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# **Apache ShenYu document**

**Apache ShenYu**

**Jul 29, 2021**

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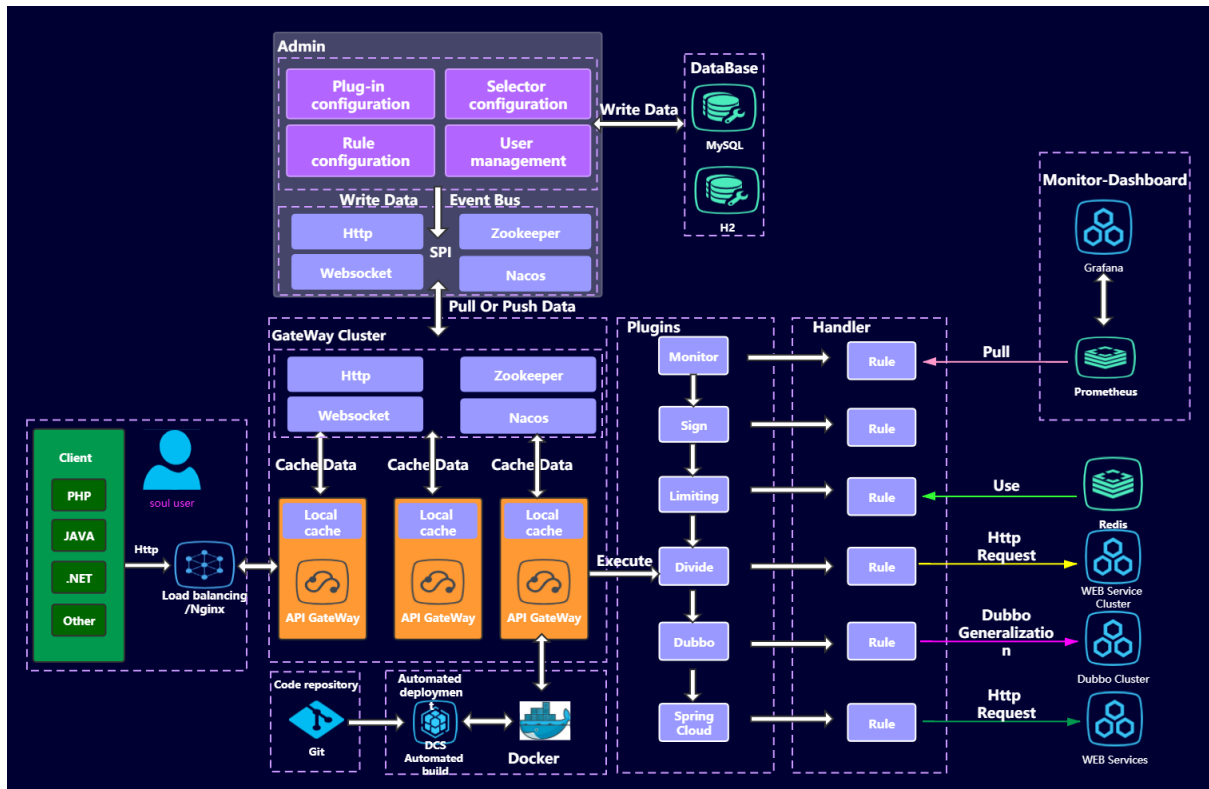
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## **What is the Apache ShenYu?**

This is an asynchronous, high-performance, cross-language, responsive API gateway.

- Support various languages (http protocol), support Dubbo, Spring Cloud, gRPC, Motan, Sofa, Tars and other protocols.
- Plugin design idea, plugin hot swap, easy to expand.
- Flexible flow filtering to meet various flow control.
- Built-in rich plugin support, authentication, limiting, fuse, firewall, etc.
- Dynamic flow configuration, high performance.
- Support cluster deployment, A/B Test, blue-green release.

## 2.1 Architecture Diagram



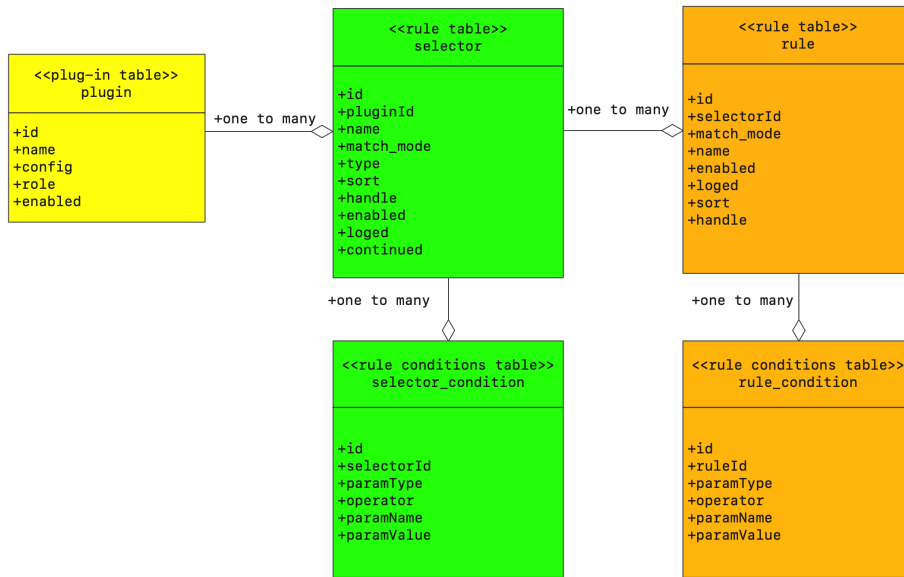
## 3.1 ShenYu Admin Database Design

Shenyu Admin is the management system of the gateway, which can manage all plugins, selectors and rules visually, set users, roles and resources.

### 3.1.1 Plugin, Selector And Rule

- **Plugin:** ShenYu uses the plugin design idea to realize the hot plug of the plugin, which is easy to expand. Built-in rich plugins, including RPC proxy, circuit breaker and current limiting, authority and certification, monitoring, and more.
- **Selector:** Each plugin can set multiple selectors to carry out preliminary filtering of traffic.
- **Rule:** Multiple rules can be set per selector for more fine-grained control of flow.
- **The Database Table UML Diagram:**

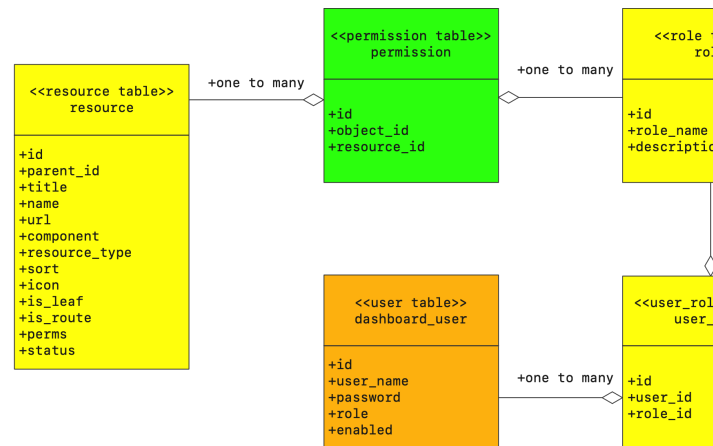




- Detailed design:
  - One plugin corresponds to multiple selectors, one selector corresponds to multiple rules.
  - One selector corresponds to multiple match conditions, one rule corresponds to multiple match conditions.
  - Each rule handles differently in corresponding plugin according to field handler, field handler is a kind of data of JSON string type. You can view detail during the use of shenyu-admin.

### 3.1.2 Resource Permission

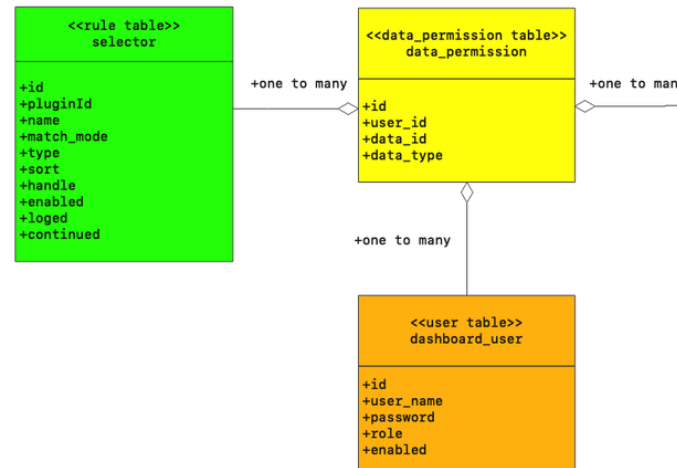
- The resource are the menus and buttons in the shenyu-admin console.
- Resource Permission use database to store user name, role, resource data and relationship.



- The Resource Permission Table UML Diagram:
- Detailed design:
  - one user corresponds to multiple role, one role corresponds to multiple resources.

### 3.1.3 Data Permissin

- Data Permission use database to store the relationship between users, selectors and rules.



- The Data Permission Table UML Diagram:
- Detailed design:
  - The most important table is data\_permission, where a user corresponds to multiple data permissions.
  - The field data\_type distinguishes between different types of data, which corresponds to the following: 0 -> selector, 1 -> rule.
  - The field data\_id holds the primary key id of the corresponding type.

### 3.1.4 Meta Data

- Metadata is used for generic invoke by gateway.
- For each interface method, there is one piece of metadata.
- The Database Table UML Diagram:
- Detailed design:
  - path: When the gateway is requested, a piece of data will be matched according to path, and then the subsequent process will be carried out.
  - rpc\_ext: Used to hold extended information for the RPC proxy.

### 3.1.5 Dictionary Management

- Dictionary management is used to maintain and manage public data dictionaries.
- The Database Table UML Diagram:

## 3.2 Data Synchronization Design

This document explains the principle of data synchronization. Data synchronization refers to the strategy used to synchronize data to ShenYu Gateway after shenyu-admin background operation data. ShenYu Gateway currently supports ZooKeeper, WebSocket, HTTP Long Polling, Nacos, Etcd and Consul for data synchronization.

See [Data Synchronization Configuration](#) for configuration information about data synchronization.

### 3.2.1 Preface

Gateway is the entrance of request and it is a very important part in micro service architecture, therefore the importance of gateway high availability is self-evident. When we use gateway, we have to change configuration such as flow rule, route rule for satisfying business requirement. Therefore, the dynamic configuration of the gateway is an important factor to ensure the high availability of the gateway.

In the actual use of ShenYu Gateway, users also feedback some problems:

- ShenYu depends on ZooKeeper, how to use Etcd, Consul, Nacos and other registry center?
- ShenYu depends on Redis and InfluxDB, and do not use limiting plugins or monitoring plugins. Why need these?
- Why not use configuration center for configuration synchronization?
- Why can't updates be configured dynamically?
- Every time you want to query the database, Redis is a better way.

According to the feedback of users, we have also partially reconstructed ShenYu. The current data synchronization features are as follows:

- All configuration is cached in ShenYu gateway memory, each request uses local cache, which is very fast.
- Users can modify any data in the background of shenyu-admin, and immediately synchronize to the gateway memory.
- Support ShenYu plugin, selector, rule data, metadata, signature data and other data synchronization.
- All plugin selectors and rules are configured dynamically and take effect immediately, no service restart required.
- Data synchronization mode supports Zookeeper, HTTP long polling, WebSocket, Nacos, Etcd and Consul.

### 3.2.2 Principle Analysis

The following figure shows the process of data synchronization of ShenYu. ShenYu Gateway will synchronize configuration data from configuration service at startup, and support push-pull mode to get configuration change information, and then update local cache. The administrator can change the user permissions, rules, plugins and traffic configuration in the admin system(shenyu-admin), and synchronize the change information to ShenYu Gateway through the push-pull mode. Whether the mode is push or pull depends on the synchronization mode used.

In the original version, the configuration service relied on the Zookeeper implementation to manage the back-end push of changes to the gateway. Now, WebSocket, HTTP long polling, ZooKeeper, Nacos, Etd, and Consul can now be supported by specifying the corresponding synchronization policy by setting `shenyu.sync.${strategy}` in the configuration file. The default Websocket synchronization policy can be used to achieve second level data synchronization. However, it is important to note that ShenYu Gateway and shenyu-admin must use the same synchronization policy.

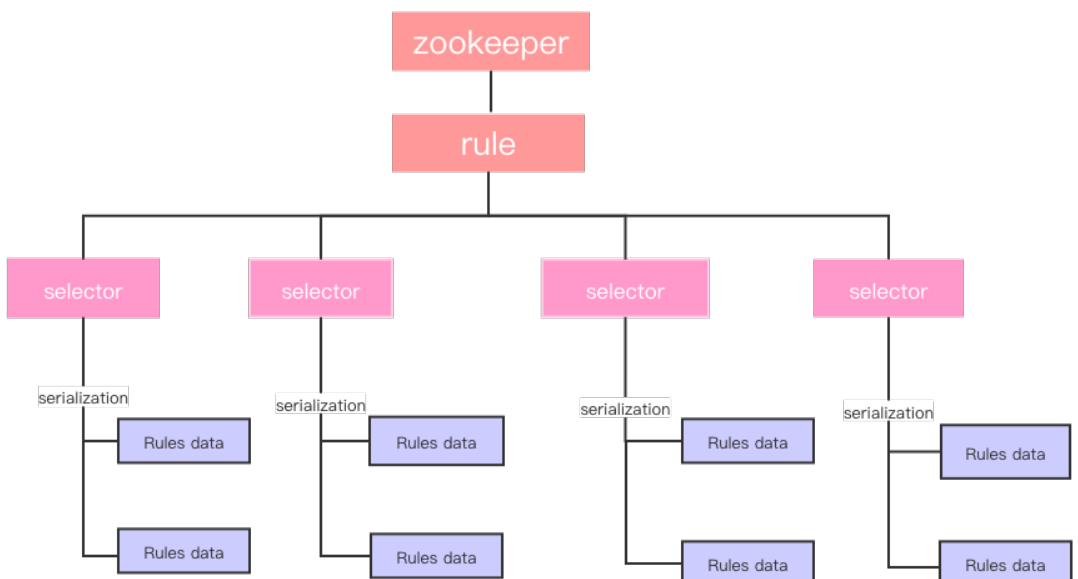
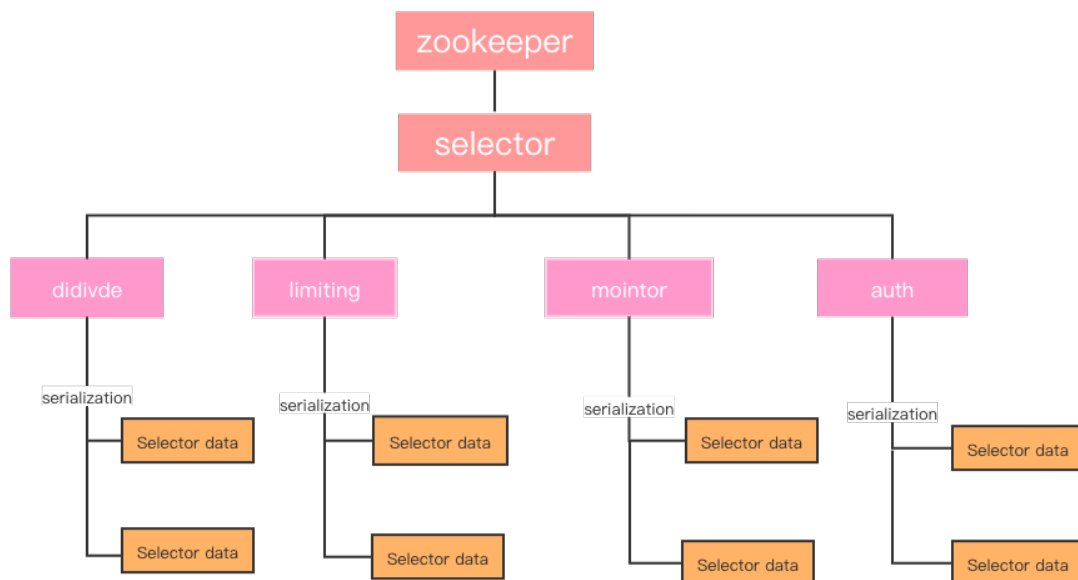
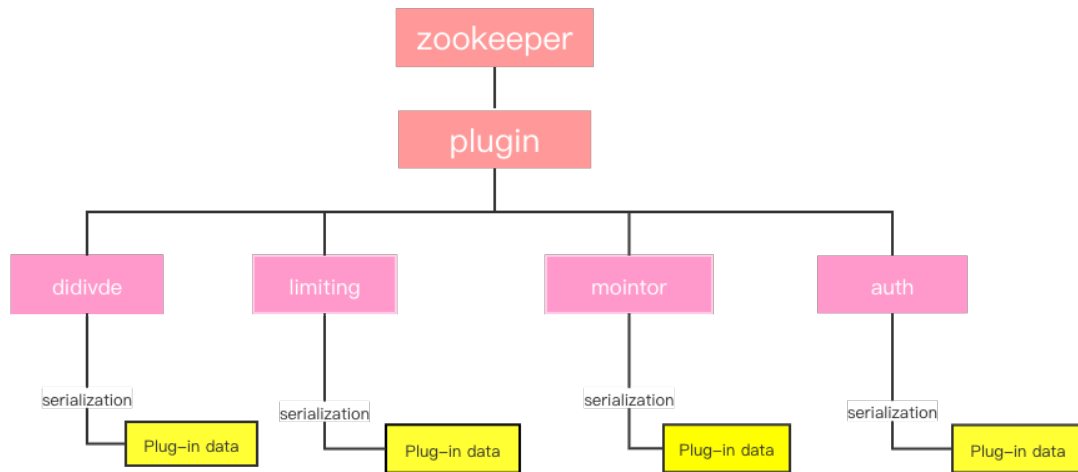
As showing picture below,shenyu-admin will issue a configuration change notification through `EventPublisher` after users change configuration,`EventDispatcher` will handle this modification and send configuration to corresponding event handler according to configured synchronization strategy.

- If it is a websocket synchronization strategy,it will push modified data to shenyu-web,and corresponding `WebsocketCacheHandler` handler will handle shenyu-admin data push at the gateway layer
- If it is a zookeeper synchronization strategy,it will push modified data to zookeeper,and the `ZookeeperSyncCache` will monitor the data changes of zookeeper and process them
- If it is a http synchronization strategy,shenyu-web proactively initiates long polling requests,90 seconds timeout by default,if there is no modified data in shenyu-admin,http request will be blocked,if there is a data change, it will respond to the changed data information,if there is no data change after 60 seconds,then respond with empty data,gateway continue to make http request after getting response,this kind of request will repeat.

#### Zookeeper Synchronization

The zookeeper-based synchronization principle is very simple,it mainly depends on zookeeper watch mechanism,shenyu-web will monitor the configured node,when shenyu-admin starts,all the data will be written to zookeeper,it will incrementally update the nodes of zookeeper when data changes,at the same time, shenyu-web will monitor the node for configuration information, and update the local cache once the information changes

ShenYu writes the configuration information to the zookeeper node,and it is meticulously designed. If you want to learn more about the code implementation, refer to the source code `ZookeeperSyncDataService`.



## WebSocket Synchronization

The mechanism of websocket and zookeeper is similar,when the gateway and the shenyu-admin establish a websocket connection,shenyu-admin will push all data at once,it will automatically push incremental data to shenyu-web through websocket when configured data changes

When we use websocket synchronization,pay attention to reconnect after disconnection,which also called keep heartbeat.ShenYu uses java-websocket ,a third-party library,to connect to websocket. If you want to learn more about the code implementation, refer to the source code `WebSocketSyncDataService`.

## Http Long Polling

The mechanism of zookeeper and websocket data synchronization is relatively simple,but http synchronization will be relatively complicated.ShenYu borrows the design ideas of Apollo and Nacos and realizes http long polling data synchronization using their advantages.Note that this is not traditional ajax long polling.

http long polling mechanism as above,shenyu-web gateway requests shenyu-admin configuration services,timeout is 90 seconds,it means gateway layer request configuration service will wait at most 90 seconds,this is convenient for shenyu-admin configuration service to respond modified data in time,and therefore we realize near real-time push.

