+

Rust 全栈开发

如何使用 Yew/Seed 开发 Web App

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Rust Programming Language

2015 年 5 月 15 日， Rust 编程语言核心团队正式宣布发布 Rust 1.0 版本。

4 年来，它优雅的解决高并发和高安全性系统问题的能力，受到了越来越多开发者的喜爱。**并且连续 4 年，在 Stack Overflow 开发者「最受喜爱编程语言」评选中获得第一名。**

Rust 有多快

- https://www.techempower.com/benchmarks/#section=data-r18&hw=ph&test=plaintext
- https://benchmarksgame-team.pages.debian.net/benchmarksgame/fastest/rust.html

JSON serialization

Best (bar chart) | Data table | Latency | Framework overhead

Best JSON responses per second, Dell R440 Xeon Gold + 10 GbE (366 tests)

Rnk	Framework	Best performance (higher is better)		Errors	Cls	Lng	Plt	FE	Aos	IA
1	ulib-json_fit	1,366,569	100.0%	0	Plt	C++	Non	ULi	Lin	Rea
2	ulib-json	1,364,155	99.8%	0	Plt	C++	Non	ULi	Lin	Rea
3	hyper	1,361,588	99.6%	0	Mcr	Rus	Rus	Hyp	Lin	Rea
4	libreactor	1,358,605	99.4%	0	Mcr	C	Non	Non	Lin	Rea
5	actix	1,357,798	99.4%	0	Mcr	Rus	Non	act	Lin	Rea
6	tokio-minihttp	1,357,168	99.3%	0	Mcr	Rus	Rus	tok	Lin	Rea
7	actix-raw	1,356,789	99.3%	0	Plt	Rus	Non	act	Lin	Rea
8	thruster	1,355,558	99.2%	0	Mcr	Rus	Rus	Non	Lin	Rea
9	httpbeast	1,353,732	99.1%	0	Plt	Nim	Non	Non	Lin	Rea
10	jester	1,352,096	98.9%	0	Mcr	Nim	Non	Non	Lin	Rea

Single query

Best (bar chart) | Data table | Latency | Framework overhead

Best database-access responses per second, single query, Dell R440 Xeon Gold + 10 GbE (404 tests)

Rnk	Framework	Best performance (higher is better)		Errors	Cls	Lng	Plt	FE	Aos	DB	Dos	Orm	IA
1	actix-core	886,499	100.0%	0	Plt	Rus	Non	act	Lin	Pg	Lin	Raw	Rea
2	wizzardo-http	863,265	97.4%	0	Mcr	Jav	Non	Non	Lin	Pg	Lin	Raw	Rea
3	actix-pg	816,955	92.2%	0	Mcr	Rus	Non	act	Lin	Pg	Lin	Raw	Rea
4	vertx-postgres	753,286	85.0%	0	Plt	Jav	ver	Non	Lin	Pg	Lin	Raw	Rea
5	es4x	702,052	79.2%	0	Mcr	JS	ver	Non	Lin	Pg	Lin	Raw	Rea
6	vertx-web-postgres	671,894	75.8%	0	Mcr	Jav	vtx	Non	Lin	Pg	Lin	Raw	Rea
7	h2o	558,915	63.0%	0	Plt	C	Non	Non	Lin	Pg	Lin	Raw	Rea
8	drogon-raw	545,313	61.5%	0	Ful	C++	Non	Non	Lin	Pg	Lin	Raw	Rea
9	greenlightning	512,477	57.8%	0	Mcr	Jav	Non	Non	Lin	Pg	Lin	Raw	Rea
10	cpoll_cppsp-raw	506,222	57.1%	0	Plt	C++	Non	Non	Lin	My	Lin	Raw	Rea

Multiple queries

20-queries (bar) | Data table | Latency | Framework overhead

Responses per second at 20 queries per request, Dell R440 Xeon Gold + 10 GbE (394 tests)

