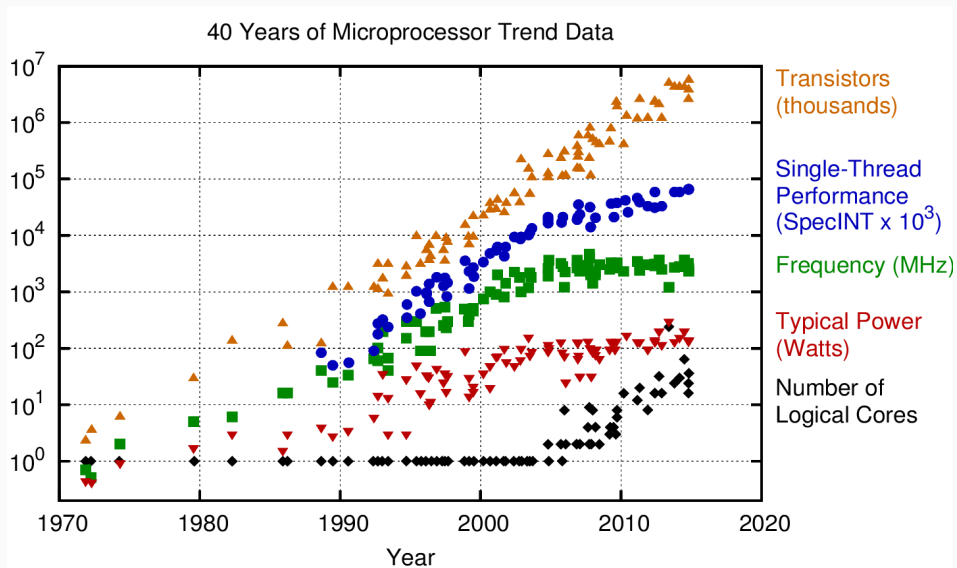


- Programming Language;
- Memory and thread-safe;
- Rust \rightarrow LLVM \rightarrow C \rightarrow EXE;
- C-Bindings;
- Object-Oriented and Functional;
- Unit-tests and Package Manager;
- Interfaces and Generics;
- Without Garbage Collector;

"O clock dos processadores dobra a cada 18 meses."

Lei de Moore, 1965.

Motivação



"The way the processor industry is going, is to add more and more cores, but nobody knows how to program those things. I mean, two, yeah; four, not really; eight, forget it."

Steve Jobs, Apple.

Motivação

Programação Paralela



Problemas:

- Data races;
- Deadlock;
- Use After Free;
- Double Free;

Bug 650064

Running Aurora and Firefox in parallel

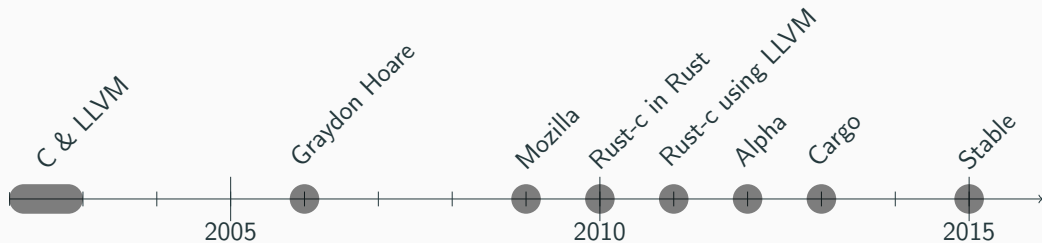
UNCONFIRMED Unassigned

▼ Status

Product: Firefox ▼
Component: General ▼
Status: UNCONFIRMED

Reported: 8 years ago
Modified: 6 years ago

História



- Licença MIT no Github;
- Duas versões: Stable e Nightly;
- Atualizações a cada 6 semanas;
- Processo de RFC;
- Quando uma RFC é aprovada ela é adicionada na versão Nightly;
- Após algum tempo em Nightly, ela pode ser adicionada na versão Stable, deixada de lado ou alterada;

Quem usa? E para que?

Quem usa? E para que?



"Optimizing cloud file-storage."

CANONICAL

"Everything from server monitoring to middleware!"



