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In a world of microservices development and Docker-based deployments, RESTful web services tend to grab all of the headlines. And while the design of RESTful APIs can be a challenge, modern frameworks like Spring Boot and JAX-RS make RESTful web services incredibly easy to develop. As such, their proliferation comes as no surprise. But we've made great strides in the world of JAX-WS (Java API for XML Web Services), and modern SOAP (Simple Object Access Protocol) web services development is no longer the arduous task it once was. In this step-by-step SOAP web services example in Java using Eclipse, we will demonstrate just how easy it is to develop and test a web service based in JAX-WS. The simplicity might surprise you. In fact, this SOAP web services tutorial might even convince you to give up on your RESTful APIs for good. SOAP web services example In a recently published Spring Boot RESTful web services tutorial, we implemented a microservice that keeps track of the number of wins, losses and ties in an online game of rock-paper-scissors. In this SOAP web services example in Java using Eclipse, I would like to implement the exact same use case, only with JAX-WS instead of JAX-RS. Create a project named soap-ws-example in Eclipse. Step 1: Create the Eclipse project The first step is simply to create a dynamic web project in Eclipse named soap-ws-example. The project should use web module version 3.1, employ a minimal configuration and be associated with a runtime that supports the Java web profile. For this SOAP web services example in Java using Eclipse, we will employ WildFly 10.x as the chosen runtime. Step 2: Code the Score class This SOAP web services example will use two classes: a simple POJO (Plain Old Java Object) named Score and a class that mitigates remote access to the Score class named ScoreService. We will keep the Score class incredibly simple. The class will declare only three public variables, each of type int, named wins, losses and ties. To really keep things tight, we won't even add any setters or getters. Step 3: Add XML annotations The only minor complication to the Score class is that you have to decorate it with a couple of annotations. Since the data the Score class encapsulates will be sent to SOAP web services clients in XML format, the class requires an @XMLType annotation. Furthermore, since the class has no getter methods, the XML engine will need to look directly at the properties of the Score class. So, add an @XmlAccessorType annotation that indicates field-based access. The complete class looks as follows: Decorate the class with these annotations. Step 4: Code the ScoreService The ScoreService class will mitigate access to the Score class through methods such as getScore(), increaseWins() and getLosses(). Initialize the instance of the Score class the ScoreService references through dependency injection, or read from a NoSQL database, as a web service should never maintain any internal state. But to keep this SOAP web services example in Java using Eclipse as simple as possible, we will cheat a little and simply make the Score instance static. This will work when the SOAP web services example is tested on a single Java virtual machine. Just keep in mind that such an approach would fail in a distributed environment. Step 5: Add SOAP WebService annotations To turn the ScoreService into a SOAP web service, it needs to be decorated with two annotations: one to indicate the class complies with all of the semantics of a stateless Enterprise JavaBeans (EJB) architecture and another to indicate that the public methods in the class can be accessed through a SOAP-based service. The first iteration of the SOAP web services example looks as follows: The SOAP web service needs two annotations. Step 6: Enhance the SOAP web service All of the methods in the first iteration of the SOAP web services example have empty method signatures. To demonstrate how easy it is to pass data to a SOAP web service, we will add an updateScore method that takes three int parameters, updates all of the instance variables of the Score class and returns the updated Score instance: Add an updateScore method to the SOAP web service. Step 7: Use the @WebMethod annotation Next, we will add a reset method. This sets the number of wins, losses and ties to nil. The method in the class will be named reset, but when SOAP web services clients invoke the method, we want the remote API call to be resetScore. To override the default method to Web Services Description Language (WSDL) mappings, JAX-WS provides a special annotation called @WebMethod. By changing the operationName attribute of the @WebMethod annotation, the method name used by the SOAP web services client can be tweaked. Override the default method and provide a special annotation. Step 8: Run and test the SOAP web service With the Score and the ScoreService classes completed, simply right-click on the soap-ws-example project, and select Run As > Run on Server. How to run the SOAP web services example on WildFly. As the SOAP web services example starts, look in the console output of the server for a reference to a WSDL file. As the web container processes the @WebService annotation, it will create a WSDL file that describes the service's remote API. Note the location of the WSDL file. Note the WSDL file creation and identification. Once you know the location of the WSDL file, open Eclipse's Web Services Explorer, and browse to the file. This will then open a web-based SOAP client that can you can use to invoke all of the public methods of the web service. How to use the Web Services Explorer in Eclipse to test SOAP web services. And that's all there is to it. In the past, years before the release of the EJB 3.0 specification and the introduction of the @WebService annotation, the creation of a SOAP-based web service meant writing WSDL files. This was arduous work with XML parsing libraries and a fight with SOAP envelopes. But today, using popular frameworks and a modern IDE, web services development is extremely simple, as this SOAP web services example in Java using Eclipse demonstrates. The Java source code used in this SOAP web services example in Java can be found on GitHub. View All