# 10,000 Lines Later: When a Tool Became a Compiler (and I Became a Gleamlin)

Rob Durst | February 21, 2026 | Gleam Gathering

# Some Philosophy

What makes someone a Gleamlin?

What is Gleam?

# A Bit About Me

[Day Job]: Site Reliability Engineer 
[Home]: Salt Lake City, Utah
[Fun Fact]: I do have a yorkie who does sometimes code…

 @rob_d

# Disclaimer

*This is a talk about the evolution of a tool. Service Level Objectives (SLOs) are just the language domain.*

# Service Level Objectives

*“99.9% of **users** who try to sign in with valid credentials succeed.”*

# ClickOps

# We Built some Tooling

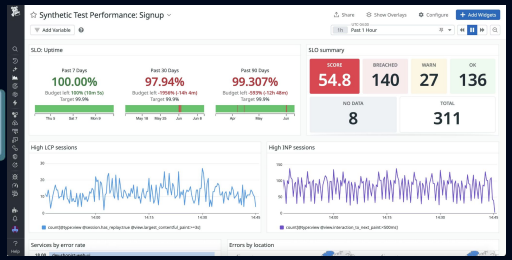
## Specification

```
## Sign In
  - view: "/sign_in"
    slis:
      - type: "FE_Renders"
        target: 99.9
      - type: "LCP_Latency"
        target: 99.99
        duration_threshold_seconds: 3.5
```

## Compiled Artifact

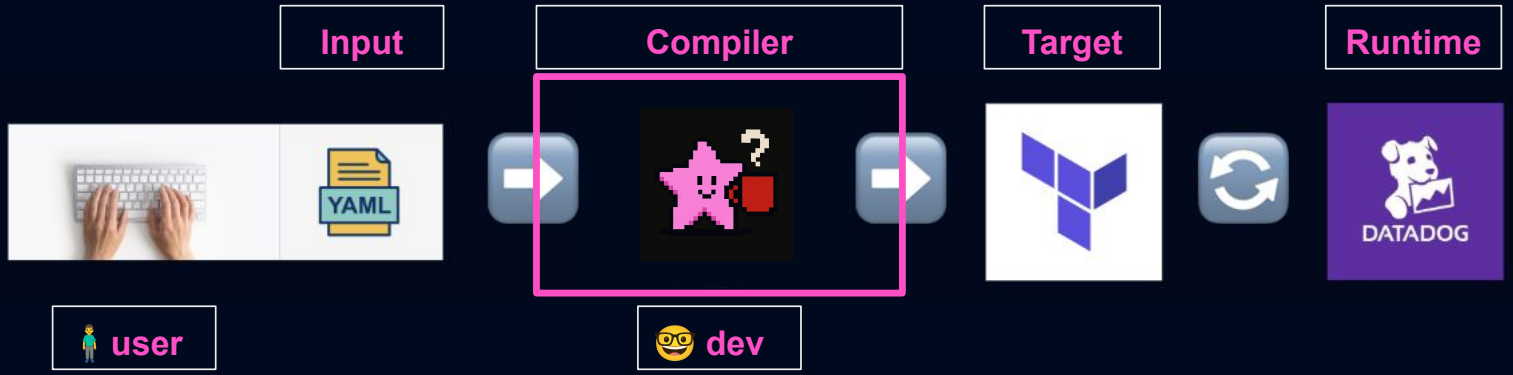
```
# Monitor-Based SLO
# Create a new Datadog service level objective
resource "datadog_service_level_objective" "bar" {
  name        = "Example Monitor SLO"
  type        = "monitor"
  description = "My custom monitor SLO"
  monitor_ids = [1, 2, 3]
```

## Manifestation



# So We Accidentally Built a Compiler…

- [user] Simplify user interface
- [dev] Reduce maintenance burden
- [compiler] Enable tooling to create a pit of success



