DZone

Step-By-Step Spring Boot RESTful Web Service Complete Example

by Abhijit Pritam Dutta · Sep. 13, 18 · Integration Zone · Tutorial

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After the huge response and viewership for my earlier article, I have decided to write a new article with all the REST calls example respectively **GET, POST, PUT, and DELETE**.

Let's start this project step by step.

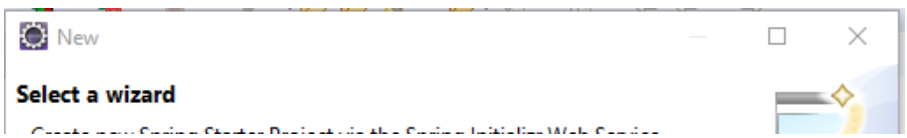
Prerequisites for this project:

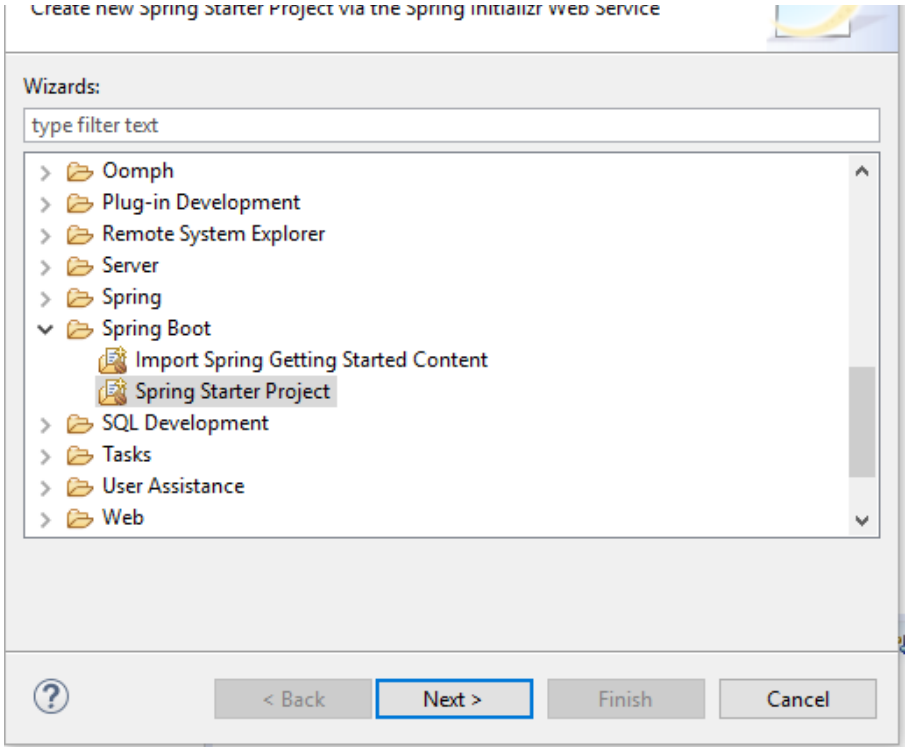
- If you have Eclipse, download the STS plug-in from here.
- If you don't have Eclipse, download STS from here.
- Download the latest JDK from here.
- Also for testing please download and install SOAPUI tool from here.

The first example I am going to explain is about **HTTP GET** request, the second example will be about **HTTP POST** request, the third example about **HTTP PUT** request, and the fourth example is for **HTTP DELETE** request. In all of these examples, I am going to use JSON Representation.

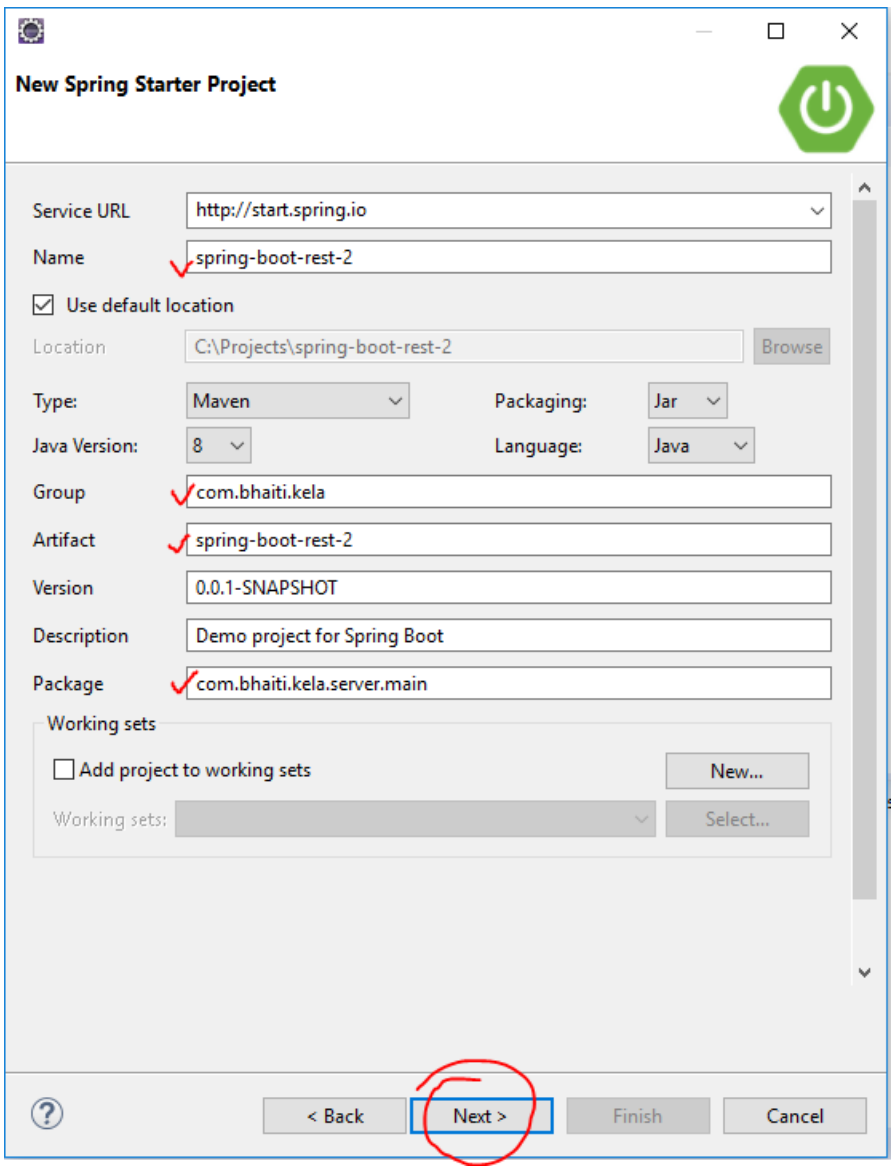
You can download this project from here.

1. First, create a folder in your C drive: **C:\Projects**
2. Open eclipse and select work space as: **C:\Projects**
3. From the File menu, select "New" and then "other," and from wizard, expand "Spring Boot" and select "Spring Starter Project" (**File->New->other->wizard->Spring Starter Project**).