"Developing memory-safe embedded applications on our SmartThings Hub and supporting services in the cloud."

moz://a

"Building the Servo browser engine, integrating into Firefox, other projects."



"Programming Assignments in secured Docker containers."

Quem usa? E para que?



"Letting you develop, deploy and manage infrastructure, run-time environments and applications."



"We use Rust in a service for analyzing petabytes of source code."



"Replacing C and rewriting performance-critical bottlenecks in the registry service architecture."

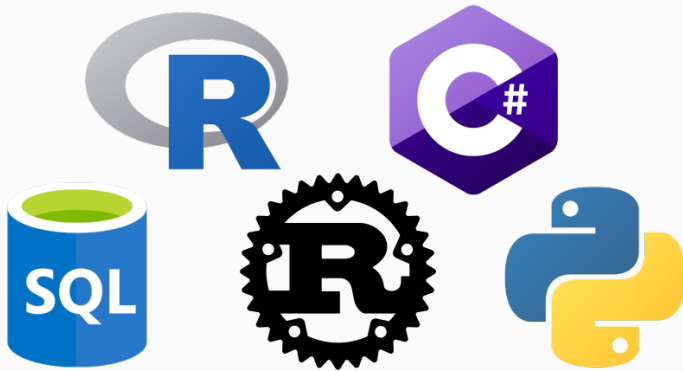


"Rust aid us to remove bottlenecks."

Quem usa? E para que?

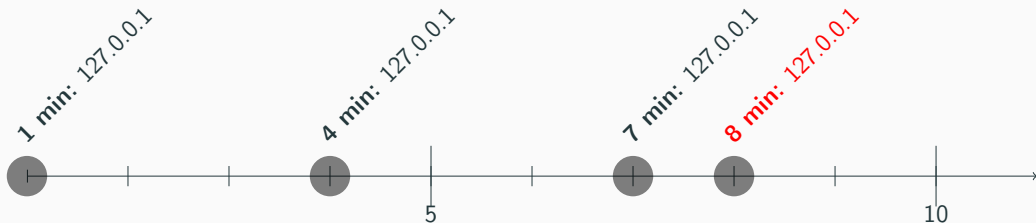
- No site oficial da linguagem há mais 123 empresas que deixaram claro que utilizam Rust em produção;

Sugestões de regras do Velocity



Regras de repetição:

- 5 repetições de um **Cpf** em 10 minutos;
- 10 repetições de um **Cartão** em 2 dias;
- 2 repetições de um **Ip** em 5 minutos;



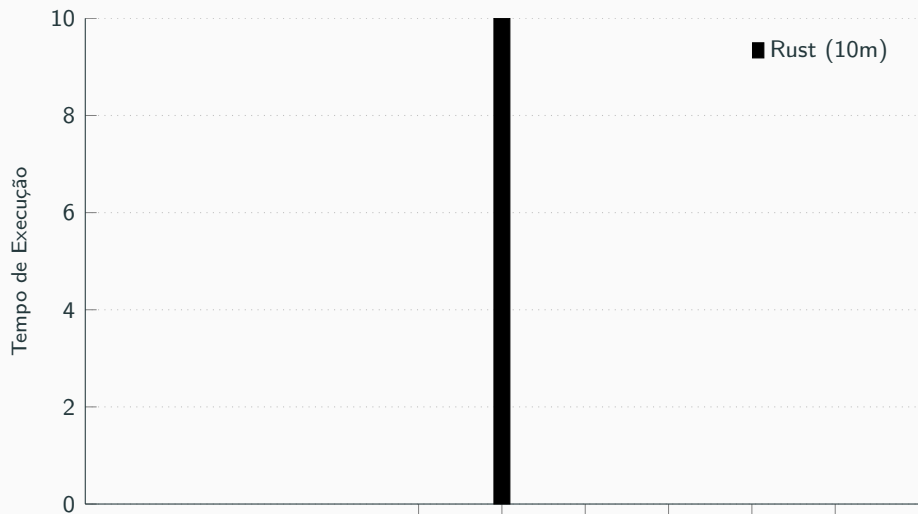
Algoritmo

```
var transactions = List<Transaction>();  
var quarantine = new DateTime();  
  
for transaction in transactions do  
    if quarantine_is_active(quarantine, transaction) then  
        block(transaction);  
        update(quarantine);  
    else  
        if extrapolate_rule(transaction) then  
            block(transaction);  
            update(quarantine);  
        end  
    end  
end  
end
```