Videos Web Services tutorial is designed for beginners and professionals providing basic and advanced concepts of web services such as protocols, SOAP, RESTful, java web service implementation, JAX-WS and JAX-RS tutorials and examples. Web service is a technology to communicate one programming language with another. For example, java programming language can interact with PHP and .Net by using web services. In other words, web service provides a way to achieve interoperability. Java Web Services Tutorial In this tutorial, you will be able to learn java web services and its specifications such as JAX-WS and JAX-RS. There are two ways to write the code for JAX-WS by RPC style and Document style. Like JAX-WS, JAX-RS can be written by Jersey and RESTeasy. We will learn all these technologies later. Web Services Examples In this tutorial, we will see a lot of web services examples like JAX-WS example by RPC style, JAX-WS example by document style, JAX-RS example by Jersey and JAX-RS example by RESTeasy implementation. Web Services Index Problem Web services tutorial is developed and tested carefully. But if you find any problem or mistake in our tutorial, you can report to us. We assure, you will not find any problem in web services tutorial. Next TopicWhat is web service For Videos Join Our Youtube Channel- Join Now Send your Feedback to (email protected) Welcome to the Java Web Services Tutorial. Here we will learn about web services, useful concepts in web services and then different types of API we have in java to create web services.What is a Web ServiceIn simple words, services that can be accessed over network are called web services. So how does it differ from web application, they are also services that are accessed over network. There are few attributes that clarifies this difference.Web applications are meant for users and to be accessed in browser having human readable format whereas web services are meant for applications to access data in the format of XML, JSON etc.Web applications always use HTTP/HTTPS protocol whereas traditional web services use SOAP protocol. Recently REST is getting popularity that is an architecture style and almost all times run on HTTP/HTTPS protocol.Web applications are not meant for reusability whereas this is one of the benefit of web services. A single web service can be used by different kinds of applications.Web application can access web services to access some data or to perform some tasks, web services can't access web applications to fetch some data.Web applications are capable to maintain user session, web services are stateless.I hope above differences are good enough to clear any confusion with web applications and web services. Both are different concepts and meant for different purpose.Types of Web ServicesThere are two types of web services.SOAP: SOAP stands for Simple Object Access Protocol. SOAP is an XML based industry standard protocol for designing and developing web services. Since it's XML based, it's platform and language independent. So our server can be based on JAVA and client can be on .NET, PHP etc. and vice versa.REST: REST is an architectural style for developing web services. It's getting popularity recently because it has small learning curve when compared to SOAP. Resources are core concepts of Restful web services and they are uniquely identified by their URIs.Java Web ServicesJava provides it's own API to create both SOAP as well as REST web services.JAX-WS: JAX-WS stands for Java API for XML Web Services. JAX-WS is XML based Java API to build web services server and client application.JAX-RS: Java API for RESTful Web Services (JAX-RS) is the Java API for creating REST web services. JAX-RS uses annotations to simplify the development and deployment of web services.Both of these APIs are part of standard JDK installation, so we don't need to add any jars to work with them. Both of these APIs use annotations very heavily.Hello World JAX-WS ApplicationLet's create a very simple Hello World JAX-WS application.TestService.java package com.journaldev.jaxws.service; import javax.jws.WebMethod; import javax.jws.WebService; import javax.jws.soap.SOAPBinding; import javax.xml.ws.Endpoint; @WebService @SOAPBinding(style = SOAPBinding.Style.DOCUMENT) public class TestService { @WebMethod public String sayHello(String msg){ return "Hello "+msg; } public static void main(String[] args){ Endpoint.publish(" new TestService()); } } That's it. Just run this application and our Hello World JAX-WS SOAP web service is published. Below image shows the invocation of this JAX-WS web service through SOAP UI.That's it for a very basic tutorial of JAX-WS web service. Below are some of the articles you should read for better understanding of SOAP web services and JAX-WS.Hello World JAX-RS ApplicationJersey is the reference implementation of JAX-RS API, it's not part of standard JDK and we have to include all the required jars. Best way is to use Maven build, so create a simple Dynamic web project and then convert it to Maven in Eclipse.Here is the final pom.xml file having required dependencies. JAX-RS-HelloWorld Jersey REST Service com.sun.jersey.spi.container.servlet.ServletContainer com.sun.jersey.config.property.packages com.journaldev.jaxrs.service 1 Jersey REST Service /\* Above two steps are required for initial setup, below is our Hello World JAX-RS service class. package com.journaldev.jaxrs.service; import javax.ws.rs.GET; import javax.ws.rs.Path; import javax.ws.rs.PathParam; @Path("/test") public class TestService { @GET @Path("/hello/{msg}") public String sayHello(@PathParam(value="msg") String msg){ return "Hello "+msg; } } Just export it as WAR file and then access it in the browser as shown in below image.You can change the last part of URL and returned message will change accordingly.You can see how easy it was to create RESTful web service using JAX-RS API. However there is more to it, follow below articles to learn more.Restful Web ServicesRESTEasy TutorialJersey TutorialThat's all for a quick introduction of java web services, finally if you are preparing for an interview then go through Web Services Interview Questions.References: JAX-WS Oracle Page, JAX-RS Oracle Page







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