After the http request reaches shenyu-admin, it does not respond immediately,but uses the asynchronous mechanism of Servlet3.0 to asynchronously respond to the data.First of all,put long polling request task `LongPollingClient` into `BlockingQueue`,and then start scheduling task,execute after 60 seconds,this aims to remove the long polling request from the queue after 60 seconds,even there is no configured data change.Because even if there is no configuration change,gateway also need to know,otherwise it will wait,and there is a 90 seconds timeout when the gateway requests configuration services.

If the administrator changes the configuration data during this period,the long polling requests in the queue will be removed one by one, and respond which group's data has changed(we distribute plugins, rules, flow configuration , user configuration data into different groups).After gateway receives response,it only knows which Group has changed its configuration,it need to request again to get group configuration data.Somone may ask,why don't you write out the changed data directly?We also discussed this issue deeply during development, because the http long polling mechanism can only guarantee quasi real-time,if gateway layer does not handle it in time,or administrator updates configuration frequently,we probably missed some configuration change push.For security, we only inform that a certain Group information has changed.

When shenyu-web gateway layer receives the http response information,pull modified information(if exists),and then request shenyu-admin configuration service again,this will repeatedly execute. If you want to learn more about the code implementation, refer to the source code `HttpSyncDataService`.

### Nacos Synchronization

The synchronization principle of Nacos is basically similar to that of ZooKeeper, and it mainly depends on the configuration management of Nacos. The path of each configuration node is similar to that of ZooKeeper.

ShenYu gateway will monitor the configured node. At startup, if there is no configuration node in Nacos, it will write the synchronous full amount of data into Nacos. When the sequential data send changes, it will update the configuration node in Nacos in full amount. The local cache is updated.

If you want to learn more about the code implementation, please refer to the source code `NacosSyncDataService` and the official documentation for [Nacos](#).

### Etcd Synchronization

Etcd data synchronization principle is similar to Zookeeper, mainly relying on Etcd's watch mechanism, and each configuration node path is the same as that of Zookeeper.

The native API for Etcd is a bit more complicated to use, so it's somewhat encapsulated.

ShenYu gateway will listen to the configured node. When startup, if there is no configuration node in Etcd, it will write the synchronous full amount of data into Etcd. When the sequential data send changes, it will update the configuration node in Etcd incrementally.

If you want to learn more about the code implementation, refer to the source `EtcdSyncDataService`.

### Consul Synchronization

Consul data synchronization principle is that the gateway regularly polls Consul's configuration center to get the configuration version number for local comparison.

ShenYu gateway will poll the configured nodes regularly, and the default interval is 1s. When startup, if there is no configuration node in Consul, write the synchronous full amount of data into Consul, then incrementally update the configuration node in Consul when the subsequent data is sent to change. At the same time, ShenYu Gateway will regularly polls the node of configuration information and pull the configuration version number for comparison with the local one. The local cache is updated when the version number is changed.

If you want to learn more about the code implementation, refer to the source `ConsulSyncDataService`.



### 3.3 Application Client Access

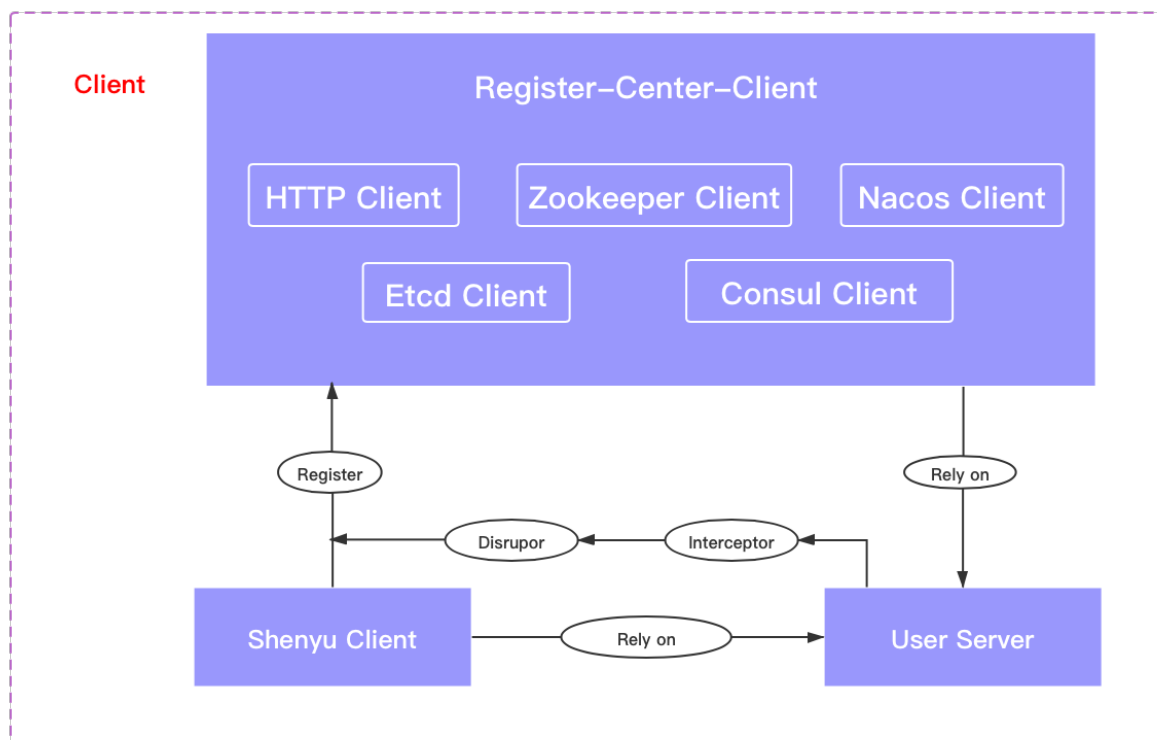
Application client access means to access your micro service to ShenYu Gateway, currently supports HTTP, Dubbo, Spring Cloud, gRPC, Motan, Sofa, Tars and other protocols access.

Connecting the application client to ShenYu gateway is realized through the registration center, which involves the registration of the client and the synchronization of the server data. The registry supports HTTP, ZooKeeper, Etcd, Consul, and Nacos.

Refer to the client access configuration in the user documentation for Application Client Config.

#### 3.3.1 Design principle

##### Client

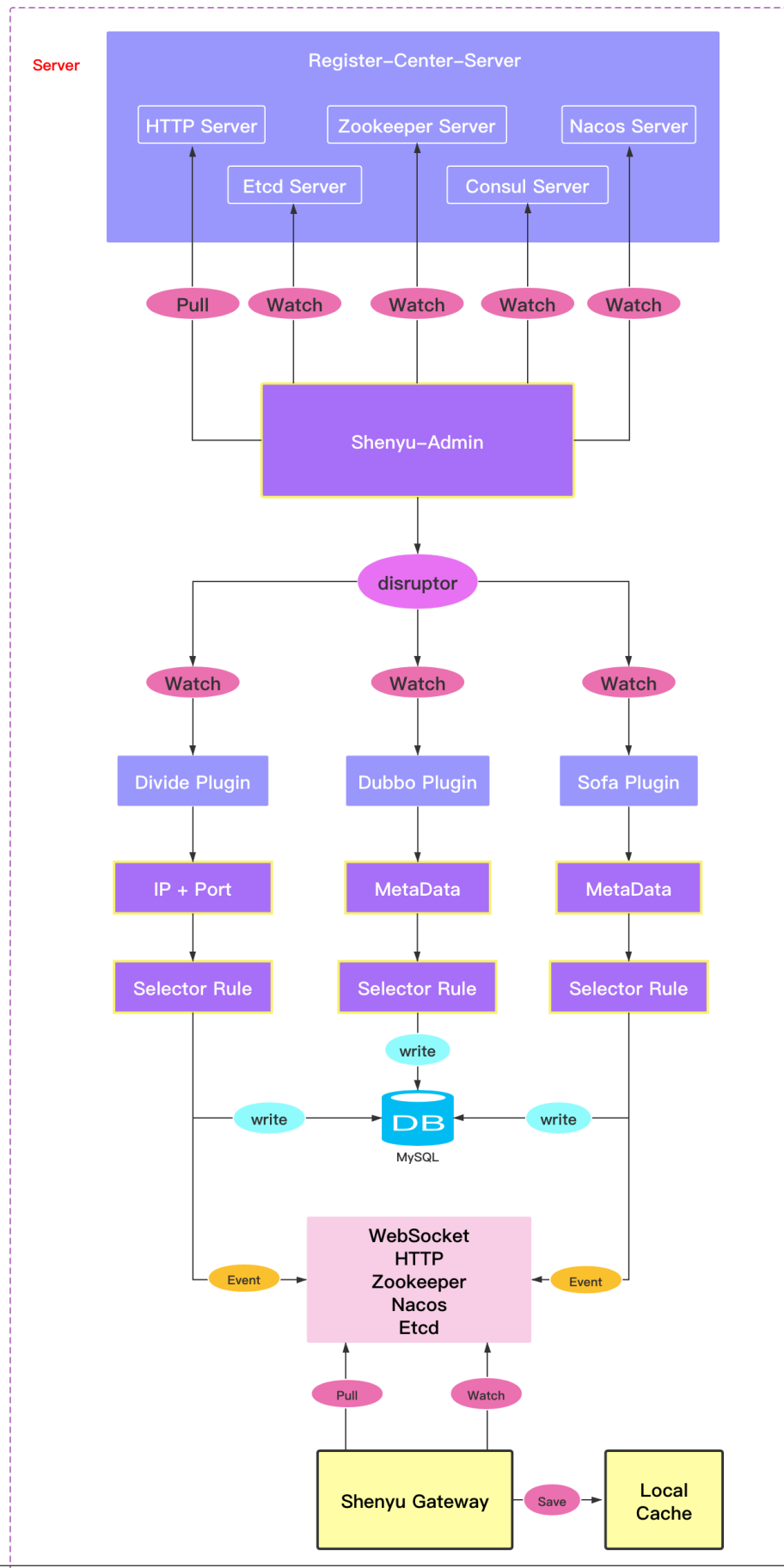


Declare the registry client type, such as HTTP or ZooKeeper, in your microservice configuration. Use SPI to load and initialize the corresponding registry client when the application starts, implement the post-processor interface associated with the Spring Bean, get the service interface information to register in it, and place the obtained information into Disruptor.

The Registry client reads data from the Disruptor and registers the interface information with shenyu-admin, where the Disruptor decouples data from operations for scaling.



## Server



Declare the registry server type, such as HTTP or ZooKeeper, in the Shenyu-Admin configuration. When shenyu-admin is started, it will read the configuration type, load and initialize the corresponding registry server, and when the registry server receives the interface information registered by shenyu-client, it will put it into Disruptor, which will trigger the registration processing logic to update the interface information and publish a synchronous event.

Disruptor provides data and operations decoupling for expansion. If there are too many registration requests, resulting in abnormal registration, there is also a data buffer role.

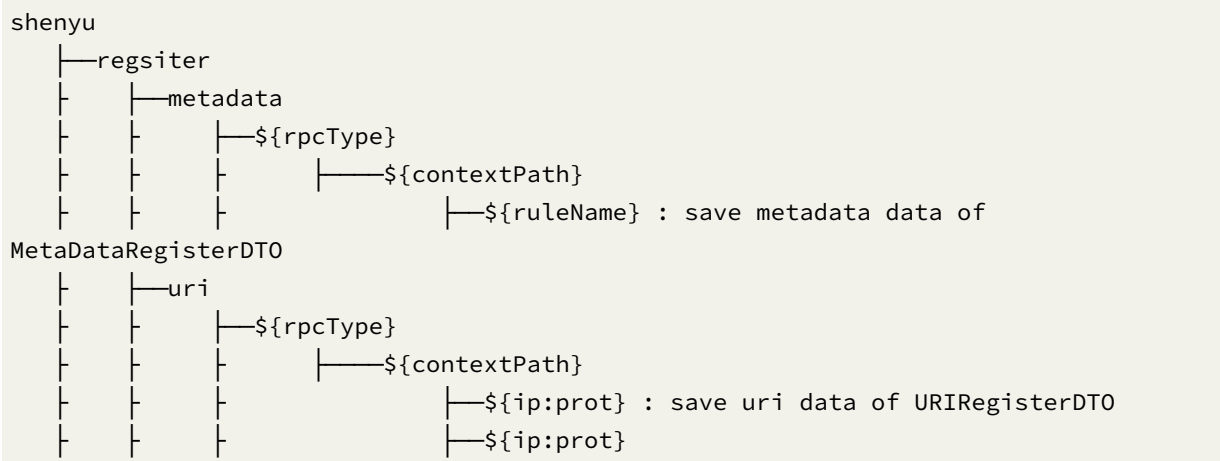
### 3.3.2 Http Registry

The principle of HTTP service registration is relatively simple. After Shenyu-Client is started, the relevant service registration interface of Shenyu-Admin will be called to upload data for registration.

After receiving the request, shenyu-admin will update the data and publish the data synchronization event to synchronize the interface information to ShenYu Gateway.

### 3.3.3 Zookeeper Registry

Zookeeper storage struct is:

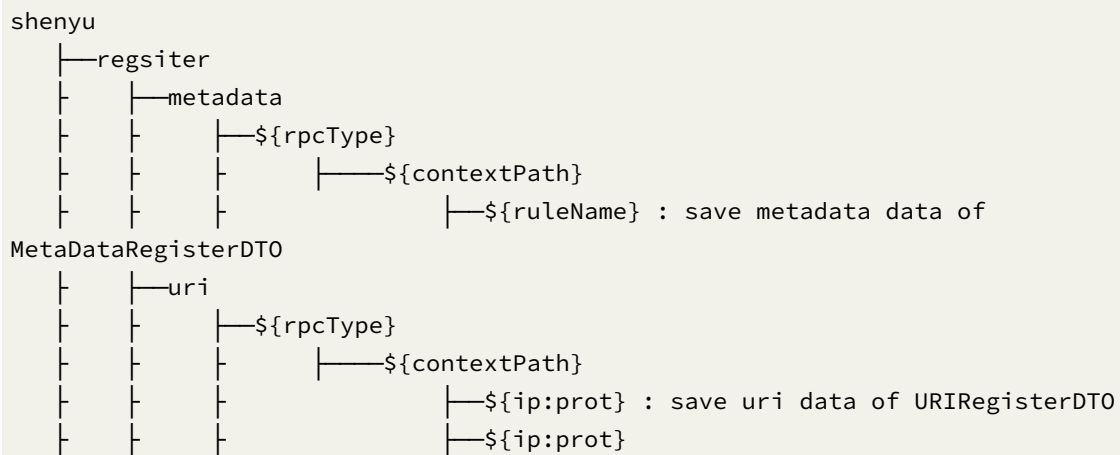


shenyu-client starts up, the service interface information (MetadataRegisterDTO/URIRegisterDTO) wrote above the Zookeeper nodes.

shenyu-admin uses the Watch mechanism of Zookeeper to monitor events such as data update and deletion, and triggers the corresponding registration processing logic after data changes. Upon receipt of a change to the MetadataregisterDTO node, the data change and data synchronization event publication of the selector and rule is triggered. Upon receipt of a UriRegisterDTO node change, the upstream of the selector is triggered to publish an update and data synchronization event.

### 3.3.4 Etcd Registry

Etcd storage struct is:

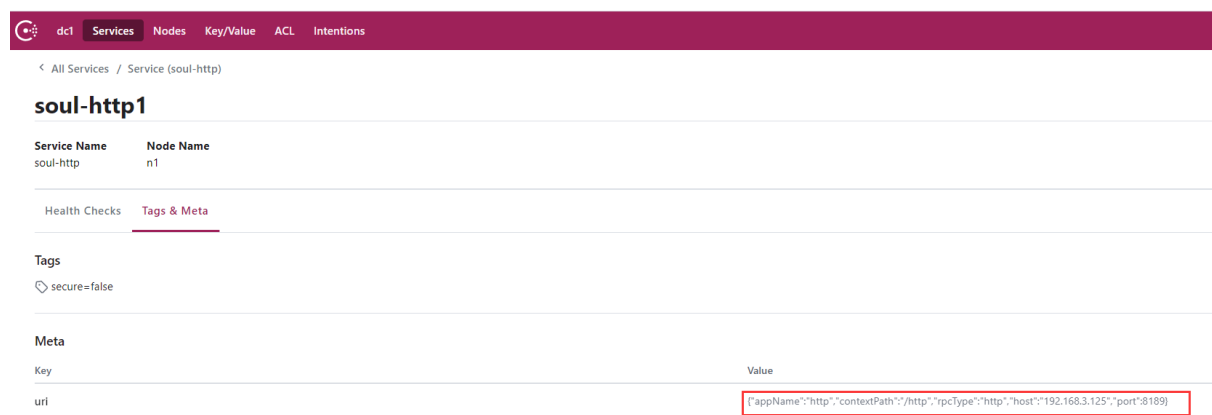


shenyu-client starts up, the service interface information (MetaDataRegisterDTO/URIRegisterDTO) wrote in Ephemeral way above Etcd of the node.

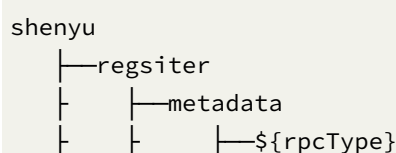
shenyu-admin uses Etcd's Watch mechanism to monitor events such as data update and deletion, and triggers the corresponding registration processing logic after data changes. Upon receipt of a change to the MetadataregisterDTO node, the data change and data synchronization event publication of the selector and rule is triggered. Upon receipt of a UriRegisterDTO node change, the upstream of the selector is triggered to publish an update and data synchronization event.

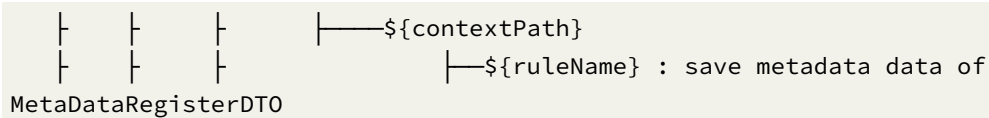
### 3.3.5 Consul Registry

Consul register client will save URIRegisterDTO to service instance metadata, and URIRegisterDTO will disappear with service unregister.



And Consul register client will save MetaDataRegisterDTO to Key/Value store, storage struct is:





When shenyu-client is started, The service interface information (MetaDataRegisterDTO/URIRegisterDTO) on the Metadata of the ServiceInstance (URIRegisterDTO) and Key-Value (MetaDataRegisterDTO), Store as described above.

shenyu-admin senses the update and deletion of data by monitoring the change of index of Catalog and KeyValue, and triggers the corresponding registration processing logic after the change of data. Upon receipt of a change to the MetadataregisterDTO node, the data change and data synchronization event publication of the selector and rule is triggered. Upon receipt of a UriRegisterDTO node change, the upstream of the selector is triggered to publish an update and data synchronization event.

### 3.3.6 Nacos Register

Nacos registration is divided into two parts: URI and Metadata. URI is registered by instance. In case of service exception, the relevant URI data node will be deleted automatically and send events to the subscriber, and the subscriber will carry out relevant offline processing. Metadata is registered by configuration without any related up-down operation. When a URI instance is registered, the Metadata configuration will be published accordingly. The subscriber monitors data changes and carries out update processing.

The URI instance registration command rules are as follows:

```
shenyu.register.service.${rpcType}
```

Listens on all RpcType nodes initially, and the `{contextPath}` instances registered under them are distinguished by IP and Port, and carry their corresponding contextPath information. After the URI instance is offline, it triggers the update and data synchronization event publication of the selector's upstream.

