Tick Tock:
Maintaining Time

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Montréal

RustConf
2026

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  - parallel API surfaces: panicking and fallible

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- API evolves, but your build never breaks

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- Format description
- Low-level types for formatting & parsing

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Date                    date!(2026-09-10)
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UtcDateTime       utc_datetime!(2026-09-10 18:47)
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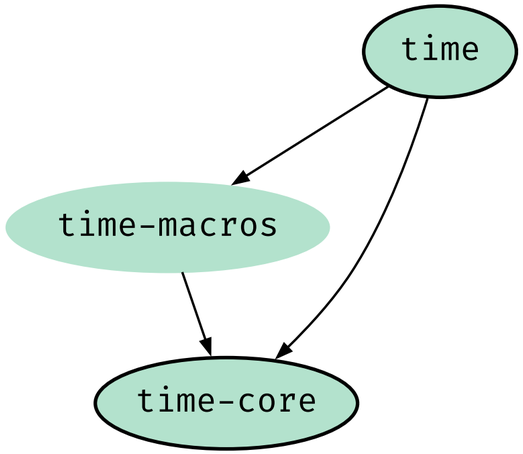
`zoneinfo`	TZif file reading & writing
`zoneinfo-static`	precompiled time zone database

Dependency Tree



☐ mandatory ■ `time` workspace

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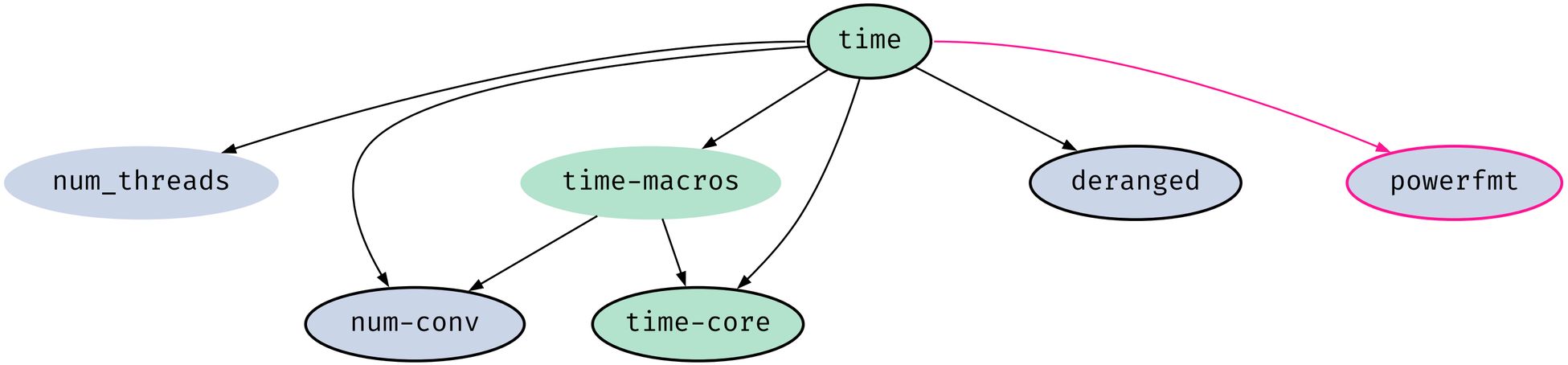

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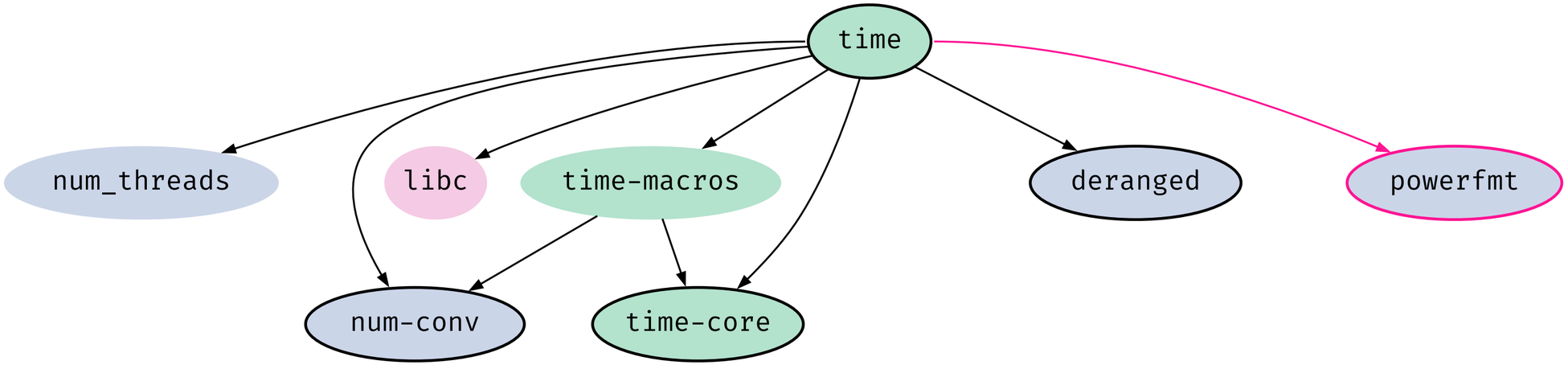