Rnk	Framework	Performance (higher is better)		Errors	Cls	Lng	Plt	FE	Aos	DB	Dos	Orm	IA
1	actix-core	46,968	100.0%	0	Plt	Rus	Non	act	Lin	Pg	Lin	Raw	Rea
2	actix-pg	46,910	99.9%	0	Mcr	Rus	Non	act	Lin	Pg	Lin	Raw	Rea
3	greenlightning	45,823	97.6%	0	Mcr	Jav	Non	Non	Lin	Pg	Lin	Raw	Rea
4	vertx-postgres	44,979	95.8%	0	Plt	Jav	ver	Non	Lin	Pg	Lin	Raw	Rea
5	es4x	43,352	92.3%	0	Mcr	JS	ver	Non	Lin	Pg	Lin	Raw	Rea
6	wizzardo-http	43,228	92.0%	0	Mcr	Jav	Non	Non	Lin	Pg	Lin	Raw	Rea
7	ratpack-pgclient	42,940	91.4%	0	Mcr	Jav	Nty	Non	Lin	Pg	Lin	Raw	Rea
8	vertx-web-postgres	42,339	90.1%	0	Mcr	Jav	vtx	Non	Lin	Pg	Lin	Raw	Rea
9	micronaut	33,173	70.6%	0	Mcr	Jav	Nty	Non	Lin	Pg	Lin	Raw	Rea
10	spring-webflux-pgclient	31,522	67.1%	0	Ful	Jav	Nty	Non	Lin	Pg	Lin	Mcr	Rea

Plaintext

Best (bar chart) | Data table | Latency | Framework overhead

Best plaintext responses per second, Dell R440 Xeon Gold + 10 GbE (352 tests)

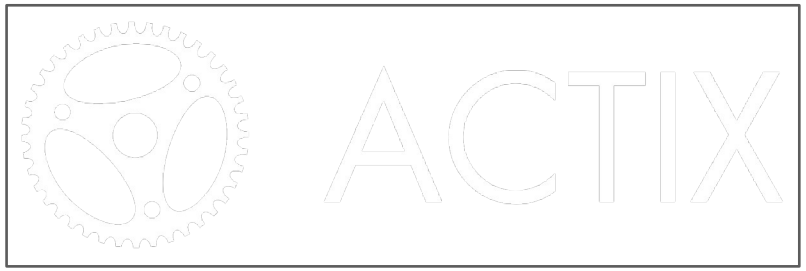
Rnk	Framework	Best performance (higher is better)		Errors	Cls	Lng	Plt	FE	Aos	IA
1	hyper	7,007,513	100.0%	0	Mcr	Rus	Rus	Hyp	Lin	Rea
2	tokio-minihttp	7,006,181	100.0%	0	Mcr	Rus	Rus	tok	Lin	Rea
3	ulib-plaintext_fit	7,004,608	100.0%	2	Plt	C++	Non	ULi	Lin	Rea
4	actix	7,000,911	99.9%	0	Mcr	Rus	Non	act	Lin	Rea
5	ulib	6,998,172	99.9%	3	Plt	C++	Non	ULi	Lin	Rea
6	libreactor	6,997,422	99.9%	0	Mcr	C	Non	Non	Lin	Rea
7	actix-raw	6,996,104	99.8%	0	Plt	Rus	Non	act	Lin	Rea
8	atreugo-prefork	6,995,436	99.8%	0	Plt	Go	Non	Non	Lin	Rea
9	firenio-http-lite	6,994,344	99.8%	0	Plt	Jav	fir	Non	Lin	Rea
10	aspcore	6,993,704	99.8%	0	Plt	C#	.NE	kes	Lin	Rea

Rust 是怎么保护你的程序的?

