Bobur Umurzokov

How to Write an API Gateway Plugin in Java

Apache APISIX Plugin Development

About me

Bobur Umurzokov

- Apache APISIX Contributor.

- Software Engineering Trainer at Software Development Academy

- Developer advocate for Apache APISIX

- For more info

  - https://www.linkedin.com/in/bobur-u-147400106/

  - https://github.com/Boburmirzo

- About Apache APISIX API Gateway.

- Overview of existing plugins in APISIX

- Low-code Plugin Orchestration.

- Custom plugin development.

- Managing Spring Boot REST API with APISIX .

- How Java plugin runner works.

- Develop a new plugin in Java demo.

APIs

APIs are everywhere

API Gateway
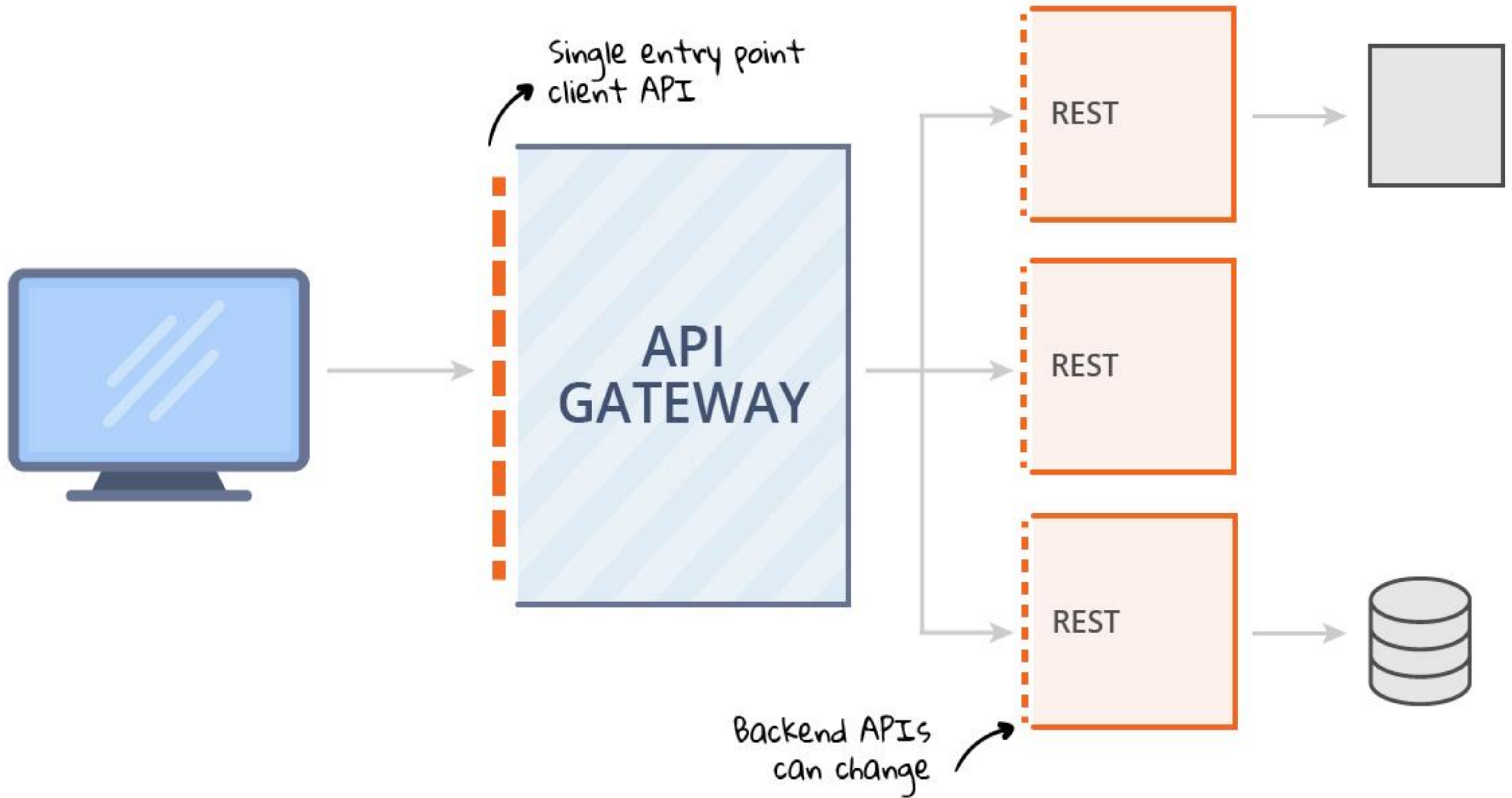
Single entry point client API