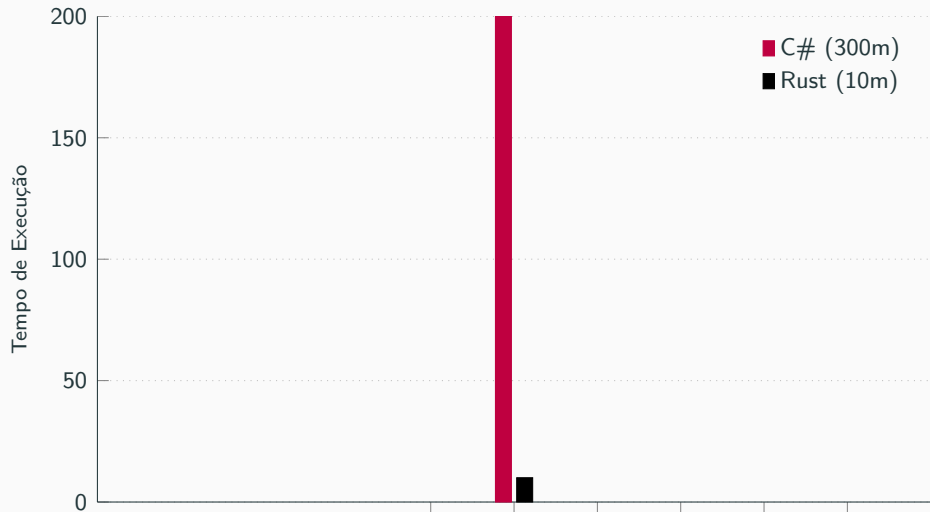
Hardware: I7 8770 (6 núcleos + 6 threads), 8GB RAM DDR4, SSD;

- Todas as versões representam o Velocity de forma exata;
- Não é utilizado agrupamento e nem programação funcional;
- C# e Rust paralelizam o processamento;
- C# e Rust realmente processaram 640 regras, o tempo de R é uma estimativa;
- R executou no banco SQL de monitoria;

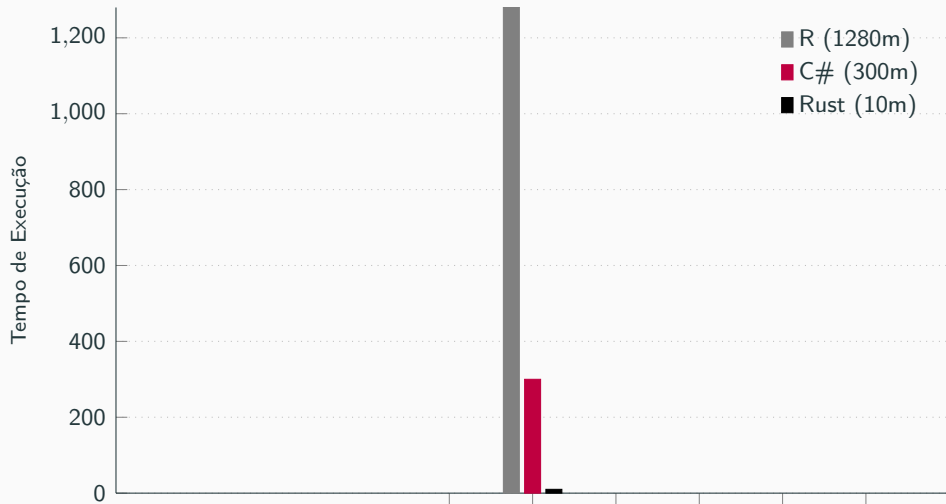
Benchmark (v1.0)



Benchmark (v1.0)