# Let's Do it Right: *Introducing Caffeine*

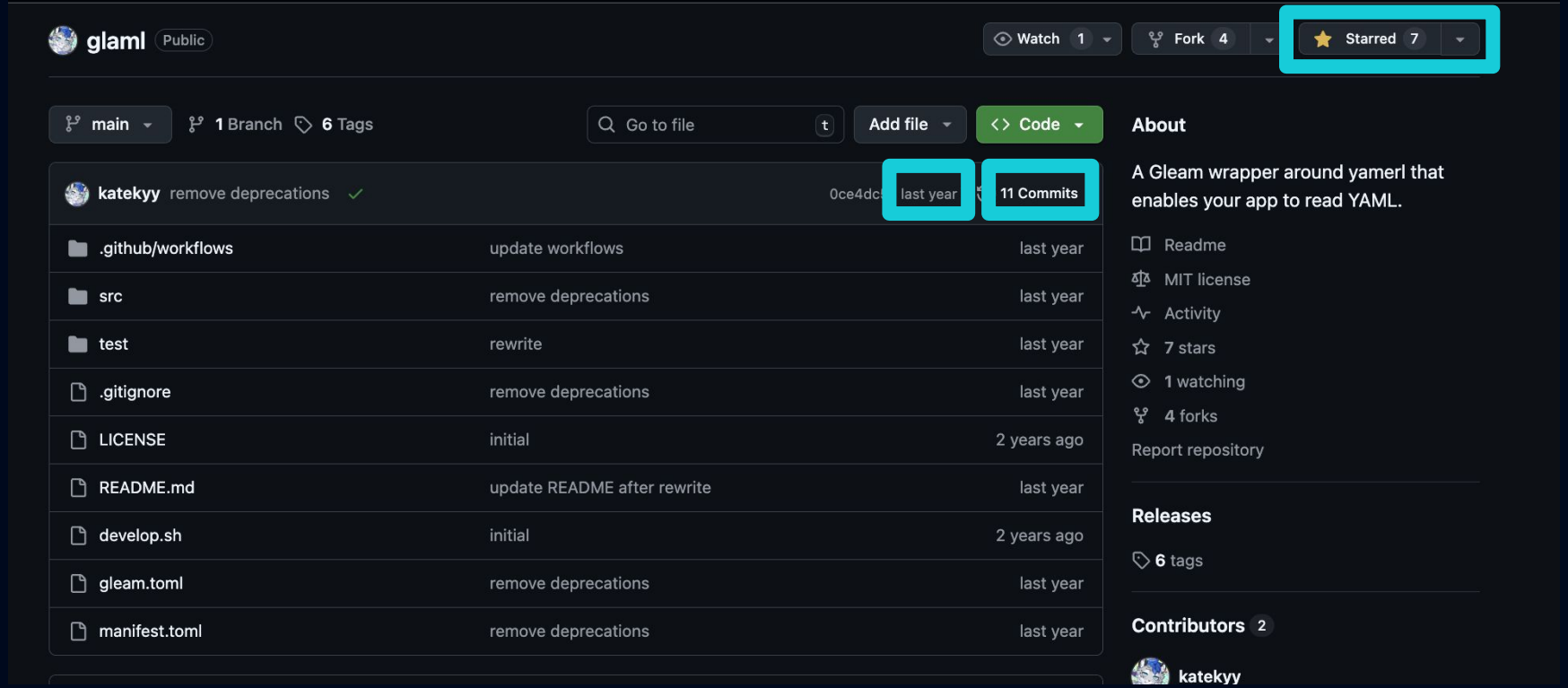
*"A compiler for generating reliability artifacts from service expectation definitions."*

# Gleam?

# One Week to Feature Parity

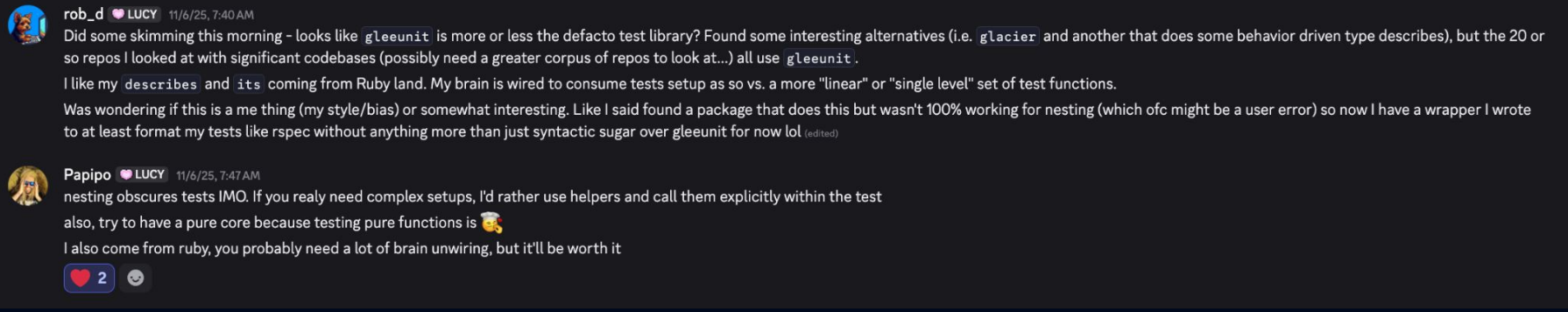

Progress 0%

# YAML


glaml
Public
Watch 1
Fork 4
Starred 7
main
1 Branch
6 Tags
Go to file
t
Add file
Code
katekyy remove deprecations
0ce4dc
last year
11 Commits
.github/workflows update workflows last year
src remove deprecations last year
test rewrite last year
.gitignore remove deprecations last year
LICENSE initial 2 years ago
README.md update README after rewrite last year
develop.sh initial 2 years ago
gleam.toml remove deprecations last year
manifest.toml remove deprecations last year
About
A Gleam wrapper around yamerl that enables your app to read YAML.
Readme
MIT license
Activity
7 stars
1 watching
4 forks
Report repository
Releases
6 tags
Contributors 2
katekyy