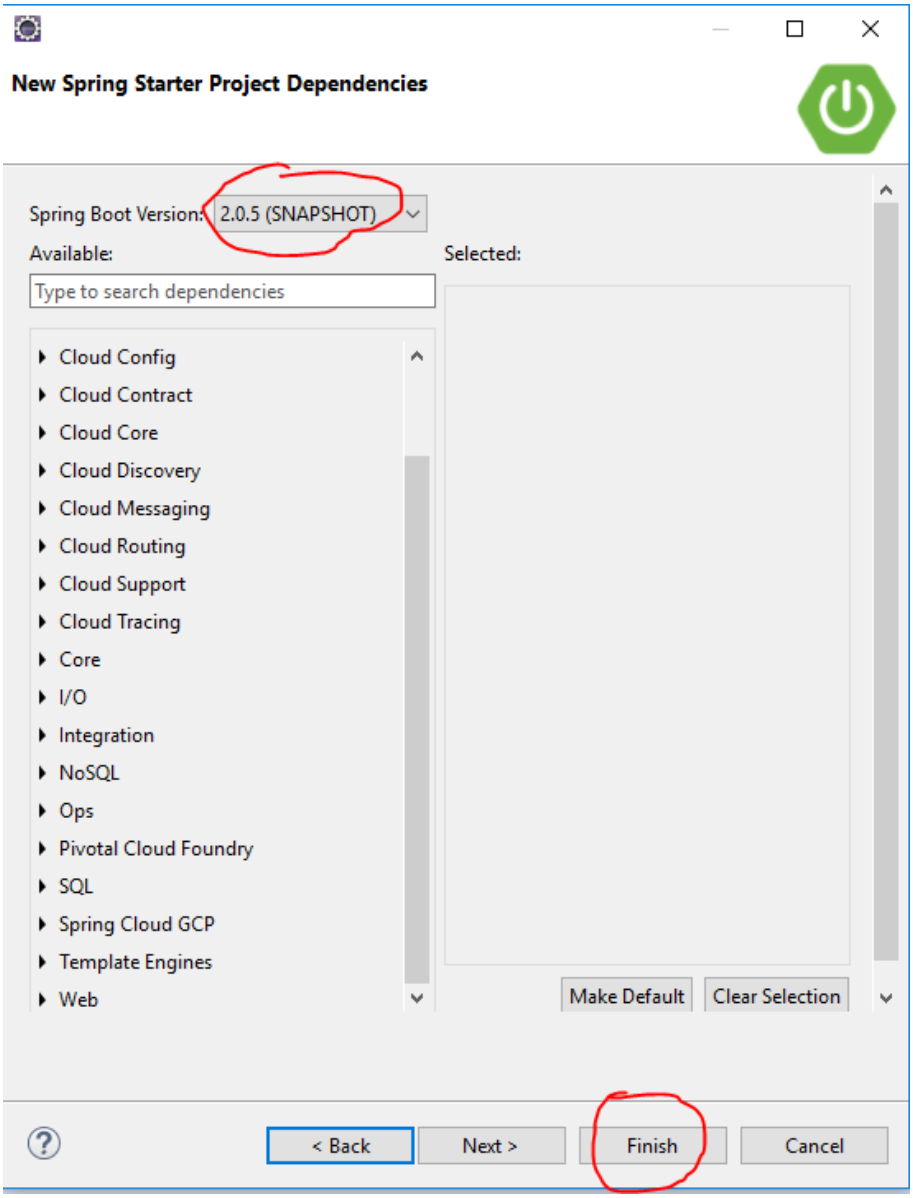




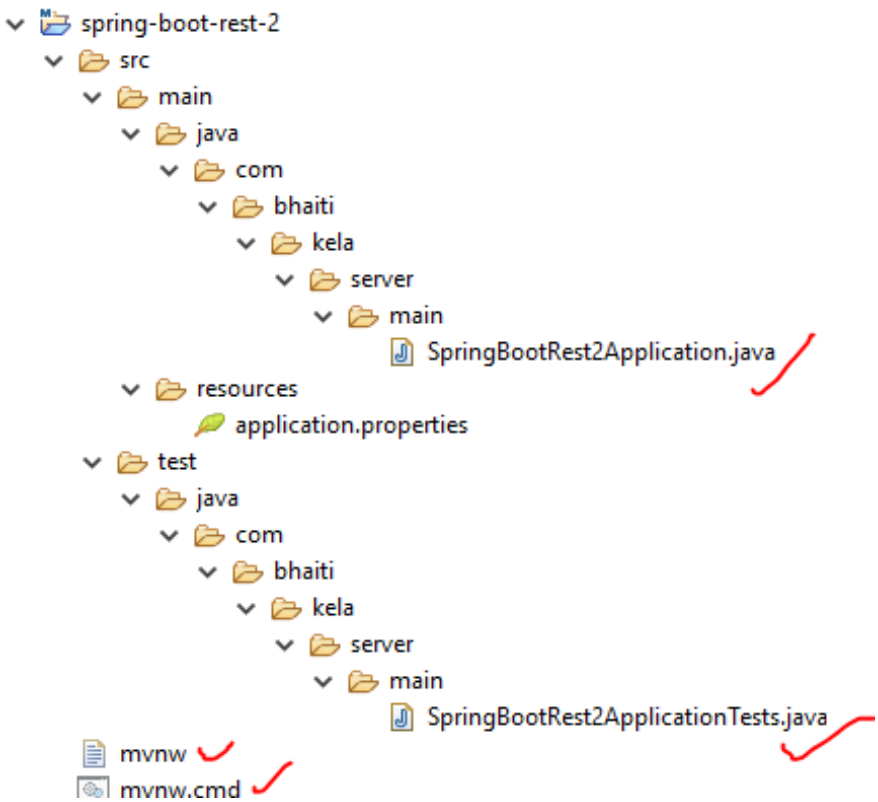
Now click the **Next** button and provide the below information and click the **Next** button again.

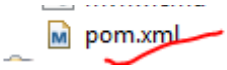


Now, provide/select the below information and click the **Finish** button.



Now you can see the below project structure in your project's explorer window.





Now, look that the **SpringBootRest2Application.java** file, which is created by the **STS plug-ins**.

```
package com.bhaiti.kela.server.main;

import org.springframework.boot.SpringApplication;
import org.springframework.boot.autoconfigure.SpringBootApplication;

@SpringBootApplication
public class SpringBootRest2Application {

    public static void main(String[] args) {
    SpringApplication.run(SpringBootRest2Application.class, args);
    }
}
```

This is a Spring Boot main class. A Spring Boot REST application loads through this class. We can also see that this class is created with the annotation **@SpringBootApplication** . As per the Spring documentation, the annotation **@SpringBootApplication** is equivalent to using **@Configuration**, **@EnableAutoConfiguration**, and **@ComponentScan**, and these annotations are frequently used together. Most of the time, in Spring Boot development, the main class is always annotated with all three of these important annotations.

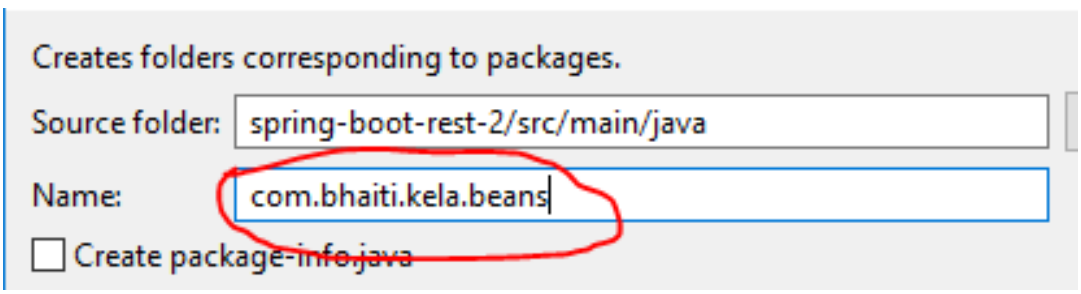
So we are going to modify the **@SpringBootApplication** (given below in the Java class) with a component path. Without that, the application cannot find out the controller classes. We will learn more about controller classes in a few minutes.

@SpringBootApplication(scanBasePackages = {"com.bhaiti"})

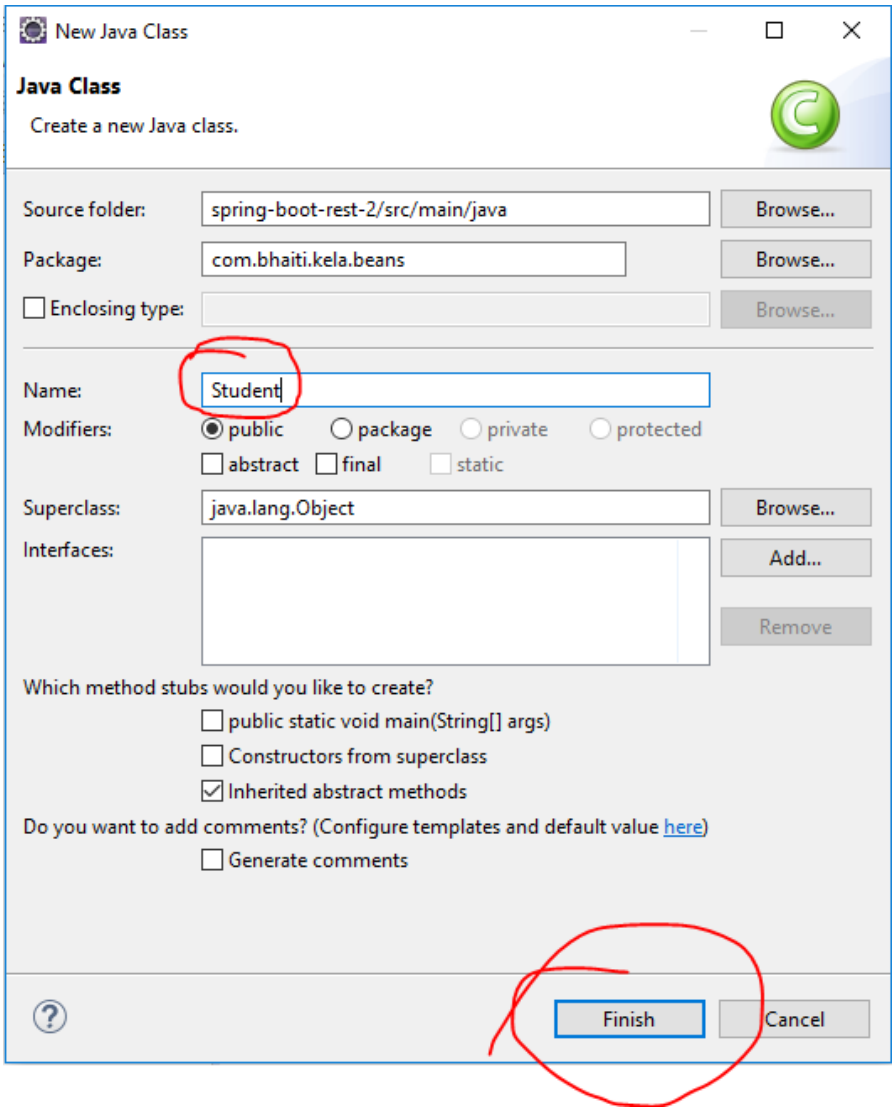
```
@SpringBootApplication(scanBasePackages = {"com.bhaiti"})
public class SpringBootRest2Application {

    public static void main(String[] args) {
    SpringApplication.run(SpringBootRest2Application.class, args);
    }
}
```

