

Lesson 16 Transcript: Java, Ruby on Rails, PHP

Slide 1: Cover

Welcome to Lesson 16 of the DB2 on Campus lecture series. Today we're going to talk about Java, Ruby on Rails, and PHP and how do they work with DB2. My name is Raul Chong and I'm the DB2 on Campus Program Manager.

Slide 2: Agenda

This is the agenda for today, and we will start with Java.

Slide 3: Agenda - Java

Now again, what we are covering here is not how to program in Java, or how to program in Ruby on Rail or PHP but how to work with these programming languages and with DB2.

Slide 4: IBM DB2 Driver for JDBC (aka JCC Driver)

So in the case of Java, we have one file which is **db2jcc.jar** which includes the type 2 and type 4 JDBC drivers. So, we are talking about the IBM DB2 driver for JDBC also known as the JCC driver and as we mentioned before, this file db2jcc.jar includes type 2 and type 4 JDBC drivers. Now where can you find this db2jcc.jar file? Well, it is included in IBM Data Server client, or in the IBM Data Server Runtime Client, or it's also provided separately as the IBM Data Server Driver for JDBC and SQLJ as a separate download. So these clients and drivers can be obtained all for free from the DB2 Express-C website, which is www.ibm.com/db2/express.

Slide 5: Basics

Now if you want to create a program using Java, you can use IBM Data Studio because IBM Data Studio after all is based on Eclipse, and there is a Java perspective that you can use, so you can use IBM Data Studio. Just make sure you include in the build path these files that are mentioned here: db2jcc.jar, db2jcc_Javax.jar and db2jcc_license_cu.jar.

Slide 6: Basics

And this is shown as well on the screenshot. So you have to add that to your Java settings for your build path.

Slide 7: Database connection

Ok, in terms of your database connection in your program, here highlighted in red is what you will put or how you put the URL if you want to connect to a DB2 database. So in this case, we are using `jdbc:db2:test`, where test is the name of the database that I want to connect to for this program. Now in this particular example we are using JDBC type 2 because we are not providing the IP address, host name and the port number; so that means we are using the type 2 driver here and that means that the DB2 client has to be installed where these applications or these Java programs are running because information about where, or the IP address of the host and the port of the instances is going to be stored in the DB2 client. On the other hand if we were using JDBC type 4, then we would include the port number here as well as the IP address or the hostname, and these would be the class for the driver for DB2.

Slide 8: Inserting XML data from a file

Moving on, if you want to insert an XML document or XML data from a file into a DB2 database using a Java program, just do it as any file when you try to insert from a file. So in this example, we have that the filename is this one client1885.XML and it is stored under this string fn, then you provide an insert statement, and you are using SetBinaryStream for the file.

Slide 9: Inserting XML data from a character string

If you want to insert XML data but you are hard coding the data, so you are not providing this as part of a file but just hard coding the XML document in the Java program, just create it as a string. So here you see we say “String query” and this is where we input the insert statement that we want to run. And then we use setString as you can see from this other highlighted part. Now XML here is just the variable we defined here at the top for the XML text, it is not a special keyword in this particular Java program.

Slide 10: Retrieving full XML documents with SQL

If you want to retrieve the information from the database and need XML, you will basically want to retrieve XML data from the database. Again you just treat it as a string, so you have a query. This is your string variable query and you are putting here the query you want to execute, so here you do all the selects you want. You can put XMLquery, XMLexists, all the XML functions that we talked about in Lesson 15 where we talked about pureXML. You can put them here in this Java program. And then as you can see from here, at the end when we want to retrieve the information we use getString. So basically what we have tried to do is that we don't want Java programmers to learn something new in terms of how to manipulate XML documents. Basically what they need to do is just treat them as strings and DB2 will know what to do. For example, you are trying to insert into an XML column, then DB2 will know that the string you are passing should be really converted to XML and should be parsed.

So, as a suggestion, given that we have this native XML interface to the engine in DB2 or we have basically pureXML on DB2, then we recommend you to try and just move all the logic that maybe you had in your Java program to DB2 to perform all the navigation of the XML document and just get what you want using these pureXML queries, using select, or using xquery. And then once you get what you want, then process that in your application. So, that way, your application will have maybe less; you will not use that much effort from the application side, but you are passing some of the effort to the database side, but the database side or DB2 is using pureXML, so it is fairly good in performance.

Slide 11: Retrieving part of XML documents with SQL/XML

Ok, this is another example where we are also retrieving some XML document from the database and in this case we are using a parameter marker. As you can see from this question mark, this is a parameter marker and that's discussed in the previous lessons as well.