When the URI instance goes online, the corresponding Metadata data will be published. The node name command rules are as follows:

```
shenyu.register.service.${rpcType}.${contextPath}
```

The subscriber side continues to listen for all Metadata configurations, triggering selector and rule data changes and data synchronization events after the initial subscription and configuration update.

### 3.3.7 SPI

<i>SPI Name</i>	<i>Description</i>
ShenyuClientRegisterRepository	ShenYu client register SPI

<i>Implementation Class</i>	<i>Description</i>
HttpClientRegisterRepository	Http client register repository
ZookeeperClientRegisterRepository	Zookeeper client register repository
EtcdClientRegisterRepository	Etcd client register repository
ConsulClientRegisterRepository	Consul client register repository
NacosClientRegisterRepository	Nacos client register repository

<i>SPI Name</i>	<i>Description</i>
ShenyuServerRegisterRepository	ShenYu server register SPI

<i>Implementation Class</i>	<i>Description</i>
ShenyuHttpRegistryController	Http server repository
ZookeeperServerRegisterRepository	Zookeeper server registry repository
EtcdServerRegisterRepository	Etcd server registry repository
ConsulServerRegisterRepository	Consul server registry repository
NacosServerRegisterRepository	Nacos server registry repository

## 3.4 Flow Control

ShenYu gateway realizes flow control through plugins, selectors and rules. For related data structure, please refer to the previous [ShenYu Admin Database Design](#).

### 3.4.1 Plugin

In ShenYu Admin System, each plugin uses Handle (JSON format) fields to represent different processing, and the plugin processing is used to manage and edit the custom processing fields in the JSON.

The main purpose of this feature is to enable plugins to handle templated configurations.

### 3.4.2 Selector And Rule

Selector and rule are the most soul of ShenYu Gateway. Master it and you can manage any traffic.

A plugin has multiple selectors, and one selector corresponds to multiple rules. The selector is the first level filter of traffic, and the rule is the final filter. For a plugin, we want to meet the traffic criteria based on our configuration before the plugin will be executed. Selectors and rules are designed to allow traffic to perform what we want under certain conditions. The rules need to be understood first.

The execution logic of plugin, selector and rule is as follows. When the traffic enters into ShenYu gateway, it will first judge whether there is a corresponding plugin and whether the plugin is turned on. Then determine whether the traffic matches the selector of the plugin. It then determines whether the traffic matches the rules of the selector. If the request traffic meets the matching criteria, the plugin will be executed. Otherwise, the plugin will not be executed. Process the next one. ShenYu gateway is so through layers of screening to complete the flow control.



## 4.1 Local Deployment

This article introduces how to start the Apache ShenYu gateway in the local environment.

### 4.1.1 Environmental preparation

- Install JDK1.8+ locally
- Install Git locally
- Install Maven locally
- Choose a development tool, such as IDEA

### 4.1.2 Download the compiled code

- Download

```
> git clone https://github.com/apache/incubator-shenyu.git
> cd shenyu
> mvn clean install -Dmaven.javadoc.skip=true -B -Drat.skip=true -Djacoco.skip=true
-DskipITs -DskipTests
```

- use the development tool to start `org.apache.shenyu.admin.ShenyuAdminBootstrap`, Visit <http://localhost:9095>, the default username and password are: admin and 123456 respectively.
  - If you use h2 to store, set the variable `--spring.profiles.active = h2`.
  - If you use MySQL for storage, modify the mysql configuration in `application.yaml`.
- use the development tool to start `org.apache.shenyu.bootstrap.ShenyuBootstrapApplication`.

## 4.2 Binary Packages Deployment

This article introduces the deployment of the Apache ShenYu gateway using the binary packages.

### 4.2.1 Start Apache ShenYu Admin

- download [2.4.0](#) download `apache-shenyu-admin-bin-2.4.0-RELEASE.tar.gz`
- unzip `apache-shenyu-admin-bin-2.4.0-RELEASE.tar.gz`. go to the `bin` directory.
- use `h2` to store data:

```
> windows: start.bat --spring.profiles.active = h2
> linux: ./start.sh --spring.profiles.active = h2
```

- use MySQL to store data, go to the `/conf` directory, and modify the configuration of `mysql` in `application.yaml`.

```
> windows: start.bat
> linux: ./start.sh
```

### 4.2.2 Start Apache ShenYu Bootstrap

- download [2.4.0](#) download `apache-shenyu-bootstrap-bin-2.4.0-RELEASE.tar.gz`
- unzip `apache-shenyu-bootstrap-bin-2.4.0-RELEASE.tar.gz`. go to the `bin` directory.

```
> windwos : start.bat
> linux : ./start.sh
```

## 4.3 Docker Deployment

This article introduces the use of docker to deploy the Apache ShenYu gateway.

### 4.3.1 Start Apache ShenYu Admin

```
> docker pull apache/shenyu-admin
> docker network create shenyu
```

- use h2 to store data:

```
> docker run -d -p 9095:9095 --net shenyu apache/shenyu-admin
```

- use MySQL to store data, copy mysql-connector.jar to /\$(your\_work\_dir)/ext-lib:

```
docker run -v /${your_work_dir}/ext-lib:/opt/shenyu-admin/ext-lib -e "SPRING_
PROFILES_ACTIVE=mysql" -e "spring.datasource.url=jdbc:mysql://${your_ip_port}/
shenyu?useUnicode=true&characterEncoding=utf-8&useSSL=false" -e "spring.datasource.
user=${your_username}" -e "spring.datasource.password=${your_password}" -d -p
9095:9095 --net shenyu apache/shenyu-admin
```

another way is to put the application.yml configuration in \${your\_work\_dir}/conf, and then execute the following statement:

```
docker run -v ${your_work_dir}/conf:/opt/shenyu-admin/conf/ -v /${your_work_dir}/
ext-lib:/opt/shenyu-admin/ext-lib -d -p 9095:9095 --net shenyu apache/shenyu-admin
```

### 4.3.2 Start Apache ShenYu Bootstrap

```
> docker network create shenyu
> docker pull apache/shenyu-bootstrap
> docker run -d -p 9195:9195 --net shenyu apache/shenyu-bootstrap
```

## 4.4 k8s Deployment

This article introduces the use of k8s to deploy the Apache ShenYu gateway.

## 4.5 Helm Deployment

This article introduces the use of helm to deploy the Apache ShenYu gateway.

## 4.6 Custom Deployment

This article describes how to build your own gateway based on Apache ShenYu.

### 4.6.1 Start Apache ShenYu Admin

- docker reference docker deployment Apache ShenYu Admin
- liunx/windows reference binary packages deployment Apache ShenYu Admin

### 4.6.2 Build your own gateway (recommended)

- first create an empty springboot project, you can refer to shenyu-bootstrap, or you can create it on [spring official website](#).
- introduce the following jar package:

```
<dependencies>
  <dependency>
    <groupId>org.springframework.boot</groupId>
    <artifactId>spring-boot-starter-webflux</artifactId>
    <version>2.2.2.RELEASE</version>
  </dependency>
  <dependency>
    <groupId>org.springframework.boot</groupId>
    <artifactId>spring-boot-starter-actuator</artifactId>
    <version>2.2.2.RELEASE</version>
  </dependency>
  <dependency>
    <groupId>org.apache.shenyu</groupId>
    <artifactId>shenyu-spring-boot-starter-gateway</artifactId>
    <version>${project.version}</version>
  </dependency>
  <dependency>
    <groupId>org.apache.shenyu</groupId>
    <artifactId>shenyu-spring-boot-starter-sync-data-websocket</artifactId>
    <version>${project.version}</version>
  </dependency>
</dependencies>
```

among them, `${project.version}` please use the current latest version.

- add the following configuration to your `application.yaml` file:

```
spring:
  main:
    allow-bean-definition-overriding: true
management:
```

```
health:
  defaults:
    enabled: false
shenyu:
  sync:
    websocket:
      urls: ws://localhost:9095/websocket //set to your shenyu-admin address
```

## 5.1 Quick start with Http

This document introduces how to quickly access the ShenYu gateway using Http. You can get the code example of this document by clicking [here](#).

### 5.1.1 Environment to prepare

Please refer to the deployment to select a way to start shenyu-admin. For example, start the ShenYu gateway management system through [local deployment](#).

After successful startup, you need to open the Divide plugin on in the BasicConfig -> Plugin. In the ShenYu gateway, the HTTP request is handled by the Divide plugin.

If you are a startup gateway by means of source, can be directly run the ShenYuBootstrapApplication of shenyu-bootstrap module.

Note: Before starting, make sure the gateway has added dependencies.

Add the following dependencies to the gateway's pom.xml file:

```
<!--if you use http proxy start this-->
<dependency>
  <groupId>org.apache.shenyu</groupId>
  <artifactId>shenyu-spring-boot-starter-plugin-divide</artifactId>
  <version>${project.version}</version>
</dependency>

<dependency>
  <groupId>org.apache.shenyu</groupId>
  <artifactId>shenyu-spring-boot-starter-plugin-httpclient</artifactId>
  <version>${project.version}</version>
</dependency>
```

### 5.1.2 Run the shenyu-examples-http project

Download `shenyu-examples-http`

Execute the `org.apache.shenyu.examples.http.ShenyuTestHttpApplication` main method to start project.

The following log appears when the startup is successful:

```
2021-02-10 00:57:07.561 INFO 3700 --- [pool-1-thread-1] o.d.s.client.common.utils.
RegisterUtils : http client register success: {"appName":"http","context":"/http",
"path":"/http/test/**","pathDesc":"","rpcType":"http","host":"192.168.50.13","port
":8188,"ruleName":"/http/test/**","enabled":true,"registerMetaData":false}
2021-02-10 00:57:07.577 INFO 3700 --- [pool-1-thread-1] o.d.s.client.common.utils.
RegisterUtils : http client register success: {"appName":"http","context":"/http",
"path":"/http/order/save","pathDesc":"Save order","rpcType":"http","host":"192.168.
50.13","port":8188,"ruleName":"/http/order/save","enabled":true,"registerMetaData
":false}
2021-02-10 00:57:07.587 INFO 3700 --- [pool-1-thread-1] o.d.s.client.common.utils.
RegisterUtils : http client register success: {"appName":"http","context":"/http",
"path":"/http/order/path/**/name","pathDesc":"","rpcType":"http","host":"192.168.
50.13","port":8188,"ruleName":"/http/order/path/**/name","enabled":true,
"registerMetaData":false}
2021-02-10 00:57:07.596 INFO 3700 --- [pool-1-thread-1] o.d.s.client.common.utils.
RegisterUtils : http client register success: {"appName":"http","context":"/http",
"path":"/http/order/findById","pathDesc":"Find by id","rpcType":"http","host":"192.
168.50.13","port":8188,"ruleName":"/http/order/findById","enabled":true,
"registerMetaData":false}
2021-02-10 00:57:07.606 INFO 3700 --- [pool-1-thread-1] o.d.s.client.common.utils.
RegisterUtils : http client register success: {"appName":"http","context":"/http",
"path":"/http/order/path/**","pathDesc":"","rpcType":"http","host":"192.168.50.13",
"port":8188,"ruleName":"/http/order/path/**","enabled":true,"registerMetaData
":false}
2021-02-10 00:57:08.023 INFO 3700 --- [          main] o.s.b.web.embedded.netty.
NettyWebServer : Netty started on port(s): 8188
2021-02-10 00:57:08.026 INFO 3700 --- [          main] o.d.s.e.http.
ShenyuTestHttpApplication : Started ShenyuTestHttpApplication in 2.555 seconds
(JVM running for 3.411)
```

### 5.1.3 Test

The `shenyu-examples-http` project will automatically register interface methods annotated with `@ShenyuSpringMvcClient` in the shenyu gateway after successful startup.

Open `PluginList` -> `rpc proxy` -> `divide` to see the list of plugin rule configurations:

SelectorList			RulesList			
			Synchronous divide			
Name	Open	Operation		RuleName	Open	UpdateTime
/http	Open	Modify Delete	+	/http/test/**	Open	2021-02-10 00:57:07
			+	/http/order/save	Open	2021-02-10 00:57:07
			+	/http/order/path/**/name	Open	2021-02-10 00:57:07
			+	/http/order/findById	Open	2021-02-10 00:57:07
			+	/http/order/path/**	Open	2021-02-10 00:57:07

Use PostMan to simulate HTTP to request your http service:

POST http://localhost:9195/http/order/save

Authorization Headers (1) Body Pre-request Script Tests

form-data x-www-form-urlencoded raw binary JSON (application/json)

```

1 {
2   "id": "123",
3   "name": "test"
4 }
5

```

Body Cookies Headers (2) Test Results Status: 200 OK Time: 410 ms

Pretty Raw Preview JSON

```

1 {
2   "id": "123",
3   "name": "hello world save order"
4 }

```

## 5.2 Quick start with Dubbo

This document introduces how to quickly access the ShenYu gateway using Dubbo. You can get the code example of this document by clicking [here](#).

### 5.2.1 Environment to prepare

Please refer to the deployment to select a way to start shenyu-admin. For example, start the ShenYu gateway management system through [local deployment](#).

After successful startup, you need to open the Dubbo plugin on in the BasicConfig -> Plugin, and set your registry address. Please make sure the registry center is open locally.

If you are a startup gateway by means of source, can be directly run the ShenYuBootstrapApplication of shenyu-bootstrap module.

Note: Before starting, make sure the gateway has added dependencies.

If client is apache dubbo, registry center is Zookeeper, please refer to the following configuration:

```

<!--shenyu apache dubbo plugin start-->
<dependency>
  <groupId>org.apache.shenyu</groupId>

```



```

        <artifactId>shenyu-spring-boot-starter-plugin-apache-dubbo</artifactId>
        <version>${project.version}</version>
    </dependency>
    <dependency>
        <groupId>org.apache.dubbo</groupId>
        <artifactId>dubbo</artifactId>
        <version>2.7.5</version>
    </dependency>
    <!-- Dubbo zookeeper registry dependency start -->
    <dependency>
        <groupId>org.apache.curator</groupId>
        <artifactId>curator-client</artifactId>
        <version>4.0.1</version>
        <exclusions>
            <exclusion>
                <artifactId>log4j</artifactId>
                <groupId>log4j</groupId>
            </exclusion>
        </exclusions>
    </dependency>
    <dependency>
        <groupId>org.apache.curator</groupId>
        <artifactId>curator-framework</artifactId>
        <version>4.0.1</version>
    </dependency>
    <dependency>
        <groupId>org.apache.curator</groupId>
        <artifactId>curator-recipes</artifactId>
        <version>4.0.1</version>
    </dependency>
    <!-- Dubbo zookeeper registry dependency end -->
    <!-- shenyu apache dubbo plugin end-->

```

If client is alibaba dubbo, registry center is Zookeeper, please refer to the following configuration:

```

<!--shenyu alibaba dubbo plugin start-->
<dependency>
    <groupId>org.apache.shenyu</groupId>
    <artifactId>shenyu-spring-boot-starter-plugin-alibaba-dubbo</artifactId>
    <version>${project.version}</version>
</dependency>
<dependency>
    <groupId>com.alibaba</groupId>
    <artifactId>dubbo</artifactId>
    <version>${alibaba.dubbo.version}</version>
</dependency>
<dependency>
    <groupId>org.apache.curator</groupId>

```

```

    <artifactId>curator-client</artifactId>
    <version>${curator.version}</version>
    <exclusions>
        <exclusion>
            <artifactId>log4j</artifactId>
            <groupId>log4j</groupId>
        </exclusion>
    </exclusions>
</dependency>
<dependency>
    <groupId>org.apache.curator</groupId>
    <artifactId>curator-framework</artifactId>
    <version>${curator.version}</version>
</dependency>
<dependency>
    <groupId>org.apache.curator</groupId>
    <artifactId>curator-recipes</artifactId>
    <version>${curator.version}</version>
</dependency>
<!-- shenyu alibaba dubbo plugin end-->

```

### 5.2.2 Run the shenyu-examples-dubbo project

Download [shenyu-examples-dubbo](#) .

replace the register address in shenyu-examples-alibaba-dubbo-service/src/main/resources/spring-dubbo.xml with your local zk address, such as:

```
<dubbo:registry address="zookeeper://localhost:2181"/>
```

Execute the `org.apache.shenyu.examples.alibaba.dubbo.service.TestAlibabaDubboApplication` main method to start dubbo project.

The following log appears when the startup is successful:

```

2021-02-06 20:58:01.807 INFO 3724 --- [pool-2-thread-1] o.d.s.client.common.utils.
RegisterUtils : dubbo client register success: {"appName":"dubbo","contextPath":"/
dubbo","path":"/dubbo/insert","pathDesc":"Insert a row of data","rpcType":"dubbo",
"serviceName":"org.dromara.shenyu.examples.dubbo.api.service.DubboTestService",
"methodName":"insert","ruleName":"/dubbo/insert","parameterTypes":"org.dromara.
shenyu.examples.dubbo.api.entity.DubboTest","rpcExt":{"group":"","version":"","
","loadbalance":"random","retries":2,"timeout":10000,"url":"","enabled":true}
2021-02-06 20:58:01.821 INFO 3724 --- [pool-2-thread-1] o.d.s.client.common.utils.
RegisterUtils : dubbo client register success: {"appName":"dubbo","contextPath":"/
dubbo","path":"/dubbo/findAll","pathDesc":"Get all data","rpcType":"dubbo",
"serviceName":"org.dromara.shenyu.examples.dubbo.api.service.DubboTestService",
"methodName":"findAll","ruleName":"/dubbo/findAll","parameterTypes":"","rpcExt":{"
group":"","version":"","","loadbalance":"random","retries":2,"timeout":
10000,"url":"","enabled":true}

```

```

2021-02-06 20:58:01.833 INFO 3724 --- [pool-2-thread-1] o.d.s.client.common.utils.
RegisterUtils : dubbo client register success: {"appName":"dubbo","contextPath":"/
dubbo","path":"/dubbo/findById","pathDesc":"Query by Id","rpcType":"dubbo",
"serviceName":"org.dromara.shenyu.examples.dubbo.api.service.DubboTestService",
"methodName":"findById","ruleName":"/dubbo/findById","parameterTypes":"java.lang.
String","rpcExt":{"group":"","version":"","loadbalance":"random","retries\
":2,"timeout":10000,"url":"","enabled":true}
2021-02-06 20:58:01.844 INFO 3724 --- [pool-2-thread-1] o.d.s.client.common.utils.
RegisterUtils : dubbo client register success: {"appName":"dubbo","contextPath":"/
dubbo","path":"/dubbo/findById","pathDesc":"","rpcType":"dubbo","serviceName":
"org.dromara.shenyu.examples.dubbo.api.service.DubboMultiParamService","methodName
":"findById","ruleName":"/dubbo/findById","parameterTypes":"java.util.List
","rpcExt":{"group":"","version":"","loadbalance":"random","retries\
":2,"timeout":10000,"url":"","enabled":true}
2021-02-06 20:58:01.855 INFO 3724 --- [pool-2-thread-1] o.d.s.client.common.utils.
RegisterUtils : dubbo client register success: {"appName":"dubbo","contextPath":"/
dubbo","path":"/dubbo/findByIdsAndName","pathDesc":"","rpcType":"dubbo",
"serviceName":"org.dromara.shenyu.examples.dubbo.api.service.DubboMultiParamService
","methodName":"findByIdsAndName","ruleName":"/dubbo/findByIdsAndName",
"parameterTypes":"java.util.List,java.lang.String","rpcExt":{"group":"","
version":"","loadbalance":"random","retries":2,"timeout":10000,"url\
":"","enabled":true}
2021-02-06 20:58:01.866 INFO 3724 --- [pool-2-thread-1] o.d.s.client.common.utils.
RegisterUtils : dubbo client register success: {"appName":"dubbo","contextPath":"/
dubbo","path":"/dubbo/batchSave","pathDesc":"","rpcType":"dubbo","serviceName":
"org.dromara.shenyu.examples.dubbo.api.service.DubboMultiParamService","methodName
":"batchSave","ruleName":"/dubbo/batchSave","parameterTypes":"java.util.List",
"rpcExt":{"group":"","version":"","loadbalance":"random","retries\
":2,"timeout":10000,"url":"","enabled":true}
2021-02-06 20:58:01.876 INFO 3724 --- [pool-2-thread-1] o.d.s.client.common.utils.
RegisterUtils : dubbo client register success: {"appName":"dubbo","contextPath":"/
dubbo","path":"/dubbo/findByIdsAndName","pathDesc":"","rpcType":"dubbo",
"serviceName":"org.dromara.shenyu.examples.dubbo.api.service.DubboMultiParamService
","methodName":"findByIdsAndName","ruleName":"/dubbo/findByIdsAndName",
"parameterTypes":"[Ljava.lang.Integer;java.lang.String","rpcExt":{"group":"","
version":"","loadbalance":"random","retries":2,"timeout":10000,"url\
":"","enabled":true}
2021-02-06 20:58:01.889 INFO 3724 --- [pool-2-thread-1] o.d.s.client.common.utils.
RegisterUtils : dubbo client register success: {"appName":"dubbo","contextPath":"/
dubbo","path":"/dubbo/saveComplexBeanTestAndName","pathDesc":"","rpcType":"dubbo",
"serviceName":"org.dromara.shenyu.examples.dubbo.api.service.DubboMultiParamService
","methodName":"saveComplexBeanTestAndName","ruleName":"/dubbo/
saveComplexBeanTestAndName","parameterTypes":"org.dromara.shenyu.examples.dubbo.
api.entity.ComplexBeanTest,java.lang.String","rpcExt":{"group":"","version\
":"","loadbalance":"random","retries":2,"timeout":10000,"url\
":"","enabled":true}
2021-02-06 20:58:01.901 INFO 3724 --- [pool-2-thread-1] o.d.s.client.common.utils.
RegisterUtils : dubbo client register success: {"appName":"dubbo","contextPath":"/
dubbo","path":"/dubbo/batchSaveAndNameAndId","pathDesc":"","rpcType":"dubbo",
"serviceName":"org.dromara.shenyu.examples.dubbo.api.service.DubboMultiParamService
","methodName":"batchSaveAndNameAndId","ruleName":"/dubbo/batchSaveAndNameAndId",
"parameterTypes":"java.util.List,java.lang.String,java.lang.String","rpcExt":{"
group":"","version":"","loadbalance":"random","retries":2,"timeout\
":10000,"url":"","enabled":true}