# Ok, I Miss RSpec

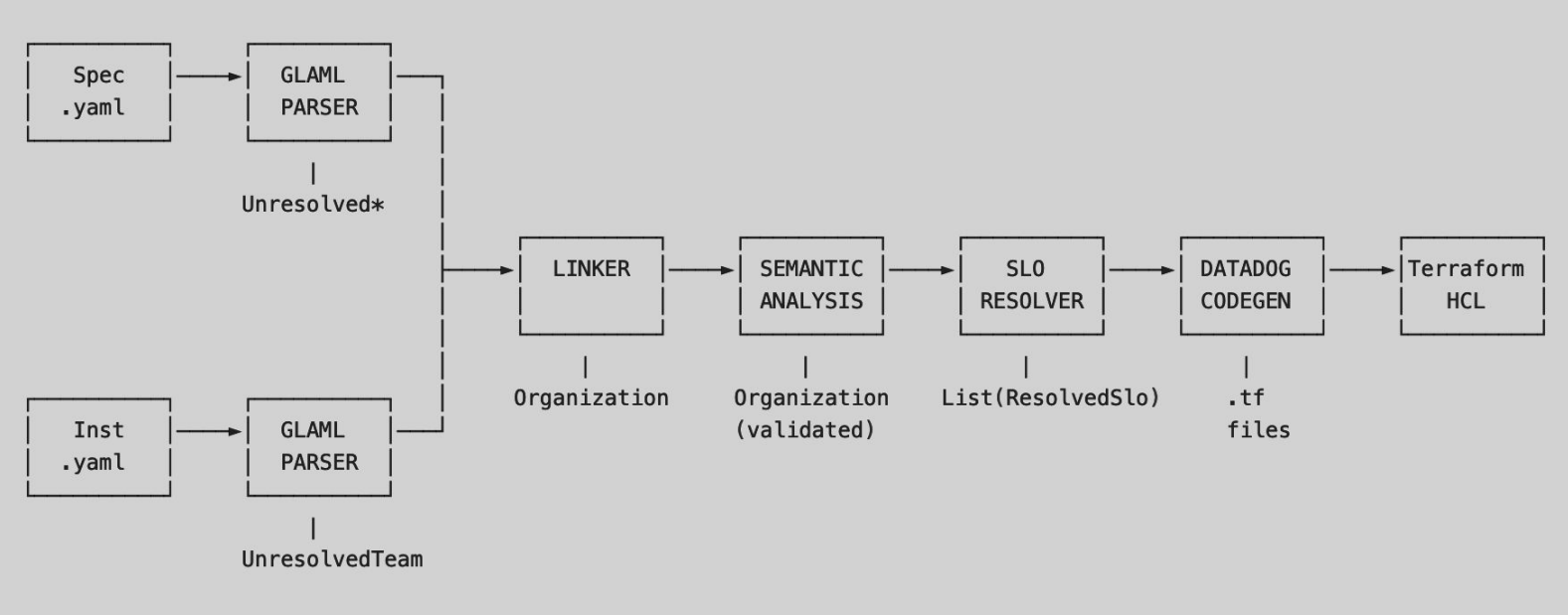
```gleam
pub fn is_last_char_test() {
  describe("is_last_char", fn() {
    it("should return true for empty string at index 0", fn() {
      is_last_char("", 0)
      |> gleeunit.be_true
    })
  })
}
```