Now we are going to create our beans classes, which we will use for our **GET, POST, PUT, and DELETE** REST calls. Create package, **`com.bhaiti.beans`** , and add classes into that package like below:

4. Right-click on the project and select New and then package (**New=>Package**). Enter the above package name and click Finish.



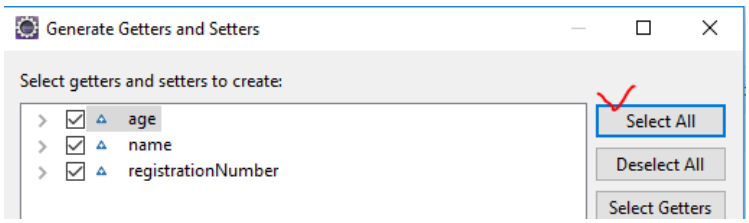
5. Now, right-click on the package **`com.bhaiti.beans`** and select **New->class** and provide the class name, **`Student`** , like below:

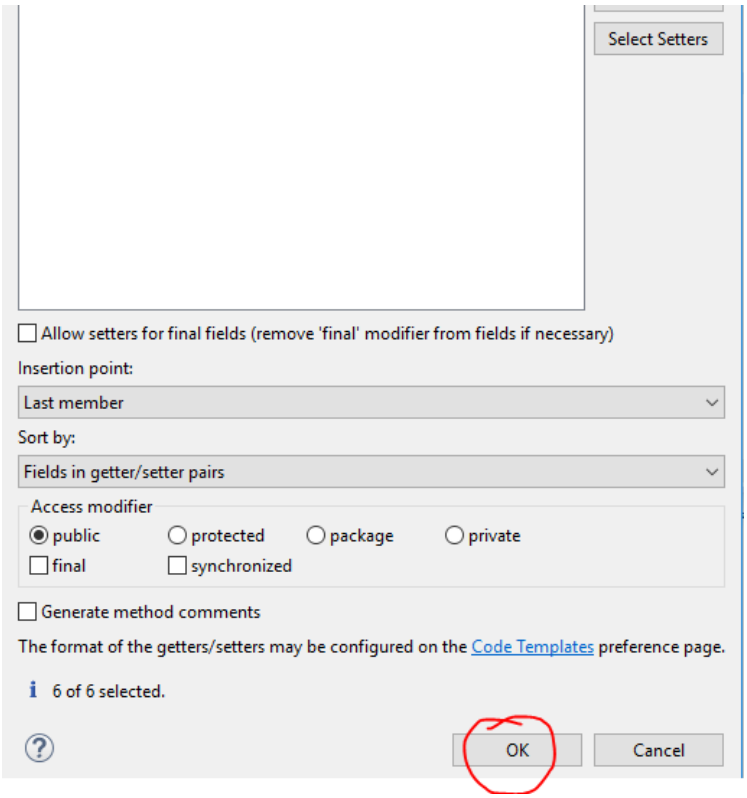


- In the empty class, just add below members:

```
package com.bhaiti.kela.beans;

public class Student {

    String name;
    int age;
    String registrationNumber;
}
```

- Now create **getter** and **setter** methods for these members. For that, from the Project Explorer window, right-click on the class "Student" and select “Source” and select “Generate Getter and Setter.”






```
package com.bhaiti.kela.beans;

public class Student {

    String name;
    int age;
    String registrationNumber;

    public String getName() {
    return name;
    }
    public void setName(String name) {
    this.name = name;
    }
    public int getAge() {
    return age;
    }
    public void setAge(int age) {
    this.age = age;
    }
    public String getRegistrationNumber() {
    return registrationNumber;
    }
    public void setRegistrationNumber(String registrationNumber) {
    this.registrationNumber = registrationNumber;
    }
}
```

6. Now follow steps 5 and create class call **StudentRegistration** and modify it like below:

```
package com.bhaiti.kela.beans;

import java.util.ArrayList;
import java.util.List;

public class StudentRegistration {

    private List<Student> studentRecords;

    private static StudentRegistration stdregd = null;

    private StudentRegistration(){
    studentRecords = new ArrayList<Student>();
    }

    public static StudentRegistration getInstance() {

        if(stdregd == null) {
              stdregd = new StudentRegistration();
              return stdregd;
            }
            else {
                return stdregd;
            }
    }

    public void add(Student std) {
    studentRecords.add(std);
    }

public String upDateStudent(Student std) {

for(int i=0; i<studentRecords.size(); i++)
        {
            Student stdn = studentRecords.get(i);
            if(stdn.getRegistrationNumber().equals(std.getRegistrationNumber())) {
              studentRecords.set(i, std);//update the new record
              return "Update successful";
            }
        }

return "Update un-successful";
}

public String deleteStudent(String registrationNumber) {

```

```
for(int i=0; i<studentRecords.size(); i++)
        {
            Student stdn = studentRecords.get(i);
            if(stdn.getRegistrationNumber().equals(registrationNumber)){
              studentRecords.remove(i);//update the new record
              return "Delete successful";
            }
        }

return "Delete un-successful";
}

    public List<Student> getStudentRecords() {
    return studentRecords;
    }

}
```

7. Now add a class calls **StudentRegistrationReply** and modify like below. This class will be used to reply a response back to the client application

```
package com.bhaiti.kela.beans;

public class StudentRegistrationReply {

    String name;
    int age;
    String registrationNumber;
    String registrationStatus;

    public String getName() {
    return name;
    }
    public void setName(String name) {
    this.name = name;
    }
    public int getAge() {
    return age;
    }
    public void setAge(int age) {
    this.age = age;
    }
    public String getRegistrationNumber() {
    return registrationNumber;
    }
    public void setRegistrationNumber(String registrationNumber) {
    this.registrationNumber = registrationNumber;
    }
```

```
    }
    public String getRegistrationStatus() {
    return registrationStatus;
    }
    public void setRegistrationStatus(String registrationStatus) {
    this.registrationStatus = registrationStatus;
    }

}
```

8. Now we will introduce two controllers, one to serve the **GET** request and the second one to serve the **POST** request. With the **GET** request, we will retrieve all Student Registration information, and with the **POST** request, we will add student information into our application. In spring's approach to build a **RESTful** web services, **HTTP** requests are handled by a controller. Controller classes/components are easily identified by the **@RestController** annotation, and the below **StudentRetrieveController** will handle **GET** requests for **/student/allstudent** by returning a list of **Student** class objects in **JSON** format.

- Now just follow **step 4** and **step 5** and create the package **com.bhaiti.kela.controllers** and add the class **StudentRetrieveController** to it and import the class **Student** and modify the class like below:-

```
package com.bhaiti.kela.controllers;

import java.util.List;

import org.springframework.stereotype.Controller;
import org.springframework.web.bind.annotation.RequestMapping;
import org.springframework.web.bind.annotation.RequestMethod;
import org.springframework.web.bind.annotation.ResponseBody;

import com.bhaiti.kela.beans.Student;
import com.bhaiti.kela.beans.StudentRegistration;

@Controller
public class StudentRetrieveController {

  @RequestMapping(method = RequestMethod.GET, value="/student/allstudent")

  @ResponseBody
  public List<Student> getAllStudents() {
  return StudentRegistration.getInstance().getStudentRecords();
  }

}
```

The **@RequestMapping** annotation maps all HTTP operations by default and, in this example, it ensures that HTTP requests to **/student/allstudent** are mapped to the **getAllStudents()** method.