API GATEWAY

REST

REST

REST

Backend APIs can change

A central point for APIs observation

API Gateway Features

- Routing.
- Request Aggregation.
- Authentication.
- Authorization.
- Rate Limiting.
- Caching.
- Retry policies / QoS.
- Load Balancing.
- Logging / Tracing / Metrics.
- Headers / Method / Query String / gRPC Transformation.
- Configuration / Administration REST API.
- And many more…

What is Apache APISIX?

- One of the fastest-growing top projects of the Apache Software Foundation in 2022.

- Cloud native API gateway.

- It has rich traffic management features.

- Many well-known organizations use APISIX in production.

- APISIX has a user-friendly dashboard.

- It support plugin hot reloading.

- You can write custom plugins.

API Gateway Plugins

- Authentication

- Security

- Traffic Control

- Observability

- Serverless

- Transformation

- Other

Custom plugin development

APISIX Dashboard

? 🔺 APISIX User 文A
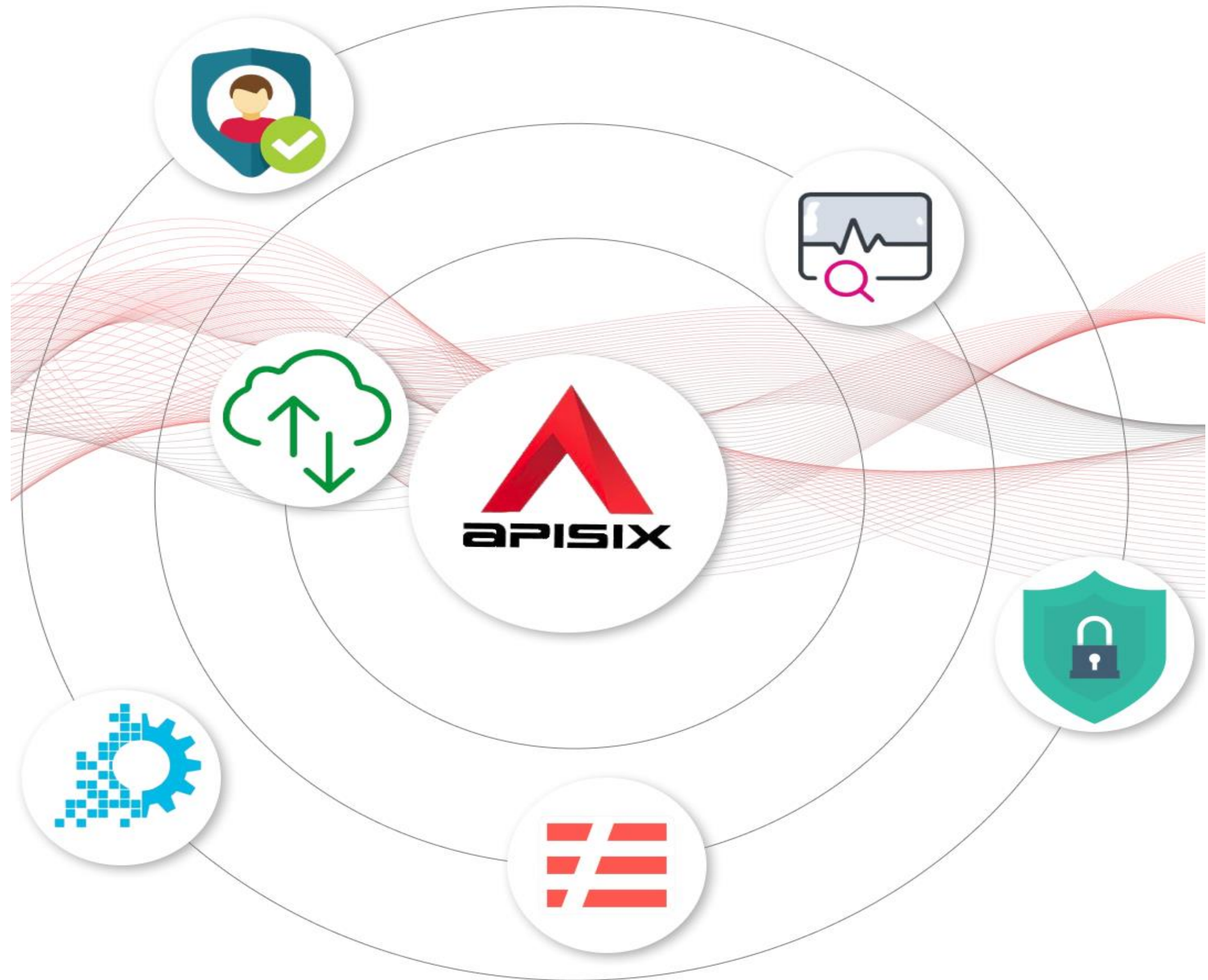
- ⊘ Dashboard
- ▤ Route
- ▦ Upstream
- ⊞ Service
- ⚏ Consumer
- ◈ Plugin
- ▦ SSL
- ⓘ System Info