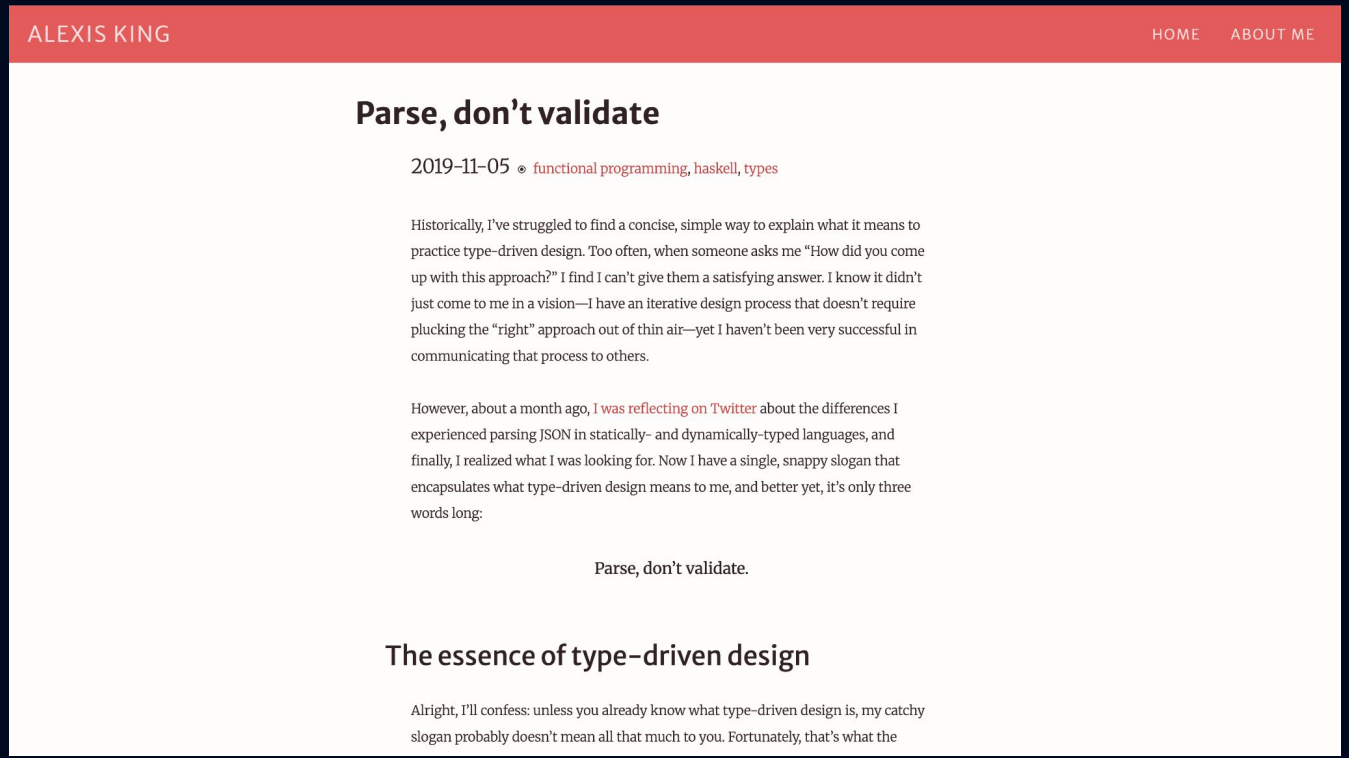
# Table Driven Testing

```gleam
pub fn extract_paren_content_test() {
  [
    #("happy path - simple parens", "(String)", Ok("String")),
    #("nested parens", "(Dict(String, Integer))", Ok("Dict(String, Integer)")),
    #("prefix before parens", "List(String)", Ok("String")),
    #("no parens returns Error", "no parens", Error(Nil)),
    #("content after closing paren returns Error", "(String) { x | x in { a } }", Error(Nil)),
  ]
  |> test_helpers.array_based_test_executor_1(
    parsing_utils.extract_paren_content,
  )
}
```

# Checkpoint: a **Compiler** in a week



# Parse Don’t Validate



ALEXIS KING

HOME ABOUT ME

## Parse, don’t validate

2019-11-05 ◉ functional programming, haskell, types

Historically, I’ve struggled to find a concise, simple way to explain what it means to practice type-driven design. Too often, when someone asks me “How did you come up with this approach?” I find I can’t give them a satisfying answer. I know it didn’t just come to me in a vision—I have an iterative design process that doesn’t require plucking the “right” approach out of thin air—yet I haven’t been very successful in communicating that process to others.

However, about a month ago, I was reflecting on Twitter about the differences I experienced parsing JSON in statically- and dynamically-typed languages, and finally, I realized what I was looking for. Now I have a single, snappy slogan that encapsulates what type-driven design means to me, and better yet, it’s only three words long:

Parse, don’t validate.

### The essence of type-driven design

Alright, I’ll confess: unless you already know what type-driven design is, my catchy slogan probably doesn’t mean all that much to you. Fortunately, that’s what the