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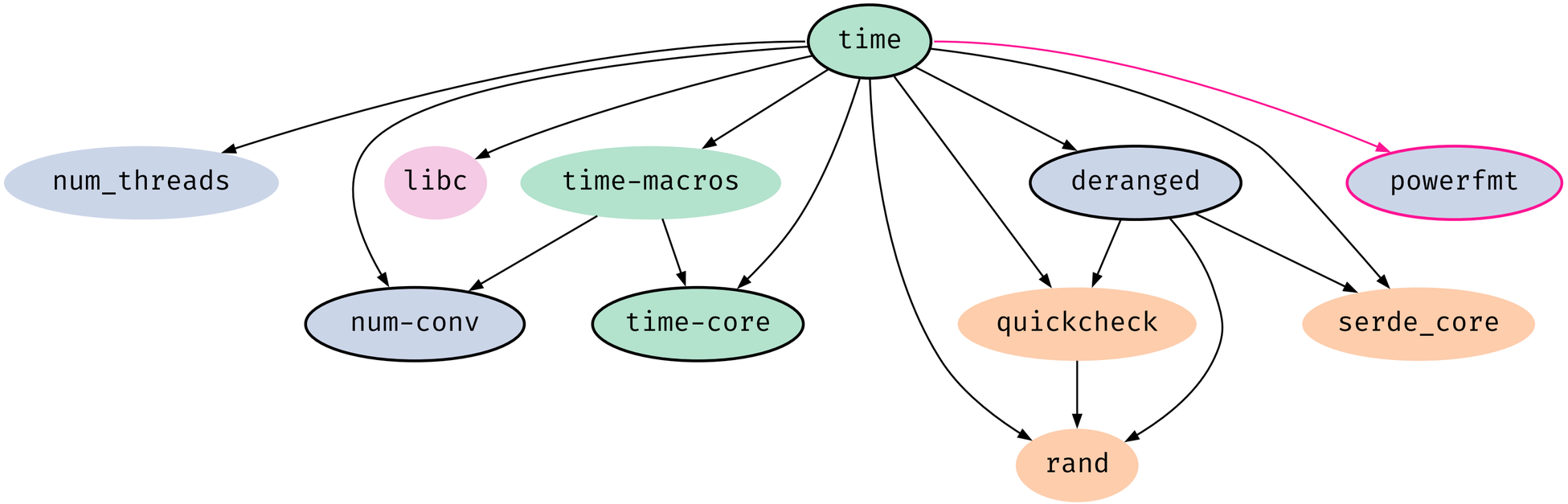

