REST/RESTful

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REST/RESTful

- Representational State Transfer，簡稱REST，它是一種網路架構風格，並不是一種標準。
- 而 RESTful 可以這樣子想像： 美麗 (Beauty) 的事物可以稱為 Beautiful; 設計為 REST 的系統就可以稱為 RESTful

Web API 風格

- 傳統
  ```
  取得所有使用者 GET  /getAllUsers
  取得單筆使用者 GET  /getUser/1
  新增使用者資料 POST /createUser
  更新使用者資料 POST /updateUser/1
  刪除使用者資料 POST /deleteUser/1
  ```
- REST
  ```
  取得所有使用者 GET    /rest/users
  取得單筆使用者 GET    /rest/user/1
  新增使用者資料 POST   /rest/user
  更新使用者資料 PUT    /rest/user/1
  刪除使用者資料 DELETE /rest/user/1
  ```

JAX-RS

- Java API for RESTful Web Services (JAX-RS), is a set if APIs to developer REST service.
- JAX-RS is part of the Java EE6, and make developers to develop REST web application easily.
  - both Jersey and RESTEasy, popular JAX-RS implementation.
    - https://www.mkyong.com/tutorials/jax-rs-tutorials/

Jersey

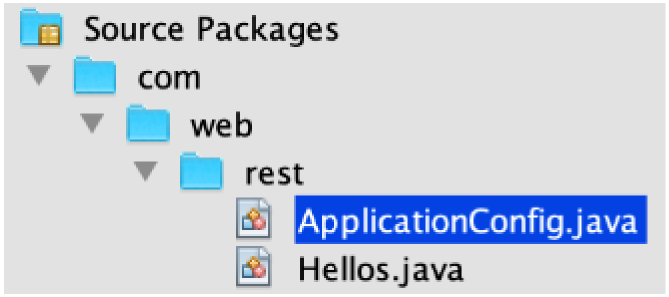
- Jersey
  - 以前叫 Glassfish Jersey
  - 現在叫 Eclipse Jersey
    - 他是一個 REST 框架，它提供JAX-RS（JSR-370）實現以及更多其他功能
      - 核心服務器：用於基於註釋構建RESTful服務（jersey-core，jersey-server，jsr311-api）
      - 核心客戶端：幫助您與REST服務進行通信（jersey-client）
      - JAXB（Java映射XML）支持、JSON支持
      - Spring、Guice（輕量級 Spring） 的整合模組

Jersey 資源部署

- pom.xml

```
<dependency>
		<groupId>org.glassfish.jersey.containers</groupId>
		<artifactId>jersey-container-servlet</artifactId>
		<version>2.6</version>
</dependency>
```

Jersey 路徑配置

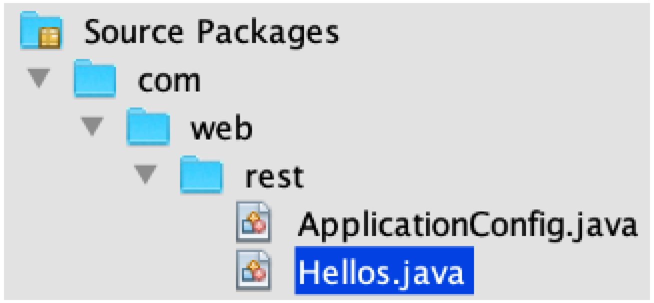

Source Packages
com
web
rest
ApplicationConfig.java
Hellos.java

```
package com.web.rest;

import javax.ws.rs.ApplicationPath;
import javax.ws.rs.core.Application;

@ApplicationPath("rest")
public class JerseyApplication extends Application {

    public JerseyApplication() {
    }

}
```