目前 Rust 领域的生态介绍

- 异步（async/await） 1.39 11 月正式发布：async-std, tokio
- command line: clap, struct_opt, fd, ripgrep, bat ...
- Web Framework: hyper, Rocket, Actix-web, Tide, Sapper, diesel ...
- Web Frontend Yew, Seed, Deno
- WebAssembly: wasm-bindgen, web-sys, js-sys
- 数据库：tikv，sled
- 大数据处理：DataFusion, FastSpark
- CDN：cloudflare 云，边缘计算
- BlockChain: Polkadot/Substrate, Libra, Grin, Near, Nervos ...
- 操作系统与嵌入式：redox, tock, 连载教程
- 机器学习与AI：tensorflow-rust
- GUI: gtk-rs, imgui-rs

Rust 语言服务端框架

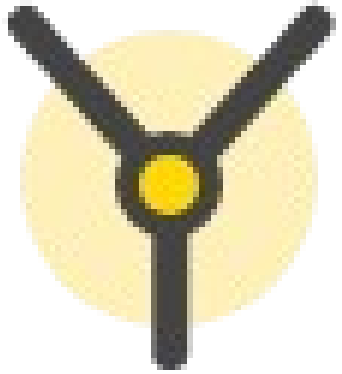


Rust 性能高、安全编程、无忧并发，确实很适合系统级编程和服务端编程！那它跟全栈有什么关系呢?

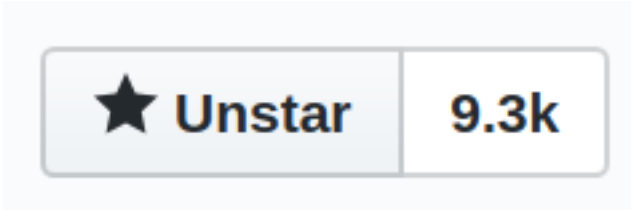
什么，要使用 Rust 进行前端 Web App 开发

Are you crazy!

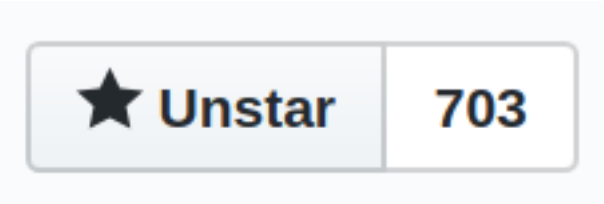
Rust 开发 Web 前端框架



Yew



Seed



Inspired by

Elm

&&

React

```rust
impl Component for Model {
    // Some details omitted. Explore the examples to see more.

    type Message = Msg;
    type Properties = ();

    fn create(_: Self::Properties, _: ComponentLink<Self>) -> Self {
        Model { }
    }

    fn update(&mut self, msg: Self::Message) -> ShouldRender {
        match msg {
            Msg::DoIt => {
                // Update your model on events
                true
            }
        }
    }

    fn view(&self) -> Html<Self> {
        html! {
            // Render your model here
            <button onclick=|_| Msg::DoIt>{ "Click me!" }</button>
        }
    }
}

fn main() {
    yew::start_app::<Model>();
}
```

Seed

View

```
fn view(model: &Model) -> impl View<Msg> {
    let plural = if model.count == 1 {""} else {"s"};

    // Attrs, Style, Events, and children may be defined separately.
    let outer_style = style!{
            St::Display => "flex";
            St::FlexDirection => "column";
            St::TextAlign => "center"
    };

    div![ outer_style,
        h1![ "The Grand Total" ],
        div![
            style!{
                // Example of conditional logic in a style.
                St::Color => if model.count > 4 {"purple"} else {"gray"};
                St::Border => "2px solid #004422";
                St::Padding => unit!(20, px);
            },
            // We can use normal Rust code and comments in the view.
            h3![ format!("{} {}{} so far", model.count, model.what_we_count, plural) ],
            button![ simple_ev(Ev::Click, Msg::Increment), "+" ],
            button![ simple_ev(Ev::Click, Msg::Decrement), "-" ],

            // Optionally-displaying an element
            if model.count >= 10 { h2![ style!{St::Padding => px(50)}, "Nice!" ] } else { empty![] }
        ],
        success_level(model.count),  // Incorporating a separate component

        h3![ "What are we counting?" ],
        input![ attrs!{At::Value => model.what_we_count}, input_ev(Ev::Input, Msg::ChangeWWC) ]
    ]
}
```