Configure Route

✓ Define API Request ———————— ✓ Define API Backend Server ———————— ③ Plugin Config ④ Preview

| Normal | Orchestration |

⊖ **Available Nodes**

🗑 | ◯ ◯ | ⬚ ✂ ▢ | ▤ 🖨

Search plugin by name

⊖ General

(Start)   ◇ Condition ◇

⊖ Authentication

🔌 openid-connect
openid-connect

🔌 basic-auth
basic-auth

Previous   Next

Managing Spring Boot REST API with APISIX

- Multi-container app (*backend, db, apisix and etcd* together) with [Docker compose](#).

- Configure APISIX upstream for Spring boot REST API.

- Only allowed user can access (Security plugin).

- Enable a traffic management (Traffic control plugin).

  - https://github.com/Boburmirzo/apisix-plugin-spring-rest-demo source code on GitHub.

Secure the API

[Consumer Restriction](consumer-restriction) 🔌 (*consumer-restriction*) – makes corresponding access restrictions to your services or routes based on different users selected.

Enable a traffic management

The [Limit count plugin](#) 🔌 is one among many limiting plugins. It limits the request rate by a fixed number of requests in each time window.

Observe the API

[Prometheus plugin](#) can fetch API metrics data and you can show metrics exported by the plugin in [Grafana](#).

