# Zeppelin Helium : Spell

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ZEPL

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# What is Spell?

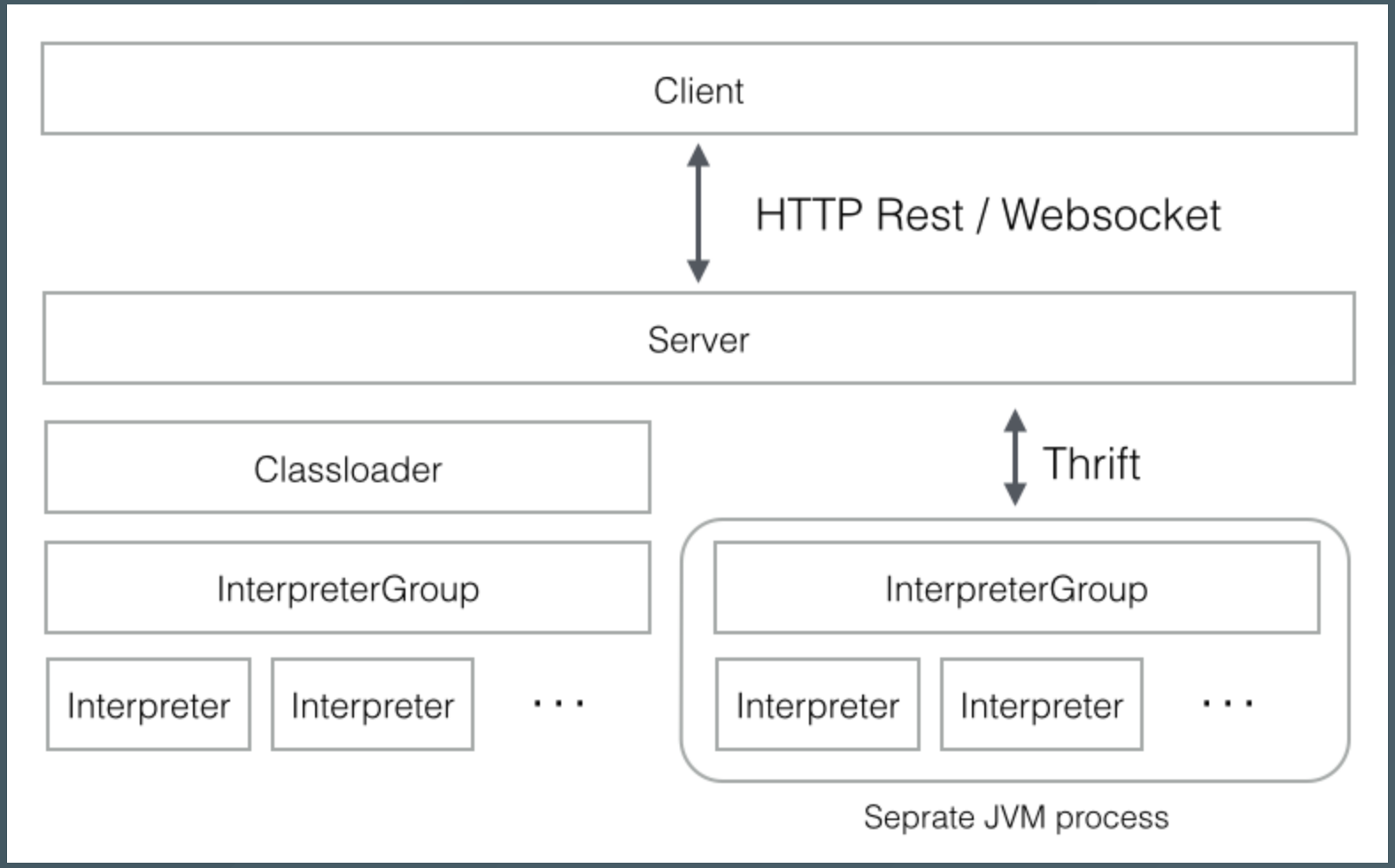
Frontend interpreter runs on browser not in backend.