# Extraction Pattern

## Specification

```
3
4    threshold: Float
5
```

## Compiler

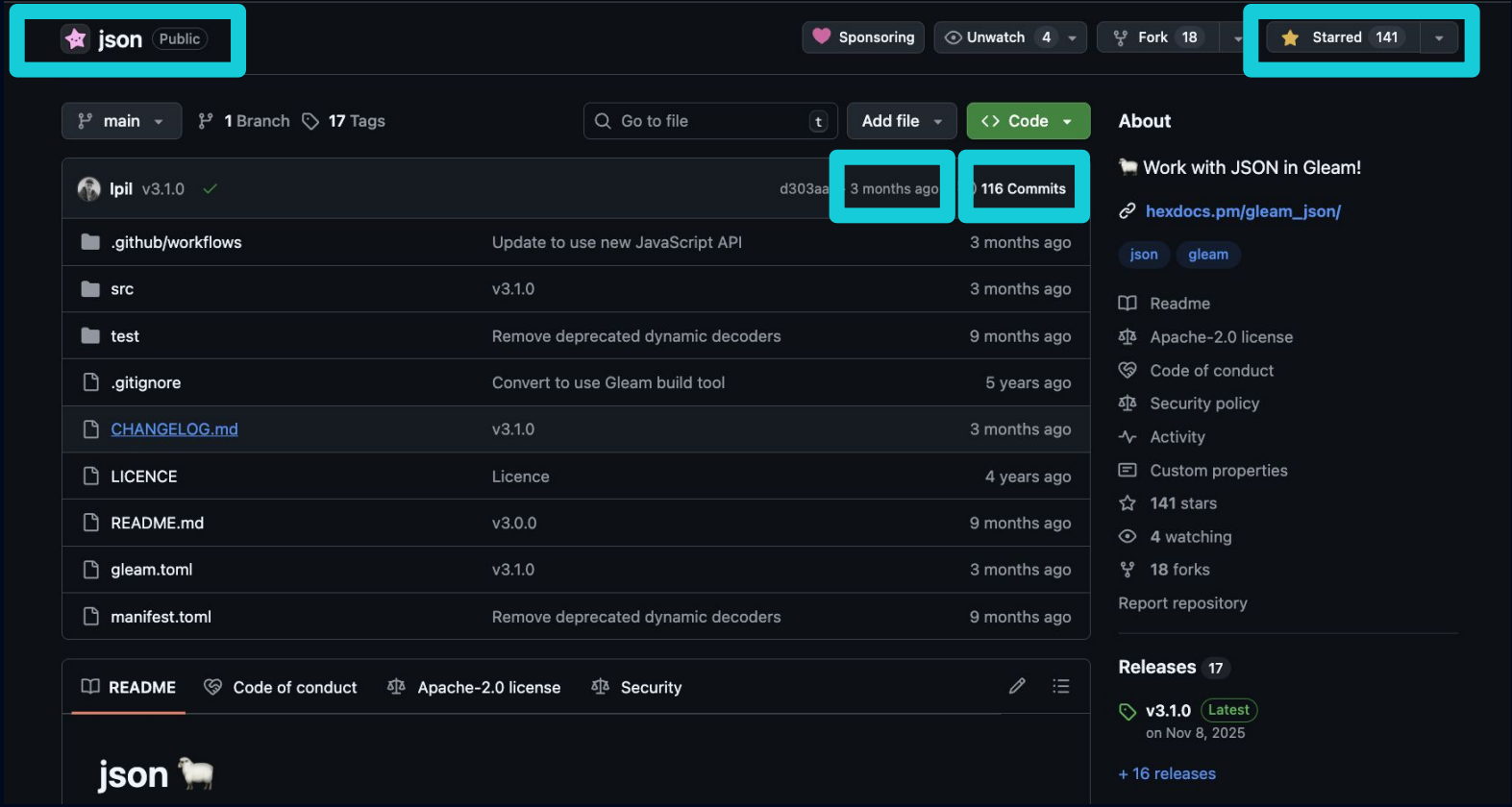
```
1   // Extract the actual float value using pattern matching
2   let threshold_value = try_extract_float(threshold_node)
3
4   fn try_extract_float(node: glaml.Node) -> Float {
5     case node {
6       glaml.NodeFloat(value) -> value
7       _ -> panic as "Expected node to be a float"
8     }
9   }
```

# A Fork: YAY - “*yet another YAML*”

A combinatorial explosion of extractors: 5 x 4 → 20

| Pattern | String | Int | Float | Bool |
|---|---|---|---|---|
| **Required** | extract_string | extract_int | extract_float | extract_bool |
| **Optional** | extract_optional_string | extract_optional_int | extract_optional_float | extract_optional_bool |
| **With default** | extract_string_or | extract_int_or | extract_float_or | extract_bool_or |
| **List of** | extract_string_list | extract_int_list | extract_float_list | extract_bool_list |
| **Map of** | extract_string_map | extract_int_map | extract_float_map | extract_bool_map |

# JSON?


json Public
Sponsoring
Unwatch 4
Fork 18
Starred 141
main
1 Branch
17 Tags
Go to file
t
Add file
Code
lpil v3.1.0
d303aa
3 months ago
116 Commits
.github/workflows
Update to use new JavaScript API
3 months ago
src
v3.1.0
3 months ago
test
Remove deprecated dynamic decoders
9 months ago
.gitignore
Convert to use Gleam build tool
5 years ago
CHANGELOG.md
v3.1.0
3 months ago
LICENCE
Licence
4 years ago
README.md
v3.0.0
9 months ago
gleam.toml
v3.1.0
3 months ago
manifest.toml
Remove deprecated dynamic decoders
9 months ago
README
Code of conduct
Apache-2.0 license
Security
json
About
Work with JSON in Gleam!
hexdocs.pm/gleam_json/
json
gleam
Readme
Apache-2.0 license
Code of conduct
Security policy
Activity
Custom properties
141 stars
4 watching
18 forks
Report repository
Releases 17
v3.1.0 Latest
on Nov 8, 2025
+ 16 releases