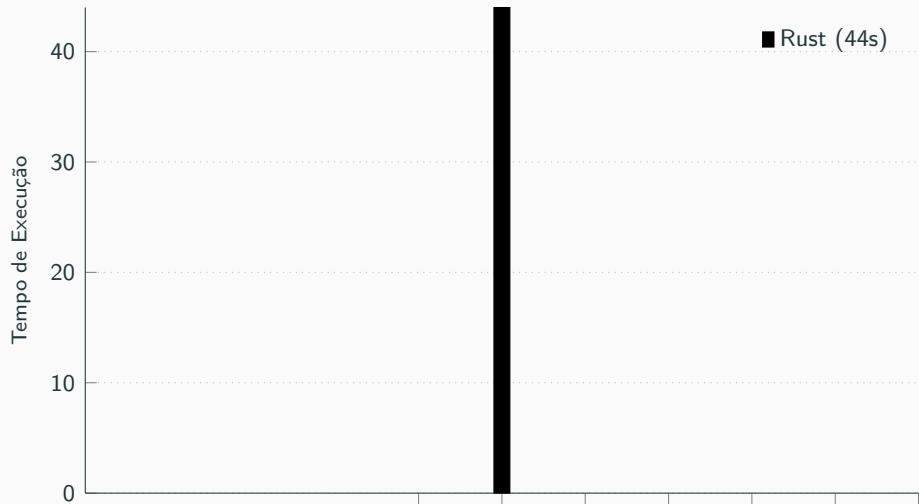
Benchmark (v1.0)



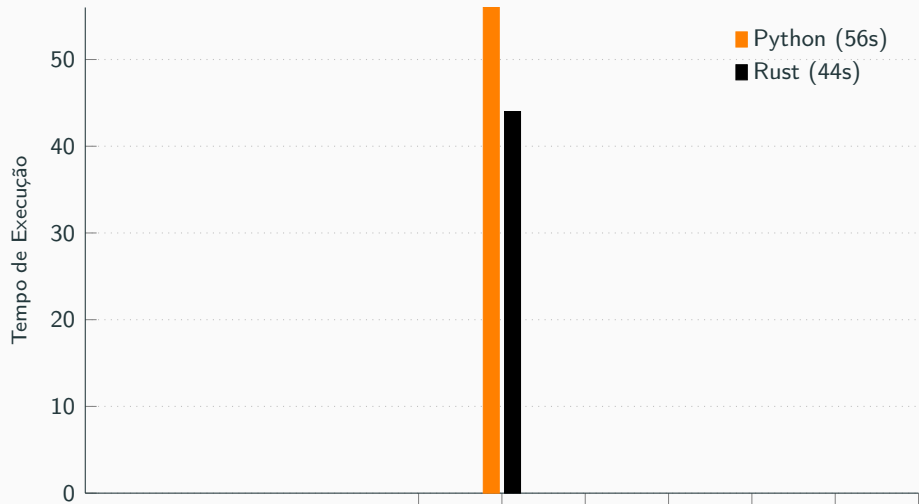
Hardware: I7 8770 (6 núcleos + 6 threads), 8GB RAM DDR4, SSD;

- Todos os algoritmos utilizam agrupamento;
- Rust e Python utilizam programação funcional;
- Somente a versão em Rust simula exatamente o Velocity;
- Python utiliza a lib Numpy, que é feita em C, C++ e Fortran;

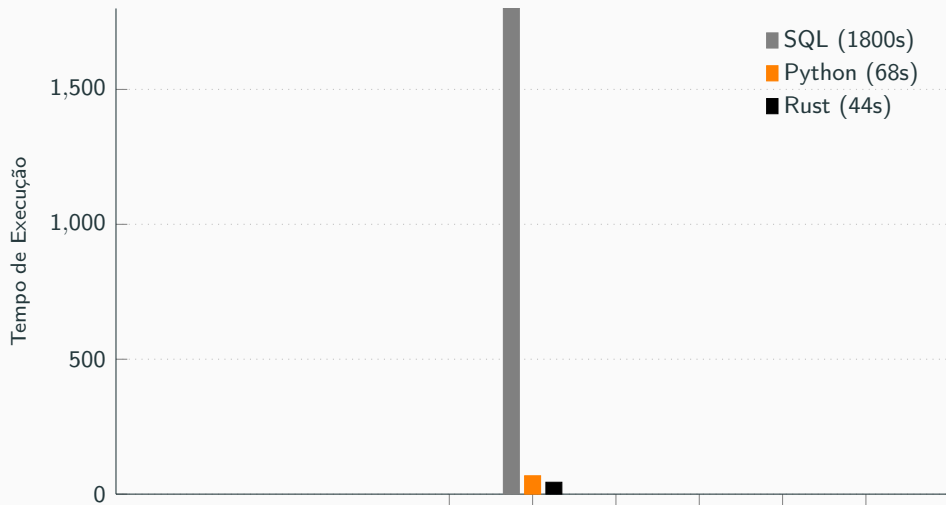
Benchmark (v2.0)



