

Improving Debugging For Optimized Rust Code

Master Thesis

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Overview

1. Introduction
2. DWARF
3. Implementation
4. Evaluation and Discussion
5. Conclusion

What is debugging

- Lorem ipsum dolor sit amet, consectetur adipiscing elit
- Aliquam blandit faucibus nisi, sit amet dapibus enim tempus eu
- Nulla commodo, erat quis gravida posuere, elit lacus lobortis est, quis porttitor odio mauris at libero
- Nam cursus est eget velit posuere pellentesque
- Vestibulum faucibus velit a augue condimentum quis convallis nulla gravida

What is a Debugger

- Lorem ipsum dolor sit amet, consectetur adipiscing elit
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List of common debugger features

- Lorem ipsum dolor sit amet, consectetur adipiscing elit
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Unoptimized Vs Optimized

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Problem definition

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Motivation

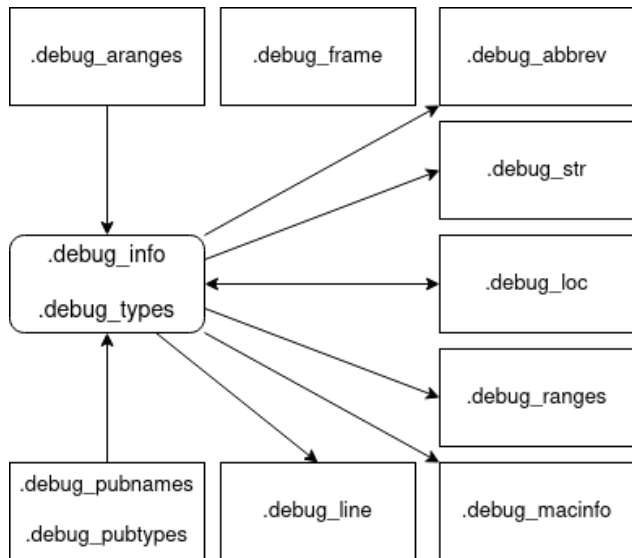
- Lorem ipsum dolor sit amet, consectetur adipiscing elit
- Aliquam blandit faucibus nisi, sit amet dapibus enim tempus eu
- Nulla commodo, erat quis gravida posuere, elit lacus lobortis est, quis porttitor odio mauris at libero
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Deliminations

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DWARF Sections



DWARF Unit and DIE

- Lorem ipsum dolor sit amet, consectetur adipiscing elit
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Evaluating a variable

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Evaluating the location of a variable

```
<2><4321>: Abbrev Number: 16 (DW_TAG_subprogram)
  <4322>   DW_AT_low_pc      : 0x8000fca
  <4326>   DW_AT_high_pc     : 0x2c
  <432a>   DW_AT_frame_base  : 1 byte block: 57          (DW_OP_reg7 (r7))
  <432c>   DW_AT_linkage_name: (indirect string, offset: 0x473b8): _ZN24nucleo_r
  <4330>   DW_AT_name        : (indirect string, offset: 0x64a52): my_function
  <4334>   DW_AT_decl_file   : 1
  <4335>   DW_AT_decl_line   : 194
  <4336>   DW_AT_type        : <0x6233>
<3><433a>: Abbrev Number: 17 (DW_TAG_formal_parameter)
  <433b>   DW_AT_location    : 2 byte block: 91 7e      (DW_OP_fbreg: -2)
  <433e>   DW_AT_name        : (indirect string, offset: 0x11d94): val
  <4342>   DW_AT_decl_file   : 1
  <4343>   DW_AT_decl_line   : 194
  <4344>   DW_AT_type        : <0x6233>
```

