Babelfish

Universal Code Parsing Server

Curry On

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Who am I?

- Lead Data Engineer at source{d}: https://sourced.tech
- Working on a pipeline to analyze all open source code found online.

Who am I not?

- Programming languages expert

The Story

2015

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- Project: find best developers to recruit based on their open source projects

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- How?
  - Fetch all Git repositories
  - Apply PageRank to contributors
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  - ...

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- How?
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  - ...
- Easy

2016

Detect common libraries

2016

Detect common libraries Regexps

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Detect common libraries	Regexps
Ignore comments	

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2016

Detect common libraries	Regexps
Ignore comments	More regexps
More libraries	Tokenizing, some pattern matching, +200 regexps

Data Science comes in

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Abstract Syntax Trees

- We can use ASTs to easily extract the kind of data we need
- Most languages have one already implemented

Universal Abstract Syntax Trees

- But we need them normalized
- Writing our own grammars to produce a UAST?

Universal Abstract Syntax Trees

- But we need them normalized
- Writing our own grammars to produce a UAST?
- For 200 languages?

Middle Ground

- Leverage standard parser from each language
- Normalize as a post-processing step
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- Leverage standard parser from each language
- Normalize as a post-processing step
- Normalizers are written in a single language (Go)
- **That's Babelfish**

Motivation

- *Babelfish was born as a solution for massive code analysis.*
- **Goal:** analyzing all source code from every repository in the world, for every revision.

Scope

- **Scope:** parsing single files in any programming language and producing a universal abstract syntax tree.

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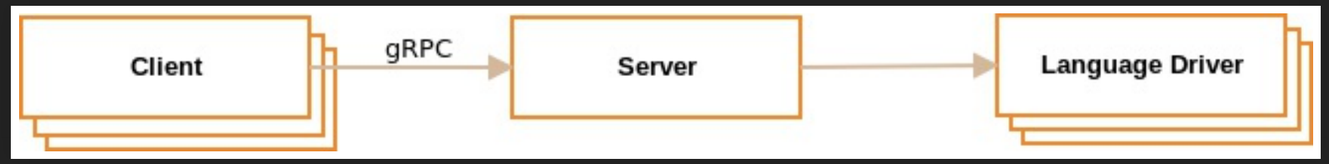
- **Scope:** parsing single files in any programming language and producing a universal abstract syntax tree.
- **Future scope, maybe, *who knows:*** full project analysis, where source code can be analyzed with its full context, and not just per-file.

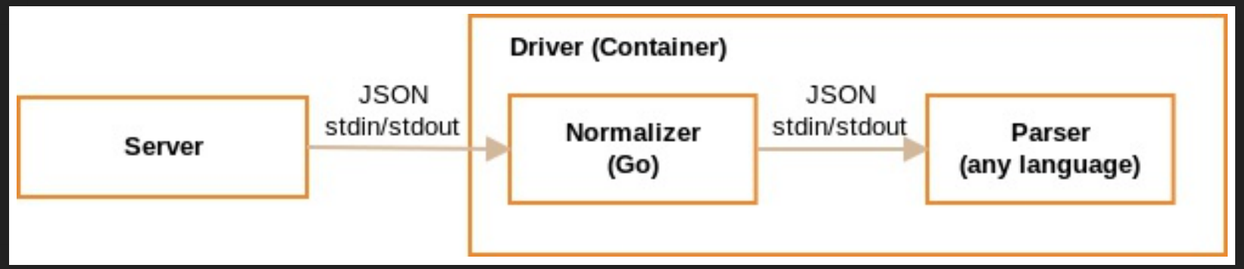
Architecture Overview



Containerize everything!

- Language drivers are packaged as Docker containers
- Server contains a lightweight container runtime
- Based on libcontainer
- No Docker, no external runtime dependencies
- Official drivers published at Docker Hub

Driver Architecture



UAST

- Minimal structural normalization
- Language-independent annotations
- Fallback to language-specific data

Clients

- gRPC: protocol code generated for any language
- Library available in Go
- C++ library + bindings in multiple languages *(early stage)*

Status

- Early stage
- Server working
- Beta drivers: Python and Java
- Early drivers: 13 more
- Early UAST Specification
- Showcase tools (tokenizer, cyclomatic complexity, npath)

We need your help

- Feedback on the UAST specs
- Language driver contributions
- Use cases implemented on top of it!

Thank you!

- Documentation: doc.bblf.sh
- GitHub: github.com/bblfsh
- Slack: doc.bblf.sh/community.html