# Decoders

## [Before] Extractor

```
4  fn try_extract_float(node: glaml.Node) -> Float {
5    case node {
6      glaml.NodeFloat(value) -> value
7      _ -> panic as "Expected node to be a float"
8    }
9  }
```

## [After] Decoder

```
pub fn decode_float(input: Dynamic) -> Result(Float, String) {
  decode.run(input, decode.float)
  |> result.replace_error("Unable to decode: " <> string.inspect(input))
}
```

# A Makeover (sort of)

(YAML) Specification

```yaml
name: Some_Expectation
blueprint: Some_Blueprint
provides:
  threshold: 99.9
  endpoint: /sign-in
```

(JSON) Specification

```json
{
  "name": "Some_Expectation",
  "blueprint": "Some_Blueprint",
  "provides": {
    "threshold": 99.9,
    "endpoint": "/sign-in"
  }
}
```

# Example Type System Addition

```
pub type AcceptedTypes {
  PrimitiveType(PrimitiveTypes)
  CollectionType(CollectionTypes(AcceptedTypes))
  ModifierType(ModifierTypes(AcceptedTypes))
  RefinementType(RefinementTypes(AcceptedTypes))
  RecordType(dict.Dict(String, AcceptedTypes))
  SomeNewType(String)
}
```

# Exhaustiveness Checks as a Checklist

## CLI (*7 errors returned*)

```
[→  caffeine_lang git:(main) × gleam build
  Compiling caffeine_lang
error: Inexhaustive patterns
   ┌─ /Users/rdurst/BrickellResearch/caffeine/caffeine_lang/src/caffeine_lang/types.gleam:323:3
   │
323 │ ┌   case accepted_type {
324 │ │     PrimitiveType(primitive_type) -> primitive_type_to_string(primitive_type)
325 │ │     CollectionType(collection_type) ->
326 │ │       collection_type_to_string(collection_type)
    · │
330 │ │     RecordType(fields) -> record_type_to_string(fields)
331 │ │   }
   │ └───^

This case expression does not have a pattern for all possible values. If it
is run on one of the values without a pattern then it will crash.

The missing patterns are:

    SomeNewType(_)

error: Inexhaustive patterns
   ┌─ /Users/rdurst/BrickellResearch/caffeine/caffeine_lang/src/caffeine_lang/types.gleam:888:3
   │
888 │ ┌   case typ {
889 │ │     PrimitiveType(primitive) ->
890 │ │       validate_primitive_default_value(primitive, value)
891 │ │     RefinementType(refinement) ->
    · │
904 │ │     RecordType(_) -> Error(Nil)
905 │ │   }
   │ └───^
```

## IDE (*7 sections underlined*)

```
pub fn validate_value(
  accepted_type: AcceptedTypes,
  val: Value,
) -> Result(Value, List(ValidationError)) {
  case accepted_type {
    PrimitiveType(primitive) -> validate_primitive_value(primitive, val)
    CollectionType(collection) -> validate_collection_value(collection, val)
    ModifierType(modifier) -> validate_modifier_value(modifier, val)
    RefinementType(refinement) -> validate_refinement_value(refinement, val)
    RecordType(fields) -> validate_record_value(fields, val)
  }
}
```

