Visualizing Device Trees

Daniel Maslowski

Agenda

- Device Tree History
- Design of dtvis
- Rust and WebAssembly

Thanks for a start!

The development of `dtvis` has had strong support from our hackerspace.

Device Tree History

… so what is a Device Tree?

IEEE 1275[1] Standard for Boot (Initialization Configuration) Firmware: Core Requirements and Practices / Open Firmware[2]

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- can range from a few hundred to a thousand nodes
- the tree is a lie; there are cycles, e.g., power supplies and clocks

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Previous work

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- VS Code plugin `plorefice.devicetree`[5]
  - syntax highlighting + collapsing
  - could be enhanced with *dtvis* :-)

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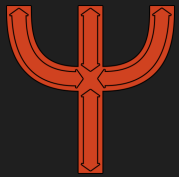
Design of dtvis

Recap: Platform System Interface



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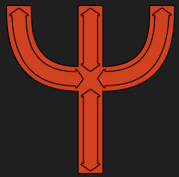

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Talk: Platform System Interface - Design and Evaluation of Computing as a Whole

in-depth discussion of design paradigms and complexity in computing
https://metaspora.org/platform-system-interface-computing-as-whole.pdf

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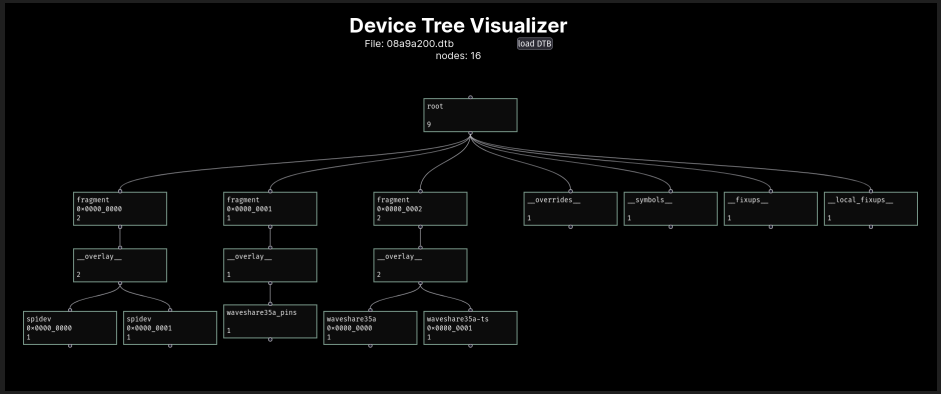

https://github.com/platform-system-interface/dtvis

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Challenges when Drawing Trees

- How do we distribute nodes without overlaps?
- How do we make “good” use of space?
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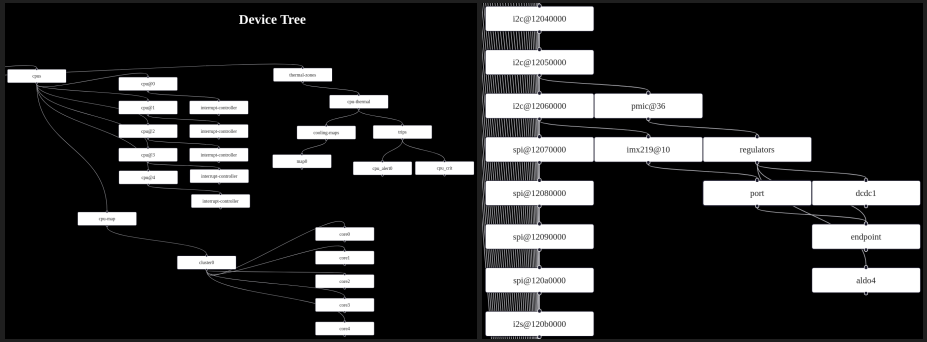