```

## 5.2. Quick start with Dubbo

```

2021-02-06 20:58:01.911 INFO 3724 --- [pool-2-thread-1] o.d.s.client.common.utils.
RegisterUtils : dubbo client register success: {"appName":"dubbo","contextPath":"/
dubbo","path":"/dubbo/saveComplexBeanTest","pathDesc":"","rpcType":"dubbo",
"serviceName":"org.dromara.shenyu.examples.dubbo.api.service.DubboMultiParamService",
"methodName":"saveComplexBeanTest","ruleName":"/dubbo/saveComplexBeanTest",
"parameterTypes":"org.dromara.shenyu.examples.dubbo.api.entity.ComplexBeanTest",
"rpcExt":{"group":"","version":"","loadbalance":"random","retries\
":2,"timeout":10000,"url":"","enabled":true}
2021-02-06 20:58:01.922 INFO 3724 --- [pool-2-thread-1] o.d.s.client.common.utils.
RegisterUtils : dubbo client register success: {"appName":"dubbo","contextPath":"/
dubbo","path":"/dubbo/findByStringArray","pathDesc":"","rpcType":"dubbo",
"serviceName":"org.dromara.shenyu.examples.dubbo.api.service.DubboMultiParamService",
"methodName":"findByStringArray","ruleName":"/dubbo/findByStringArray",
"parameterTypes":["Ljava.lang.String;","rpcExt":{"group":"","version":"","loadbalance\
":"random","retries":2,"timeout":10000,"url":"","enabled
":true}

```

### 5.2.3 Test

The shenyu-examples-dubbo project will automatically register interface methods annotated with @ShenYuDubboClient in the ShenYu gateway after successful startup.

Open PluginList -> rpc proxy -> dubbo to see the list of plugin rule configurations:

SelectorList

Add

Name	Open	Operation
/dubbo	Open	Modify Delete

<

1

>

RulesList

Synchronous dubbo

Add

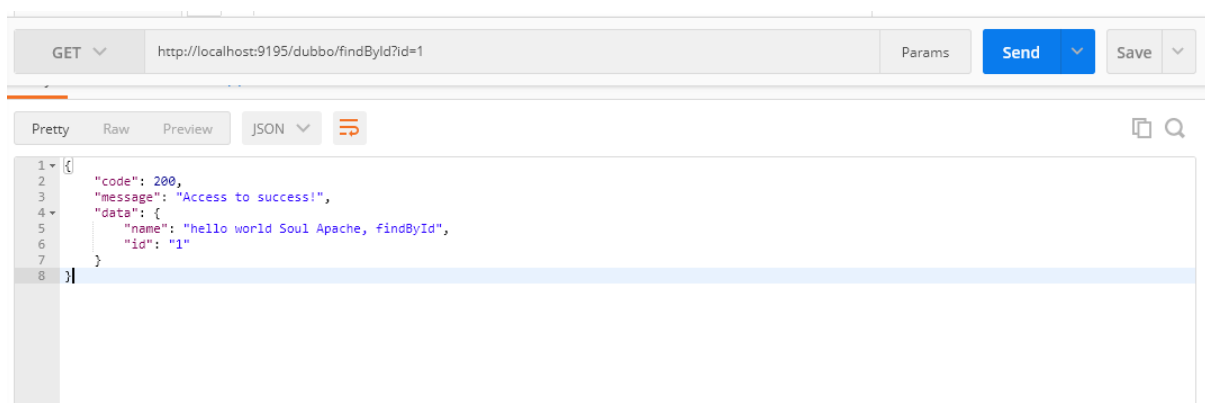
	RuleName	Open	UpdateTime	Operation
+	/dubbo/insert	Open	2021-02-06 20:58:01	Modify Delete
+	/dubbo/findAll	Open	2021-02-06 20:58:01	Modify Delete
+	/dubbo/findById	Open	2021-02-06 20:58:01	Modify Delete
+	/dubbo/findByIdListId	Open	2021-02-06 20:58:01	Modify Delete
+	/dubbo/findByIdsAndName	Open	2021-02-06 20:58:01	Modify Delete
+	/dubbo/batchSave	Open	2021-02-06 20:58:01	Modify Delete
+	/dubbo/findByIdsAndName	Open	2021-02-06 20:58:01	Modify Delete
+	/dubbo/saveComplexBeanTestAndName	Open	2021-02-06 20:58:01	Modify Delete
+	/dubbo/batchSaveAndNameAndId	Open	2021-02-06 20:58:01	Modify Delete
+	/dubbo/saveComplexBeanTest	Open	2021-02-06 20:58:01	Modify Delete
+	/dubbo/findByIdStringArray	Open	2021-02-06 20:58:01	Modify Delete

<

1

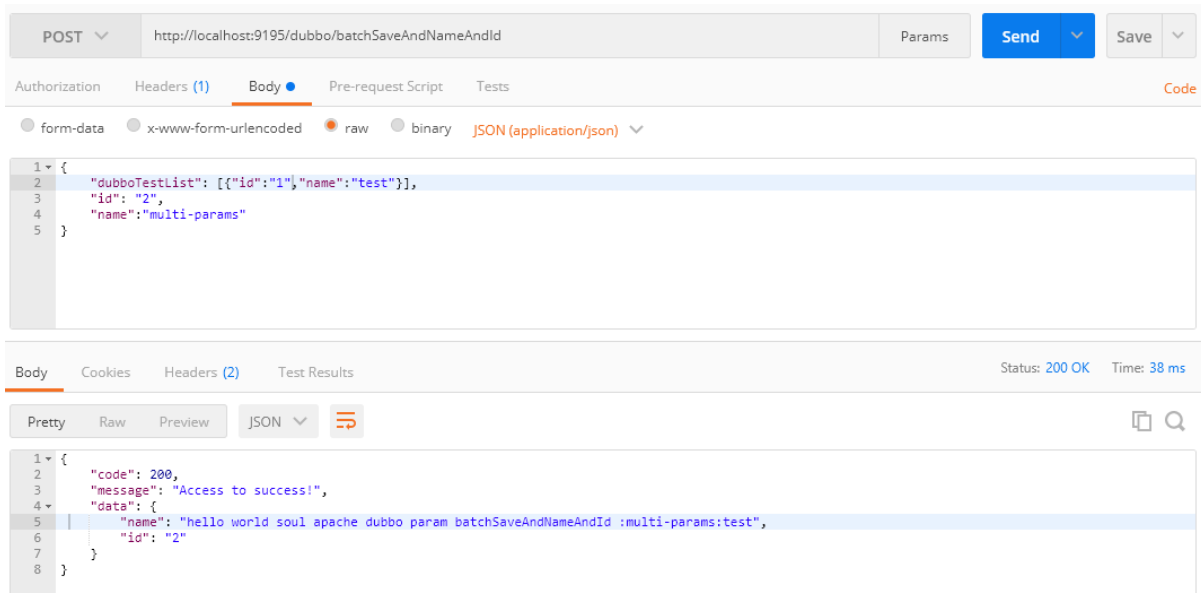
>

Use PostMan to simulate HTTP to request your Dubbo service:



Complex multi-parameter example: The related interface implementation class is `org.apache.shenyu.examples.alibaba.dubbo.service.impl.DubboMultiParamServiceImpl#batchSaveAndNameAndId`.

```
@Override
@ShenyuDubboClient(path = "/batchSaveAndNameAndId")
public DubboTest batchSaveAndNameAndId(List<DubboTest> dubboTestList, String id,
String name) {
    DubboTest test = new DubboTest();
    test.setId(id);
    test.setName("hello world shenyu alibaba dubbo param batchSaveAndNameAndId :" +
name + ":" + dubboTestList.stream().map(DubboTest::getName).collect(Collectors.
joining("-")));
    return test;
}
```



When your arguments do not match, the following exception will occur:

```
2021-02-07 22:24:04.015 ERROR 14860 --- [:20888-thread-3] o.d.shenyu.web.handler.
GlobalExceptionHandler : [e47b2a2a] Resolved [ShenyuException: org.apache.dubbo.
remoting.RemotingException: java.lang.IllegalArgumentException: args.length !=
types.length
java.lang.IllegalArgumentException: args.length != types.length
    at org.apache.dubbo.common.utils.PojoUtils.realize(PojoUtils.java:91)
    at org.apache.dubbo.rpc.filter.GenericFilter.invoke(GenericFilter.java:82)
    at org.apache.dubbo.rpc.protocol.ProtocolFilterWrapper$1.
invoke(ProtocolFilterWrapper.java:81)
    at org.apache.dubbo.rpc.filter.ClassLoaderFilter.invoke(ClassLoaderFilter.
java:38)
    at org.apache.dubbo.rpc.protocol.ProtocolFilterWrapper$1.
invoke(ProtocolFilterWrapper.java:81)
    at org.apache.dubbo.rpc.filter.EchoFilter.invoke(EchoFilter.java:41)
    at org.apache.dubbo.rpc.protocol.ProtocolFilterWrapper$1.
invoke(ProtocolFilterWrapper.java:81)
```

```

    at org.apache.dubbo.rpc.protocol.dubbo.DubboProtocol$1.reply(DubboProtocol.
java:150)
    at org.apache.dubbo.remoting.exchange.support.header.HeaderExchangeHandler.
handleRequest(HeaderExchangeHandler.java:100)
    at org.apache.dubbo.remoting.exchange.support.header.HeaderExchangeHandler.
received(HeaderExchangeHandler.java:175)
    at org.apache.dubbo.remoting.transport.DecodeHandler.received(DecodeHandler.
java:51)
    at org.apache.dubbo.remoting.transport.dispatcher.ChannelEventRunnable.
run(ChannelEventRunnable.java:57)
    at java.util.concurrent.ThreadPoolExecutor.runWorker(ThreadPoolExecutor.
java:1149)
    at java.util.concurrent.ThreadPoolExecutor$Worker.run(ThreadPoolExecutor.
java:624)
    at java.lang.Thread.run(Thread.java:748)
] for HTTP POST /dubbo/batchSaveAndNameAndId

```

## 5.3 Quick start with Spring Cloud

This document introduces how to quickly access the ShenYu gateway using Spring Cloud. You can get the code example of this document by clicking [here](#).

### 5.3.1 Environment to prepare

Please refer to the deployment to select a way to start shenyu-admin. For example, start the ShenYu gateway management system through [local deployment](#).

After successful startup, you need to open the springCloud plugin on in the BasicConfig -> Plugin.

If you are a startup gateway by means of source, can be directly run the ShenYuBootstrapApplication of shenyu-bootstrap module.

Note: Before starting, make sure the gateway has added dependencies.

Add the gateway proxy plugin for Spring Cloud and add the your registry center dependencies:

```

<!--shenyu springCloud plugin start-->
    <dependency>
        <groupId>org.apache.shenyu</groupId>
        <artifactId>shenyu-spring-boot-starter-plugin-springcloud</
artifactId>

        <version>${project.version}</version>
    </dependency>

    <dependency>
        <groupId>org.springframework.cloud</groupId>
        <artifactId>spring-cloud-commons</artifactId>

```

```

        <version>2.2.0.RELEASE</version>
    </dependency>
    <dependency>
        <groupId>org.springframework.cloud</groupId>
        <artifactId>spring-cloud-starter-netflix-ribbon</artifactId>
        <version>2.2.0.RELEASE</version>
    </dependency>

    <dependency>
        <groupId>org.apache.shenyu</groupId>
        <artifactId>shenyu-spring-boot-starter-plugin-httpclient</
artifactId>
        <version>${project.version}</version>
    </dependency>
    <!-- springCloud if you config register center is eureka please dependency
end-->
    <dependency>
        <groupId>org.springframework.cloud</groupId>
        <artifactId>spring-cloud-starter-netflix-eureka-client</
artifactId>
        <version>2.2.0.RELEASE</version>
    </dependency>
    <!--shenyu springCloud plugin end-->

```

eureka config information:

```

eureka:
  client:
    serviceUrl:
      defaultZone: http://localhost:8761/eureka/
  instance:
    prefer-ip-address: true

```

Restart the shenyu-bootstrap project.

### 5.3.2 Run the shenyu-examples-springcloud project

In the example project we used Eureka as the registry for Spring Cloud. You can use the local Eureka or the application provided in the example.

Download [shenyu-examples-eureka](#) 、 [shenyu-examples-springcloud](#) .

Startup the Eureka service: Execute the `org.apache.shenyu.examples.eureka.EurekaServerApplication` main method to start project.

Startup the Spring Cloud service: Execute the `org.apache.shenyu.examples.springcloud.ShenyuTestSpringCloudApplication` main method to start project.

The following log appears when the startup is successful:

```

2021-02-10 14:03:51.301 INFO 2860 --- [          main] o.s.s.concurrent.
ThreadPoolTaskExecutor : Initializing ExecutorService 'applicationTaskExecutor'
2021-02-10 14:03:51.669 INFO 2860 --- [pool-1-thread-1] o.d.s.client.common.utils.
RegisterUtils : springCloud client register success: {"appName":"springCloud-test
","context":"/springcloud","path":"/springcloud/order/save","pathDesc":"","rpcType
":"springCloud","ruleName":"/springcloud/order/save","enabled":true}
2021-02-10 14:03:51.676 INFO 2860 --- [pool-1-thread-1] o.d.s.client.common.utils.
RegisterUtils : springCloud client register success: {"appName":"springCloud-test
","context":"/springcloud","path":"/springcloud/order/path/**","pathDesc":"","
","rpcType":"springCloud","ruleName":"/springcloud/order/path/**","enabled":true}
2021-02-10 14:03:51.682 INFO 2860 --- [pool-1-thread-1] o.d.s.client.common.utils.
RegisterUtils : springCloud client register success: {"appName":"springCloud-test
","context":"/springcloud","path":"/springcloud/order/findById","pathDesc":"","
","rpcType":"springCloud","ruleName":"/springcloud/order/findById","enabled":true}
2021-02-10 14:03:51.688 INFO 2860 --- [pool-1-thread-1] o.d.s.client.common.utils.
RegisterUtils : springCloud client register success: {"appName":"springCloud-test
","context":"/springcloud","path":"/springcloud/order/path/**/name","pathDesc":"","
","rpcType":"springCloud","ruleName":"/springcloud/order/path/**/name","enabled
":true}
2021-02-10 14:03:51.692 INFO 2860 --- [pool-1-thread-1] o.d.s.client.common.utils.
RegisterUtils : springCloud client register success: {"appName":"springCloud-test
","context":"/springcloud","path":"/springcloud/test/**","pathDesc":"","rpcType":
"springCloud","ruleName":"/springcloud/test/**","enabled":true}
2021-02-10 14:03:52.806 WARN 2860 --- [          main]
ockingLoadBalancerClientRibbonWarnLogger : You already have
RibbonLoadBalancerClient on your classpath. It will be used by default. As Spring
Cloud Ribbon is in maintenance mode. We recommend switching to
BlockingLoadBalancerClient instead. In order to use it, set the value of `spring.
cloud.loadbalancer.ribbon.enabled` to `false` or remove spring-cloud-starter-
netflix-ribbon from your project.
2021-02-10 14:03:52.848 WARN 2860 --- [          main] igation
$LoadBalancerCaffeineWarnLogger : Spring Cloud LoadBalancer is currently working
with default default cache. You can switch to using Caffeine cache, by adding it to
the classpath.
2021-02-10 14:03:52.921 INFO 2860 --- [          main] o.s.c.n.eureka.
InstanceInfoFactory : Setting initial instance status as: STARTING
2021-02-10 14:03:52.949 INFO 2860 --- [          main] com.netflix.discovery.
DiscoveryClient : Initializing Eureka in region us-east-1
2021-02-10 14:03:53.006 INFO 2860 --- [          main] c.n.d.provider.
DiscoveryJerseyProvider : Using JSON encoding codec LegacyJacksonJson
2021-02-10 14:03:53.006 INFO 2860 --- [          main] c.n.d.provider.
DiscoveryJerseyProvider : Using JSON decoding codec LegacyJacksonJson
2021-02-10 14:03:53.110 INFO 2860 --- [          main] c.n.d.provider.
DiscoveryJerseyProvider : Using XML encoding codec XStreamXml
2021-02-10 14:03:53.110 INFO 2860 --- [          main] c.n.d.provider.
DiscoveryJerseyProvider : Using XML decoding codec XStreamXml
2021-02-10 14:03:53.263 INFO 2860 --- [          main] c.n.d.s.r.aws.
ConfigClusterResolver : Resolving eureka endpoints via configuration

```



```

2021-02-10 14:03:53.546 INFO 2860 --- [          main] com.netflix.discovery.
DiscoveryClient    : Disable delta property : false
2021-02-10 14:03:53.546 INFO 2860 --- [          main] com.netflix.discovery.
DiscoveryClient    : Single vip registry refresh property : null
2021-02-10 14:03:53.547 INFO 2860 --- [          main] com.netflix.discovery.
DiscoveryClient    : Force full registry fetch : false
2021-02-10 14:03:53.547 INFO 2860 --- [          main] com.netflix.discovery.
DiscoveryClient    : Application is null : false
2021-02-10 14:03:53.547 INFO 2860 --- [          main] com.netflix.discovery.
DiscoveryClient    : Registered Applications size is zero : true
2021-02-10 14:03:53.547 INFO 2860 --- [          main] com.netflix.discovery.
DiscoveryClient    : Application version is -1: true
2021-02-10 14:03:53.547 INFO 2860 --- [          main] com.netflix.discovery.
DiscoveryClient    : Getting all instance registry info from the eureka server
2021-02-10 14:03:53.754 INFO 2860 --- [          main] com.netflix.discovery.
DiscoveryClient    : The response status is 200
2021-02-10 14:03:53.756 INFO 2860 --- [          main] com.netflix.discovery.
DiscoveryClient    : Starting heartbeat executor: renew interval is: 30
2021-02-10 14:03:53.758 INFO 2860 --- [          main] c.n.discovery.
InstanceInfoReplicator    : InstanceInfoReplicator onDemand update allowed rate
per min is 4
2021-02-10 14:03:53.761 INFO 2860 --- [          main] com.netflix.discovery.
DiscoveryClient    : Discovery Client initialized at timestamp 1612937033760 with
initial instances count: 0
2021-02-10 14:03:53.762 INFO 2860 --- [          main] o.s.c.n.e.s.
EurekaServiceRegistry      : Registering application SPRINGCLOUD-TEST with eureka
with status UP
2021-02-10 14:03:53.763 INFO 2860 --- [          main] com.netflix.discovery.
DiscoveryClient    : Saw local status change event StatusChangeEvent
[timestamp=1612937033763, current=UP, previous=STARTING]
2021-02-10 14:03:53.765 INFO 2860 --- [nfoReplicator-0] com.netflix.discovery.
DiscoveryClient    : DiscoveryClient_SPRINGCLOUD-TEST/host.docker.
internal:springCloud-test:8884: registering service...
2021-02-10 14:03:53.805 INFO 2860 --- [          main] o.s.b.w.embedded.tomcat.
TomcatWebServer    : Tomcat started on port(s): 8884 (http) with context path ''
2021-02-10 14:03:53.807 INFO 2860 --- [          main] .s.c.n.e.s.
EurekaAutoServiceRegistration : Updating port to 8884
2021-02-10 14:03:53.837 INFO 2860 --- [nfoReplicator-0] com.netflix.discovery.
DiscoveryClient    : DiscoveryClient_SPRINGCLOUD-TEST/host.docker.
internal:springCloud-test:8884 - registration status: 204
2021-02-10 14:03:54.231 INFO 2860 --- [          main] o.d.s.e.s.
ShenyuTestSpringCloudApplication : Started ShenyuTestSpringCloudApplication in 6.
338 seconds (JVM running for 7.361)

```

### 5.3.3 Test

The shenyu-examples-springcloud project will automatically register interface methods annotated with @ShenyuSpringCloudClient in the shenyu gateway after successful startup.