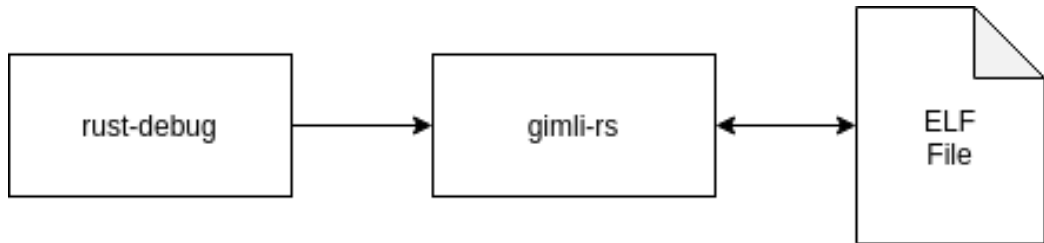
Parsing the type of a variable

```
<1><6233>: Abbrev Number: 34 (DW_TAG_base_type)
  <6234>   DW_AT_name      : (indirect string, offset: 0x2a125): i16
  <6238>   DW_AT_encoding   : 5          (signed)
  <6239>   DW_AT_byte_size  : 2
```

Virtually Unwinding Call Stack

- Lorem ipsum dolor sit amet, consectetur adipiscing elit
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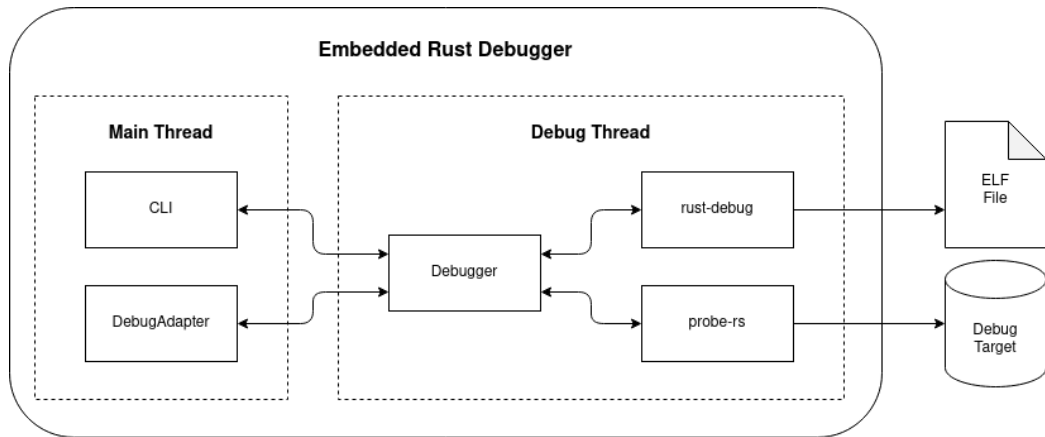
Debugging library rust-debug



Debugging library rust-debug

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Embedded Rust Debugger(ERD)



VSCode Extension

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Debugger settings

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Evaluating Rust enums

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Conclution

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References



John Smith (2012)

Title of the publication

Journal Name 12(3), 45 – 678.

The End

Bullet Points

- Lorem ipsum dolor sit amet, consectetur adipiscing elit
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Blocks of Highlighted Text

In this slide, some important text will be **highlighted** because it's important. Please, don't abuse it.

Block

Sample text

Alertblock

Sample text in red box

Examples

Sample text in green box. The title of the block is "Examples".

Multiple Columns

Heading

1. Statement
2. Explanation
3. Example

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Integer lectus nisl, ultricies in feugiat rutrum, porttitor sit amet augue. Aliquam ut tortor mauris. Sed volutpat ante purus, quis accumsan dolor.

Table

Treatments	Response 1	Response 2
Treatment 1	0.0003262	0.562
Treatment 2	0.0015681	0.910
Treatment 3	0.0009271	0.296

Table: Table caption

Theorem

Theorem (Mass–energy equivalence)

$$E = mc^2$$

Figure

Uncomment the code on this slide to include your own image from the same directory as the template .TeX file.

An example of the `\cite` command to cite within the presentation:

This statement requires citation [Smith, 2012].

References



John Smith (2012)

Title of the publication

Journal Name 12(3), 45 – 678.

The End