Slide 12: Retrieving part of XML documents with SQL/XML

Here is another example also using parameter markers, and also using some casting.

Slide 13: Retrieving part of XML documents with XQuery

And here we have another example, but in this case we are using xquery instead of select, so before we are using SQL with XML extensions and now here we're using xquery. Over here, this is highlighted because with DB2 version 9, so not version 9.5 but version 9, there was a limitation where you needed to hard code; you couldn't use parameter markers and you needed to hard code information in the program. But with DB2 9.5, this has been resolved.

Slide 14: Update/delete part of XML document

Now in terms of updates and deletes, you can also see this as an example of a delete operation, and this is pretty much the same as a select, right? Because, you know, a delete is basically where you first have to find something using a select, or similar to a select, and then you use it to delete the information, so in a delete we can also use, for example, an XMLexists, and any of the order functions that we showed in Lesson 15 for pureXML.

Slide 15: SQL PL Stored procedures

Ok, so that's all about Java. We are basically concentrating on what you need to work on DB2 with Java and also concentrating on the XML part. Now this is just one slide where I go back to stored procedures, SQL PL stored procedures. I just wanted to show you that you can, when you develop your stored procedures, you can use any of the things that we talked about when we were covering pureXML. For example, here, we create a cursor and we use an XMLquery function. So anything we talked about related to pureXML could be put as part of your stored procedure. And you can also use, it's not shown in this example, but you can use XML as a parameter... as a data type for your input/output parameters, or any of the parameters in your procedure.

Slide 16: Agenda

Ok, so now we move on to the next section of this presentation, which is Ruby on Rails. And again we are not teaching here what Ruby on Rails is and how to program on Ruby on Rails but just maybe give you some awareness about Ruby on Rails and how you can work with Ruby on Rails and DB2.

Slide 17: What is Ruby on Rails?

So what is Ruby on Rails? Well, Ruby is an object oriented language, invented in Japan in 1995, and Rails is a framework that was created using Ruby. So in a sense, as an analogy you can think of Java and J2EE, Java is the language and J2EE is the framework. So here is the same, Ruby is the language and Rails is the framework. Now Ruby on Rails is becoming very very popular. It's very good to develop database backed web-based applications. It's an agile software development and hot new technology.

Slide 18: Ruby on Rails (RoR) highlights

Ruby on Rails or RoR is based on the MVC architecture (Model, View, Controller) stands for and promotes what is convention over configuration. So trying to force conventions and that way you don't need to code some different mapping because you're following some different conventions. It's easy to perform testing because with Ruby on Rails some test cases can be generated for you; and in the development environment, it comes with a web server which is called WEBrick. And there is a popular IDE which is RadRails (It's missing an 's' on the slide).

Slide 19: TPC Index <http://www.tiobe.com/tpci/htm>

Moving on to the next slide, this is just to show you how popular Ruby is becoming today. For example, in this slide we can see that the position in Jan 2006 for Ruby was position 21, in Jan 2007 it's now position 10. So Ruby has moved 11 positions within one year. We can see Java is still number 1, C is still number 2, and so on, but again, Ruby has moved up 11 positions. So that's something interesting.

Slide 20: Job market (Source: indeed.com)

Also here you can see that in terms of the job market, there are more jobs for Ruby and Ruby on Rails, so the trend is going up for this programming language.

Slide 21: Is Ruby on Rails the next Java?

And this is also interesting because many respected Java and PHP people are saying that Ruby on Rails may be the next Java. What is different from PHP is that Ruby has a framework which is Rails, which made Ruby popular; while PHP doesn't have a framework. The community is trying to work on a framework, but it's not yet catching up. It's not that popular yet.

Slide 22: Productivity... just an example

This is an example taken from this source here of Java code by Peter Szinek. And it just shows you that this is the amount of code you need in Java, and this is the amount of code you need in Ruby to do the same thing, right? So Ruby is a lot more compact than Java in this example.

Slide 23: Ruby utilities

This is showing you some Ruby utilities like RI for Ruby Interactive, IRB for Interactive Ruby Shell, which is just like a shell where you can input some information like putting "Hello Ruby" or you can do some addition, multiplication, etc. And here you also have RubyGems, which is like creating packages, sort of like RPM in Linux.