# A Glow Up: Docs Next to Code

BLUEPRINT — blueprints.caffeine

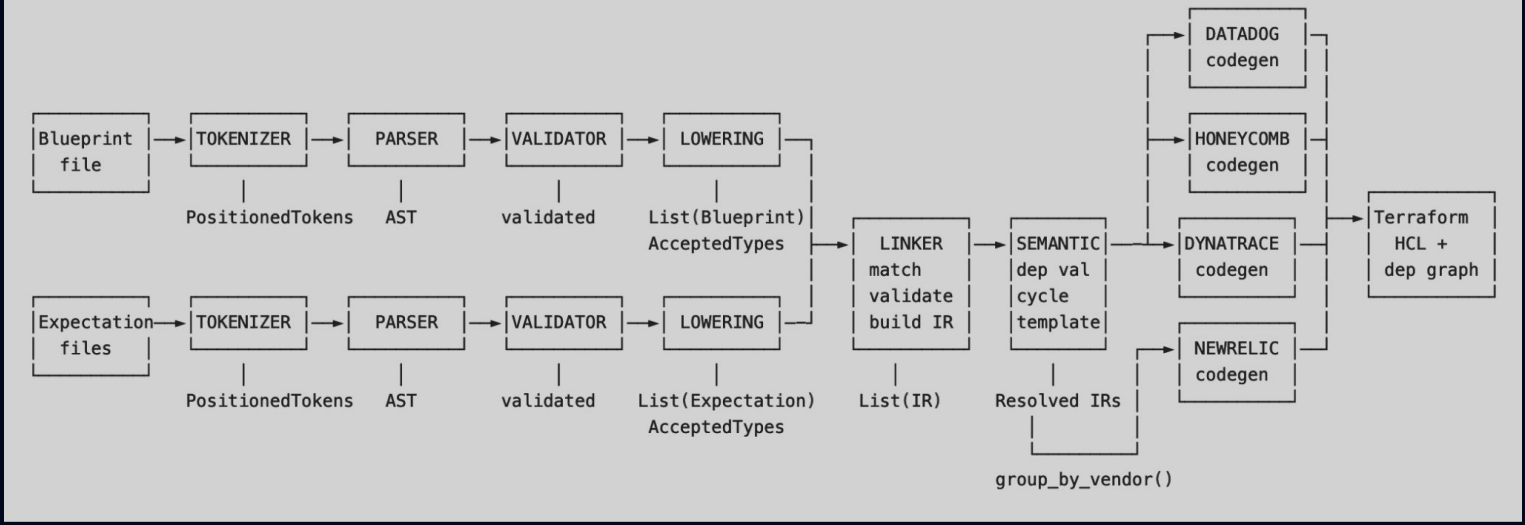
```
Blueprints for "SLO"
  * "Simple_SLO":
    Requires { service_name: String }
    Provides {
      vendor: "datadog",
      indicators: {
        numerator: "sum:successes{$$service->service_name$$}",
        denominator: "sum:total{$$service->service_name$$}"
      },
      evaluation: "numerator / denominator"
    }
```

EXPECTATION — tour/demo/service.caffeine

```
Expectations for "Simple_SLO"
  ## This SLO is useful because we
  ## need to be mindful of how often
  ## hello world succeeds.
  * "My First SLO":
    Provides {
      service_name: "hello-world",
      threshold: 99.9,
    }
  ## So while everyone "hello worlds"
  ## not everyone will fuzzbuzz. Is
  ## this a right of passage, idk?
  ## It is unsupported in Caffeine...
  * "My Second SLO":
    Provides {
      service_name: "fuzzbuzz",
      threshold: 99.99,
    }
```

# Checkpoint: a **Language**

✅ [user] Simplify user interface
✅ [dev] Reduce maintenance burden
✅ [compiler] Enable tooling to create a pit of success



# Packaging Caffeine

1. gleam export erlang-shipment or gleescript
   *Requires Erlang on the target.*
2. Docker
   *Works, but awkward for a CLI.*
3. Nix
   *Nix is great - just a me problem?**
4. Deno
   *Target JS → Deno Compile → Binary*

Shoutout to *gleative* and *garnet* both of which take this same approach!

**Check out "A Gleam Burrito"!*

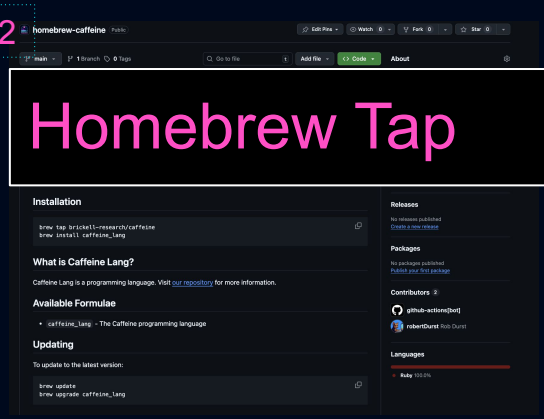
# Checkpoint: a **Distributable** Language