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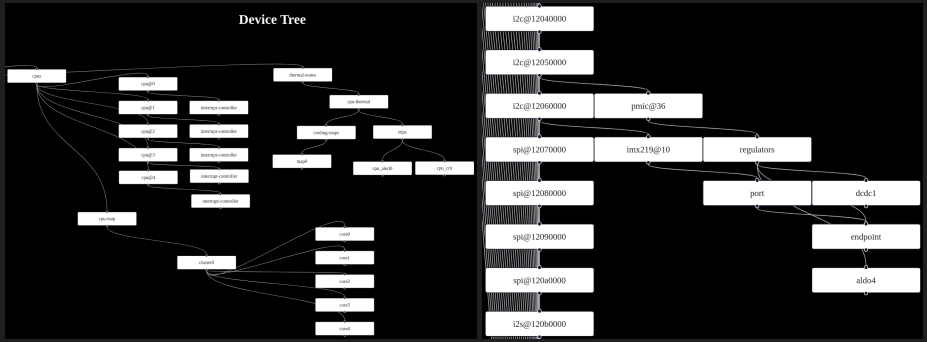
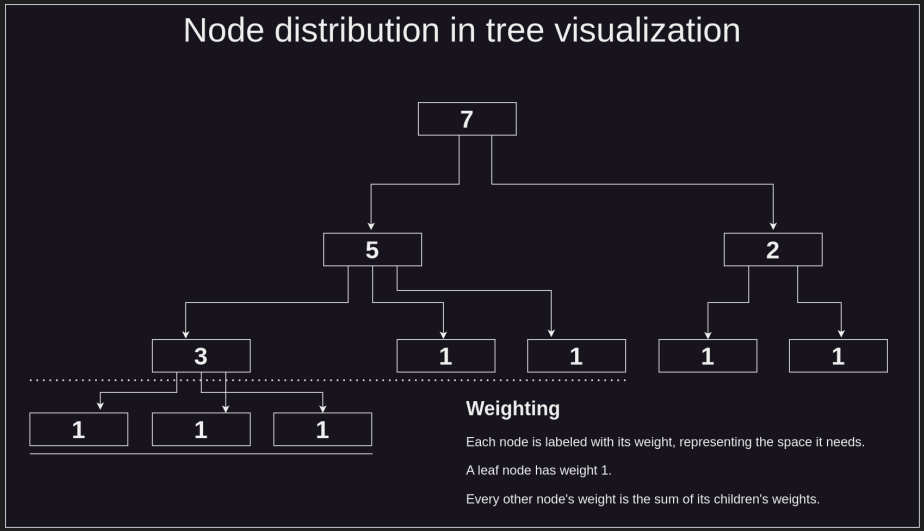


Strategies

- Even distribution
- Collapsing

dtvis Design



Currently, we have no overlaps, but trees may grow very wide.

DEMO

Rust and WebAssembly

What if…

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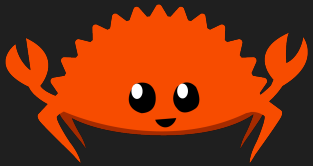
… we compile Rust…



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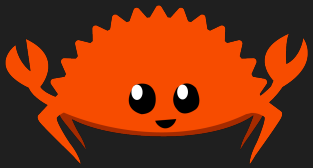

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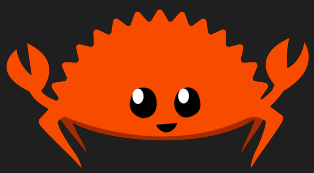

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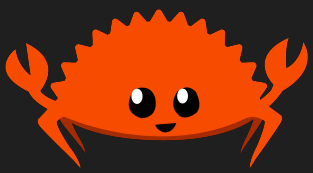

Magic happens - we can use native code on web platforms!

Howto

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TL;DR

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More glue

```
cargo add gloo-utils
```

The Rust side

The Rust side

```rust
extern crate wasm_bindgen;
use gloo_utils::format::JsValueSerdeExt;
use serde::{Deserialize, Serialize};
use wasm_bindgen::prelude::*;

/// ...

#[derive(Serialize, Deserialize)]
struct Foo {
    bar: u32,
    baz: String,
}

#[wasm_bindgen]
pub fn some_fun(data: JsValue) -> JsValue {
    /// ...
    let foo = Foo::new { bar: 42, baz: "Rust Wasm" };
    JsValue::from_serde(&foo).unwrap()
}
```

The JavaScript side

```
import { some_fun } from "./rs/pkg";

/* ... */
    const res = some_fun({ woopWoop: 1337 });
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Thanks! :)

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Daniel Maslowski

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