Open PluginList -> rpc proxy -> springCloud to see the list of plugin rule configurations:

SelectorList

Add

Name	Open	Operation
/springcloud	Open	Modify Delete

< 1 >

RulesList

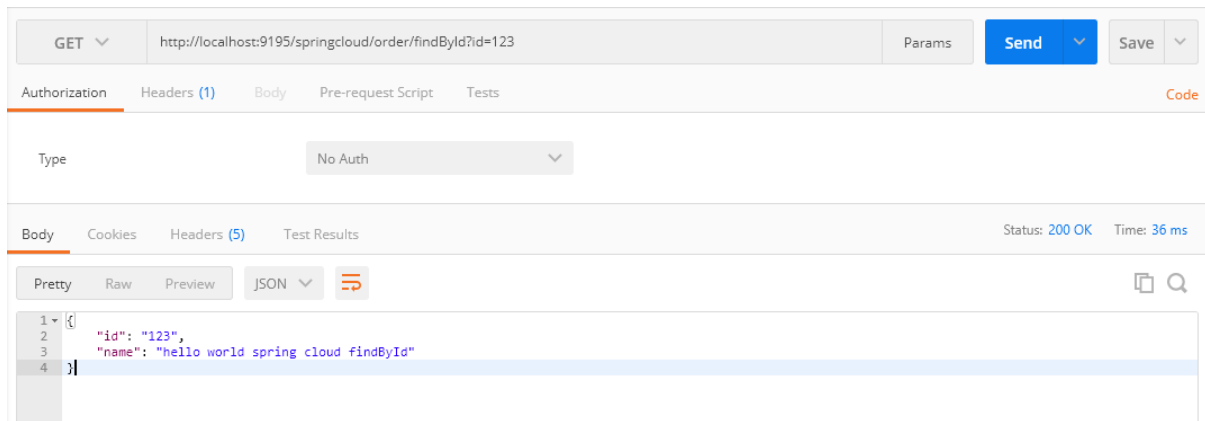
Synchronous springCloud

Add

	RuleName	Open	UpdateTime	Operation
+	/springcloud/order/save	Open	2021-02-10 14:00:04	Modify Delete
+	/springcloud/order/path/**/name	Open	2021-02-10 14:00:04	Modify Delete
+	/springcloud/order/findById	Open	2021-02-10 14:00:04	Modify Delete
+	/springcloud/order/path/**	Open	2021-02-10 14:00:04	Modify Delete
+	/springcloud/test/**	Open	2021-02-10 14:00:04	Modify Delete

< 1 >

Use PostMan to simulate HTTP to request your SpringCloud service:



## 5.4 Quick start with Sofa

This document introduces how to quickly access the ShenYu gateway using Sofa RPC. You can get the code example of this document by clicking [here](#).

### 5.4.1 Environment to prepare

Please refer to the deployment to select a way to start shenyu-admin. For example, start the ShenYu gateway management system through [local deployment](#).

After successful startup, you need to open the Sofa plugin on in the BasicConfig -> Plugin, and set your registry address. Please make sure the registry center is open locally.

If you are a startup gateway by means of source, can be directly run the ShenYuBootstrapApplication of shenyu-bootstrap module.

Note: Before starting, make sure the gateway has added dependencies.

If client is sofa, registry center is Zookeeper, please refer to the following configuration:

```

<!--shenyu sofa plugin start-->
<dependency>
  <groupId>com.alipay.sofa</groupId>
  <artifactId>sofa-rpc-all</artifactId>
  <version>5.7.6</version>
</dependency>
<dependency>
  <groupId>org.apache.curator</groupId>
  <artifactId>curator-client</artifactId>
  <version>4.0.1</version>
</dependency>
<dependency>
  <groupId>org.apache.curator</groupId>
  <artifactId>curator-framework</artifactId>
  <version>4.0.1</version>
</dependency>
<dependency>
  <groupId>org.apache.curator</groupId>
  <artifactId>curator-recipes</artifactId>
  <version>4.0.1</version>
</dependency>

<dependency>
  <groupId>org.apache.shenyu</groupId>
  <artifactId>shenyu-spring-boot-starter-plugin-sofa</artifactId>
  <version>${project.version}</version>
</dependency>
<!--shenyu sofa plugin end-->

```

### 5.4.2 Run the shenyu-examples-sofa project

Download [shenyu-examples-sofa](#), replace the register address in `spring-dubbo.xml` with your local zk address, such as:

```

com:
  alipay:
    sofa:
      rpc:
        registry-address: zookeeper://127.0.0.1:2181

```

Execute the `org.apache.shenyu.examples.sofa.service.TestSofaApplication` main method to start sofa service.

The following log appears when the startup is successful:

```

2021-02-10 02:31:45.599 INFO 2156 --- [pool-1-thread-1] o.d.s.client.common.utils.
RegisterUtils : sofa client register success: {"appName":"sofa","contextPath":"/
sofa","path":"/sofa/insert","pathDesc":"Insert a row of data","rpcType":"sofa",
"serviceName":"org.dromara.shenyu.examples.sofa.api.service.SofaSingleParamService
","methodName":"insert","ruleName":"/sofa/insert","parameterTypes":"org.dromara.
shenyu.examples.sofa.api.entity.SofaSimpleTypeBean","rpcExt":{"loadbalance":"\
"hash","\retries\":"3","\timeout\":"-1"},"enabled":true}

```

```

2021-02-10 02:31:45.605 INFO 2156 --- [pool-1-thread-1] o.d.s.client.common.utils.
RegisterUtils : sofa client register success: {"appName":"sofa","contextPath":"/
sofa","path":"/sofa/findById","pathDesc":"Find by Id","rpcType":"sofa","serviceName
":"org.dromara.shenyu.examples.sofa.api.service.SofaSingleParamService","methodName
":"findById","ruleName":"/sofa/findById","parameterTypes":"java.lang.String",
"rpcExt":{"loadbalance":"hash","retries":3,"timeout":-1},"enabled":true}
2021-02-10 02:31:45.611 INFO 2156 --- [pool-1-thread-1] o.d.s.client.common.utils.
RegisterUtils : sofa client register success: {"appName":"sofa","contextPath":"/
sofa","path":"/sofa/findAll","pathDesc":"Get all data","rpcType":"sofa",
"serviceName":"org.dromara.shenyu.examples.sofa.api.service.SofaSingleParamService
","methodName":"findAll","ruleName":"/sofa/findAll","parameterTypes":"","rpcExt":
{"loadbalance":"hash","retries":3,"timeout":-1},"enabled":true}
2021-02-10 02:31:45.616 INFO 2156 --- [pool-1-thread-1] o.d.s.client.common.utils.
RegisterUtils : sofa client register success: {"appName":"sofa","contextPath":"/
sofa","path":"/sofa/batchSaveNameAndId","pathDesc":"","rpcType":"sofa","serviceName
":"org.dromara.shenyu.examples.sofa.api.service.SofaMultiParamService","methodName
":"batchSaveNameAndId","ruleName":"/sofa/batchSaveNameAndId","parameterTypes":
"java.util.List,java.lang.String,java.lang.String#org.dromara.shenyu.examples.sofa.
api.entity.SofaSimpleTypeBean","rpcExt":{"loadbalance":"hash","retries":3,"
timeout":-1},"enabled":true}
2021-02-10 02:31:45.621 INFO 2156 --- [pool-1-thread-1] o.d.s.client.common.utils.
RegisterUtils : sofa client register success: {"appName":"sofa","contextPath":"/
sofa","path":"/sofa/saveComplexBeanAndName","pathDesc":"","rpcType":"sofa",
"serviceName":"org.dromara.shenyu.examples.sofa.api.service.SofaMultiParamService",
"methodName":"saveComplexBeanAndName","ruleName":"/sofa/saveComplexBeanAndName",
"parameterTypes":"org.dromara.shenyu.examples.sofa.api.entity.SofaComplexTypeBean,
java.lang.String","rpcExt":{"loadbalance":"hash","retries":3,"timeout":-1}
","enabled":true}
2021-02-10 02:31:45.627 INFO 2156 --- [pool-1-thread-1] o.d.s.client.common.utils.
RegisterUtils : sofa client register success: {"appName":"sofa","contextPath":"/
sofa","path":"/sofa/findByIdsAndName","pathDesc":"","rpcType":"sofa",
"serviceName":"org.dromara.shenyu.examples.sofa.api.service.SofaMultiParamService",
"methodName":"findByIdsAndName","ruleName":"/sofa/findByIdsAndName",
"parameterTypes":"[Ljava.lang.Integer;java.lang.String","rpcExt":{"loadbalance\
":"hash","retries":3,"timeout":-1},"enabled":true}
2021-02-10 02:31:45.632 INFO 2156 --- [pool-1-thread-1] o.d.s.client.common.utils.
RegisterUtils : sofa client register success: {"appName":"sofa","contextPath":"/
sofa","path":"/sofa/findByIdsAndName","pathDesc":"","rpcType":"sofa","serviceName
":"org.dromara.shenyu.examples.sofa.api.service.SofaMultiParamService","methodName
":"findByIdsAndName","ruleName":"/sofa/findByIdsAndName","parameterTypes":
"[Ljava.lang.String;","rpcExt":{"loadbalance":"hash","retries":3,"timeout\
":-1},"enabled":true}
2021-02-10 02:31:45.637 INFO 2156 --- [pool-1-thread-1] o.d.s.client.common.utils.
RegisterUtils : sofa client register success: {"appName":"sofa","contextPath":"/
sofa","path":"/sofa/saveTwoList","pathDesc":"","rpcType":"sofa","serviceName":"org.
dromara.shenyu.examples.sofa.api.service.SofaMultiParamService","methodName":
"saveTwoList","ruleName":"/sofa/saveTwoList","parameterTypes":"java.util.List,java.
util.Map#org.dromara.shenyu.examples.sofa.api.entity.SofaComplexTypeBean","rpcExt":
{"loadbalance":"hash","retries":3,"timeout":-1},"enabled":true}

```

```

2021-02-10 02:31:45.642 INFO 2156 --- [pool-1-thread-1] o.d.s.client.common.utils.
RegisterUtils : sofa client register success: {"appName":"sofa","contextPath":"/
sofa","path":"/sofa/batchSave","pathDesc":"","rpcType":"sofa","serviceName":"org.
dromara.shenyu.examples.sofa.api.service.SofaMultiParamService","methodName":
"batchSave","ruleName":"/sofa/batchSave","parameterTypes":"java.util.List#org.
dromara.shenyu.examples.sofa.api.entity.SofaSimpleTypeBean","rpcExt":{"\
"loadbalance\":"hash","\retries\":3,"\timeout\":-1},"enabled":true}
2021-02-10 02:31:45.647 INFO 2156 --- [pool-1-thread-1] o.d.s.client.common.utils.
RegisterUtils : sofa client register success: {"appName":"sofa","contextPath":"/
sofa","path":"/sofa/findById","pathDesc":"","rpcType":"sofa","serviceName":
"org.dromara.shenyu.examples.sofa.api.service.SofaMultiParamService","methodName":
"findById","ruleName":"/sofa/findById","parameterTypes":"java.util.List",
"rpcExt":{"\loadbalance\":"hash","\retries\":3,"\timeout\":-1},"enabled":true}
2021-02-10 02:31:45.653 INFO 2156 --- [pool-1-thread-1] o.d.s.client.common.utils.
RegisterUtils : sofa client register success: {"appName":"sofa","contextPath":"/
sofa","path":"/sofa/saveComplexBean","pathDesc":"","rpcType":"sofa","serviceName":
"org.dromara.shenyu.examples.sofa.api.service.SofaMultiParamService","methodName":
"saveComplexBean","ruleName":"/sofa/saveComplexBean","parameterTypes":"org.dromara.
shenyu.examples.sofa.api.entity.SofaComplexTypeBean","rpcExt":{"\loadbalance\":"
hash","\retries\":3,"\timeout\":-1},"enabled":true}
2021-02-10 02:31:45.660 INFO 2156 --- [pool-1-thread-1] o.d.s.client.common.utils.
RegisterUtils : sofa client register success: {"appName":"sofa","contextPath":"/
sofa","path":"/sofa/findByIdsAndName","pathDesc":"","rpcType":"sofa","serviceName":
"org.dromara.shenyu.examples.sofa.api.service.SofaMultiParamService","methodName":
"findByIdsAndName","ruleName":"/sofa/findByIdsAndName","parameterTypes":"java.util.
List,java.lang.String","rpcExt":{"\loadbalance\":"hash","\retries\":3,"\timeout\
":-1},"enabled":true}
2021-02-10 02:31:46.055 INFO 2156 --- [ main] o.a.c.f.imps.
CuratorFrameworkImpl : Starting
2021-02-10 02:31:46.059 INFO 2156 --- [ main] org.apache.zookeeper.
ZooKeeper : Client environment:zookeeper.version=3.4.6-1569965, built on
02/20/2014 09:09 GMT
2021-02-10 02:31:46.059 INFO 2156 --- [ main] org.apache.zookeeper.
ZooKeeper : Client environment:host.name=host.docker.internal
2021-02-10 02:31:46.059 INFO 2156 --- [ main] org.apache.zookeeper.
ZooKeeper : Client environment:java.version=1.8.0_211
2021-02-10 02:31:46.059 INFO 2156 --- [ main] org.apache.zookeeper.
ZooKeeper : Client environment:java.vendor=Oracle Corporation
2021-02-10 02:31:46.059 INFO 2156 --- [ main] org.apache.zookeeper.
ZooKeeper : Client environment:java.home=C:\Program Files\Java\jdk1.8.0_
211\jre
2021-02-10 02:31:46.059 INFO 2156 --- [ main] org.apache.zookeeper.
ZooKeeper : Client environment:java.class.path=C:\Program Files\Java\
jdk1.8.0_211\jre\lib\charsets.jar;C:\Program Files\Java\jdk1.8.0_211\jre\lib\
deploy.jar;C:\Program Files\Java\jdk1.8.0_211\jre\lib\ext\access-bridge-64.jar;C:\
Program Files\Java\jdk1.8.0_211\jre\lib\ext\cldrdata.jar;C:\Program Files\Java\
jdk1.8.0_211\jre\lib\ext\dnsns.jar;C:\Program Files\Java\jdk1.8.0_211\jre\lib\ext\
jaccess.jar;C:\Program Files\Java\jdk1.8.0_211\jre\lib\ext\jfxrt.jar;C:\Program
Files\Java\jdk1.8.0_211\jre\lib\ext\localedata.jar;C:\Program Files\Java\jdk1.8.0_
211\jre\lib\ext\nashorn.jar;C:\Program Files\Java\jdk1.8.0_211\jre\lib\ext\sunec.

```

```

2021-02-10 02:31:46.060 INFO 2156 --- [          main] org.apache.zookeeper.
ZooKeeper          : Client environment:java.library.path=C:\Program Files\Java\
jdk1.8.0_211\bin;C:\Windows\Sun\Java\bin;C:\Windows\system32;C:\Windows;C:\Program
Files\Common Files\Oracle\Java\javapath;C:\ProgramData\Oracle\Java\javapath;C:\
Program Files (x86)\Common Files\Oracle\Java\javapath;C:\Windows\system32;C:\
Windows;C:\Windows\System32\Wbem;C:\Windows\System32\WindowsPowerShell\v1.0\;C:\
Windows\System32\OpenSSH\;C:\Program Files\Java\jdk1.8.0_211\bin;C:\Program Files\
Java\jdk1.8.0_211\jre\bin;D:\SOFT\apache-maven-3.5.0\bin;C:\Program Files\Go\bin;
C:\Program Files\nodejs\;C:\Program Files\Python\Python38\;C:\Program Files\
OpenSSL-Win64\bin;C:\Program Files\Git\bin;D:\SOFT\protobuf-2.5.0\src;D:\SOFT\zlib-
1.2.8;c:\Program Files (x86)\Microsoft SQL Server\100\Tools\Binn\;c:\Program Files\
Microsoft SQL Server\100\Tools\Binn\;c:\Program Files\Microsoft SQL Server\100\DTS\
Binn\;C:\Program Files\Docker\Docker\resources\bin;C:\ProgramData\DockerDesktop\
version-bin;D:\SOFT\gradle-6.0-all\gradle-6.0\bin;C:\Program Files\mingw-w64\x86_
64-8.1.0-posix-seh-rt_v6-rev0\mingw64\bin;D:\SOFT\hugo_extended_0.55.5_Windows-
64bit;C:\Users\DLM\AppData\Local\Microsoft\WindowsApps;C:\Users\DLM\go\bin;C:\
Users\DLM\AppData\Roaming\npm;;C:\Program Files\Microsoft VS Code\bin;C:\Program
Files\nimble-cli\bin;.
2021-02-10 02:31:46.060 INFO 2156 --- [          main] org.apache.zookeeper.
ZooKeeper          : Client environment:java.io.tmpdir=C:\Users\DLM\AppData\Local\
Temp\
2021-02-10 02:31:46.060 INFO 2156 --- [          main] org.apache.zookeeper.
ZooKeeper          : Client environment:java.compiler=<NA>
2021-02-10 02:31:46.060 INFO 2156 --- [          main] org.apache.zookeeper.
ZooKeeper          : Client environment:os.name=Windows 10
2021-02-10 02:31:46.060 INFO 2156 --- [          main] org.apache.zookeeper.
ZooKeeper          : Client environment:os.arch=amd64
2021-02-10 02:31:46.060 INFO 2156 --- [          main] org.apache.zookeeper.
ZooKeeper          : Client environment:os.version=10.0
2021-02-10 02:31:46.060 INFO 2156 --- [          main] org.apache.zookeeper.
ZooKeeper          : Client environment:user.name=DLM
2021-02-10 02:31:46.060 INFO 2156 --- [          main] org.apache.zookeeper.
ZooKeeper          : Client environment:user.home=C:\Users\DLM
2021-02-10 02:31:46.060 INFO 2156 --- [          main] org.apache.zookeeper.
ZooKeeper          : Client environment:user.dir=D:\X\dml_github\shenyu
2021-02-10 02:31:46.061 INFO 2156 --- [          main] org.apache.zookeeper.
ZooKeeper          : Initiating client connection, connectString=127.0.0.1:21810
sessionTimeout=60000 watcher=org.apache.curator.ConnectionState@3e850122
2021-02-10 02:31:46.069 INFO 2156 --- [27.0.0.1:21810] org.apache.zookeeper.
ClientCnxn          : Opening socket connection to server 127.0.0.1/127.0.0.
1:21810. Will not attempt to authenticate using SASL (unknown error)
2021-02-10 02:31:46.071 INFO 2156 --- [27.0.0.1:21810] org.apache.zookeeper.
ClientCnxn          : Socket connection established to 127.0.0.1/127.0.0.1:21810,
initiating session
2021-02-10 02:31:46.078 INFO 2156 --- [27.0.0.1:21810] org.apache.zookeeper.
ClientCnxn          : Session establishment complete on server 127.0.0.1/127.0.0.
1:21810, sessionId = 0x10005b0d05e0001, negotiated timeout = 40000
2021-02-10 02:31:46.081 INFO 2156 --- [ain-EventThread] o.a.c.f.state.
ConnectionStateManager : State change: CONNECTED

```

```
2021-02-10 02:31:46.093 WARN 2156 --- [          main] org.apache.curator.utils.
ZKPaths      : The version of ZooKeeper being used doesn't support Container
nodes. CreateMode.PERSISTENT will be used instead.
2021-02-10 02:31:46.141 INFO 2156 --- [          main] o.d.s.e.s.service.
TestSofaApplication : Started TestSofaApplication in 3.41 seconds (JVM running
for 4.423)
```

### 5.4.3 Test

The shenyu-examples-sofa project will automatically register interface methods annotated with @ShenyuSofaClient in the shenyu gateway after successful startup.