# Our CI/CD

1


## Github Releases

2

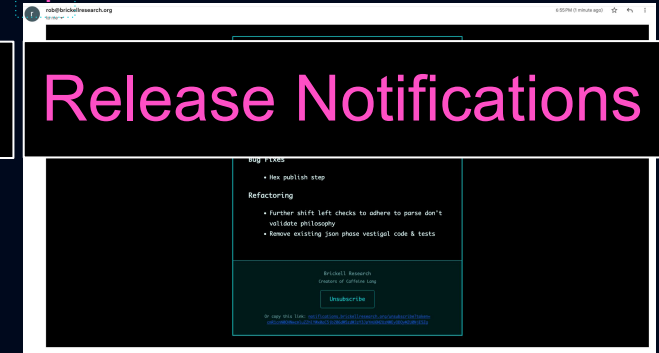



## Homebrew Tap

3


## Website Tour

4



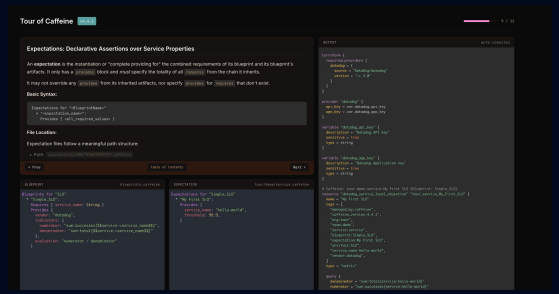

## Release Notifications

# Checkpoint: a Language **Ecosystem**

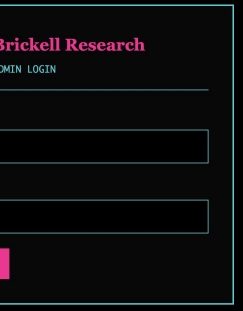
## Command Line Interface

```
(3.11.9) ➜  slos git:(main) caffeine
A compiler for generating reliability artifacts from service expectation
definitions.
Version: 4.4.1

USAGE:
    caffeine ( artifacts | compile | format | lsp | types | validate ) [ ARGS ]

SUBCOMMANDS:
    artifacts              List available artifacts from the standard library

    compile                Compile .caffeine blueprints and expectations to
                           output

    format                 Format .caffeine files

    lsp                    Start the Language Server Protocol server

    types                  Show the type system reference with all supported
                           types

    validate               Validate .caffeine blueprints and expectations without
                           writing output
```

## Language Tour




## Notifications

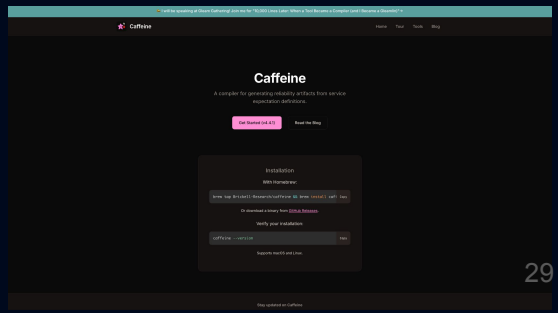



## Language Server

```
cicd_success_rate — Blueprint item
Extends: _simple_good_over_bad, _env
Requires: 2 fields | Provides: 1 fields

##                                    y circle)
* "cicd_success_rate" extends [_simple_good_over_bad, _env]:
  Requires { repo_name: String, job_name: List(String) }
  Provides {
    indicators: {
      numerator: "sum:circleci.completed_builds.count{$$repo_name->repo_na
      denominator: "sum:circleci.completed_builds.count{$$repo_name->repo_
    }
  }
```

## All Written in Gleam!

## Website (*lustre-ssg*)




## Compiler

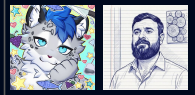
# I Had Become a Gleamlin

# Gleam is…

1. [Approachable] Small enough *to learn*
2. [Micropatterns] Functional enough *to model a compiler*
3. [Ecosystem] Practical enough *to build*
4. [Productionization] Robust enough *to ship*

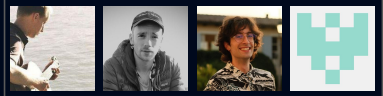
# A Special Thanks

glaml



glint

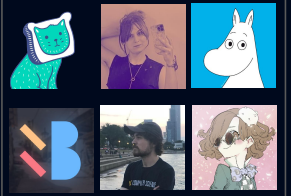
filepath



argv

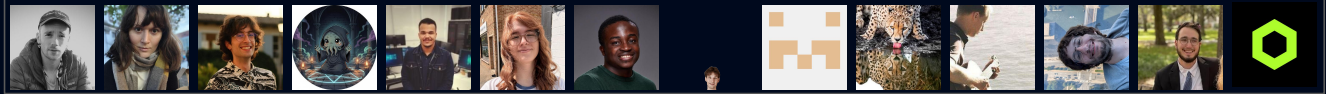
envoy

ansi



stdlib

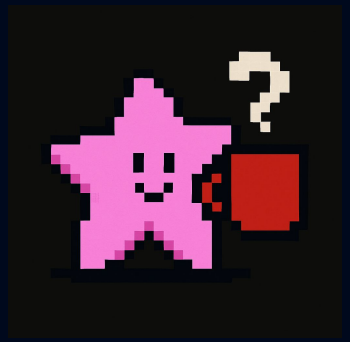

simplifile



json

gleeunit

# ~10,000 lines later we ❤️ Gleam



🏠 caffeine-lang.run
👨‍💻 github.com/Brickell-Research/caffeine_lang
✉️ rob@brickellresearch.org