Seed

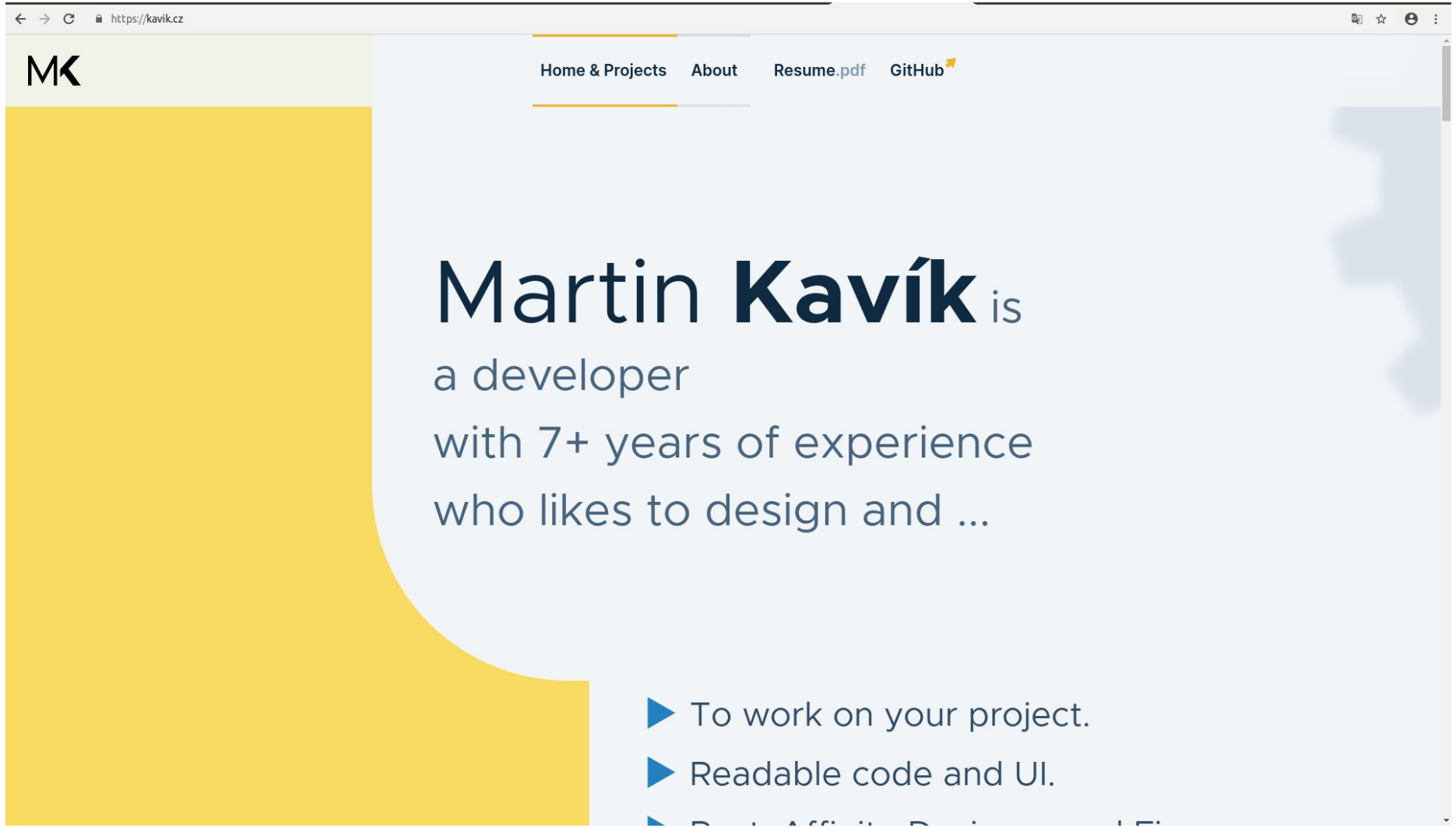
index.html

```html
<!DOCTYPE html>
<html lang="en">
  <head>
    <meta charset="utf-8" />
    <meta
      name="viewport"
      content="width=device-width, initial-scale=1, shrink-to-fit=no"
    />

    <meta name="description" content="" />

    <link rel="icon" type="image/png" href="/public/favicon.png" />

    <!--<link rel="stylesheet" type="text/css" href="/style.css">-->

    <title>Counter example</title>

    <!-- Because of Edge, see https://github.com/samthor/fast-text-encoding -->
    <script type="text/javascript" src="/public/text-polyfill.min.js"></script>
  </head>
  <body>
    <section id="app"></section>
    <script type="module">
      // https://rustwasm.github.io/docs/wasm-bindgen/examples/without-a-bundler.html
      import init from '/pkg/package.js';
      init('/pkg/package_bg.wasm');
    </script>
  </body>
</html>
```