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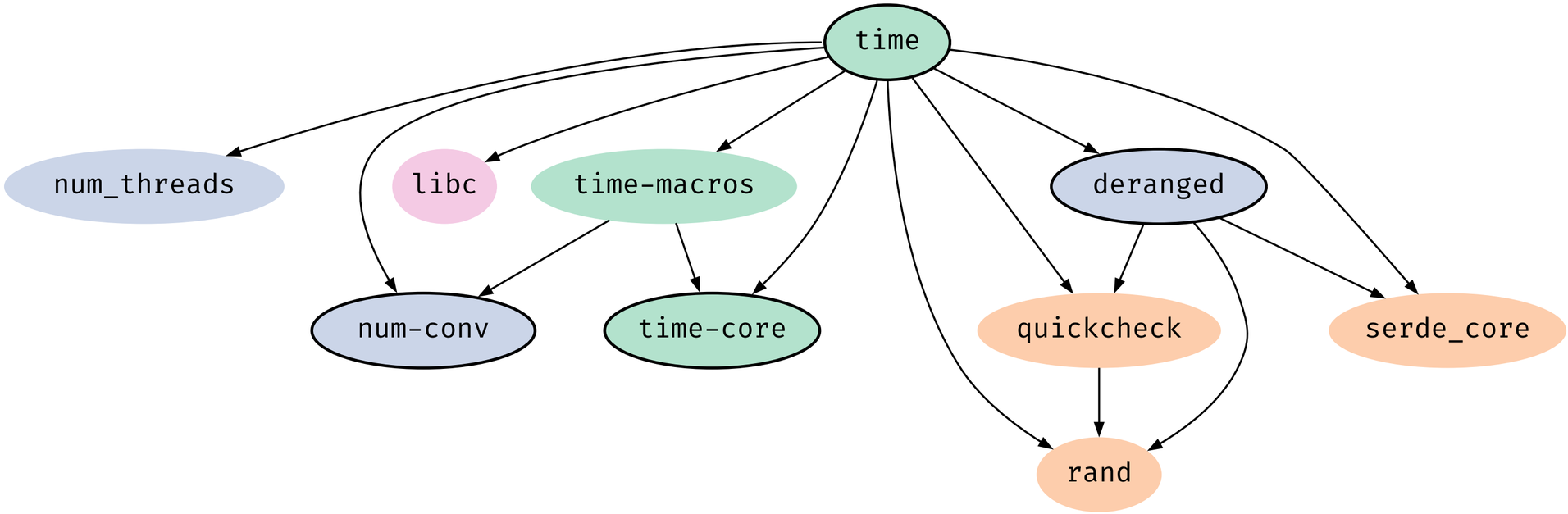
Dependency Tree
(future possibility)



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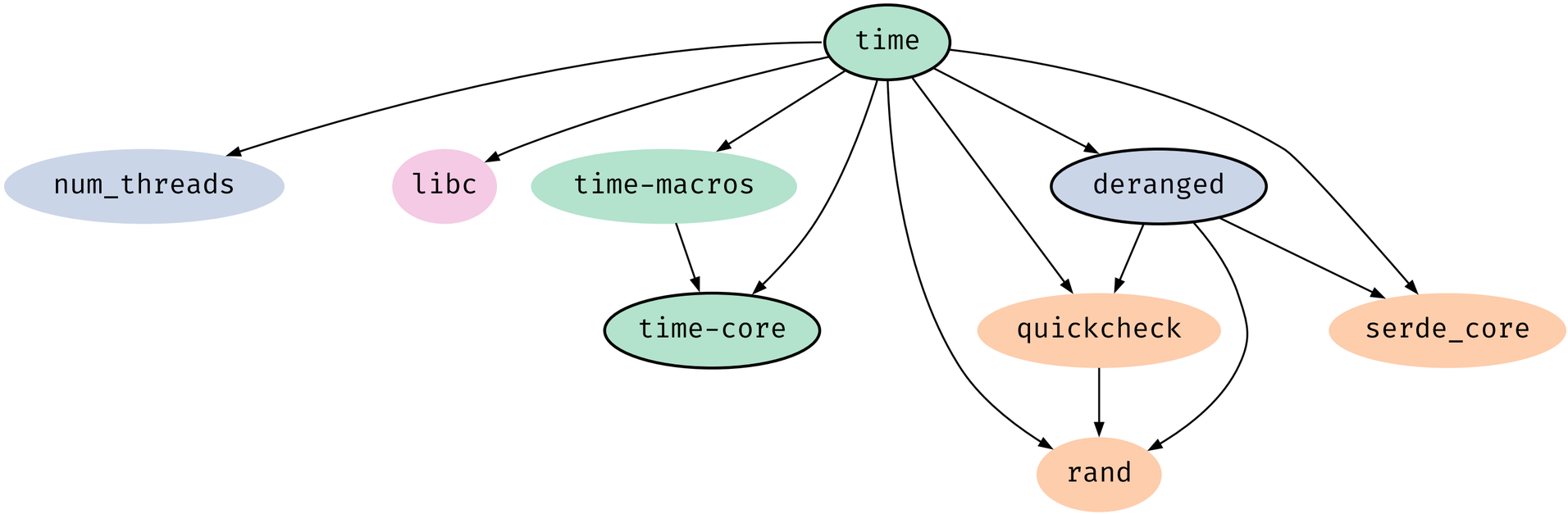