REST 風格設計

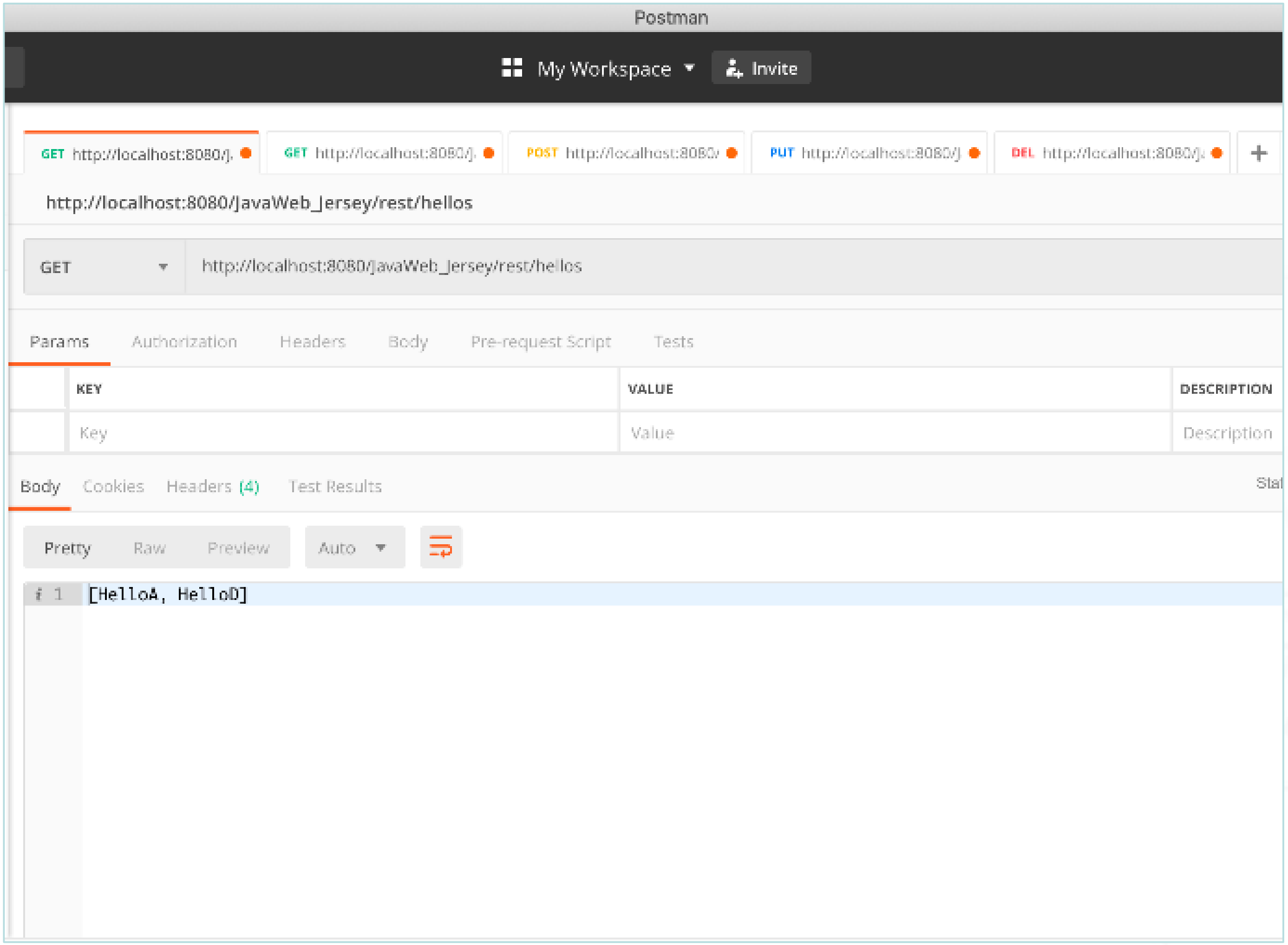
- GET → /rest/hellos
- GET → /rest/hellos/1
- POST → /rest/hellos?value=HelloC
- PUT → /hellos/2?value=HelloD
- DELETE → /rest/hellos/2

```
@Path("/hellos")
public class Hellos {
    private static List<String> hellos = new ArrayList<>(Arrays.asList("HelloA", "HelloB"));

    @GET
    public String list() {
        return hellos.toString();
    }

    @GET
    @Path("/{id}")
    public String show(@PathParam("id") int id) {
        return hellos.get(id);
    }

    @POST
    public String add(@QueryParam( “value” ) String value) { // @FormParam 表單資料
        hellos.add(value);
        return "add ok";
    }

    @PUT
    @Path("/{id}")
    public String update(@PathParam("id") int id, @QueryParam("value") String value) {
        hellos.set(id, value);
        return "update ok";
    }

    @DELETE
    @Path("/{id}")
    public String delete(@PathParam("id") int id) {
        hellos.remove(id);
        return "delete ok";
    }
}
```



```
Source Packages
▼ com
    ▼ web
        ▼ rest
            ApplicationConfig.java
            Hellos.java
```