Slide 24: Startup Toolkit for DB2 on Rails

Now what we have available today to learn Ruby on Rails is the Startup Toolkit for DB2 on Rails. This is an integrated installer. So, you basically can download this package called "Startup Toolkit for DB2 on Rails." It will come with Ruby, Rails, all the drivers and extensions that you need also come with DB2 Express-C, so you just download this package, install it and then you are ready to go and start working with Ruby on Rails and also with DB2 Express-C. All of this is for free, free to download, free to use, so all of these come with that, and you can download the Startup Toolkit for DB2 on Rails from this website in alphaworks.

Slide 25: PHP

Ok, so moving on to the next section, we are going to talk about PHP

Slide 26: What is PHP?

So PHP is the most popular Web language in the world today: 70% of the UNIX-based, Apache Web platform market and 40% of the overall market so 70% on UNIX-based, Apache Web platform market, and 40% on the rest.

Slide 27: Why PHP is popular

Now it's a very popular scripting language because it's very easy to develop; it's very quick to develop on PHP, it's very robust, and has high performance and there is a vibrant community and it can be easily integrated with other environments.

Slide 28: PHP - Key driver of LAMP Stack

So PHP is also part of the LAMP stack, which stands for Linux, Apache, MySQL, PHP/Perl/Python, and the LAMP stack is very popular in the open source community; although, there are some concerns about when the open source software used in companies, but anyway that discussion is not part of this course.

Slide 29: DB2 Connection options for PHP

Ok, in terms of how to work with PHP and DB2, there are several PHP drivers for DB2: we have PHP Unified ODBC Extension, which is an old extension and it was not very good, so we don't recommend you to use that. Then we have `ibm_db2`, which is good, but it's only for DB2. Then we have `PDO_ODBC`, which can work with DB2 and other databases. And then we have `PDO_IBM` which is a newer version and more stable than `PDO_ODBC`.

Now PDO stands for PHP Data Objects and it is basically a standard way to interact with databases in a more object-oriented way. The way I compare PDO is by doing an analogy to Java. So, we have Java and we have JDBC. JDBC is a standard way to develop Java applications to connect to databases or to work with databases, so in the same way we say that PHP is the language and PDO is the standard way to work with databases in PHP, also Java, JDBC, PHP, and PDO. And the recommendation is that you should probably use `ibm_db2` if you are just planning to work only with DB2 databases, or `PDO_IBM` if you are planning to use PDO with different databases, but one of them is db2. You can get all the drivers from php.net.

Slide 30: PHP extension for DB2 (ibm_db2)

This is more information about `ibm_db2` extension.

Slide 31: Your first ibm_db2 application

This is one example of an `ibm_db2` application: all the php scripts or programs that are created using the `ibm_db2` extension. All the functions start with the `db2_connect`, for example, `db2_prepare` and `db2_execute`, etc. While, when you code for or when you code using the PDO extension, the `PDO_ODBC` or `PDO_IBM` extension, then it is more object oriented. You use `new`, for example, to invoke or create a new connection, etc.

Slide 32: Configuring PHP for ibm_db2

In terms of configuration of PHP for the `ibm_db2` extension, you need to modify the `php.ini` file in Linux or UNIX with this information or in Windows with this other information shown on the slide. Or we also recommend you to just install, download and install Zend Core for IBM. We will talk more about Zend Core for IBM in next few slides.

Slide 33: PHP Data Object (PDO) extension

This is more information about PDO, the PDO extension.

Slide 34: What is Zend Core?

And this is what Zend Core is. Zend core is a seamless out-of-box supported PHP development and production environment. So basically you can think of it as an environment that comes with PHP, all the extensions and drivers that you need, and DB2 Express-C. And it also has a console or a Control Center that allows you to work or facilitates the configuration of either your web server (Apache web server) or your PHP environment. It is free to download and to use from the website that is provided at the bottom of this slide.

Slide 35: Zend Core for IBM

These are some of the things that come with PHP that I already mentioned.

Slide 36: Zend Core Management & Control

And this is how the Control Center in Zend Core looks like, Zend Core for IBM.

Slide 37: Zend Core PHP Configuration

And these are more panels of Zend Core for IBM allowing you to configure PHP or also what the view was when we start web server from there.

Slide 38: Zend Core Remote Debug & Benchmark

And here is more information for debugging.

Slide 39: What's Next?

And we have reached the end of this lesson. Again, the purpose of this lesson was not to teach you how to code in these languages, but just to mention some important facts about the languages and working with DB2. So, congratulations because you've completed this Lesson 16 on Java, Ruby on Rails and PHP and as to what is next: it would be Lesson 17: Troubleshooting tips. Thank you very much and have a good day.