Jwt-Auth

Ip-Restriction

Serverless-Pre-Function
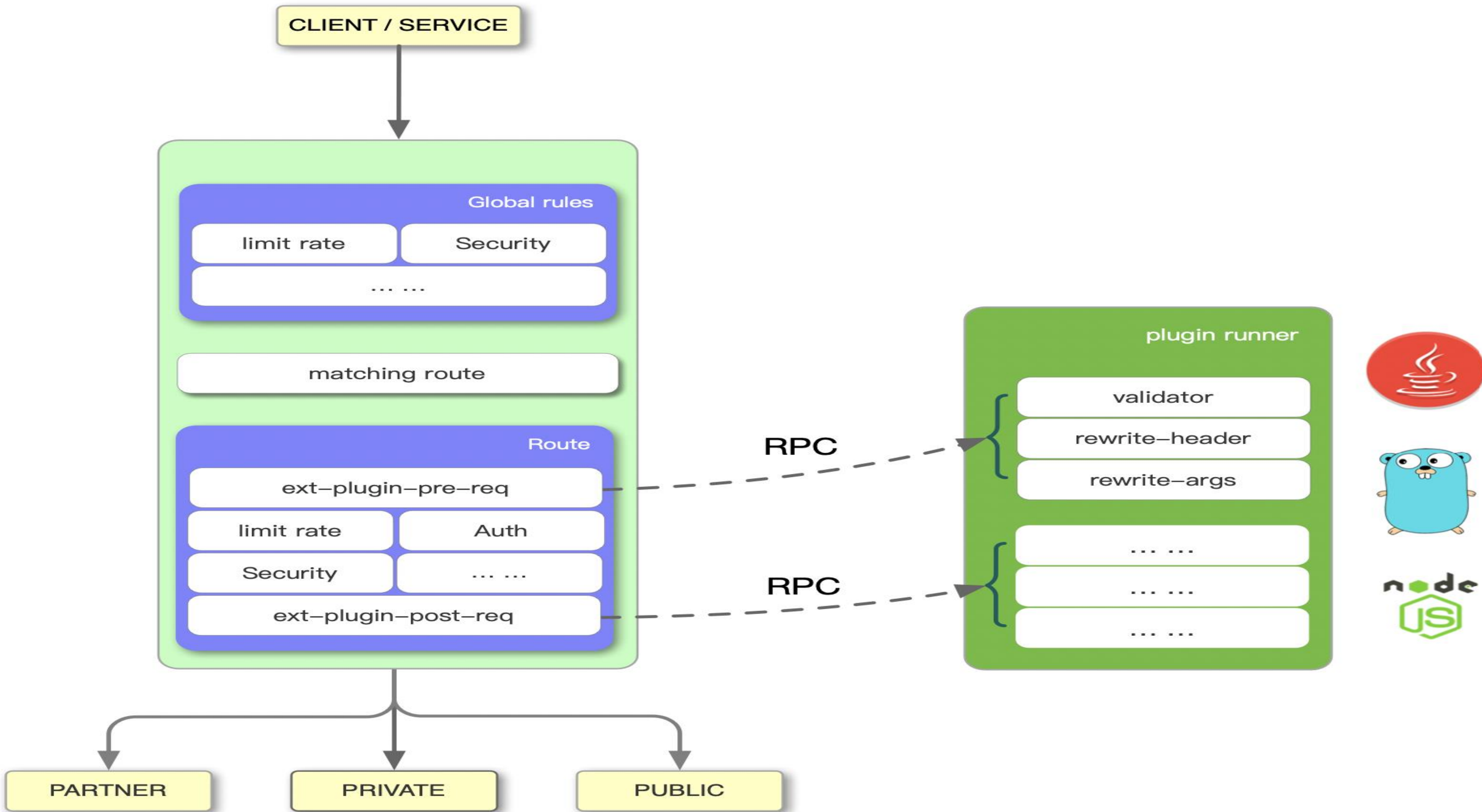
Kafka-Logger

Openid-Connect

Limit-Req

Prometheus

HTTP-Logger

CLIENT / SERVICE

Global rules

limit rate   Security

... ...

matching route

Route

ext−plugin−pre−req

limit rate   Auth

Security   ... ...

ext−plugin−post−req

RPC

RPC

plugin runner

validator

rewrite−header

rewrite−args

... ...

... ...

... ...

PARTNER   PRIVATE   PUBLIC

serialize/deserialize
flatbuffer

encode/decode
unit: byte

1	3	$(data length)
type	data length	data

1	3	$(data length)
type	data length	data
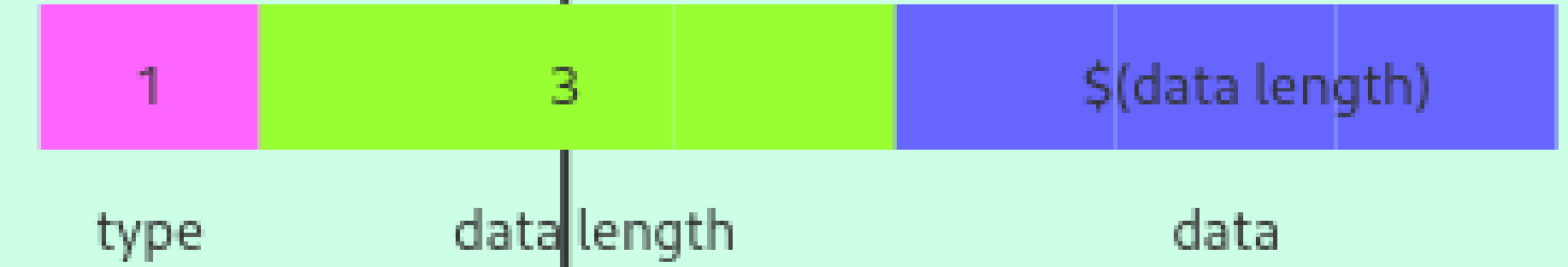
inter-process communication
unix domain socket

socket file

APISIX
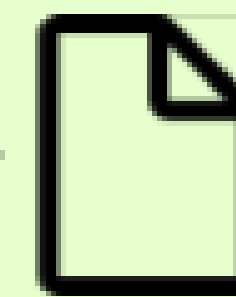
APISIX
Java Plugin Runner

Building Development Environment

- Build Apache APISIX (Docker Compose, Helm, or other ways to install).

