Lesson 3 Transcript: Part 1 of 2 - Tools & Scripting

Slide 1: Cover
Welcome to lesson 3 of the db2 on Campus lecture series. Today we're going to talk about tools and scripting, and this is part 1 of 2 parts. My name is Raul Chong and I'm the DB2 on Campus Program Manager.

Slide 2: Agenda: Introduction
This is the agenda for today; and in this first part, well talk about the introduction, the Control Center, and the command editor. In part 2, we'll cover the rest of the topics. So let's start with an introduction.

Slide 3: DB2: The Gig Picture
We showed this chart in a previous lesson; it's just to show you the big picture of DB2, and in the red ellipse we're showing what we're focusing on in this presentation today; so we're going to talk about the tools. Now, we cannot cover all the tools, we're going to cover just the important ones.

Slide 4: db2 Tools
If you go to Start > Programs > IBM db2 (on Windows) you will be able to see a menu like this. Now; on Linux you cannot get this menu, but you pretty much have many of the same tools.

Slide 5: Agenda: Introduction
So let's start with the main graphical tool, which is the Control Center.

Slide 6: Control Center
From the Control Center you can do from 90 to 95% of all the operations in DB2, and rather than going through the slides, I'm going to give you a demo on how to work with the Control Center.

Demo: Control Center 1
So, to start the Control Center there are many ways. The first way is to go to Start > Programs > IBM db2 > db2copy 1 > General Administration Tools > Control Center. So that's one way to do it using the Menu on windows. Another way to do it would be to execute the command **db2cc**, c for control, c for center, **db2cc.**

Demo: Control Center 2
So if I press ok here, then it will start the Control Center. All the graphical tools in DB2 are created using Java. Now the first time you open the Control Center, you will be prompted with this dialog box, or it asks you what type of view you want to choose. So just to make it more complete, I'm going to choose the advanced view. Now I'm going to remove this dialog box so it doesn't appear any more, I click ok. I'm going to maximize the Control Center so that you can see it better.

Demo: Control Center 3

So from the Control Center you can first of all take a look at all the systems you can administer, in this case I can only administer my own computer, which is called raul chong, but if you were on the network you could administer other computers in the network. Now if I expand this tree, I can see instances, and within instances, I have one instance, which is instance db2. Going down, I can see databases, and if I expand the Databases folder, I can see that I have four databases created. If I choose the SAMPLES database and I expand the tree, I can the see different objects. I can see tables, views, aliases, etc. etc. So if I pick tables, at the bottom here, let's say, first at the right hand side I can see information about different tables. So let's say I'm going to look for the employee table, and as soon as I click there, at the bottom, I will be able to see the structure of the employee table; I can see the columns, I can see the data types of the columns, the length, etc. etc., I can see that the first column has a primary key.

Ok, now I can also double-click on a given table, let's say I double-click on the employee table, and that will open the content of the table, I could make changes to this table, for example, I can make a change here, but let me make another change here, and let's make this change, for example, I'm going to call this steve. I could click on commit, and that will make sure that the change has taken effect, and it's safe on disk. If I had clicked rollback, then it would not have saved the change. I can also add rows, delete rows, etc. etc.

Demo: Control Center 4

Ok, now what else can I do from the Control Center? From the Control Center what you have to remember is just to right-click. Right-click whenever you want to perform an operation. So, for example, if I wanted to add an instance, I would right-click on the instance folder and I can choose Add, then if I choose, for example, a database, the same thing, on the Database folder, right-click and I choose Add; let's say at the database level, if I have tables, I right-click on tables; in this case if I want to create a table; on databases too, you can also create a database from here.

Now given that I showed you add and create, well in the case of instances you see Add—what is the difference between Add and Create? And that's a confusion for many people who are new to DB2, sometimes get confused because they say I'm going to create an instance, and they go and right-click here and they select Add. But adding is not really going to create an instance, adding..., whenever you see the word Add in the Control Center it means you are adding from somewhere else whatever object it is; for example, if it's an instance, you're adding an instance to the Control Center, but the instance was created before maybe using the command line.