Open PluginList -> rpc proxy -> sofa to see the list of plugin rule configurations:

Name	Open	Operation
/sofa	Open	Modify Delete

RuleName	Open	UpdateTime	Operation
/sofa/insert	Open	2021-02-10 02:16:12	Modify Delete
/sofa/findById	Open	2021-02-10 02:16:12	Modify Delete
/sofa/findAll	Open	2021-02-10 02:16:12	Modify Delete
/sofa/batchSaveNameAndId	Open	2021-02-10 02:16:12	Modify Delete
/sofa/saveComplexBeanAndName	Open	2021-02-10 02:16:12	Modify Delete
/sofa/findByArrayIdsAndName	Open	2021-02-10 02:16:12	Modify Delete
/sofa/findByStringArray	Open	2021-02-10 02:16:12	Modify Delete
/sofa/saveTwoList	Open	2021-02-10 02:16:12	Modify Delete
/sofa/batchSave	Open	2021-02-10 02:16:12	Modify Delete
/sofa/findByIdsAndName	Open	2021-02-10 02:16:12	Modify Delete
/sofa/saveComplexBean	Open	2021-02-10 02:16:12	Modify Delete
/sofa/findById	Open	2021-02-10 02:16:12	Modify Delete

Use PostMan to simulate HTTP to request your Sofa service:

```
POST http://localhost:9195/sofa/findById
```

```
{
  "id": "123"
}
```

```
{
  "code": 200,
  "message": "Access to success!",
  "data": {
    "id": "123",
    "name": "hello world Soul Sofa, findById"
  }
}
```

Complex multi-parameter example: The related interface implementation class is org.apache.shenyu.examples.sofa.service.impl.SofaMultiParamServiceImpl#batchSaveNameAndId



```

@Override
@ShenyuSofaClient(path = "/batchSaveNameAndId")
public SofaSimpleTypeBean batchSaveNameAndId(final List<SofaSimpleTypeBean>
sofaTestList, final String id, final String name) {
    SofaSimpleTypeBean simpleTypeBean = new SofaSimpleTypeBean();
    simpleTypeBean.setId(id);
    simpleTypeBean.setName("hello world shenyu sofa param batchSaveAndNameAndId : "
+ name + ":" + sofaTestList.stream().map(SofaSimpleTypeBean::getName).
collect(Collectors.joining("-")));
    return simpleTypeBean;
}

```

The screenshot shows a REST client interface with a POST request to `http://localhost:9195/sofa/batchSaveNameAndId`. The request body is a JSON array of two objects, each with `id` and `name` fields. The response status is 200 OK, and the response body is a JSON object containing `code`, `message`, and `data` fields. The `data` field contains an object with `id` and `name` fields, where the `name` field is a concatenation of the two input names separated by a hyphen.

```

1 {
2   "sofaTestList": [{
3     "id": "123",
4     "name": "test"
5   }],
6   "id": "134",
7   "name": "test1"
8 }

```

```

1 {
2   "code": 200,
3   "message": "Access to success!",
4   "data": {
5     "id": "134",
6     "name": "hello world soul sofa param batchSaveAndNameAndId :test1:test"
7   }
8 }

```

## 5.5 Quick start with gRPC

This document introduces how to quickly access the ShenYu gateway using gRPC. You can get the code example of this document by clicking [here](#).

### 5.5.1 Prepare For Environment

Please refer to the deployment to select a way to start shenyu-admin. For example, start the ShenYu gateway management system through [local deployment](#).

After successful startup, you need to open the gRPC plugin on in the BasicConfig -> Plugin.

If you are a startup gateway by means of source, can be directly run the `ShenyuBootstrapApplication` of `shenyu-bootstrap` module.

Note: Before starting, make sure the gateway has added dependencies.

Add the following dependencies to the gateway's `pom.xml` file:



```

<!--shenyu grpc plugin start-->
<dependency>
  <groupId>org.apache.shenyu</groupId>
  <artifactId>shenyu-spring-boot-starter-plugin-grpc</artifactId>
  <version>${project.version}</version>
</dependency>
<!--shenyu grpc plugin end-->

```

## 5.5.2 Run the shenyu-examples-grpc project

Download [shenyu-examples-grpc](#)

Run the following command under shenyu-examples-grpc to generate Java code:

```

mvn protobuf:compile
mvn protobuf:compile-custom

```

Execute the `org.apache.shenyu.examples.grpc.ShenyuTestGrpcApplication` main method to start project.

The following log appears when the startup is successful:

```

2021-06-18 19:33:32.866 INFO 11004 --- [or_consumer_19] o.a.s.r.client.http.
utils.RegisterUtils : grpc client register success: {"appName":"127.0.0.1:8080",
"contextPath":"/grpc","path":"/grpc/clientStreamingFun","pathDesc":
"clientStreamingFun","rpcType":"grpc","serviceName":"stream.StreamService",
"methodName":"clientStreamingFun","ruleName":"/grpc/clientStreamingFun",
"parameterTypes":"io.grpc.stub.StreamObserver","rpcExt":{"timeout\":"5000,\
"methodType\":"CLIENT_STREAMING\"},"enabled":true,"host":"172.20.10.6","port
":8080,"registerMetaData":false}
2021-06-18 19:33:32.866 INFO 11004 --- [or_consumer_17] o.a.s.r.client.http.
utils.RegisterUtils : grpc client register success: {"appName":"127.0.0.1:8080",
"contextPath":"/grpc","path":"/grpc/echo","pathDesc":"echo","rpcType":"grpc",
"serviceName":"echo.EchoService","methodName":"echo","ruleName":"/grpc/echo",
"parameterTypes":"echo.EchoRequest,io.grpc.stub.StreamObserver","rpcExt":{"\
"timeout\":"5000,\\"methodType\":"UNARY\"},"enabled":true,"host":"172.20.10.6",
"port":8080,"registerMetaData":false}
2021-06-18 19:33:32.866 INFO 11004 --- [or_consumer_20] o.a.s.r.client.http.
utils.RegisterUtils : grpc client register success: {"appName":"127.0.0.1:8080",
"contextPath":"/grpc","path":"/grpc/bidiStreamingFun","pathDesc":"bidiStreamingFun",
"rpcType":"grpc","serviceName":"stream.StreamService","methodName":
"bidiStreamingFun","ruleName":"/grpc/bidiStreamingFun","parameterTypes":"io.grpc.
stub.StreamObserver","rpcExt":{"timeout\":"5000,\\"methodType\":"BIDI_STREAMING\"}
","enabled":true,"host":"172.20.10.6","port":8080,"registerMetaData":false}
2021-06-18 19:33:32.866 INFO 11004 --- [or_consumer_21] o.a.s.r.client.http.
utils.RegisterUtils : grpc client register success: {"appName":"127.0.0.1:8080",
"contextPath":"/grpc","path":"/grpc/unaryFun","pathDesc":"unaryFun","rpcType":"grpc",
"serviceName":"stream.StreamService","methodName":"unaryFun","ruleName":"/grpc/
unaryFun","parameterTypes":"stream.RequestData,io.grpc.stub.StreamObserver","rpcExt
":{"timeout\":"5000,\\"methodType\":"UNARY\"},"enabled":true,"host":"172.20.10.6
","port":8080,"registerMetaData":false}

```

```
2021-06-18 19:33:32.866 INFO 11004 --- [or_consumer_-18] o.a.s.r.client.http.
utils.RegisterUtils : grpc client register success: {"appName":"127.0.0.1:8080",
"contextPath":"/grpc","path":"/grpc/serverStreamingFun","pathDesc":
"serverStreamingFun","rpcType":"grpc","serviceName":"stream.StreamService",
"methodName":"serverStreamingFun","ruleName":"/grpc/serverStreamingFun",
"parameterTypes":"stream.RequestData,io.grpc.stub.StreamObserver","rpcExt":{"\
"timeout\":"5000","\methodType\":"SERVER_STREAMING\"},"enabled":true,"host":"172.
20.10.6","port":8080,"registerMetaData":false}
```

### 5.5.3 Test

The shenyu-examples-grpc project will automatically register interface methods annotated with `@ShenyuGrpcClient` in the shenyu gateway after successful startup.

Open PluginList -> rpc proxy -> gRPC to see the list of plugin rule configurations:

Selector

N..

Query

Add

Name	Open	Operation
/grpc	Open	Modify Delete

< 1 >

RulesList

Synchronous grpc

RuleName

Query

Add

	RuleName	Open	UpdateTime	Operation
+	/grpc/unaryFun	Open	2021-06-18 13:27:36	Modify Delete
+	/grpc/serverStreamingFun	Open	2021-06-18 13:27:37	Modify Delete
+	/grpc/clientStreamingFun	Open	2021-06-18 13:27:37	Modify Delete
+	/grpc/bidiStreamingFun	Open	2021-06-18 13:27:37	Modify Delete
+	/grpc/echo	Open	2021-06-18 13:27:37	Modify Delete

< 1 >

Use postman to simulate http to request your gRPC service. The following is the request body.

```
{
  "data": [
    {
      "message": "hello grpc"
    }
  ]
}
```

The screenshot shows a REST client interface with the following details:

- Method:** POST
- URL:** http://localhost:9195/grpc/echo
- Body:** `{ "data": [ { "message": "hello grpc" } ] }`
- Response:**

```

1 {
2   "code": 200,
3   "message": "Access to success!",
4   "data": [
5     {
6       "message": "ReceivedHELLO",
7       "traces": [ { "host": "LAPTOP-7P4PA12J(172.20.10.6)" } ]
8     }
9   ]
10 }

```
- Status:** 200 OK, Time: 16 ms, Size: 238 B

The parameters are passed in json format. The name of the key is data by default, and you can reset it in `GrpcConstants.JSON_DESCRIPTOR_PROTO_FIELD_NAME`. The input of value is based on the proto file defined by you.

### 5.5.4 Streaming

The shenyu can support streaming of gRPC. The following shows the calls of the four method types of gRPC. In streaming, you can pass multiple parameters in the form of an array.

- UNARY

The request body like this.

```

{
  "data": [
    {
      "text": "hello grpc"
    }
  ]
}

```

Then, call gRPC service by UNARY method type.

POST ▼ http://localhost:9195/grpc/unaryFun Send ▼

Params Authorization Headers (9) **Body ●** Pre-request Script Tests Settings

● none ● form-data ● x-www-form-urlencoded ● **raw** ● binary ● GraphQL **JSON ▼**

```
1 [{"data": [{"text": "hello grpc"}]}]
```

Body Cookies Headers (2) Test Results 🌐 Status: 200 OK Time: 26 ms Size: 178 B Save

Pretty Raw Preview Visualize JSON ▼ ≡

```
1 {
2   "code": 200,
3   "message": "Access to success!",
4   "data": [
5     "{\n  \"text\": \"unaryFun response: hello gRPC\"\n}"
6   ]
7 }
```

- CLIENT\_STREAMING

The request body like this.

```
{
  "data": [
    {
      "text": "hello grpc"
    },
    {
      "text": "hello grpc"
    },
    {
      "text": "hello grpc"
    }
  ]
}
```

Then, call gRPC service by CLIENT\_STREAMING method type.

The screenshot shows a REST client interface. At the top, a POST request is configured to `http://localhost:9195/grpc/clientStreamingFun`. The 'Body' tab is selected, showing a JSON array of three objects, each with a 'text' property set to 'hello grpc'. Below the request, the 'Body' tab of the response is selected, showing a JSON object with 'code': 200, 'message': 'Access to success!', and 'data': an array of one object with 'text': 'clientStreamingFun onCompleted'.

```
POST http://localhost:9195/grpc/clientStreamingFun
```

Params Authorization Headers (9) **Body** Pre-request Script Tests Settings

none form-data x-www-form-urlencoded raw binary GraphQL JSON

```
1 [{"data":{"text":"hello grpc"}}, {"text":"hello grpc"}, {"text":"hello grpc"}]}
```

Body Cookies Headers (2) Test Results Status: 200 OK Time: 11 ms Size: 179 B Save

Pretty Raw Preview Visualize JSON

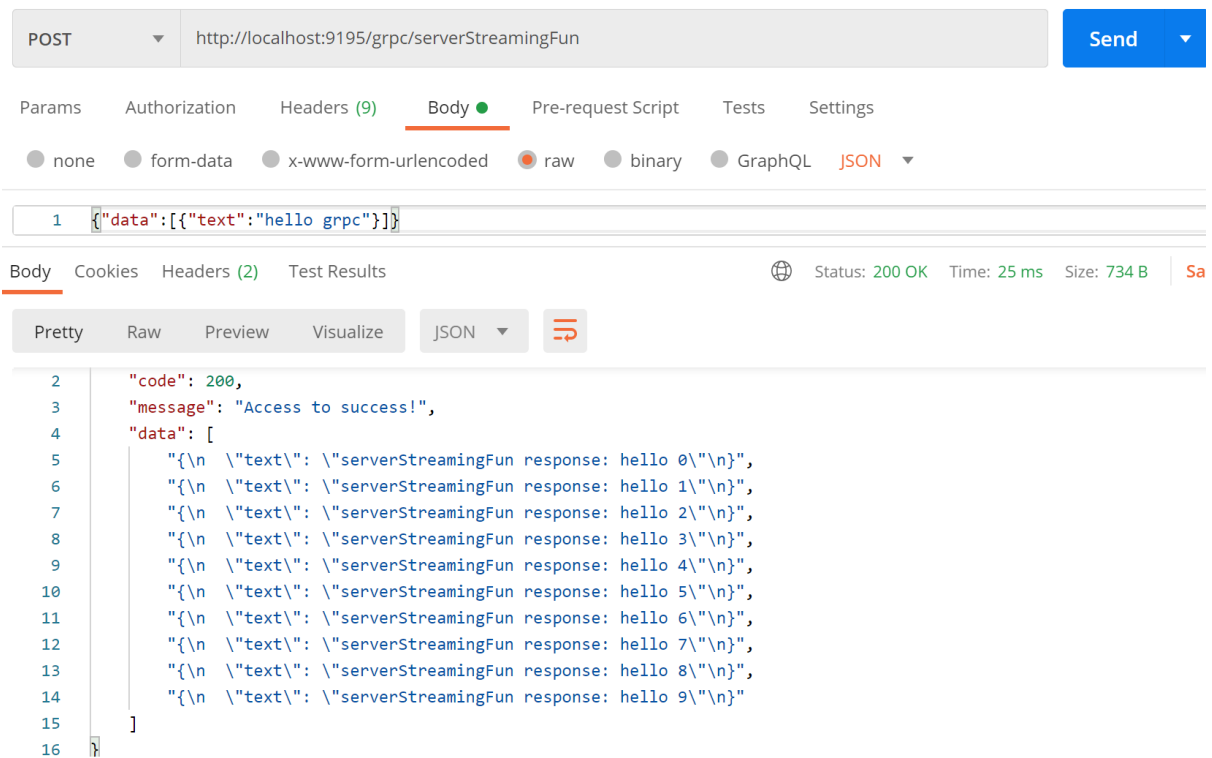
```
1 {
2   "code": 200,
3   "message": "Access to success!",
4   "data": [
5     "{\n  \"text\": \"clientStreamingFun onCompleted\"\n}"
6   ]
7 }
```

- SERVER\_STREAMING

The request body like this.

```
{
  "data": [
    {
      "text": "hello grpc"
    }
  ]
}
```

Then, call gRPC service by SERVER\_STREAMING method type.



POST http://localhost:9195/grpc/serverStreamingFun

Params Authorization Headers (9) **Body** Pre-request Script Tests Settings

none form-data x-www-form-urlencoded raw binary GraphQL **JSON**

1 [{"data":[{"text":"hello grpc"}]}]

Body Cookies Headers (2) Test Results Status: 200 OK Time: 25 ms Size: 734 B Sa

Pretty Raw Preview Visualize JSON

```

2  "code": 200,
3  "message": "Access to success!",
4  "data": [
5    "{\n  \"text\": \"serverStreamingFun response: hello 0\\n\"}",
6    "{\n  \"text\": \"serverStreamingFun response: hello 1\\n\"}",
7    "{\n  \"text\": \"serverStreamingFun response: hello 2\\n\"}",
8    "{\n  \"text\": \"serverStreamingFun response: hello 3\\n\"}",
9    "{\n  \"text\": \"serverStreamingFun response: hello 4\\n\"}",
10   "{\n  \"text\": \"serverStreamingFun response: hello 5\\n\"}",
11   "{\n  \"text\": \"serverStreamingFun response: hello 6\\n\"}",
12   "{\n  \"text\": \"serverStreamingFun response: hello 7\\n\"}",
13   "{\n  \"text\": \"serverStreamingFun response: hello 8\\n\"}",
14   "{\n  \"text\": \"serverStreamingFun response: hello 9\\n\"}"
15  ]
16 }

```

- BIDI\_STREAMING

The request body like this.

```

{
  "data": [
    {
      "text": "hello grpc"
    },
    {
      "text": "hello grpc"
    },
    {
      "text": "hello grpc"
    }
  ]
}

```

Then, call gRPC service by BIDI\_STREAMING method type.

POST http://localhost:9195/grpc/bidiStreamingFun

Params Authorization Headers (9) **Body** Pre-request Script Tests Settings

none form-data x-www-form-urlencoded raw binary GraphQL JSON

```
1 [{"data":[{"text":"hello grpc"}, {"text":"hello grpc"}, {"text":"hello grpc"}]}
```

Body Cookies Headers (2) Test Results

Status: 200 OK Time: 15 ms Size: 348 B Sav

Pretty Raw Preview Visualize JSON

```
1 {
2   "code": 200,
3   "message": "Access to success!",
4   "data": [
5     "{\n  \"text\": \"bidiStreamingFun response: hello\"\n}",
6     "{\n  \"text\": \"bidiStreamingFun response: hello\"\n}",
7     "{\n  \"text\": \"bidiStreamingFun response: hello\"\n}",
8     "{\n  \"text\": \"bidiStreamingFun onCompleted\"\n}"
9   ]
10 }
```

## 5.6 Quick start with Tars

This document introduces how to quickly access the ShenYu Gateway using Tars. You can get the code example of this document by clicking [here](#).