使用 Postman 測試


Postman
My Workspace
Invite
GET http://localhost:8080/j.
GET http://localhost:8080/j.
POST http://localhost:8080/
PUT http://localhost:8080/J
DEL http://localhost:8080/j.
Params
Authorization
Headers
Body
Pre-request Script
Tests
Body
Cookies
Headers (4)
Test Results
Stat
Pretty
Raw
Preview
Auto

http://localhost:8080/JavaWeb_Jersey/rest/hellos

GET http://localhost:8080/JavaWeb_Jersey/rest/hellos

KEY	VALUE	DESCRIPTION
Key	Value	Description

```
[HelloA, HelloD]
```

JQuery

```
<script src="https://ajax.aspnetcdn.com/ajax/jQuery/jquery-3.4.1.min.js"></script>
<script>
    function update(id) {
        var url = './rest/hellos/' + id;
        var data = $('form').serialize();
        $.ajax({
            url: url,
            type: 'PUT',
            data: data,
            success: function (result) {
                console.log(result)
            }
        });
    }
</script>
```

```
<form>
    <input type="text" name="value">
    <input type="button" onclick="update(0)" value="update">
</form>
```

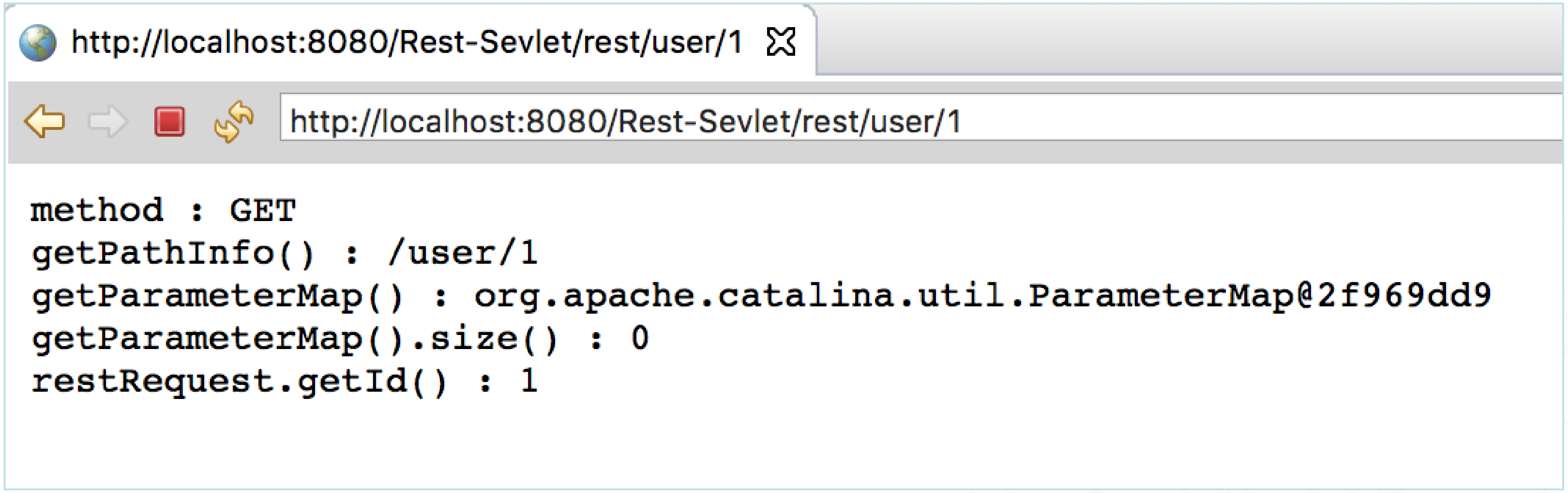
補充 ： 簡易 restful 實作

```java
public class RestRequest {
    private Pattern regExAllPattern = Pattern.compile("/user");
    private Pattern regExIdPattern = Pattern.compile("/user/([0-9]*)");

    private int id;

    public RestRequest(String pathInfo) throws ServletException {
        // regex parse pathInfo
        Matcher matcher;
        // Check for ID case first, since the All pattern would also match
        matcher = regExIdPattern.matcher(pathInfo);
        if (matcher.find()) {
            id = Integer.parseInt(matcher.group(1));
            return;
        }

        matcher = regExAllPattern.matcher(pathInfo);
        if (matcher.find())
            return;

        throw new ServletException("Invalid URI");
    }

    public int getId() {
        return id;
    }

    public void setId(int id) {
        this.id = id;
    }
}
```

```
@WebServlet("/rest/*")
public class TestRestServlet extends HttpServlet {
   protected void doHandler(HttpServletRequest request, HttpServletResponse response)