静态文件、 CSS 处理

```
mike@mike-pocket:~/works/seed/examples/counter$ ls
Cargo.toml  index.html  Makefile.toml  public  README.md  src
mike@mike-pocket:~/works/seed/examples/counter$ ls public/
styles.css  text-polyfill.min.js
```

Seed App 可展示网站



https://seed-rs-realworld.netlify.com

conduit

Home Sign in Sign up

conduit

A place to share your knowledge.

Global Feed

helloa
November 16, 2019

wef

wef

Read more...

sdfvzxcv
November 16, 2019

fdvcxvcxv

cvxcvcxvcxvcxv

Read more... butt

manmohansingh
November 16, 2019

ytuihojp

fguyihojpk

Read more... dyfugiojp

B
November 16, 2019

Foo

Foo

Read more... clown

Popular Tags

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https://explorer.adex.network

205 Campaigns

184 Ad units

25 Publishers

38,861,427 Monthly impressions

73996.57 DAI Total campaign deposits

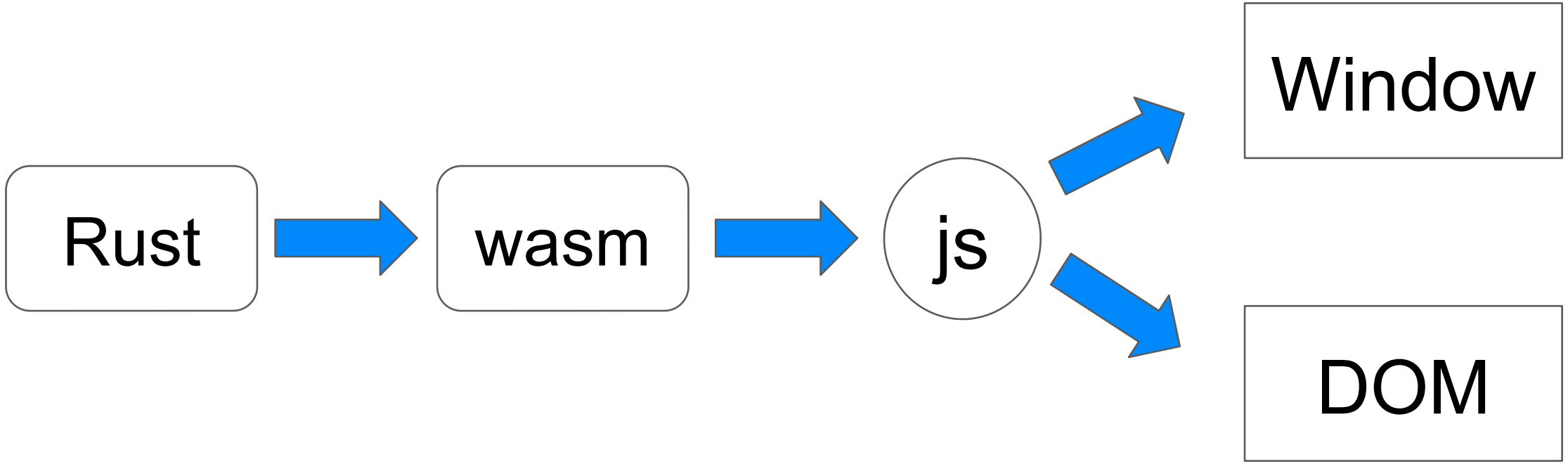
65195.00 DAI Paid out

Locked up on-chain