Now we are done with everything for a **GET** RESTful call. Let's implement a RESTFul **POST** call.

- Now it's time to introduce the controller class to handle the **POST** request. Follow **step 5** and add below

- Now it's time to introduce the controller class to handle the **POST** request. Follow **step 3** and add below controller class **StudentRegistrationController** in package **com.bhaiti.kela.controllers**

```
package com.bhaiti.kela.controllers;

import java.util.List;

import org.springframework.stereotype.Controller;
import org.springframework.web.bind.annotation.RequestBody;
import org.springframework.web.bind.annotation.RequestMapping;
import org.springframework.web.bind.annotation.RequestMethod;
import org.springframework.web.bind.annotation.ResponseBody;

import com.bhaiti.kela.beans.*;

@Controller
public class StudentRegistrationController {

  @RequestMapping(method = RequestMethod.POST, value="/register/student")

  @ResponseBody
  public StudentRegistrationReply registerStudent(@RequestBody Student student) {
  System.out.println("In registerStudent");
        StudentRegistrationReply stdregreply = new StudentRegistrationReply();
        StudentRegistration.getInstance().add(student);
        //We are setting the below value just to reply a message back to the calle
        stdregreply.setName(student.getName());
        stdregreply.setAge(student.getAge());
        stdregreply.setRegistrationNumber(student.getRegistrationNumber());
        stdregreply.setRegistrationStatus("Successful");

        return stdregreply;
}

}
```

Till now, we are done with everything for a **GET and POST** RESTful call. Let's test this application first. After the test, we will learn about **PUT and DELETE** calls as well. First, we need to compile the application.

- **Compilation**: To compile this project with Maven, we will add the below information into the POM file: Double click and open the POM file from project explorer window and add below information under "**<dependencies>**" section.

```
    <dependency>
        <groupId>org.springframework.boot</groupId>
        <artifactId>spring-boot-starter</artifactId>
    </dependency>

    <dependency>
```

```
    <dependency>
        <groupId>org.springframework.boot</groupId>
        <artifactId>spring-boot-starter-test</artifactId>
        <scope>test</scope>
    </dependency>

    <dependency>
        <groupId>org.springframework.boot</groupId>
        <artifactId>spring-boot-starter</artifactId>
    </dependency>

    <dependency>
        <groupId>org.springframework</groupId>
        <artifactId>spring-web</artifactId>
    </dependency>

    <dependency>
        <groupId>org.springframework.boot</groupId>
        <artifactId>spring-boot-starter-web</artifactId>
    </dependency>

    <dependency>
        <groupId>org.springframework.boot</groupId>
        <artifactId>spring-boot-starter-test</artifactId>
        <scope>test</scope>
    </dependency>
```

And we'll also add the below information for the property file for this project under the build section of our **POM.xml** file (to change the port number at the moment):

```
        <resource>
            <directory>src/main/resources</directory>
            <filtering>true</filtering>
        </resource>
```

your POM.xml file finally looks like below:

```
<?xml version="1.0" encoding="UTF-8"?>
<project xmlns="http://maven.apache.org/POM/4.0.0" xmlns:xsi="http://www.w3.org/20(
xsi:schemaLocation="http://maven.apache.org/POM/4.0.0 http://maven.apache.org/xsd/r
<modelVersion>4.0.0</modelVersion>

<groupId>com.bhaiti.kela</groupId>
<artifactId>spring-boot-rest-2</artifactId>
<version>0.0.1-SNAPSHOT</version>
<packaging>jar</packaging>

<name>spring-boot-rest-2</name>
<description>Demo project for Spring Boot</description>
```

```
<parent>
<groupId>org.springframework.boot</groupId>
<artifactId>spring-boot-starter-parent</artifactId>
<version>2.0.5.BUILD-SNAPSHOT</version>
<relativePath/> <!-- lookup parent from repository -->
</parent>

<properties>
<project.build.sourceEncoding>UTF-8</project.build.sourceEncoding>
<project.reporting.outputEncoding>UTF-8</project.reporting.outputEncoding>
<java.version>1.8</java.version>
</properties>

<dependencies>
<dependency>
<groupId>org.springframework.boot</groupId>
<artifactId>spring-boot-starter</artifactId>
</dependency>

<dependency>
<groupId>org.springframework.boot</groupId>
<artifactId>spring-boot-starter-test</artifactId>
<scope>test</scope>
</dependency>

<dependency>
<groupId>org.springframework.boot</groupId>
<artifactId>spring-boot-starter</artifactId>
</dependency>

<dependency>
    <groupId>org.springframework</groupId>
    <artifactId>spring-web</artifactId>
</dependency>

<dependency>
    <groupId>org.springframework.boot</groupId>
    <artifactId>spring-boot-starter-web</artifactId>
</dependency>

<dependency>
<groupId>org.springframework.boot</groupId>
<artifactId>spring-boot-starter-test</artifactId>
<scope>test</scope>
</dependency>
```

```
</dependencies>

<build>
<plugins>
<plugin>
<groupId>org.springframework.boot</groupId>
<artifactId>spring-boot-maven-plugin</artifactId>
</plugin>
</plugins>
<resources>
        <resource>
            <directory>src/main/resources</directory>
            <filtering>true</filtering>
        </resource>
        </resources>
</build>

<repositories>
<repository>
<id>spring-snapshots</id>
<name>Spring Snapshots</name>
<url>https://repo.spring.io/snapshot</url>
<snapshots>
<enabled>true</enabled>
</snapshots>
</repository>
<repository>
<id>spring-milestones</id>
<name>Spring Milestones</name>
<url>https://repo.spring.io/milestone</url>
<snapshots>
<enabled>false</enabled>
</snapshots>
</repository>
</repositories>

<pluginRepositories>
<pluginRepository>
<id>spring-snapshots</id>
<name>Spring Snapshots</name>

<url>https://repo.spring.io/snapshot</url>

<snapshots>

<enabled>true</enabled>

</snapshots>
```

```
</pluginRepository>
<pluginRepository>
<id>spring-milestones</id>
<name>Spring Milestones</name>
<url>https://repo.spring.io/milestone</url>
<snapshots>
<enabled>false</enabled>
</snapshots>
</pluginRepository>
</pluginRepositories>



</project>
```

9. Now open file **application.properties** under **C:\Projects\spring-boot-rest-2\src\main\resources** and add the below lines in it:

server.port=8083

spring.profiles.active=@spring.profiles.active@

10. Now open the command prompt window and go to the project home directory in the command prompt. In my case, it looks like this:

cd C:\Projects\spring-boot-rest-2

mvnw clean package

If everything goes fine, you can see the below result:

```
[INFO] ------------------------------------------------------------------------
[INFO] BUILD SUCCESS
[INFO] ------------------------------------------------------------------------
[INFO] Total time: 02:06 min
[INFO] Finished at: 2018-08-29T19:34:08+01:00
[INFO] ------------------------------------------------------------------------

C:\Projects\spring-boot-rest-2>
```

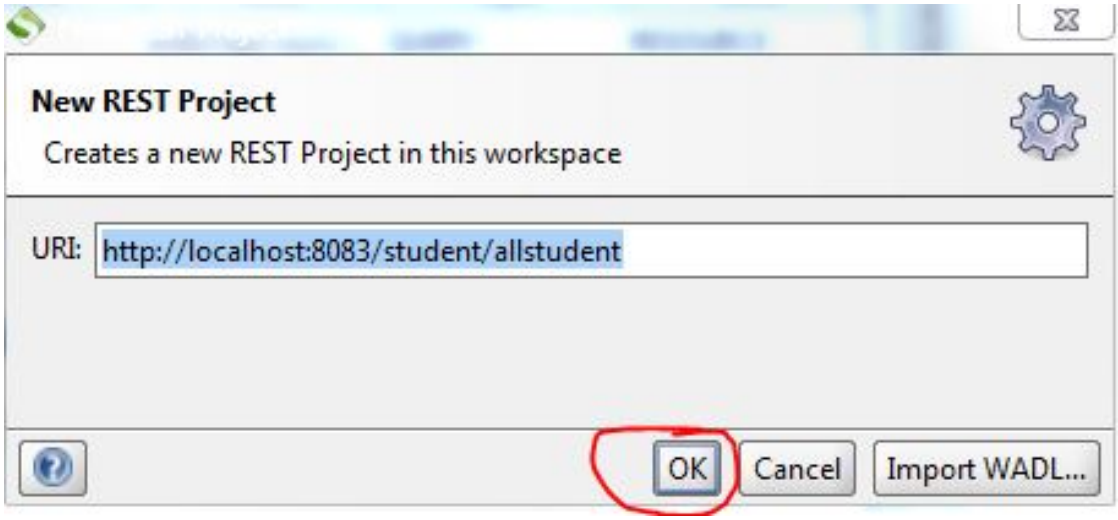
Now run the server:

java -jar target\spring-boot-rest-2-0.0.1-SNAPSHOT.jar

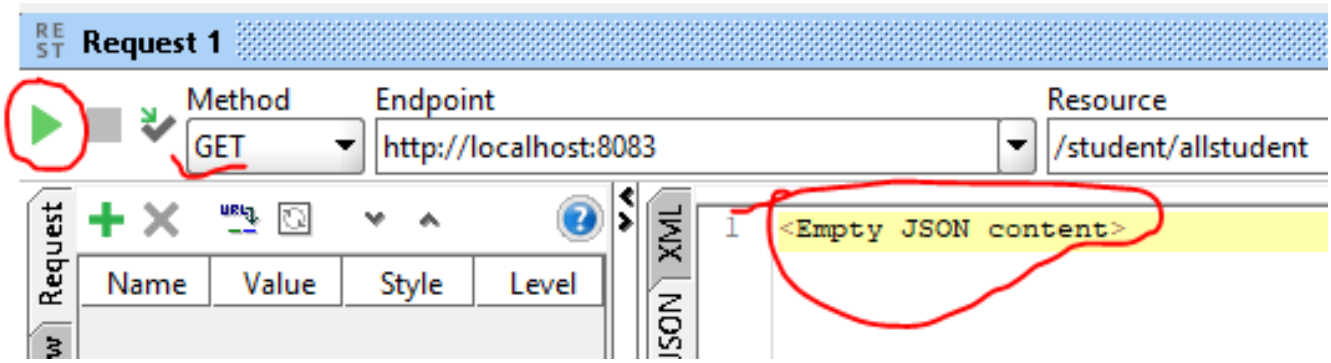
```
ort(s): 8083 (http) with context path ''
2018-08-29 19:36:58.351  INFO 22828 --- [           main] c.b.k.s.main.SpringBootRest2Application  : Started SpringBootR
est2Application in 34.087 seconds (JVM running for 38.504)
```

11. Once the server starts successfully, we will test get **GET** request first. Open your **SOAPUI** tool. In **SOAPUI** tool from file menu select **New REST Project** and put the below URL in the address bar and press OK. (**File=>New REST Project**)

http://localhost:8083/student/allstudent



12. Now, from the SOAPUI project explorer menu, expand your project and double click on Request1 and click the green arrow button:

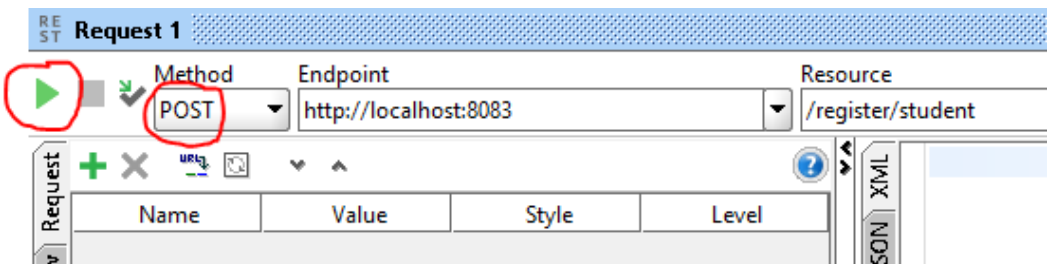


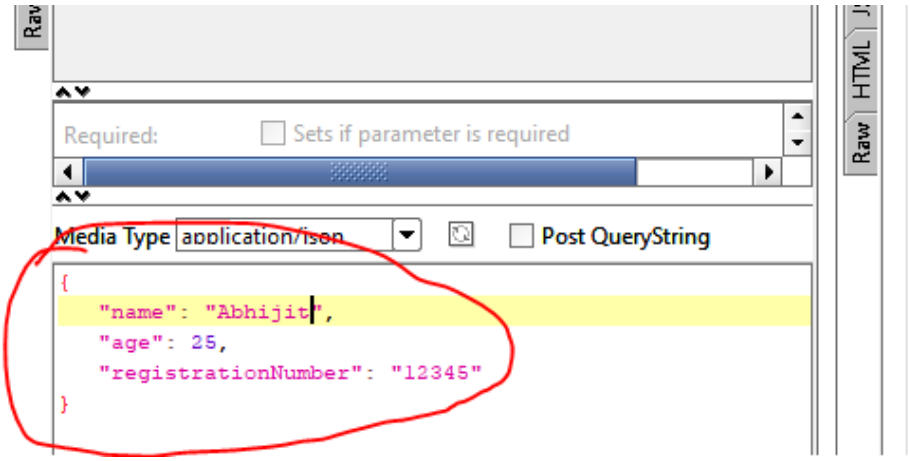
Now you can see the above information. The reason is our student list is empty at the moment, and to store student information, we need to insert some values in it. For that, we will use the POST service that we have already implemented.

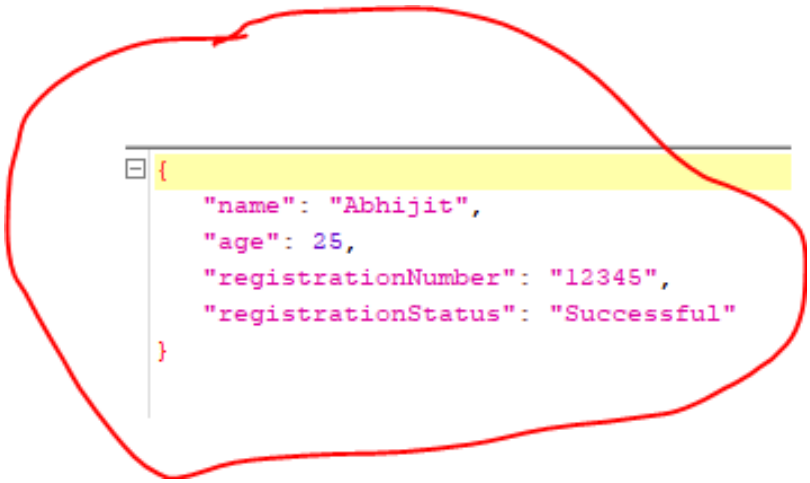
13. Follow step 10 and insert the below URL in the address box and click OK.

http://localhost:8083/register/student

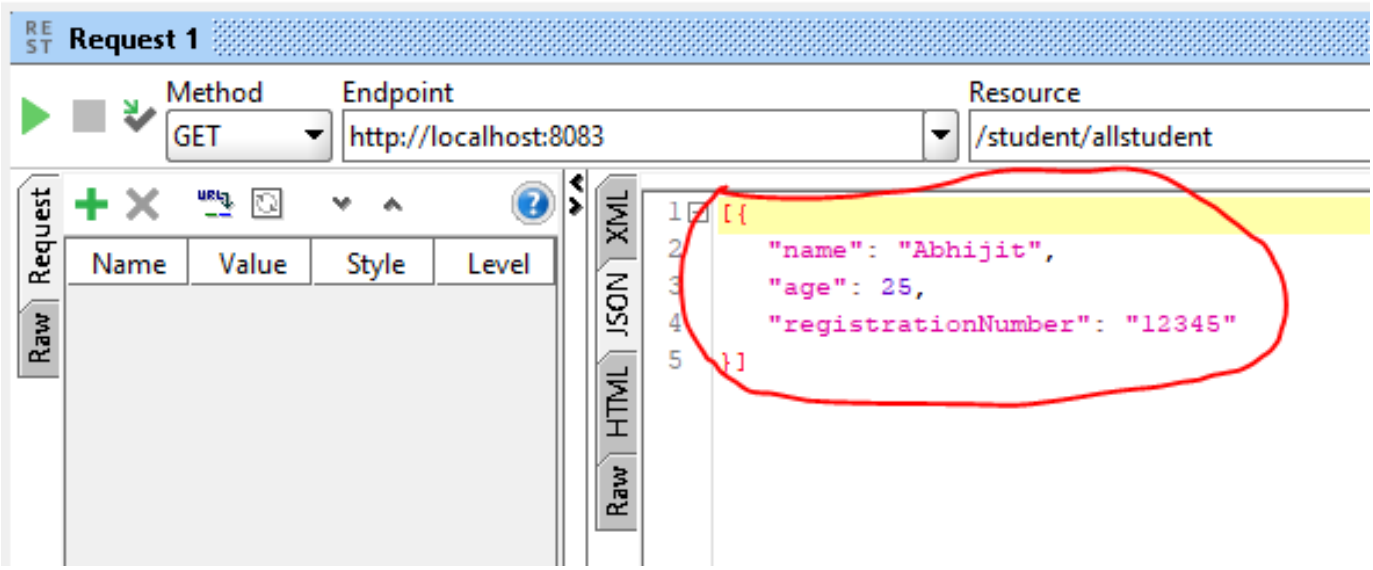
14. Now you have to select **POST** this time from **Method combo box** for a post request. Once you select POST **Media Type,** sub pane will emerge from where you have to select media type to **application/json** like below and put the below **json body** in it and click the **green arrow** button, which will add the information into our application.