- Build Apache [APISIX Java Plugin Runner](#).

  Note: Apache APISIX and apisix-java-plugin-runner need to be located on the same instance.

How it works

```java
public class TokenValidator implements PluginFilter {

    @Override
    public String name() {
      // It is recommended to keep the name of the filter the
      // same as the class name.
      return "TokenValidator";
}
}
```

How it works

```java
@Override
public void filter(HttpRequest request, HttpResponse response,
PluginFilterChain chain){
    /* Here, you can define a filter logic
     * Also, fetch the Nginx variables, and the request body.
     */

    chain.filter(request, response);
}
```

How it works

```java
@Override
public List<String> requiredVars() {
    List<String> vars = new ArrayList<>();
    vars.add("remote_addr");
    vars.add("server_port");
    return vars;
}
```

How it works

```json
{
    "uri":"/get",
    "plugins":{
        "ext-plugin-pre-req":{
            "conf":[
                {
                    "name":"TokenValidator",
                    "value":"{\"validate_header\":\"token\",\"validate_url\":\"https://www.sso.foo.com/token/validate\",\"rejected_code\":\"403\"}"
                }
            ]
        }
    },
    "upstream_id": "1"
}'
```

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apache / **apisix-java-plugin-runner**   Public

⌕ Notifications   ⑂ Fork 51   ☆ Star 70

<> Code   ⊙ Issues 22   ⑂ Pull requests 1   ⊙ Actions   ⊙ Security   ⊬ Insights

⑂ main ∨   ⑂ 3 branches   ⊘ 2 tags

Go to file   Code ∨

ericluoliu docs: add MAINTAIN.md (#160)   ✓ 713a2c5 15 hours ago   ⊙ 68 commits

📁 .github	chore: upgrade spring boot release version (#157)	6 days ago
📁 .mvn/wrapper	initial commit (#1)	14 months ago
📁 ci	chore(e2e): update apisix image to dev (#134)	4 months ago
📁 docs	chore: adjust the matching APISIX version to 2.12.0 (#124)	5 months ago
📁 runner-core	refactor: rename the name of the function that gets all the headers t...	4 months ago
📁 runner-dist	feat: release 0.2.0 (#115)	6 months ago
📁 runner-plugin-sdk	refactor: rename the name of the function that gets all the headers t...	4 months ago
📁 runner-plugin	feat: release 0.2.0 (#115)	6 months ago
📁 runner-starter	feat: release 0.2.0 (#115)	6 months ago
📁 sample	feat: release 0.2.0 (#115)	6 months ago
📁 src/main/checkstyle	refactor: switch from reactor-netty to netty, and support fetching va...	6 months ago
📁 tests/e2e	feat(ci): add e2e test framework (#133)	4 months ago

About

APISIX Plugin Runner in Java

🔗 apisix.apache.org/

plugin   java   gateway   apisix

📖 Readme

⚖ Apache-2.0 license

Ⓒ Code of conduct

☆ 70 stars

👁 24 watching

⑂ 51 forks

Releases 2

🏷 0.2.0 Latest
on Jan 17

+ 1 release

References

- [Apache APISIX official website](#)
- [Apache APISIX GitHub repo](#)
- Read [Getting Started](#) guide

- Watch Video Tutorial [Getting Started with Apache APISIX](#)

- [Download Apache APISIX](#)

- Read the full written [guide on](#) our docs

- View the complete [Apache APISIX documentation](#)

- [Read the blog posts](#)

- Learn [plugin development](#)

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- ✉️ Mail to us with your questions: [dev@apisix.apache.org](#)

Questions?

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APISIX

APACHE