382.92 DAI 24h volume

Ad Size	Current CPM	Active volume	Total volume
legacy_728x90	0.35 DAI	2725.51 DAI	99259.17 DAI
legacy_468x60	0.34 DAI	605.97 DAI	8127.76 DAI
legacy_160x600	0.27 DAI	1038.01 DAI	47199.88 DAI
legacy_300x250	0.27 DAI	1038.01 DAI	52589.27 DAI
legacy_300x100	0.00 DAI	0.00 DAI	659.86 DAI
legacy_336x280	0.00 DAI	0.00 DAI	550.00 DAI
legacy_234x60	0.00 DAI	0.00 DAI	0.00 DAI
legacy_250x250	0.00 DAI	0.00 DAI	260.00 DAI
legacy_180x150	0.00 DAI	0.00 DAI	0.00 DAI

Rust 开发 Web App 原理



Wasm-bindgen

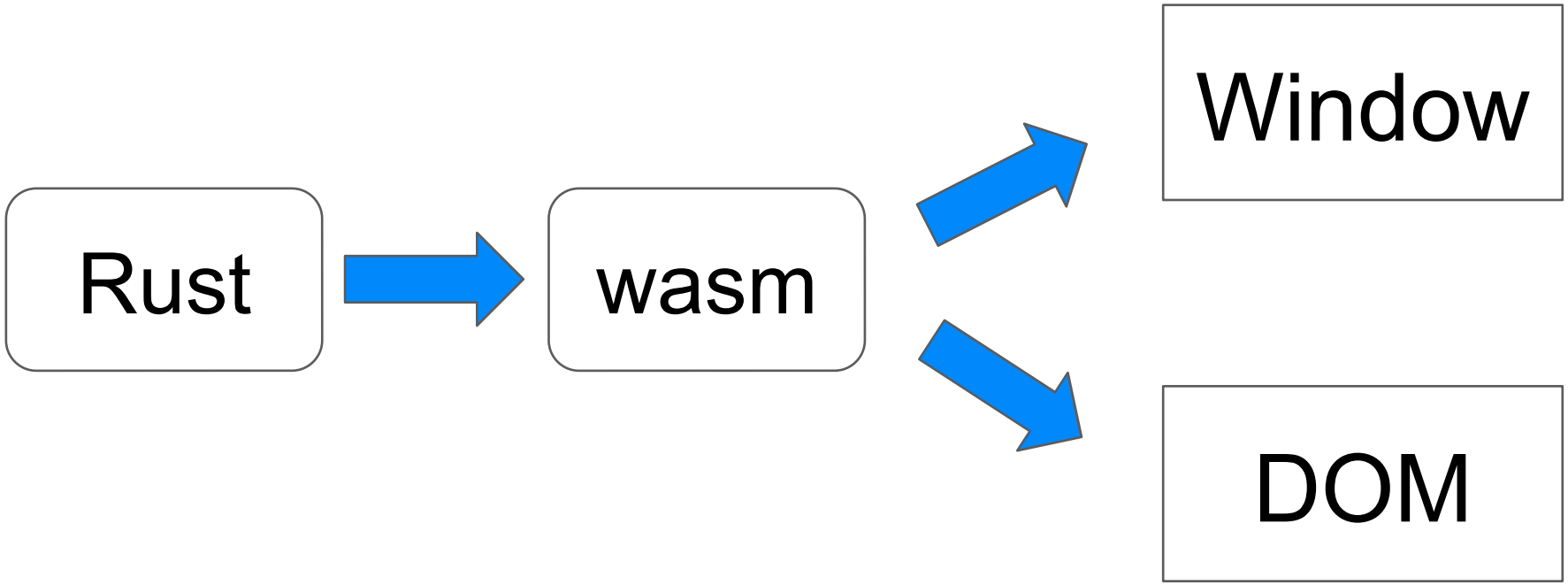
A Rust library and CLI tool that facilitate high-level interactions between wasm modules and JavaScript

自动绑定生成

性能、 IDL

- https://github.com/WebAssembly/interface-types/blob/master/proposals/interface-types/Explainer.md

性能 Update



Rust 全栈开发的优势

- 性能
- 类型编程，减少出错
- 运行安全
- 团队多人协作

适用领域

- 大型 Web App
- 网页游戏
- 类 google docs app， excel, word
- 地图类应用
- VR/3D 建模 app
- ....