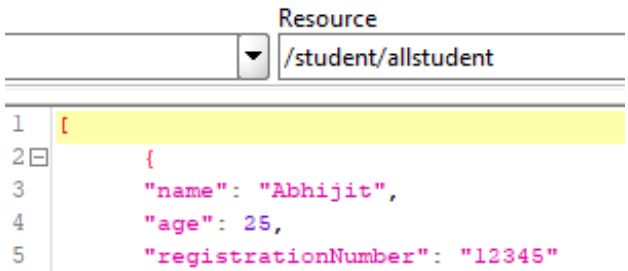




15. Now go to the GET request project (step 12) and click the green arrow button. You can see one record like below:



16. Now go back to **POST** request test (step 14) and add at least three records and call the **GET** request (step 11) and see:



```
    },
        {
        "name": "Pritam",
        "age": 26,
        "registrationNumber": "12346"
    },
        {
        "name": "Dutta",
        "age": 27,
        "registrationNumber": "12347"
    }
]
```

Until now, we have learned how to implement GET and POST services. Now we will learn PUT and DELETE requests.

17. Now introduce the controller classes to handle PUT and DELETE requests. Follow Step 6 above and add the below two controller classes in it.

Create **StudentUpdateController** class and modify it like below:

```
package com.bhaiti.kela.controllers;

import org.springframework.stereotype.Controller;
import org.springframework.web.bind.annotation.RequestBody;
import org.springframework.web.bind.annotation.RequestMapping;
import org.springframework.web.bind.annotation.RequestMethod;
import org.springframework.web.bind.annotation.ResponseBody;

import com.bhaiti.kela.beans.Student;
import com.bhaiti.kela.beans.StudentRegistration;

@Controller
public class StudentUpdateController {

@RequestMapping(method = RequestMethod.PUT, value="/update/student")


@ResponseBody
public String updateStudentRecord(@RequestBody Student stdn) {
System.out.println("In updateStudentRecord");
    return StudentRegistration.getInstance().upDateStudent(stdn);
}

}
```

Create **StudentDeleteController** and modify it like below:

```
package com.bhaiti.kela.controllers;

import org.springframework.stereotype.Controller;
import org.springframework.web.bind.annotation.RequestMapping;
```

```
import org.springframework.web.bind.annotation.RequestMethod;
import org.springframework.web.bind.annotation.ResponseBody;
import org.springframework.web.bind.annotation.PathVariable;

import com.bhaiti.kela.beans.StudentRegistration;

@Controller
public class StudentDeleteController {

@RequestMapping(method = RequestMethod.DELETE, value="/delete/student/{regdNum}")

@ResponseBody
public String deleteStudentRecord(@PathVariable("regdNum") String regdNum) {
System.out.println("In deleteStudentRecord");
    return StudentRegistration.getInstance().deleteStudent(regdNum);
}

}
```

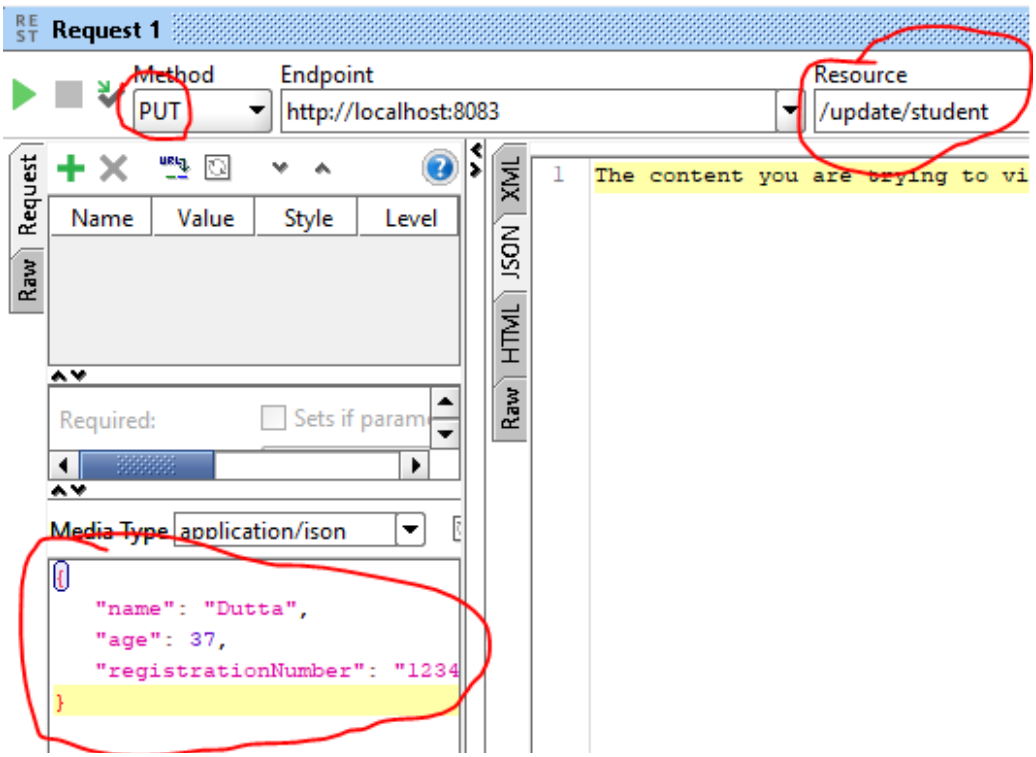
NB: In reality, you don't need four controller classes to handle four different REST service calls. One controller class will suffice, but for clarity, I have introduced four different controller classes in this article.

18. Now stop the server (by using Control-C), and compile the code, and run the server again.

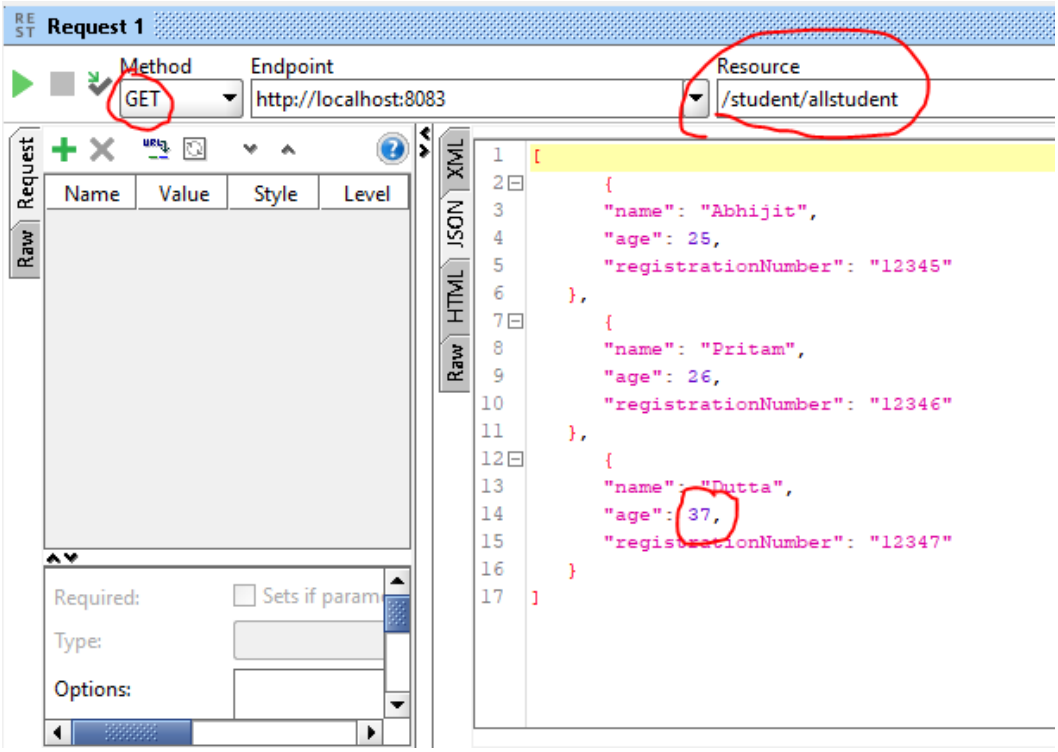
19. First, insert three to four records into the system by using POST call and retrieve the records by using GET test mentioned in step 12.