Benchmark (v2.0)



Benchmark (v2.0)



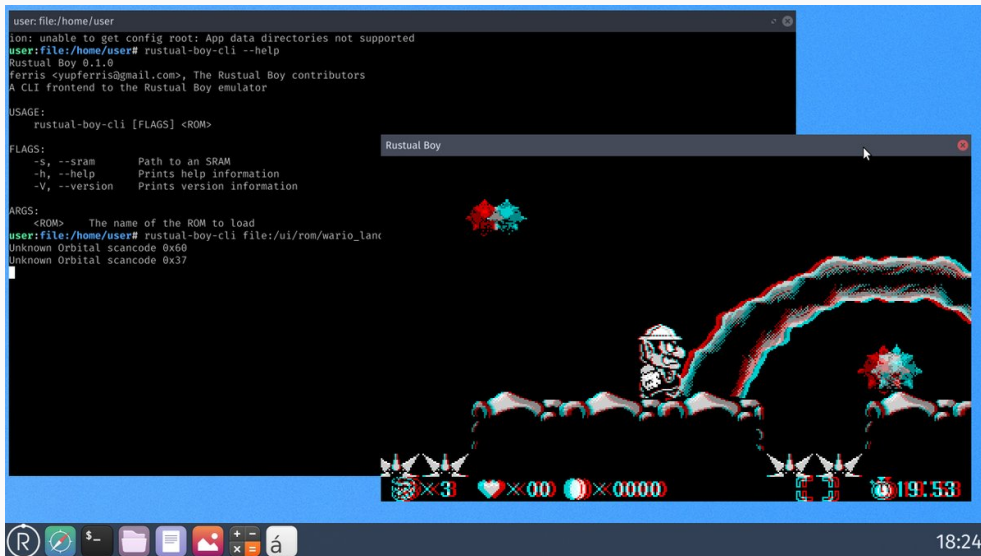
Mostre-me o código

Curiosidades

- Em apenas 3 anos o gerenciador de pacotes de Rust ultrapassou os gerenciadores de R e Haskell;
- Em 2017 a Red Hat começou a dar suporte para Rust;
- Rust possui uma imagem oficial no Docker Hub;
- Em 2017 todas as IDEs da IntelliJ passaram a dar suporte para Rust;
- Amazon e Google estão contratando desenvolvedores Rust;
- Facebook e Github fazem parte dos Gold Sponsors da RustConf;
- Intel encoraja a utilização de Rust;
- Rust possui interoperabilidade com C, C++, Swift, Python e Node.JS;