未来展望

- wasm 体积的进一步裁减
- wasm 协议标准的进一步完善
- wasm 替代 js 指日可待（不是我说的～～

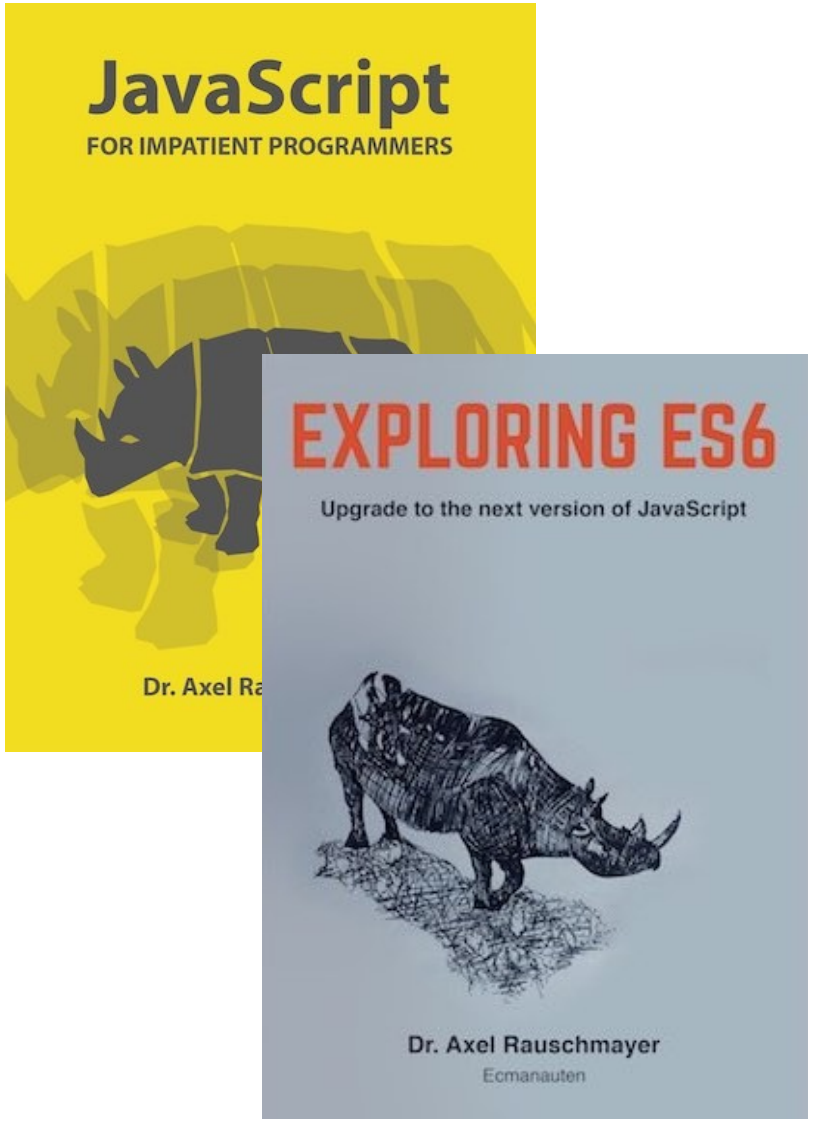
Milica Mihajlija liked

Axel Rauschmayer
@rauschma

1/ With WebAssembly, it's now possible to replace JavaScript. But replacements compete with:
1. Runtime built into browsers (no downloads)
2. Much tooling (IDEs, build tools, platforms, ...)
3. Many libraries
4. Much documentation
5. Large community (conferences, ...)

12:27 AM · Nov 16, 2019 · Twitter Web App

5 Retweets **39** Likes



Rust 语言中文社区

rust.cc/rust-china.org

Mike Tang

@daogangtang

Thank You

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