20. Now we will modify a record here, for that create a new REST project in SOAPUI tool and use the below URL and this time select PUT from method combo box and modify the records as shown below:

http://localhost:8083/update/student

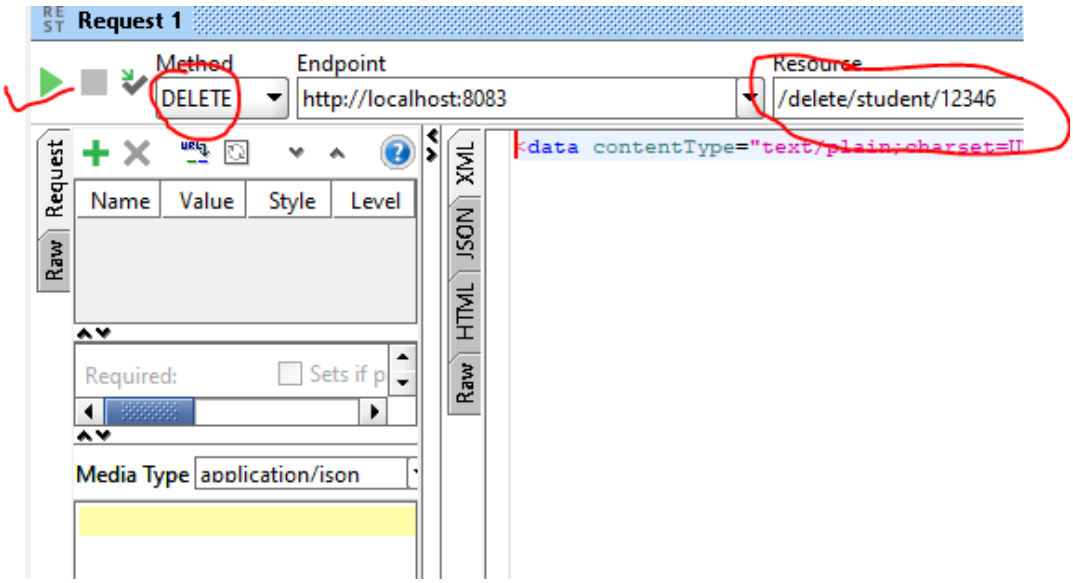


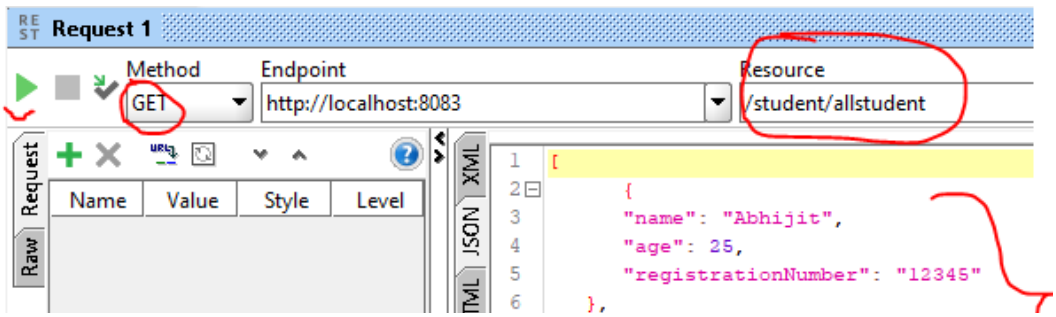
Once you click **green arrow** button this information will be updated in the system. Now see the result, just do the GET call and check.



21. Now finally we will do the **DELETE** service call test. Just create a REST project in SOAPUI and use below URL and select DELETE from method combo box and enter the record like below and click the green arrow button and to check the final outcome just call the GET service call.

http://localhost:8083/delete/student/12346 (the last numeric value is registrationNumber)





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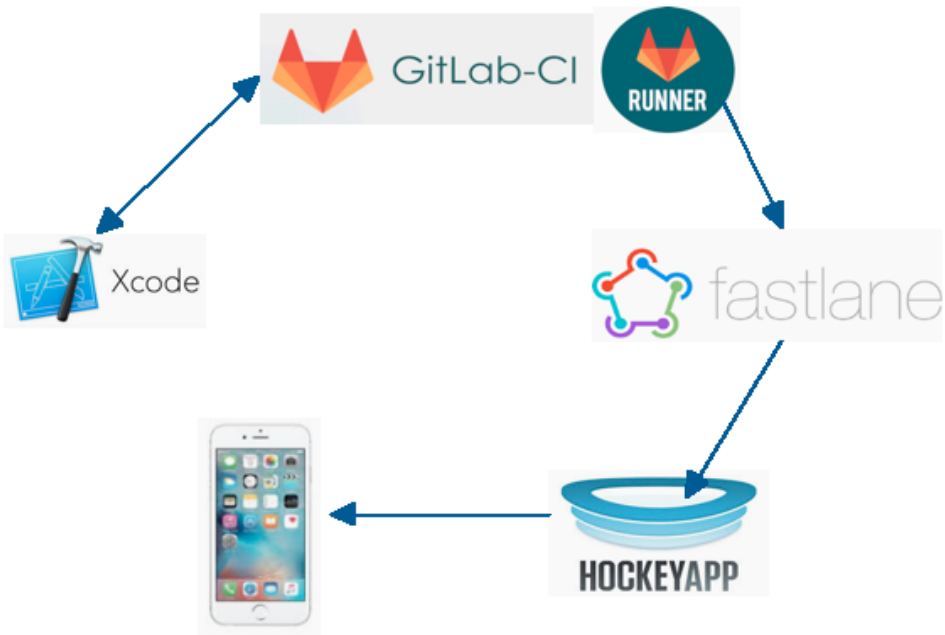
iOS Project: Integrating GitLab-CI, Fastlane, and HockeyApp

Fastlane, and HockeyApp

by Manesh Das · Nov 23, 18 · Integration Zone · Tutorial

There are many ways to implement CI/CD for iOS projects and choosing the right combination of technology is all depends on your project type, existing infrastructure and customer requirements. Here we're using Fastlane – an open source technology for *HockeyApp* uploading, but *Fastlane* itself is mature and capable of handling all tedious tasks. Here is the easiest way to setup CI/CD by using GitLab-CI, Runner, Fastlane and HockeyApp for final app distribution.



Please follow the below key steps to create a base framework for CI/CD process:

- Access to existing GitLab account/Create a new one
- Setup GitLab-Runner in MacOSX build machine
- Register GitLab-Runner with GitLab-CI
- Install Fastlane in build/development machine
- Enable GitLab-CI and Fastlane
- Access to existing HockeyApp account / Create a new one

Before starting CI/CD implementation, make sure that GitLab account is ready and the code has been pushed to the repository from your development machine.

the repository from your development machine.

Setting up GitLab-Runner (MacOSX Machine)

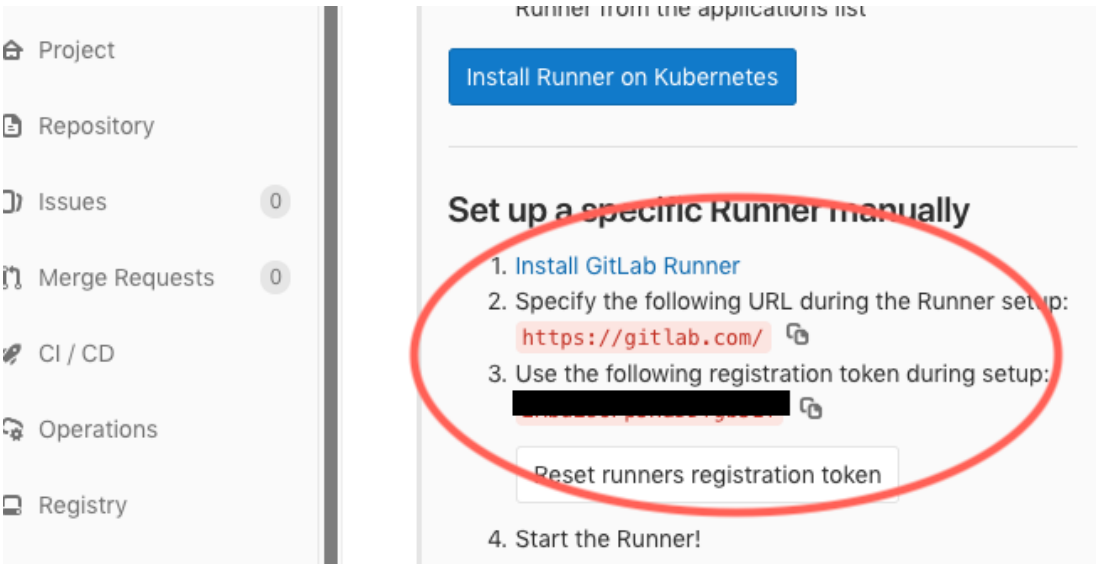
```
$ sudo curl --output /usr/local/bin/gitlab-runner https://gitlab-runner-downloads.s
```

