PROCEDURAL MACRO IN THE LINUX KERNEL 🦀

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```
➜ ~ whoami
```

“Random Person with Ramdom Side Project!”

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    - Project Leader of Macros Working Group
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- Working in the linux kernel through the Rust for Linux Initiative;

“C macros are difficult to read”

A macro is a name given to a block of C statements as a pre-processor directive.

```rust
while let Some(token) = body_it.next() {
        match token {
            TokenTree::Ident(ident) if ident.to_string() == "fn" => {
                let fn_name = match body_it.next() {
                    Some(TokenTree::Ident(ident)) =>
                          ident.to_string(),
                    _ => continue,
                };
                functions.insert(fn_name);
            }
            // ...
            _ => (),
        }
    }
```

```rust
macro_rules! quote_spanned {
    ($span:expr => $($tt:tt)*) => {{
        let mut tokens;
        #[allow(clippy::vec_init_then_push)]
        {
            tokens = ::std::vec::Vec::new();
            let span = $span;
            quote_spanned!(@proc tokens span $($tt)*);
        }
        ::proc_macro::TokenStream::from_iter(tokens)
    }};
    (@proc $v:ident $span:ident) => {};
    ....
}
```

```
➜ ~ ls -la linux/rust/macros
```

INTO THE KERNEL RIGHT NOW

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```rust
#[proc_macro]
pub fn foo(body: TokenStream) -> TokenStream {
    for tt in body.into_iter() {
        match tt {
            TokenTree::Ident(_) => eprintln!("Ident"),
            TokenTree::Punct(_) => eprintln!("Punct"),
            TokenTree::Literal(_) => eprintln!("Literal"),
            _ => {}
        }
    }
    return TokenStream::new();
}
```

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- Code duplication
- Bigger patch when there is a new syntax to support. (Good for seek jobs)
- There is no common pattern, so everyone use their own mental pattern for parsing
- Copy and Paste do not work without **eprintln**

```
➜ ~ emacs -nw kernel/kproc_macros/README.md
```

SO, WE ARE FUCK UP?

“Luckily no (maybe)”

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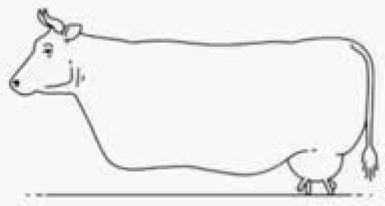
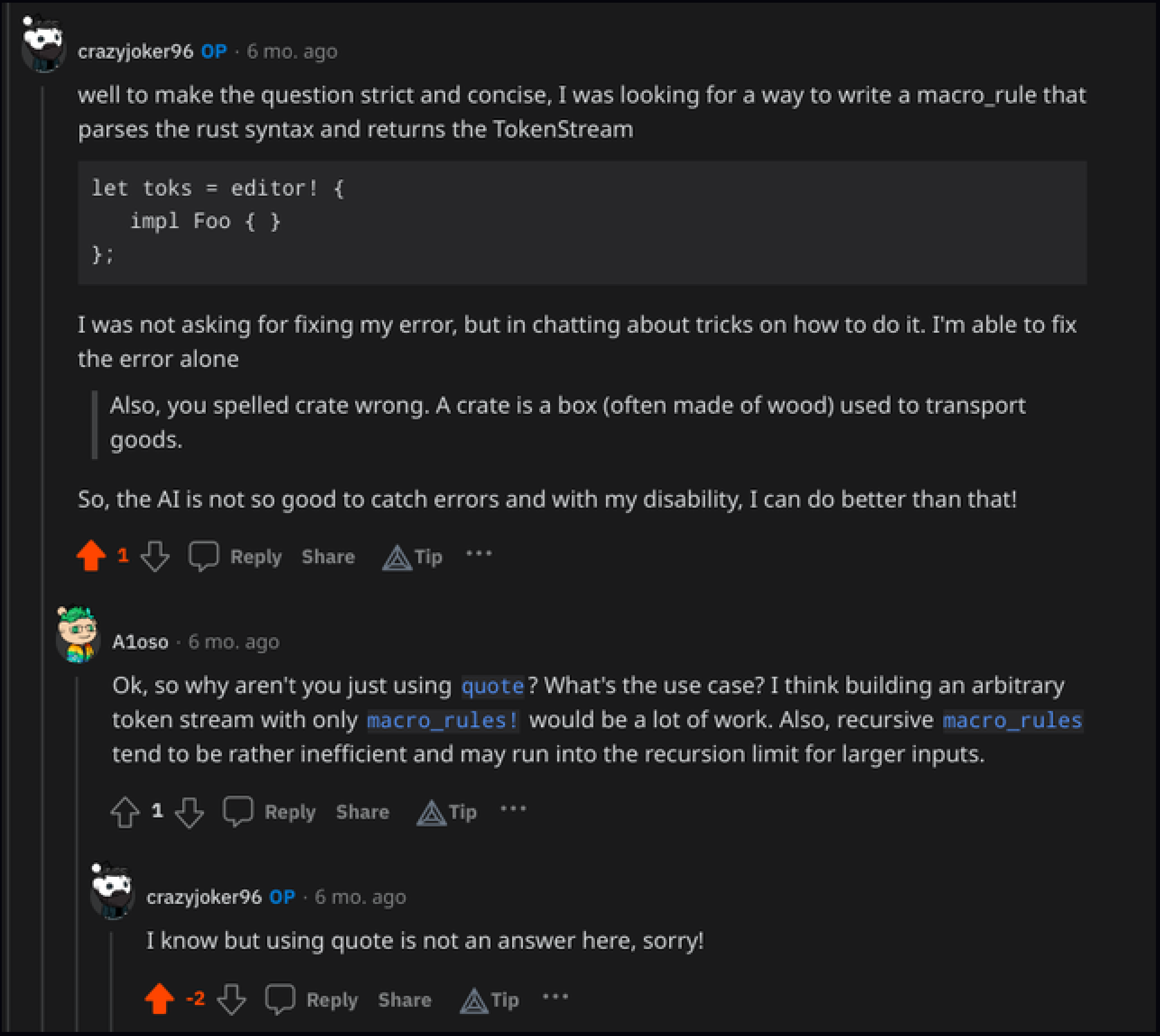
10 years of rust just 2 library?