### 5.6.1 Environment to prepare

Please refer to the deployment to select a way to start shenyu-admin. For example, start the ShenYu gateway management system through [local deployment](#).

After successful startup, you need to open the Sofa plugin on in the BasicConfig -> Plugin.

If you are a startup gateway by means of source, can be directly run the ShenYuBootstrapApplication of shenyu-bootstrap module.

Note: Before starting, make sure the gateway has added dependencies.

shenyu-bootstrap need to import tars dependencies:

```
<dependency>
  <groupId>org.apache.shenyu</groupId>
  <artifactId>shenyu-spring-boot-starter-plugin-tars</artifactId>
  <version>${project.version}</version>
</dependency>

<dependency>
  <groupId>com.tencent.tars</groupId>
```

```
<artifactId>tars-client</artifactId>
<version>1.7.2</version>
</dependency>
```

## 5.6.2 Run the shenyu-examples-tars project

Download [shenyu-examples-tars](#) .

Modify host in `application.yml` to be your local IP

Modify `config src/main/resources/ShenyuExampleServer.ShenyuExampleApp.config.conf`:

- It is recommended to make clear the meaning of the main configuration items of config, [refer to the development guide](#)
- bind IP in config should pay attention to providing cost machine
- `local=...`, Indicates the open port that the native machine connects to the tarsnode. If there is no tarsnode, this configuration can be dropped
- `locator`: Indicates the address (frame address) of the main control center, which is used to obtain the IP list according to the service name, If Registry is not required to locate the service, this configuration can be dropped
- `node=tars.tarsnode.ServerObj@xxxx`, Indicates the address of the connected tarsnode. If there is no tarsnode locally, this configuration can be removed

More config configuration instructions, Please refer to [TARS Official Documentation](#)

Execute the `org.apache.shenyu.examples.tars.ShenyuTestTarsApplication main` method to start project.

**Note:** The configuration file address needs to be specified in the startup command when the service starts **-Dconfig=xxx/ShenyuExampleServer.ShenyuExampleApp.config.conf**

If the `-Dconfig` parameter is not added, the configuration may throw the following exceptions:

```
com.qq.tars.server.config.ConfigurationException: error occurred on load server
config
    at com.qq.tars.server.config.ConfigurationManager.
loadServerConfig(ConfigurationManager.java:113)
    at com.qq.tars.server.config.ConfigurationManager.init(ConfigurationManager.
java:57)
    at com.qq.tars.server.core.Server.loadServerConfig(Server.java:90)
    at com.qq.tars.server.core.Server.<init>(Server.java:42)
    at com.qq.tars.server.core.Server.<clinit>(Server.java:38)
    at com.qq.tars.spring.bean.PropertiesListener.
onApplicationEvent(PropertiesListener.java:37)
    at com.qq.tars.spring.bean.PropertiesListener.
onApplicationEvent(PropertiesListener.java:31)
    at org.springframework.context.event.SimpleApplicationEventMulticaster.
doInvokeListener(SimpleApplicationEventMulticaster.java:172)
```



```

    at org.springframework.context.event.SimpleApplicationEventMulticaster.
    invokeListener(SimpleApplicationEventMulticaster.java:165)
    at org.springframework.context.event.SimpleApplicationEventMulticaster.
    multicastEvent(SimpleApplicationEventMulticaster.java:139)
    at org.springframework.context.event.SimpleApplicationEventMulticaster.
    multicastEvent(SimpleApplicationEventMulticaster.java:127)
    at org.springframework.boot.context.event.EventPublishingRunListener.
    environmentPrepared(EventPublishingRunListener.java:76)
    at org.springframework.boot.SpringApplicationRunListeners.
    environmentPrepared(SpringApplicationRunListeners.java:53)
    at org.springframework.boot.SpringApplication.
    prepareEnvironment(SpringApplication.java:345)
    at org.springframework.boot.SpringApplication.run(SpringApplication.java:308)
    at org.springframework.boot.SpringApplication.run(SpringApplication.java:1226)
    at org.springframework.boot.SpringApplication.run(SpringApplication.java:1215)
    at org.apache.shenyu.examples.tars.ShenyuTestTarsApplication.
    main(ShenyuTestTarsApplication.java:38)
Caused by: java.lang.NullPointerException
    at java.io.FileInputStream.<init>(FileInputStream.java:130)
    at java.io.FileInputStream.<init>(FileInputStream.java:93)
    at com.qq.tars.common.util.Config.parseFile(Config.java:211)
    at com.qq.tars.server.config.ConfigurationManager.
    loadServerConfig(ConfigurationManager.java:63)
    ... 17 more
The exception occurred at load server config

```

The following log appears when the startup is successful:

```

[SERVER] server starting at tcp -h 127.0.0.1 -p 21715 -t 60000...
[SERVER] server started at tcp -h 127.0.0.1 -p 21715 -t 60000...
[SERVER] server starting at tcp -h 127.0.0.1 -p 21714 -t 3000...
[SERVER] server started at tcp -h 127.0.0.1 -p 21714 -t 3000...
[SERVER] The application started successfully.
The session manager service started...
[SERVER] server is ready...
2021-02-09 13:28:24.643 INFO 16016 --- [          main] o.s.b.w.embedded.tomcat.
TomcatWebServer : Tomcat started on port(s): 55290 (http) with context path ''
2021-02-09 13:28:24.645 INFO 16016 --- [          main] o.d.s.e.tars.
ShenyuTestTarsApplication : Started ShenyuTestTarsApplication in 4.232 seconds
(JVM running for 5.1)
2021-02-09 13:28:24.828 INFO 16016 --- [pool-2-thread-1] o.d.s.client.common.
utils.RegisterUtils : tars client register success: {"appName":"127.0.0.1:21715",
"contextPath":"/tars","path":"/tars/helloInt","pathDesc":"","rpcType":"tars",
"serviceName":"ShenyuExampleServer.ShenyuExampleApp.HelloObj","methodName":
"helloInt","ruleName":"/tars/helloInt","parameterTypes":"int,java.lang.String",
"rpcExt":{"methodInfo":{"methodName":"helloInt","params":{"{}","{}"},"
returnType":"java.lang.Integer"},"methodName":"hello","params":{"{}","{}"},"
returnType":"java.lang.String"}},"enabled":true}

```

```
2021-02-09 13:28:24.837 INFO 16016 --- [pool-2-thread-1] o.d.s.client.common.
utils.RegisterUtils : tars client register success: {"appName":"127.0.0.1:21715",
"contextPath":"/tars","path":"/tars/hello","pathDesc":"","rpcType":"tars",
"serviceName":"ShenyuExampleServer.ShenyuExampleApp.HelloObj","methodName":"hello",
"ruleName":"/tars/hello","parameterTypes":"int,java.lang.String","rpcExt":{"\
"methodInfo":[{"methodName":"helloInt","\params":[{"},{}],\returnType":"\
"java.lang.Integer"},{"methodName":"hello","\params":[{"},{}],\returnType":"\
"java.lang.String"}]},"enabled":true}
```

### 5.6.3 Test

The shenyu-examples-tars project will automatically register interface methods annotated with `@ShenyuTarsClient` in the shenyu gateway after successful startup.

Open PluginList -> rpc proxy -> tars to see the list of plugin rule configurations:

SelectorList			RulesList			
Name	Open	Operation	RuleName	Open	UpdateTime	Operation
/tars	Open	Modify Delete	/tars/helloInt	Open	2021-02-09 13:15:27	Modify Delete
			/tars/hello	Open	2021-02-09 13:15:27	Modify Delete

Use PostMan to simulate HTTP to request your tars service:

POST http://localhost:9195/tars/hello

Params Send Save

Authorization Headers (1) Body Pre-request Script Tests Code

form-data x-www-form-urlencoded raw binary JSON (application/json)

```
1 {
2   "no": "123",
3   "name": "test"
4 }
5
```

Body Cookies Headers (2) Test Results Status: 200 OK Time: 30 ms

Pretty Raw Preview JSON

```
1 {
2   "code": 200,
3   "message": "Access to success!",
4   "data": "hello no=123, name=test, time=1612867753446"
5 }
```

## 5.7 Quick start with Motan

This document introduces how to quickly access the ShenYu gateway using Motan RPC. You can get the code example of this document by clicking [here](#).

### 5.7.1 Environment to prepare

Please refer to the deployment to select a way to start shenyu-admin. For example, start the ShenYu gateway management system through [local deployment](#).

After successful startup, you need to open the Sofa plugin on in the BasicConfig -> Plugin.

If you are a startup gateway by means of source, can be directly run the ShenYuBootstrapApplication of shenyu-bootstrap module.

Note: Before starting, make sure the gateway has added dependencies.

Start up zookeeper in local.

Import the gateway proxy plugin for Motan and add the following dependencies to the gateway's pom.xml file:

```
<!--shenyu motan plugin -->
<dependency>
    <groupId>org.apache.shenyu</groupId>
    <artifactId>shenyu-spring-boot-starter-plugin-motan</artifactId>
    <version>${project.version}</version>
</dependency>

<dependency>
    <groupId>com.weibo</groupId>
    <artifactId>motan-core</artifactId>
    <version>1.1.9</version>
</dependency>

<dependency>
    <groupId>com.weibo</groupId>
    <artifactId>motan-registry-zookeeper</artifactId>
    <version>1.1.9</version>
</dependency>

<dependency>
    <groupId>com.weibo</groupId>
    <artifactId>motan-transport-netty4</artifactId>
    <version>1.1.9</version>
</dependency>

<dependency>
    <groupId>com.weibo</groupId>
```

```
<artifactId>motan-springsupport</artifactId>
<version>1.1.9</version>
</dependency>
```

### 5.7.2 Run the shenyu-examples-motan project

Download [shenyu-examples-motan](#).

Run `main` method of `org.apache.shenyu.examples.motan.service.TestMotanApplication` to start this project.

log info as follows after starting:

```
2021-07-18 16:46:25.388 INFO 96 --- [main] o.s.b.w.embedded.tomcat.
TomcatWebServer : Tomcat started on port(s): 8081 (http) with context path ''
2021-07-18 16:46:25.393 INFO 96 --- [main] o.a.s.e.m.service.
TestMotanApplication : Started TestMotanApplication in 3.89 seconds (JVM running
for 4.514)
2021-07-18 16:46:25.396 INFO 96 --- [main] info
: [ZookeeperRegistry] Url (null) will set to available to Registry
[zookeeper://localhost:2181/default_rpc/com.weibo.api.motan.registry.
RegistryService/1.0/service]
2021-07-18 16:46:25.399 INFO 96 --- [Thread-6] o.a.s.c.c.s.
ShenyuClientShutdownHook : hook Thread-0 will sleep 3000ms when it start
2021-07-18 16:46:25.399 INFO 96 --- [Thread-6] o.a.s.c.c.s.
ShenyuClientShutdownHook : hook SpringContextShutdownHook will sleep 3000ms
when it start
2021-07-18 16:46:25.445 INFO 96 --- [ntLoopGroup-3-2] info
: NettyChannelHandler channelActive: remote=/192.168.1.8:49740 local=/
192.168.1.8:8002
2021-07-18 16:46:25.445 INFO 96 --- [ntLoopGroup-3-1] info
: NettyChannelHandler channelActive: remote=/192.168.1.8:49739 local=/
192.168.1.8:8002
2021-07-18 16:46:25.925 INFO 96 --- [or_consumer_-17] o.a.s.r.client.http.utils.
RegisterUtils : motan client register success: {"appName":"motan","contextPath":"/
motan","path":"/motan/hello","pathDesc":"","rpcType":"motan","serviceName":"org.
apache.shenyu.examples.motan.service.MotanDemoService","methodName":"hello",
"ruleName":"/motan/hello","parameterTypes":"java.lang.String","rpcExt":{"\
"methodInfo":[{"methodName":"hello","params":[{"left":"java.lang.String\
","\right":"name"}]}],"group":"motan-shenyu-rpc"},"enabled":true,"host":
"192.168.220.1","port":8081,"registerMetaData":false}
```

### 5.7.3 Test

The shenyu-examples-motan project will automatically register the @ShenyuMotanClient annotated interface methods with the gateway and add selectors and rules. If not, you can manually add them.

Open PluginList -> rpc proxy -> motan to see the list of plugin rule configurations:

Use PostMan to simulate HTTP to request your Motan service:

## 6.1 Integrate Http with shenyu gateway

### 6.1.1 Features

- This chapter is a guide about integrating Http service with ShenYu Gateway.
- ShenYu Gateway uses divide plugin handling http request, pls enable it in shenyu-admin background.
- Please start shenyu-admin successfully before integrating and [Environment Setup](#) is Ok.

### 6.1.2 Configure ShenYu Gateway as Http proxy.

- Add these dependencies in gateway' s pom.xml:

```
<!--if you use http proxy start this-->
<dependency>
  <groupId>org.apache.shenyu</groupId>
  <artifactId>shenyu-spring-boot-starter-plugin-divide</artifactId>
  <version>${last.version}</version>
</dependency>

<dependency>
  <groupId>org.apache.shenyu</groupId>
  <artifactId>shenyu-spring-boot-starter-plugin-httpclient</artifactId>
  <version>${last.version}</version>
</dependency>
```

- pls restart the gateway.

### 6.1.3 Http request via ShenYu Gateway (springMVC user)

- pls make sure divide plugin has enabled in shenyu-admin background.

#### add Shenyu-Client methods (available for SpringMVC, SpringBoot user)

- SpringBoot User
  - Add these dependencies in your local maven repository pom.xml:

```
<dependency>
  <groupId>org.apache.shenyu</groupId>
  <artifactId>shenyu-spring-boot-starter-client-springmvc</artifactId>
  <version>${last.version}</version>
</dependency>
```

- Backend server register center config, please look: [register center access](#).

- SpringMVC User
  - Add these dependencies in your local maven repository pom.xml:

```
<dependency>
  <groupId>org.apache.shenyu</groupId>
  <artifactId>shenyu-client-springmvc</artifactId>
  <version>${last.version}</version>
</dependency>
```

- Inject these properties into your Spring beans XML file:

```
<bean id="springMvcClientBeanPostProcessor" class="org.apache.shenyu.
client.springmvc.init.SpringMvcClientBeanPostProcessor">
  <constructor-arg ref="shenyuRegisterCenterConfig"/>
</bean>

<bean id="shenyuRegisterCenterConfig" class="org.apache.shenyu.register.
common.config.ShenyuRegisterCenterConfig">
  <property name="registerType" value="http"/>
  <property name="serverList" value="http://localhost:9095"/>
  <property name="props">
    <map>
      <entry key="contextPath" value="/your contextPath"/>
      <entry key="appName" value="your server name"/>
      <entry key="port" value="your server port"/>
      <entry key="isFull" value="false"/>
    </map>
  </property>
</bean>
```

- Add this annotation @ShenyuSpringMvcClient in your controller interface.

- You can apply the annotation to class-level in a controller. the name of the path variable is prefix and ' /\*\*' will apply proxy for entire interfaces.
- Example1: both /test/payment and /test/findByUserId will be handled by proxy service.

```
@RestController
@RequestMapping("/test")
@ShenyuSpringMvcClient(path = "/test/**")
public class HttpTestController {

    @PostMapping("/payment")
    public UserDTO post(@RequestBody final UserDTO userDTO) {
        return userDTO;
    }

    @GetMapping("/findByUserId")
    public UserDTO findByUserId(@RequestParam("userId") final String userId) {
        UserDTO userDTO = new UserDTO();
        userDTO.setUserId(userId);
        userDTO.setUserName("hello world");
        return userDTO;
    }
}
```

- Example2: /order/save will be handled by proxy service, but /order/findById won't.

```
@RestController
@RequestMapping("/order")
@ShenyuSpringMvcClient(path = "/order")
public class OrderController {

    @PostMapping("/save")
    @ShenyuSpringMvcClient(path = "/save")
    public OrderDTO save(@RequestBody final OrderDTO orderDTO) {
        orderDTO.setName("hello world save order");
        return orderDTO;
    }

    @GetMapping("/findById")
    public OrderDTO findById(@RequestParam("id") final String id) {
        OrderDTO orderDTO = new OrderDTO();
        orderDTO.setId(id);
        orderDTO.setName("hello world findById");
        return orderDTO;
    }
}
```

- Kick off your project with your interface, which is integrated with ShenYu Gateway.



### 6.1.4 Configure ShenYu Gateway as an Http proxy (other framework)

- first of all, enable the divide plugin in shenyu-admin, then add selector and rule which will filter the request.
- if you don't know how to configure, pls refer to [selector guide](#).
- you can also develop your customized http-client, refer to [multi-language Http client development](#).

### 6.1.5 User request

- Send the request as before, only two points need to notice.
- Firstly, the domain name that requested before in your service, now need to replace with gateway's domain name.
- Secondly, ShenYu Gateway needs a route prefix which comes from contextPath, it configured during the integration with gateway, you can change it freely in divide plugin of shenyu-admin, if you are familiar with it.
  - for example, if you have an order service and it has a interface, the request url: <http://localhost:8080/test/save>
  - Now need to change to: <http://localhost:9195/order/test/save>
  - We can see localhost:9195 is your gateway's ip port, default port number is 9195, /order is your contextPath which you configured with gateway.
  - other parameters doesn't change in request method.
  - Any questions, pls join the group and we can talk about it.
- Then you can visit, very easy and simple.

## 6.2 Integrate dubbo with ShenYu Gateway

### 6.2.1 Features

- This chapter is a guide about integrating dubbo service with ShenYu Gateway.
- Support Alibaba Dubbo(< 2.7.x) and Apache Dubbo (>=2.7.x).
- Please start shenyu-admin successfully before integrating, and [Environment Setup](#) is Ok.

## 6.2.2 Configure shenyu gateway as Dubbo proxy

- Add these dependencies in gateway's pom.xml.
- Alibaba dubbo user, configure the dubbo version and registry center with yours.

```

<!--shenyu alibaba dubbo plugin start-->
<dependency>
  <groupId>org.apache.shenyu</groupId>
  <artifactId>shenyu-spring-boot-starter-plugin-alibaba-dubbo</artifactId>
  <version>${last.version}</version>
</dependency>
<!-- shenyu alibaba dubbo plugin end-->
<dependency>
  <groupId>com.alibaba</groupId>
  <artifactId>dubbo</artifactId>
  <version>2.6.5</version>
</dependency>
<dependency>
  <groupId>org.apache.curator</groupId>
  <artifactId>curator-client</artifactId>
  <version>4.0.1</version>
</dependency>
<dependency>
  <groupId>org.apache.curator</groupId>
  <artifactId>curator-framework</artifactId>
  <version>4.0.1</version>
</dependency>
<dependency>
  <groupId>org.apache.curator</groupId>
  <artifactId>curator-recipes</artifactId>
  <version>4.0.1</version>
</dependency>

```

- Apache dubbo user, configure the dubbo version and registry center with yours.

```

<!--shenyu apache dubbo plugin start-->
<dependency>
  <groupId>org.apache.shenyu</groupId>
  <artifactId>shenyu-spring-boot-starter-plugin-apache-dubbo</artifactId>
  <version>${last.version}</version>
</dependency>
<!--shenyu apache dubbo plugin end-->

<dependency>
  <groupId>org.apache.dubbo</groupId>
  <artifactId>dubbo</artifactId>
  <version>2.7.5</version>
</dependency>

```

```

<!-- Dubbo Nacos registry dependency start -->
<dependency>
  <groupId>org.apache.dubbo</groupId>
  <artifactId>dubbo-registry-nacos</artifactId>
  <version>2.7.5</version>
</dependency>
<dependency>
  <groupId>com.alibaba.nacos</groupId>
  <artifactId>nacos-client</artifactId>
  <version>1.1.4</version>
</dependency>
<!-- Dubbo Nacos registry dependency end-->

<!-- Dubbo zookeeper registry dependency start-->
<dependency>
  <groupId>org.apache.curator</groupId>
  <artifactId>curator-client</artifactId>
  <version>4.0.1</version>
</dependency>
<dependency>
  <groupId>org.apache.curator</groupId>
  <artifactId>curator-framework</artifactId>
  <version>4.0.1</version>
</dependency>
<dependency>
  <groupId>org.apache.curator</groupId>
  <artifactId>curator-recipes</artifactId>
  <version>4.0.1</version>
</dependency>
<!-- Dubbo zookeeper registry dependency end -->

```

- restart gateway service.