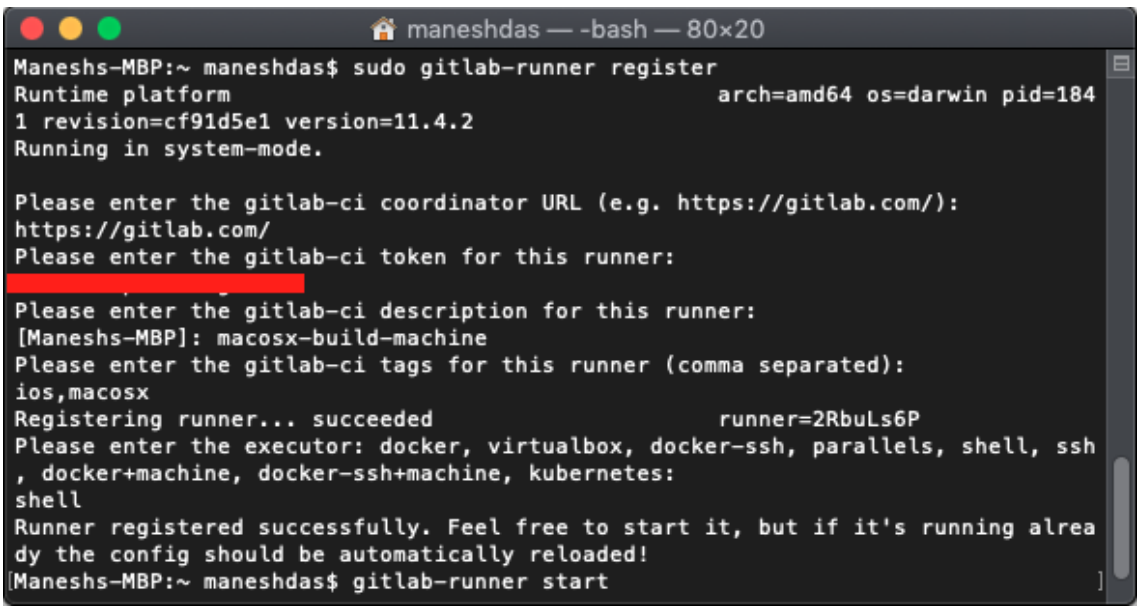
```
$ gitlab-runner install
```

Register GitLab-Runner Instance With Your GitLab Account

```
$ sudo gitlab-runner register
```

Before executing the above command please note down or copy ***gitlab-ci token*** and ***gitlab-ci coordinator url*** from GitLab account -> Settings -> CICD



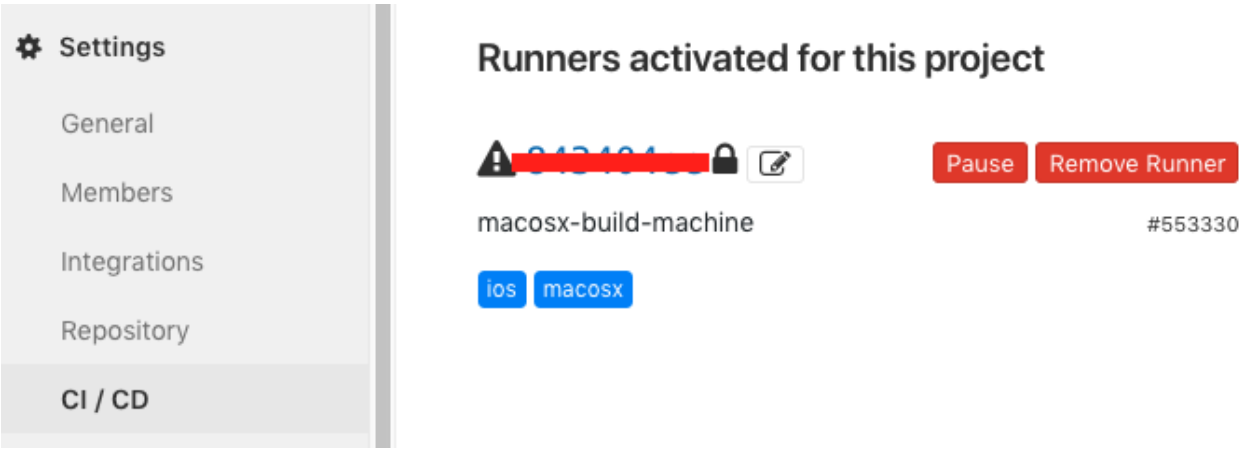


Once you are done with gitlab-runner registration process, start the GitLab-Runner by executing the following command:

```
$gitlab-runner start
```

Please make sure the runner status in GitLab account and note that "tag name" can be used to identify the specific GitLab-Runner instance and which can be added in the ***gitlab-ci.yml*** file

specific GitLab-Runner instance and which can be added in the ***.gitlab-ci.yml*** file.



Installing Fastlane in Build/Development Machine

You need to install Fastlane on both the build and development machine in order to test and configure.

Execute the following command from your build and development machine "Terminal" to install Fastlane.

```
$sudo gem install fastlane -NV
```

After installing Fastlane in development machine, go to project root directory and initialize Fastlane dependencies for Swift.

```
$fastlane init swift
```

Once initialization is completed, open "Fastfile.swift" in Xcode and insert the following code for uploading iOS binary to HockeyApp:

```
func appBetaDistributionToHockeyApp() {
//Fastlane API to upload signed ipa to HockeyApp
hockey(apiToken:<<Token from HockeyApp account>>, ipa: <</ios-builds/beta/hellogit
}
```

Enable GitLab-CI

To enable GitLab-CI, create a new file called "**.gitlab-ci.yml**" and save it in your project root directory. Insert the following xcodebuild commands to the **yml** file to **clean**, **build**, **archive** and **export** ipa from GitLab-Runner. It is mandatory to create an export options plist file with proper code signing identity and details

---

build_project:

script:

- "xcodebuild -workspace HelloGitLab.xcworkspace -scheme HelloGitLab clean"

- xcodebuild -workspace HelloGitLab.xcworkspace -scheme HelloGitLab -configuration Debug CODE_SIGNING_REQUIRED="NO" CODE_SIGNING_ALLOWED="NO" -destination generic/platform=iOS archive -archivePath /ios-builds/archive/path/HelloGitLab.xcarchive

- "xcodebuild -exportArchive -archivePath /ios-builds/archive/path/HelloGitLab.xcarchive -exportPath /ios-

builds/dev/ipa/path -exportOptionsPlist /ios-builds/dev/exportoptions-development.plist"

- "fastlane appBetaDistributionToHockeyApp"

stage: build

tags:

- ios

stages:

- build

Please validate your **.gitlab-ci.yml** file by using built-in GitLab validation tool or any yml lint tool available in online.

Export options plist

It is recommended to create multiple "export options" plist files for different targets like development, ad-hoc, enterprise etc with different code signing and provisioning profile details. Below is the sample one for development target.

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE plist PUBLIC "-//Apple//DTD PLIST 1.0//EN" "http://www.apple.com/DTDs/Pr
<plist version="1.0">
<dict>
<key>compileBitcode</key>
<false/>
<key>method</key>
<string>development</string>
<key>provisioningProfiles</key>
<dict>
<key>bundle identifier</key>
<string>Provisioning profile name</string>
</dict>
<key>signingCertificate</key>
<string>Signing certificate name</string>
<key>signingStyle</key>
<string>manual</string>
<key>stripSwiftSymbols</key>
<false/>
<key>teamID</key>
<string>teamID</string>
<key>thinning</key>
<string><none></string>
</dict>
</plist>
```

Once you complete all these steps, do a fresh commit and push the code into the GitLab repository and see the GitLab pipeline result.

Happy coding!

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