- **pluggable**: can be installed / removed easily (Helium Online Registry)
- **written in javascript**: can utilise exisiting libraries (flowchart, sigmajs, vega, papaparse)
- **can be display system as well**
- available in **0.8.0-SNAPSHOT** (ZEPPELIN #1940)

# What?! 

# DEMO

# Background: Interpreter



## Background: Interpreter (cont.)

- Interpreter consumes paragraph text and render output.
- Each interpreter has magic. For example, the markdown interpreter uses `%markdown`

```
%spark

println("Hello, Zeppelin!")
```

```
%markdown

## Hello, Zeppelin
```

# Background: Display System

```
%spark

val total = 195
println(s"%html <h3>result is ${result}</h3>")

// will be interpreted by spark interpreter
// `%html <h3>result is 195<h3>`
```

- Basic Display System: `%html`, `%table`, `%angular`
- Display system renders result **on browser not on backend**
- Can we do better? (e.g `%markdown` display type)

# Motivation: Spell

- How can i pass variables from spark to markdown in Zeppelin
- Do we really need **backend** markdown interpreter? (markdown-it)
- What if we implement `%markdown` as a **frontend** interpreter?
- Then, **we can also use them as display system** because it runs on browser like `%html`

# This is Spell 😎

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- **pluggable**: can be installed / removed easily (Helium Online Registry)
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- **can be display system as well** (ZEPPELIN-2089)

# I wanna create my own spell 😯

- Doc: How to create new spell
- Basic Examples
- Published Spells
- Configurtion Support: #1982
- Ideas: `%slack`, `%sigma`, `%vega`

# DEMO

## zeppelin-echo-spell

# Creating Spell: interpret()

- every spell takes paragraph text (string)
- returns SpellResult
- example: zeppelin-echo-spell

```
interpret(paragraphText) {
  return new SpellResult(paragraphText)
}
```

# Creating Spell: SpellResult

- SpellResult(result, displayType)
- displayType can be optional (default is `%text`)

```
import {
    SpellBase,
    SpellResult,
    DefaultDisplayType,
} from 'zeppelin-spell';

interpret(paragraphText) {
  const result = `<h2>${paragraphText}</h2>`
  return new SpellResult(result, DefaultDisplayType.HTML)
}
```

# Creating Spell: SpellResult (cont.)

- SpellResult supports multiple results: add()
- See also: Multiple paragraph results (PR #1658)

```
interpret(paragraphText) {
    const htmlResult = '<h4>Hello</h4>'
    const textResult = 'Spell'

    return new SpellResult()
     .add(htmlResult, DefaultDisplayType.HTML)
     .add(Result, DefaultDisplayType.TEXT /** optional */)
}
```

# Creating Spell: SpellResult (cont.)

- pass Promise for **API call**
- psss Function which takes elem id to **draw DOM**

| result | displayType | example |
|---|---|---|
| Object | ALL (except ELEMENT) | markdown |
| Promise | ALL (except ELEMENT) | translator API |
| Function | ELEMENT (`%element`) | flowchart-spell |

# Creating Spell: Configuration

- Actually, interpret() takes config as the second argument

```
interpret(paragraphText, config) { ... }
```

- Define config specification in package.json like

```
  "config": {
    "repeat": {
      "type": "number",
      "description": "How many times to repeat",
      "defaultValue": 1
    }
  },
```

# (unresolved) Helium, Spell Issues

we need your help 😭

- ZEPPELIN-2089: Use spell as display system with backend interpreters
- ZEPPELIN-2088: Evaluate helium bundles one by one
- ZEPPELIN-2122: Add execution time to paragraphs executed by spell
- Other Issues

# Resources

- Image: Zeppelin Interpreter Architecture

# Thanks 😀