Dubbo integration with gateway, pls refer to : [shenyu-examples-dubbo](#)

- Alibaba Dubbo User

- SpringBoot

\* Add these dependencies:

```

<dependency>
  <groupId>org.apache.shenyu</groupId>
  <artifactId>shenyu-spring-boot-starter-client-alibaba-dubbo</
artifactId>
  <version>${last.version}</version>
</dependency>

```

\* backend server register center config, please look: [register center access](#).

- Spring

\* Add these dependencies:

```
<dependency>
  <groupId>org.apache.shenyu</groupId>
  <artifactId>shenyu-client-alibaba-dubbo</artifactId>
  <version>${last.version}</version>
</dependency>
```

\* Inject these properties into your Spring beans XML file:

```
<bean id="alibabaDubboServiceBeanPostProcessor" class="org.apache.shenyu.
client.alibaba.dubbo.AlibabaDubboServiceBeanPostProcessor">
  <constructor-arg ref="shenyuRegisterCenterConfig"/>
</bean>

<bean id="shenyuRegisterCenterConfig" class="org.apache.shenyu.register.
common.config.ShenyuRegisterCenterConfig">
  <property name="registerType" value="http"/>
  <property name="serverList" value="http://localhost:9095"/>
  <property name="props">
    <map>
      <entry key="contextPath" value="/your contextPath"/>
      <entry key="appName" value="your name"/>
      <entry key="isFull" value="false"/>
    </map>
  </property>
</bean>
```

#### • Apache Dubbo User

##### – SpringBoot

\* Add these dependencies:

```
<dependency>
  <groupId>org.apache.shenyu</groupId>
  <artifactId>shenyu-spring-boot-starter-client-apache-dubbo</
artifactId>
  <version>${last.version}</version>
</dependency>
```

\* backend server register center config, please look:[register center\\_access](#):

##### – Spring

\* Add these dependencies:

```
<dependency>
  <groupId>org.apache.shenyu</groupId>
  <artifactId>shenyu-client-apache-dubbo</artifactId>
  <version>${last.version}</version>
</dependency>
```

\* Inject these properties into your Spring beans XML file:

```
<bean id="apacheDubboServiceBeanPostProcessor" class="org.apache.shenyu.
client.apache.dubbo.ApacheDubboServiceBeanPostProcessor">
    <constructor-arg ref="shenyuRegisterCenterConfig"/>
</bean>

<bean id="shenyuRegisterCenterConfig" class="org.apache.shenyu.register.
common.config.ShenyuRegisterCenterConfig">
    <property name="registerType" value="http"/>
    <property name="serverList" value="http://localhost:9095"/>
    <property name="props">
        <map>
            <entry key="contextPath" value="/your contextPath"/>
            <entry key="appName" value="your name"/>
            <entry key="isFull" value="false"/>
        </map>
    </property>
</bean>
```

### 6.2.3 Dubbo configuration

- Enable dubbo option in shenyu-admin.
- Configure your registry address in dubbo.

```
{"register":"zookeeper://localhost:2181"} or {"register":"nacos://localhost:8848"
"}
```

#### Configure the interface with gateway

- you can add the annotation `@ShenyuDubboClient` to your dubbo service implementation class, so that the interface method will be configured with gateway.
- start your provider and get the log `dubbo client register success`, then your dubbo interface has been added with ShenYu Gateway successfully. Pls refer to shenyu-test-dubbo project.

**Dubbo user request and parameter explanation.**

- communicate with dubbo service through Http transport protocol.
- ShenYu Gateway need a route prefix which configured when accessing the project.

```
# for example: you have an order service and it has a interface, his registry
address: /order/test/save

# now we can communicate with gateway through POST request http://localhost:9195/
order/test/save

# localhost:9195 is gateway's ip port, default port is 9195 , /order is the
contextPath you set through gateway.
```

- parameter deliver:
  - communicate with gateway through body or json of http post request.
  - more parameter types, pls refer to the interface definition in [shenyu-examples-dubbo](#) and parameter passing method.
- Single java bean parameter type (default).
- Multi-parameter type support, add this config value in gateway' s yaml file:

```
shenyu:
  dubbo:
    parameter: multi
```

- Support for customized multi-parameter type
- Create a new implementation class A in your gateway project of `org.apache.shenyu.web.dubbo.DubboParamResolveService`.

```
public interface DubboParamResolveService {

    /**
     * Build parameter pair.
     * this is Resolve http body to get dubbo param.
     *
     * @param body          the body
     * @param parameterTypes the parameter types
     * @return the pair
     */
    Pair<String[], Object[]> buildParameter(String body, String parameterTypes);
}
```

- body is the json string in http request.
- parameterTypes: the list of method parameter types that are matched, split with ,.

- in Pair, left is parameter type, right is parameter value, it's the standard of dubbo generalization calls.
- Inject your class into Spring bean, cover the default implementation.

```
@Bean
public DubboParamResolveService A() {
    return new A();
}
```

### 6.2.4 Service governance

- Tag route
  - Add Dubbo\_Tag\_Route when send request, the current request will be routed to the provider of the specified tag, which is only valid for the current request.
- Explicit Target
  - Set the url property in the annotation @ShenyuDubboClient.
  - Update the configuration in Admin.
  - It's valid for all request.
- Param valid and ShenyuException
  - Set validation="shenyuValidation".
  - When ShenyuException is thrown in the interface, exception information will be returned. It should be noted that ShenyuException is thrown explicitly.

```
@Service(validation = "shenyuValidation")
public class TestServiceImpl implements TestService {

    @Override
    @ShenyuDubboClient(path = "/test", desc = "test method")
    public String test(@Valid HelloServiceRequest name) throws
    ShenyuException {
        if (true){
            throw new ShenyuException("Param binding error.");
        }
        return "Hello " + name.getName();
    }
}
```

- Request param

```
public class HelloServiceRequest implements Serializable {

    private static final long serialVersionUID = -5968745817846710197L;
```

```
@NotEmpty(message = "name cannot be empty")
private String name;

@NotNull(message = "age cannot be null")
private Integer age;

public String getName() {
    return name;
}

public void setName(String name) {
    this.name = name;
}

public Integer getAge() {
    return age;
}

public void setAge(Integer age) {
    this.age = age;
}
}
```

– Send request

```
{
  "name": ""
}
```

– Response

```
{
  "code": 500,
  "message": "Internal Server Error",
  "data": "name cannot be empty,age cannot be null"
}
```

– Error message

```
{
  "code": 500,
  "message": "Internal Server Error",
  "data": "Param binding error."
}
```



Let's break down this process: http → gateway → dubbo provider

- It basically switches from HTTP request to Dubbo protocol, then invoke Dubbo service and return to the result.
- Two things need to notice after integration with gateway, one is the added annotation `@ShenyuDubboClient`, another is a path used to specify the request path.
- And you added a config value of `contextPath`.
- If you still remember, then we can start.
- If you have a function like this, the config value in `contextPath` is `/dubbo`

```
@Override
@ShenyuDubboClient(path = "/insert", desc = "insert data")
public DubboTest insert(final DubboTest dubboTest) {
    return dubboTest;
}
```

So our request path is: `http://localhost:9195/dubbo/insert`, `localhost:9195` is the gateway's domain name, if you changed before, so does with yours here..

How about the request parameter? `DubboTest` is a java bean object, has 2 parameters, `id` and `name`, so we can transfer the value's json type through request body.

```
{"id": "1234", "name": "XIAO5y"}
```

- If your interface has no parameter, then the value is:

```
{}
```

- If your interface has multi-parameter, pls refer to the guide above.

## 6.3 SpringCloud Proxy

### 6.3.1 Features

- This article is a guide about how to integrate Spring Cloud with shenyu gateway quickly.
- Please enable `springCloud` plugin in shenyu-admin background.
- Please start shenyu-admin successfully before integrating and [Environment Setup](#) is Ok.

### 6.3.2 Configure shenyu gateway as Spring Cloud proxy

- add these dependencies in gateway' s pom.xml:

```
<!--shenyu springCloud plugin start-->
<dependency>
    <groupId>org.apache.shenyu</groupId>
    <artifactId>shenyu-spring-boot-starter-plugin-springcloud</artifactId>
    <version>${last.version}</version>
</dependency>
<!--shenyu springCloud plugin end-->

<dependency>
    <groupId>org.springframework.cloud</groupId>
    <artifactId>spring-cloud-commons</artifactId>
    <version>2.2.0.RELEASE</version>
</dependency>
<dependency>
    <groupId>org.springframework.cloud</groupId>
    <artifactId>spring-cloud-starter-netflix-ribbon</artifactId>
    <version>2.2.0.RELEASE</version>
</dependency>
```

- If you use eureka as SpringCloud registry center.
  - add these dependencies:

```
<dependency>
    <groupId>org.springframework.cloud</groupId>
    <artifactId>spring-cloud-starter-netflix-eureka-client</artifactId>
    <version>2.2.0.RELEASE</version>
</dependency>
```

- add these config values in gateway' s yaml file:

```
eureka:
  client:
    serviceUrl:
      defaultZone: http://localhost:8761/eureka/ #your eureka address
  instance:
    prefer-ip-address: true
```

- if you use nacos as Spring Cloud registry center.
  - add these dependencies:

```
<dependency>
    <groupId>com.alibaba.cloud</groupId>
    <artifactId>spring-cloud-starter-alibaba-nacos-discovery</artifactId>
    <version>2.1.0.RELEASE</version>
```

```
</dependency>
```

- add these config values in gateway' s yaml file:

```
spring:
  cloud:
    nacos:
      discovery:
        server-addr: 127.0.0.1:8848 # your nacos address
```

- restart your gateway service.

### 6.3.3 SpringCloud integration with gateway

- add these dependencies in your project:

```
<dependency>
  <groupId>org.apache.shenyu</groupId>
  <artifactId>shenyu-spring-boot-starter-client-springcloud</artifactId>
  <version>${last.version}</version>
</dependency>
```

- backend server register center config, please look:[register center access](#).
- add the annotation @ShenyuSpringCloudClient in your controller interface.
- you can apply the annotation to class-level in a controller.the name of the path variable is prefix and ' /\*\*' will apply proxy for entire interfaces.
  - example (1):both /test/payment and /test/findById will be handled by gateway.

```
@RestController
@RequestMapping("/test")
@ShenyuSpringCloudClient(path = "/test/**")
public class HttpTestController {

    @PostMapping("/payment")
    public UserDTO post(@RequestBody final UserDTO userDTO) {
        return userDTO;
    }

    @GetMapping("/findById")
    public UserDTO findById(@RequestParam("userId") final String userId) {
        UserDTO userDTO = new UserDTO();
        userDTO.setUserId(userId);
        userDTO.setUserName("hello world");
        return userDTO;
    }
}
```

- example (2): `/order/save` will be handled by gateway, and `/order/findById` won't.

```
@RestController
@RequestMapping("/order")
@ShenyuSpringCloudClient(path = "/order")
public class OrderController {

    @PostMapping("/save")
    @ShenyuSpringMvcClient(path = "/save")
    public OrderDTO save(@RequestBody final OrderDTO orderDTO) {
        orderDTO.setName("hello world save order");
        return orderDTO;
    }

    @GetMapping("/findById")
    public OrderDTO findById(@RequestParam("id") final String id) {
        OrderDTO orderDTO = new OrderDTO();
        orderDTO.setId(id);
        orderDTO.setName("hello world findById");
        return orderDTO;
    }
}
```

- start your service, get the log dubbo client register success, then your interface has been added with ShenYu gateway successfully.

### 6.3.4 Plugin Setting

- enable Spring Cloud plugin in shenyu-admin.

### 6.3.5 User Request

- Send the request as before, only two points need to notice.
- firstly, the domain name that requested before in your service, now need to replace with gateway's domain name.
- secondly, ShenYu gateway needs a route prefix which comes from `contextPath`, it configured during the integration with gateway, you can change it freely in divide plugin of shenyu-admin, if your familiar with it.

```
# for example, you have an order service and it has a interface, the request url:
http://localhost:8080/test/save
```

```
# now need to change to: http://localhost:9195/order/test/save
```

```
# we can see localhost:9195 is the gateway's ip port, default port number is 9195 ,
/order is the contextPath in your config yaml file.
```

```
# the request of other parameters don't change.

# Any questions, pls join the group and we can talk about it.
```

- Then you can visit, very easy and simple.

## 6.4 Sofa RPC Proxy

### 6.4.1 Description

- This article is about sofa users using sofa plugin support, and the tutorial of connecting your own sofa service to the shenyu gateway.
- Before connecting, please start shenyu-admin correctly and [Setup Environment](#) Ok.

### 6.4.2 Introduce the plugin that the gateway supports for sofa

- Add the following dependencies in the gateway's pom.xml file:
- Replace the sofa version with yours, and replace the jar package in the registry with yours, The following is a reference.

```
<dependency>
  <groupId>com.alipay.sofa</groupId>
  <artifactId>sofa-rpc-all</artifactId>
  <version>5.7.6</version>
</dependency>
<dependency>
  <groupId>org.apache.curator</groupId>
  <artifactId>curator-client</artifactId>
  <version>4.0.1</version>
</dependency>
<dependency>
  <groupId>org.apache.curator</groupId>
  <artifactId>curator-framework</artifactId>
  <version>4.0.1</version>
</dependency>
<dependency>
  <groupId>org.apache.curator</groupId>
  <artifactId>curator-recipes</artifactId>
  <version>4.0.1</version>
</dependency>
<dependency>
  <groupId>org.apache.shenyu</groupId>
  <artifactId>shenyu-spring-boot-starter-plugin-sofa</artifactId>
```

```
<version>${last.version}</version>
</dependency>
```

- Restart the gateway service.

### 6.4.3 sofa service access gateway, you can refer to: shenyu-examples-sofa

- Springboot
  - Introduce the following dependencies :

```
<dependency>
  <groupId>org.apache.shenyu</groupId>
  <artifactId>shenyu-spring-boot-starter-client-sofa</artifactId>
  <version>${shenyu.version}</version>
</dependency>
```

- backend server register center config, please look:[register center access](#).

- Spring
  - Introduce the following dependencies:

```
<dependency>
  <groupId>org.apache.shenyu</groupId>
  <artifactId>shenyu-client-sofa</artifactId>
  <version>${project.version}</version>
</dependency>
```

- Add the following in the xml file of your bean definition:

```
<bean id="sofaServiceBeanPostProcessor" class="org.apache.shenyu.client.
sofa.SofaServiceBeanPostProcessor">
  <constructor-arg ref="shenyuRegisterCenterConfig"/>
</bean>

<bean id="shenyuRegisterCenterConfig" class="org.apache.shenyu.register.
common.config.ShenyuRegisterCenterConfig">
  <property name="registerType" value="http"/>
  <property name="serverList" value="http://localhost:9095"/>
  <property name="props">
    <map>
      <entry key="contextPath" value="/your contextPath"/>
      <entry key="appName" value="your name"/>
      <entry key="isFull" value="false"/>
    </map>
  </property>
</bean>
```

### 6.4.4 Plugin Settings

- First in the shenyu-admin plugin management, set the sofa plugin to open.
- Secondly, configure your registered address in the sofa plugin, or the address of other registry.

```
{"protocol":"zookeeper","register":"127.0.0.1:2181"}
```

### 6.4.5 Interface registered to the gateway

- For your sofa service implementation class, add @ShenyuSofaClient annotation to the method, Indicates that the interface method is registered to the gateway.
- Start your provider and output the log sofa client register success. You're done. Your sofa interface has been published to the shenyu gateway. If you still don't understand, you can refer to the shenyu-test-sofa project.

### 6.4.6 sofa user request and parameter description

- To put it bluntly, it is to request your sofa service through http
- ShenYu gateway needs to have a routing prefix, this routing prefix is for you to access the project for configuration contextPath

```
# For example, if you have an order service, it has an interface and its
registration path /order/test/save

# Now it's to request the gateway via post: http://localhost:9195/order/test/save

# Where localhost:9195 is the IP port of the gateway, default port is 9195 , /order
is the contextPath of your sofa access gateway configuration
```

- Parameter passing:
  - Access the gateway through http post, and pass through body and json.
  - For more parameter type transfer, please refer to the interface definition in [shenyu-examples-sofa](#) and the parameter transfer method.
- Single java bean parameter type (default)
- Customize multi-parameter support:
  - In the gateway project you built, add a new class A, implements org.apache.shenyu.plugin.api.sofa.SofaParamResolveService.

```
public interface SofaParamResolveService {

    /**
     * Build parameter pair.
```

```
    * this is Resolve http body to get sofa param.
    *
    * @param body          the body
    * @param parameterTypes the parameter types
    * @return the pair
    */
    Pair<String[], Object[]> buildParameter(String body, String parameterTypes);
}
```

- body is the json string passed by body in http.
- parameterTypes: list of matched method parameter types, If there are multiple, use , to separate.
- In Pair, left is the parameter type, and right is the parameter value. This is the standard for sofa generalization calls.
- Register your class as a String bean and override the default implementation.

```
@Bean
public SofaParamResolveService A() {
    return new A();
}
```



## 7.1 2.3.0

### 7.1.1 soul-admin

- Add ‘open’ field to allow app path authentication or not in sign plugin.
- Optimize divide plugin to use common plugin template in soul-dashboard.
- Add default values and rule checks in plugin handler.
- Add resource management to allow user to add plugin, adjust menu and button resource and so on in soul-dashboard and soul-admin.
- Add menu and data permission in soul-admin.
- Add H2 stroe for soul-admin ##### soul-bootstrap
- Add tars plugin
- Add sentinel plugin –Add sofa plugin
- Add Resilience4j plugin for soul-plugin.
- Add Context path mapping plugin for soul-plugin.
- Add Grpc plugin supports grpc protocol.
- Support form submission for dubbo plugin.
- feat(plugin handle):
- Add dist package module
- Add test cases for soul-admin
- Add register center for consul
- Add register center for etcd
- Add register center for nacos
- Add register center for zookeeper

## 7.2 2.2.0

- Complete plug-in architecture design, plug-in hot-swappable.
- Fully supports all versions of dubbo, alibaba-dubbo, apache-dubbo.
- Support dubbo generalization call, multi-parameter, complex parameter interface.
- Enhance the monitoring plug-in, remove influxdb support, increase memory, CPU, QPS, TPS, response delay and other indicators, and support access to Prometheus.
- The springCloud plug-in supports two registration centers, eureka and nacos.
- Waf plug-in enhancements, black and white albums, and mixed modes.
- Removed the Hystrix fuse function, independent as a plug-in support.
- Modify the data synchronization method bug in Zookeeper, and add the nacos synchronization method.
- Diversified customer support, providing traditional and springboot access to spring.
- Optimize the soul-background control interface.
- Load balancing algorithm bug repair.
- Fix bugs when uploading large files.

## 8.1 Latest Releases

Apache ShenYu is released as source code tarballs with corresponding binary tarballs for convenience.

Apache ShenYu - Version: 2.3.0 ( Release Date: Apr 2, 2020 )

- Source Codes: [zip](#) [tar](#)
- ShenYu-admin Binary Distribution: [tar](#)
- ShenYu-bootstrap Binary Distribution: [tar](#)

Apache ShenYu Dashboard - Version: 2.3.0 ( Release Date: Apr 2, 2020 )

- Source Codes: [zip](#) [tar](#)
- ShenYu-dashboard Binary Distribution: [tar](#)

## 8.2 PDF

Apache ShenYu provides a packaged and downloaded PDF of the blog for users and developers to use.

- [English](#)