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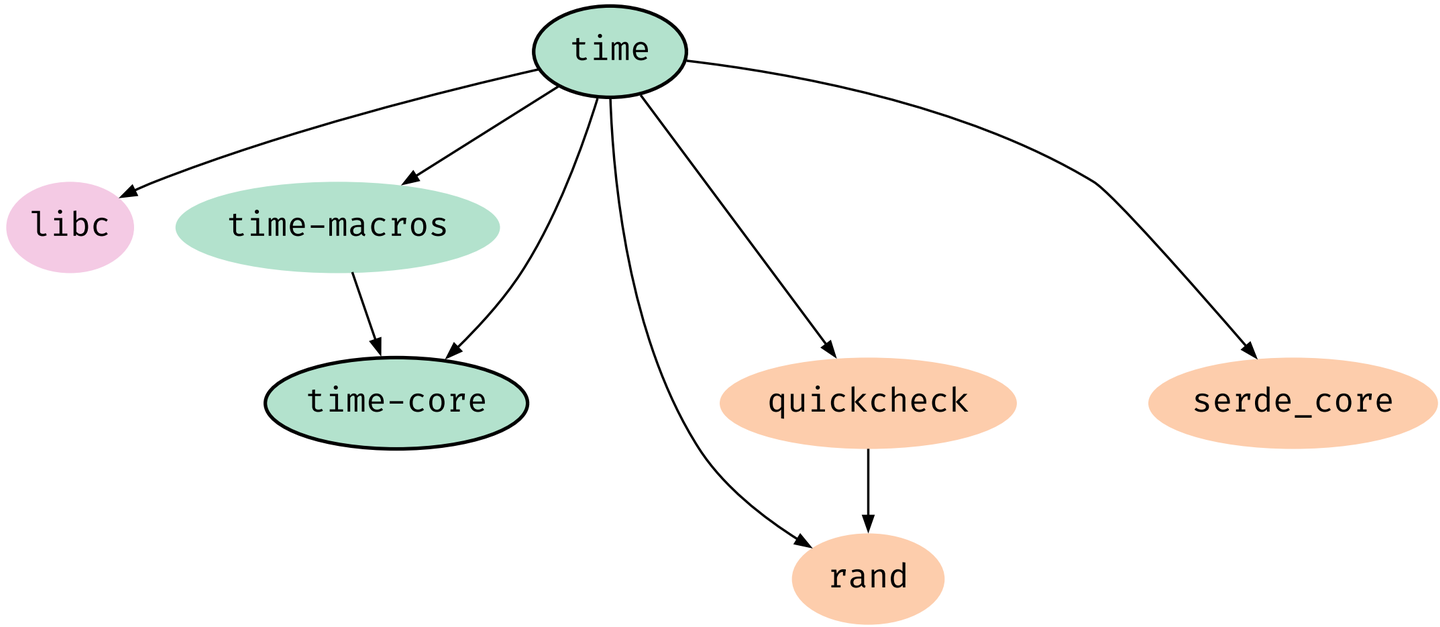

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Formatting and Parsing

Format descriptions

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C	`%a %h %d`

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```
C               %a %h %d
time            [weekday repr:short] [month repr:short] [day]
```

Formatting and Parsing

Format descriptions

`C`	`%a %h %d`
`time`	`[weekday repr:short] [month repr:short] [day]`
`well-known`	ISO 8601 (international standard) RFC 2822 (email) RFC 3339 (similar to ISO 8601)

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`well-known`	ISO 8601 (international standard) RFC 2822 (email) RFC 3339 (similar to ISO 8601)

Example of *completely valid* RFC 2822:

HT Sat,CR
(HTfoo012FOO!)(SOH VT SO DEL)(\NUL)(\SOH\HT\(\)\\DEL)\
(\
\VT)02
2021 03:04:05 GMT

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let fmt_rt: Vec<_> = parse_owned::<2>(
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let fmt_rt: Vec<_> = parse_owned::<2>(
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const FMT_V2: &[BorrowedFormatItem<'_>] =
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const FMT_V3: FormatDescriptionV3<'_> =
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```

Pushing the Compiler

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- Simulating `const impl Default`

```
impl T {
    pub const fn default() → Self { /* … */ }
}
```

Pushing the Compiler

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Pushing the Compiler

- Simulating `const impl Default`
- Eliminating magic constants

```
Second::per_t::<u32>(Week) // 604,800 as a constant
//                  ———   ————
//                named / anonymous
```

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- Type-level assertions