Sistema Operacional



Material de estudos

Introduction

1. Hello World

1.1. Comments

1.2. Formatted print

1.2.1. Debug

1.2.2. Display

1.2.2.1. Testcase: List

1.2.3. Formatting

2. Primitives

2.1. Literals and operators

2.2. Tuples

2.3. Arrays and Slices

3. Custom Types

3.1. Structures

3.2. Enums

3.2.1. use

3.2.2. C-like

3.2.3. Testcase: linked-list

3.3. constants

4. Variable Bindings



Rust By Example

Rust by Example

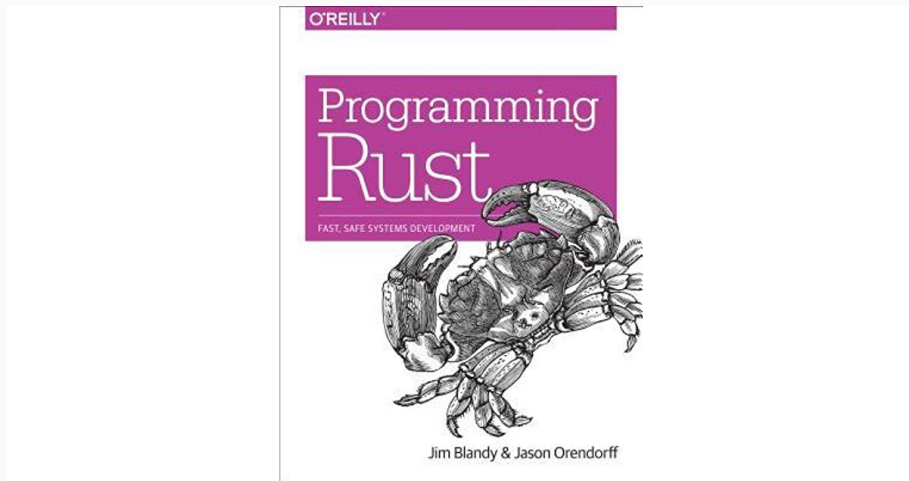
[Rust](#) is a modern systems programming language focusing on safety, speed, and concurrency. It accomplishes these goals by being memory safe without using garbage collection.

Rust by Example (RBE) is a collection of runnable examples that illustrate various Rust concepts and standard libraries. To get even more out of these examples, don't forget to [install Rust locally](#) and check out the [official docs](#). Additionally for the curious, you can also [check out the source code for this site](#).

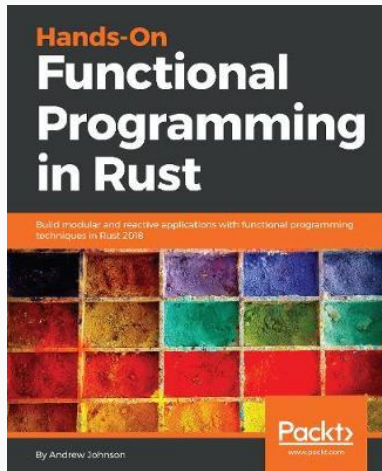
Now let's begin!

- [Hello World](#) - Start with a traditional Hello World program.
- [Primitives](#) - Learn about signed integers, unsigned integers and other primitives.
- [Custom Types](#) - `struct` and `enum`.
- [Variable Bindings](#) - mutable bindings, scope, shadowing.
- [Types](#) - Learn about changing and defining types.






Hands-On Functional Programming in Rust



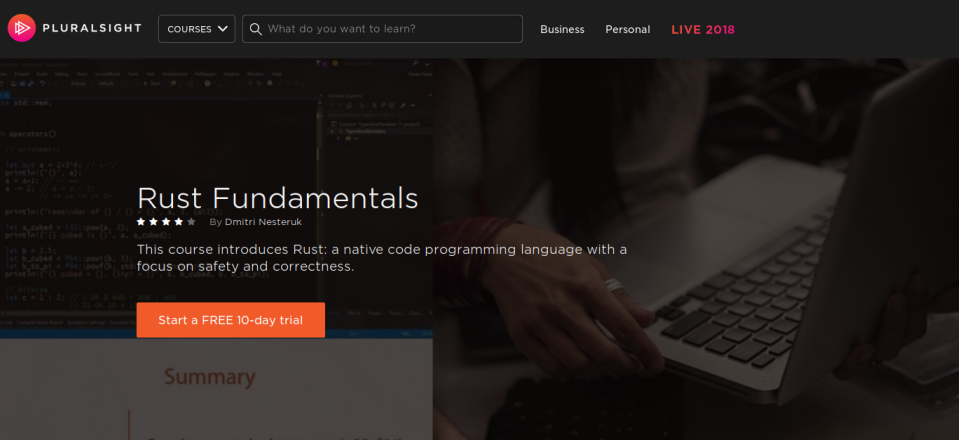
Rust Fundamentals

 PLURALSIGHT

COURSES ▼

Q What do you want to learn?

BusinessPersonalLIVE 2018



Rust Fundamentals

★★★★★ By Dmitri Nesteruk

This course introduces Rust: a native code programming language with a focus on safety and correctness.

Start a FREE 10-day trial

Summary

Concise numeric data types (u32, f64)



Obrigado