                        throws ServletException, IOException {

        PrintWriter out = response.getWriter();
        out.println("method : " + request.getMethod());
        out.println("getPathInfo() : " + request.getPathInfo());
        out.println("getParameterMap() : " + request.getParameterMap());
        out.println("getParameterMap().size() : " + request.getParameterMap().size());
        try {
                RestRequest restRequest = new RestRequest(request.getPathInfo());
                out.println("restRequest.getId() : " + restRequest.getId());
        } catch (ServletException e) {
                e.printStackTrace();
                out.println(e.toString());
        }
                out.close();
        }
        protected void doGet(HttpServletRequest request, HttpServletResponse response)
                                        throws ServletException, IOException {
                doHandler(request, response);
        }
        //...續作 doPost()、doPut() 與 doDelete()
}
```

Lab

- /rest/user/1


http://localhost:8080/Rest-Sevlet/rest/user/1
http://localhost:8080/Rest-Sevlet/rest/user/1

```
method : GET
getPathInfo() : /user/1
getParameterMap() : org.apache.catalina.util.ParameterMap@2f969dd9
getParameterMap().size() : 0
restRequest.getId() : 1
```

Ajax

Path

```
function getAllUsers() {
    var action = "./rest/user";
    var xhttp = new XMLHttpRequest();
    xhttp.onload = callback;
    xhttp.open("get", action);
    xhttp.send();
}

function callback() {
    var content = this.responseText;
    console.log(content);
    document.getElementById('result').innerText = content;
}
```

Method

JUnit
JS
ORACLE FUSION MIDDLEWARE WEBLOGIC SERVER
JBoss by Red Hat
HIBERNATE
ORACLE SPATIAL
PostGIS
SoapUI by SMARTBEAR
spring by Pivotal
HTML
GeoServer
CSS
OpenLayers
eclipse link
SUBVERSION
Java™
jQuery write less, do more.
PRIME FACES
mongoDB
Microsoft SQL Server
maven
NetBeans
git
MySQL
ORACLE DATABASE
ANGULARJS by Google
LIFERAY
eclipse
PostgreSQL
sonarqube
Visual Studio