- If your code works fine don't touch it
+ my code:




crazyjoker96 OP · 6 mo. ago

well to make the question strict and concise, I was looking for a way to write a macro_rule that parses the rust syntax and returns the TokenStream

```
let toks = editor! {
   impl Foo { }
};
```

I was not asking for fixing my error, but in chatting about tricks on how to do it. I'm able to fix the error alone

> Also, you spelled crate wrong. A crate is a box (often made of wood) used to transport goods.

So, the AI is not so good to catch errors and with my disability, I can do better than that!

1 Reply Share Tip ···

A1oso · 6 mo. ago

Ok, so why aren't you just using `quote`? What's the use case? I think building an arbitrary token stream with only `macro_rules!` would be a lot of work. Also, recursive `macro_rules` tend to be rather inefficient and may run into the recursion limit for larger inputs.

1 Reply Share Tip ···

crazyjoker96 OP · 6 mo. ago

I know but using quote is not an answer here, sorry!

-2 Reply Share Tip ···

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“Eventually yes, but why we do not take the time experiment with a new lib?”

“No, we can just use quote”

There is a PR in the kernel #1007 +78,232 -25

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That import also a wrapper of the rust API **proc_macro2** (for no reason for the kernel)

```
➜ ~ git commit -S -s -m 'rust: use kproc-macros every.."'
```

RFC: INTRODUCE AN NEW DEVELOPED LIBRARY

“Following the pattern of the kernel we call it kproc_macros”

3th iteration later ..

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- Be able to cache proc macro metadata around proc-macro. See 44034

How the user code looks like

```rust
#[derive(RustBuilder)]
pub struct BooLifetimeDyn<'a> {
    #[allow(dead_code)]
    attr: String,
    #[allow(dead_code)]
    self_ref: u32,
    #[allow(dead_code)]
    gen: Vec<&'a dyn GenTrait>,
}
```

How the proc macro looks like

```rust
struct Tracer;
impl KParserTracer for Tracer {
    fn log(&self, msg: &str) {
        eprintln!("\x1b[93mkproc-tracing\x1b[1;97m {msg}");
    }
}

#[proc_macro_derive(RustBuilder, attributes(build))]
pub fn derive_rust(input: TokenStream) -> TokenStream {
    let tracer = DummyTracer {};
    let parser = RustParser::with_tracer(&tracer);
    let ast = parser.parse_struct(&input);
    let toks = generate_impl(&ast);
    trace!(tracer, "{}", toks);
    toks
}
```

Open Problems

- How the generate_impl looks like? (Into a string or with quote like solution)

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- How the generate_impl looks like? (Into a string or with quote like solution)
- How I can print errors while parsing? or while generating the code?

```
➜ ~ cat kproc_macros/exaperiments/README.md
```

DOGFOOTING

```
let plugin = plugin! {
    state: State::new(),
    dynamic: true,
    notification: [],
    methods: [],
    hooks: [],
};
plugin.start();
```

```rust
#[rpc_method(
    rpc_name = "foo_macro",
    description = "This is a simple and short description"
)]
pub fn foo_rpc(plugin: &mut Plugin<State>, request: Value) -> Result<Va
    let response = json!({"is_dynamic": plugin.dynamic, "rpc_request":
    Ok(response)
}
```

User library: lexopt-derive

```rust
pub fn generate_impl(struct_tok: &StructToken) -> TokenStream {
    let gen = if let Some(str_gen) = &struct_tok.generics {
        format!("{}", str_gen)
    } else {
        "".to_owned()
    };
    let name_attr = &struct_tok.fields[0].identifier;
    let ty = struct_tok.fields[0].ty.to_string();
    let code = format!(
        "impl{} {}{} {{ \
                    fn get_{name_attr}(&self) -> {ty} {{ \
                       return self.{name_attr}.clone()\
                    }} \
                       \
                    fn set_{name_attr}(&self, inner: {ty}) {{ }}
                }}",
        gen, struct_tok.name, gen
```

```
editor!{
   @foreach ${attributes} {
     println!("{}", ${ir});
   }
}
```

```
editor!{
   @foreach ${attributes} {
     println!("{}", ${ir});
   }
}
```

Or just finish to implement quote in the std

Please complain at https://github.com/rsmicro/kproc-macros

THANKS!