```
Time::MIDNIGHT.format(&Iso8601::DATE) // compile error
```

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Pushing the Compiler

- Simulating `const impl Default`
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- const generic ADTs

```
pub type EncodedConfig = u128; // explicitly unspecified

impl Config {
    pub const fn encode(self) → EncodedConfig { /* … */ }
    pub const fn decode(_: u128) → Self { /* … */ }
}
```

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  - day of year → month/day conversion
  - 2.35× throughput with new algorithm

Optimizing with Novel Calendrical Algorithms

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(year as i64)
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    & 0×C000_000F_8000_000F
    ≤  0×F_8000_0000
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- Resources: *Baum*, *Hinnant*, *Neri*, *Schneider*, *Drepper*, *Joffe*

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Performance

(elapsed time, smaller is better)

Baseline

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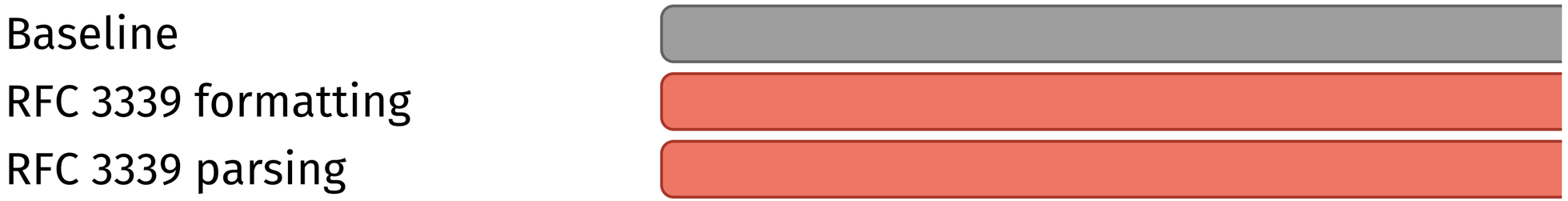

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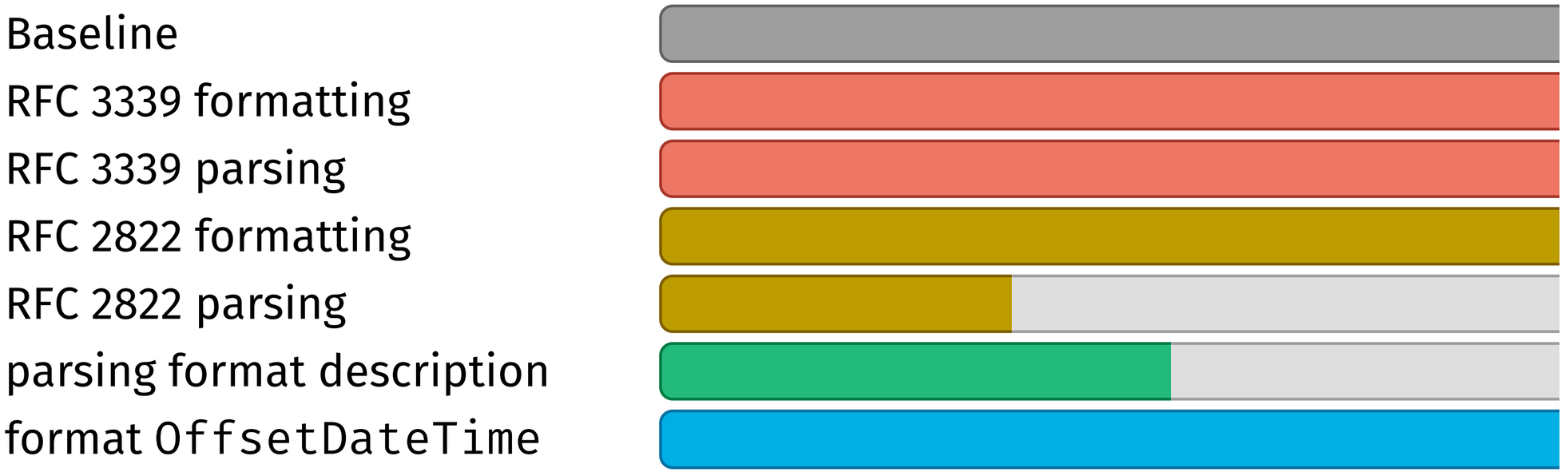

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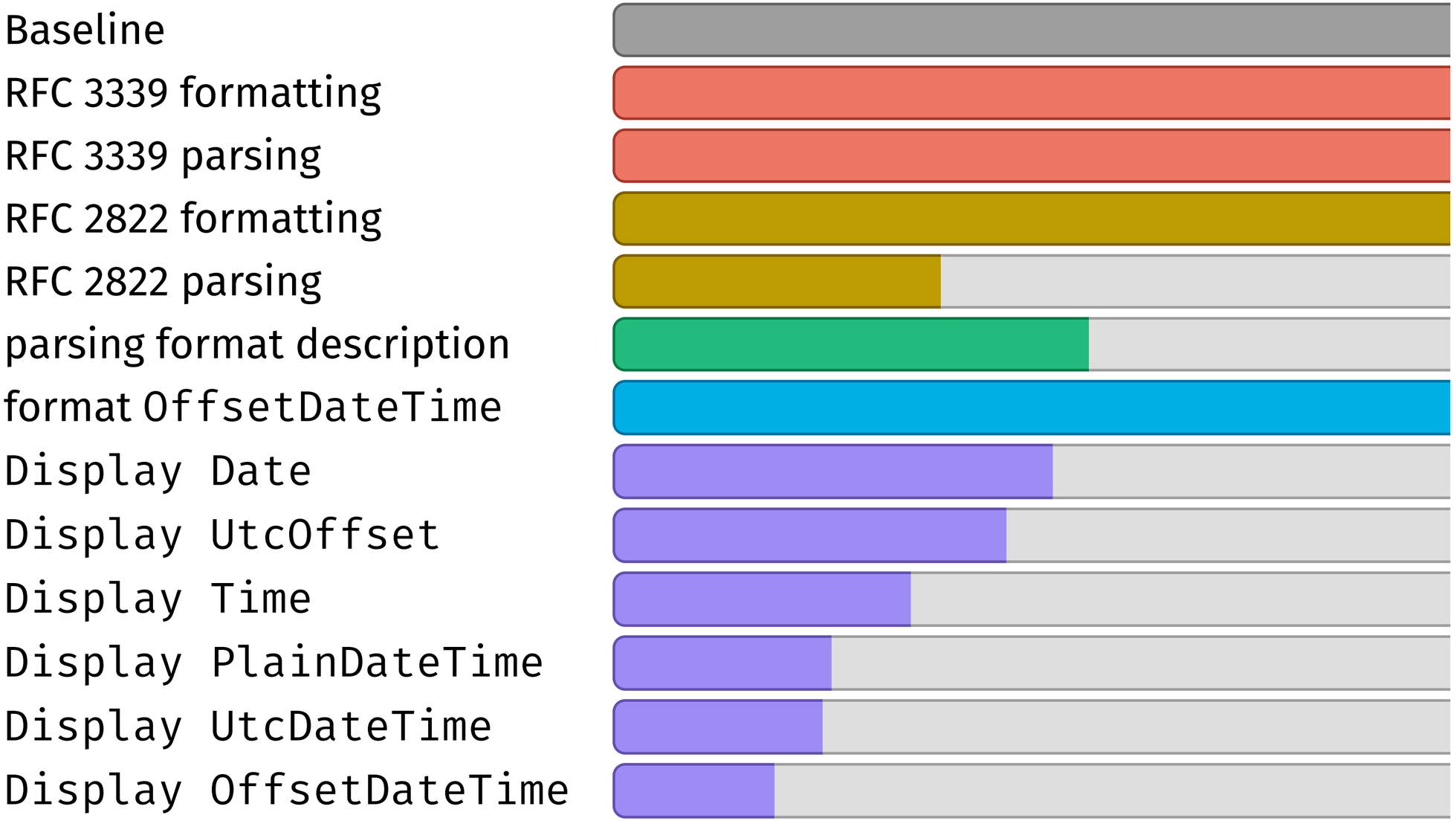

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#[derive(Clone, Copy)]
struct Digits {
    _padding: MaybeUninit<[u8; 7]>,
    digit_1: u8,
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let [
    digit_1,
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] = subsecond_from_nanos(n);

let buf = Digits {
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let bitmask =
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let digits_to_truncate =
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unsafe {
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struct Time {
    hour: u8,
    minute: u8,
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    _padding: Padding,
    nanosecond: u32,
}

#[repr(u8)]
enum Padding {
    Optimization,
}
```

CI/CD

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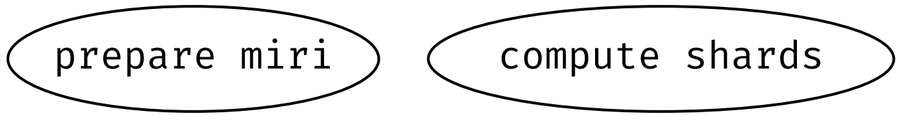

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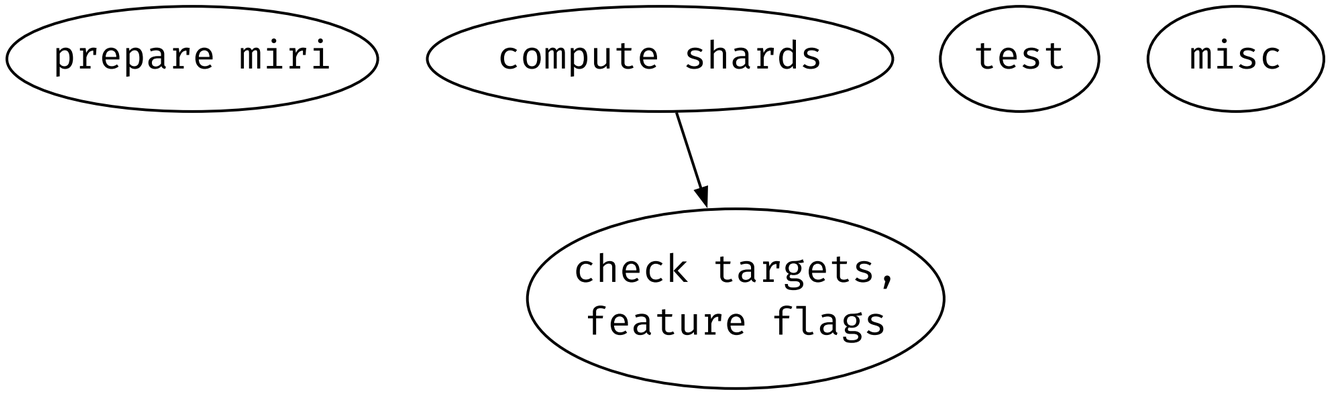
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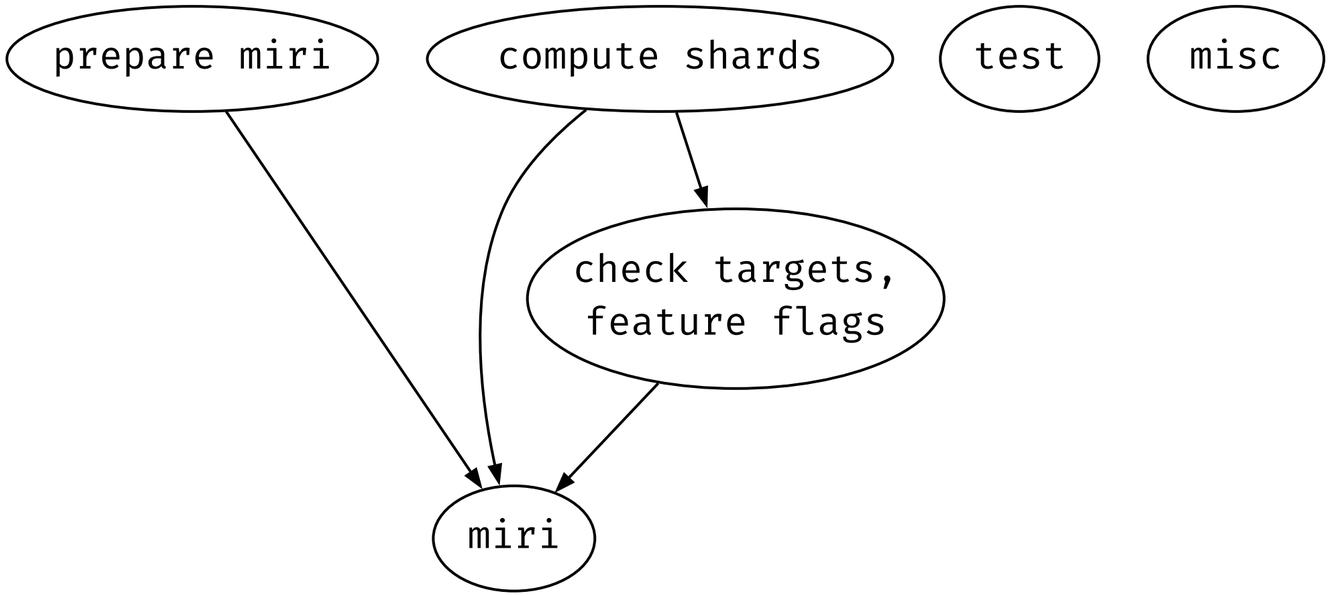
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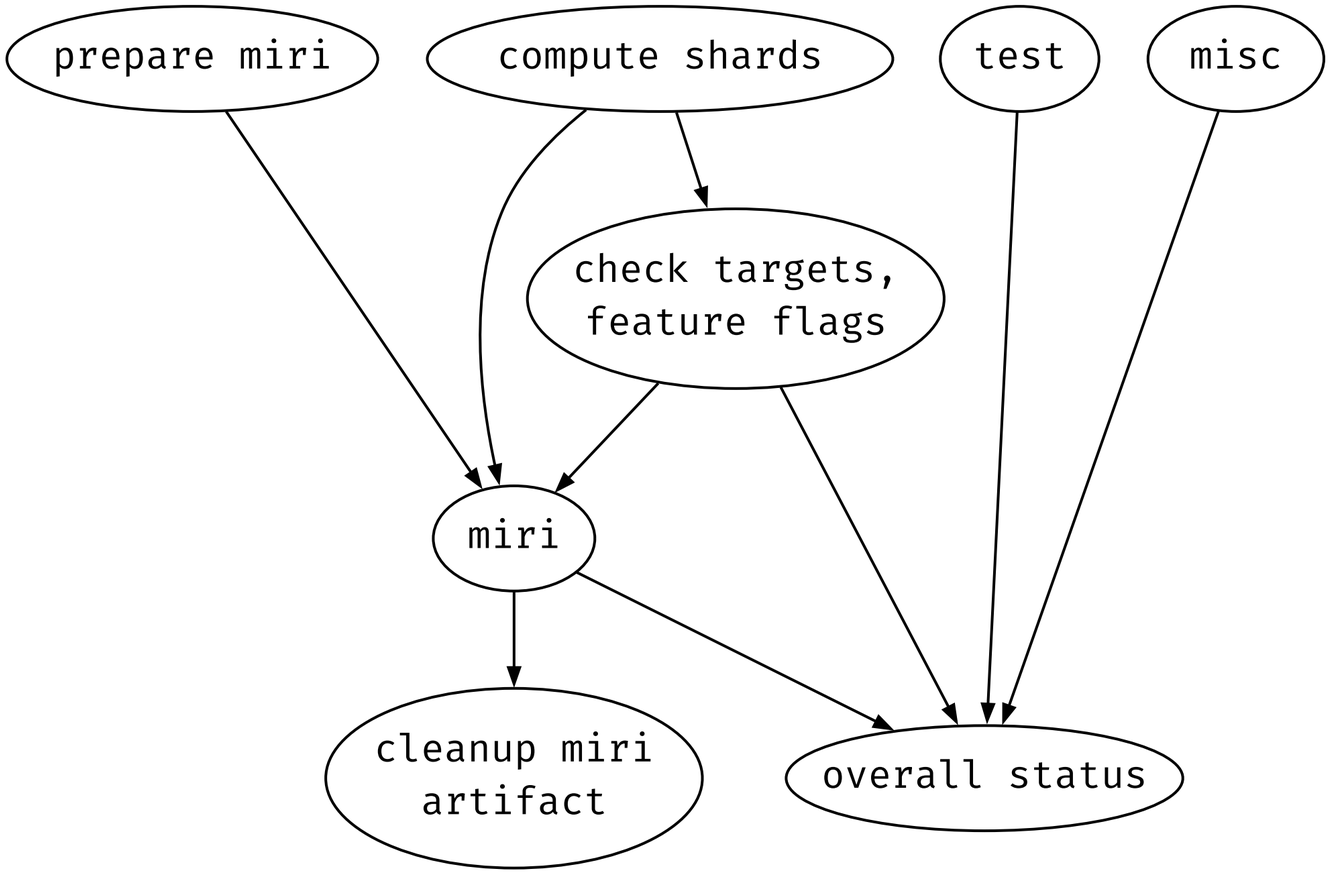
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- The largest breakages were from *compiler* bugs or *process* failures.
- Security reports are the top priority.
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  - `&&`, `||`, `!` in `cfg` — needs T-lang decision

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1.0 release

Tick Tock: Maintaining Time

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2026–09–10
Montréal

RustConf
2026