Using, as explained in lesson two, the **db2icrt** command to create an instance, the same thing with the database, if you choose create, then yes, you are creating a new database, but if you choose add, you are actually adding a database that was already existing but was not added for some reason to the Control Center. So just remember, the Control Center is a graphical tool; every GUI tool is like a layer on top of the actual engine; so just think of the graphical tool as a view, and you can add things to this layer or to this view, or you just don't add them.

Demo: Control Center 5
Ok, now let's take a look an instance in more detail; so what are the things you can do at an instance level? If I click on the db2 instance, which was created, I can right-click and I can do many of these operations. So I could start an instance which would be equivalent to the **db2start** command that was explained in Lesson 2. I could choose to stop, equivalent to **db2stop**. Start admin is like starting the instance but as an administrator, so you would be limited, or basically nobody else would be able to do much on the instance except the person who started it as an admin; and there are many other options. Now this one here, configure parameters is the one as well that I mentioned in Lesson 2.

Demo: Control Center 6: Edit Configuration
If I click on Configure Parameters; this is basically equivalent to the command **get dbm cfg** to get information about parameters. So in this case, for example, I can click on authentication and you'll see server. If I click on these three buttons, you will be able to see the different choices for selection; and I'm not going to change this but, over here, as well, you can get an explanation about what these parameters are for, and you can do the same for different parameters. There are different sections here: administration, application, communication etc. etc.

Demo: Control Center 7
Now you can also do configuration at the database level, so from here, let's say from the SAMPLE database, you can right-click; you can do many of the operations; you can also drop the database, remove the database; again this is similar to the concepts I talked about when I was talking about create and add. So the same idea here; drop is going to delete completely the database, you will get rid of all the information; while remove is not going to delete the database, the database will still remain there, but you are removing it from the graphical tool, from the Control Center.

Other things you can do here, you can connect; I will talk more about this in a few minutes, but here is Configure Parameters, as well. You can also use configure parameters at the database level, and the parameters that you get here are different than the ones at the instance level, but it's the same idea, so there are different sections, application, environment for logging, and so on. So for example, remember when we were talking about changing parameters using the command line, we were using the command **get dbcfg for sample**, for the SAMPLE database, and we picked the logfilesize parameter.

So here is the same parameter; I can click on these three buttons, and I can make the change to whatever value I want, for example, 1000, and you can see here more explanation about that parameter, then I can click ok. Now in this case you can see that the second column tells you the value that you have right now, and the third column tells you the new value, and also here, the nice thing about this window is that it tells you that's there's a pending value effective when—after the database restart. So, remember in lesson 2, I was talking about whether a parameter is dynamic or not, and here through this column you can tell if a parameter is dynamic or not, and this other parameter, as well, Dynamic yes or no. So this particular parameter is not dynamic and that's why it will take effect only after I issue a database restart, which means that I get rid of all connections, and then on the first connection then this new value will take effect.

Demo: Control Center 8
Since we're here, most of the graphical tools in db2 have a button called Show Command, or Show SQL, in this case it's Show Command. If I click on the Show Command button, I can see the actual command that is run behind the scenes. In the end, the GUI is just a view or a layer, but behind the scenes we are just executing these commands. Now the nice thing about this is that you can copy/paste and save this command into a file and eventually you can start creating your own scripts and it will save you time in the long run. So let me just cancel from here, and going back here to SAMPLE. Now many people say there are so many parameters and I'm new to DB2 and I have no idea what this parameter means or what value I should put to this parameter. Well in DB2 we have made this task a lot simpler because what we now provide is a configuration advisor. This is an advisor or a wizard that based on answers to given questions, it will generate the values for the many parameters for you.

Demo: Control Center 9 - Configuration Advisor
So this is the way the Configuration Advisor looks like, and if I click on Next, it will tell me, how much memory do I want to use for my server? Right now I have 2GB of physical memory, so how much do I want to use for this server. Well, let's say I want to use almost 1GB, click next. What type of workload will I be running on this server, is it queries or transactions? Queries is normally more sequential type of a query—the way the query goes is more sequential for reporting purposes; transaction is more random such as a small update, small delete here, etc. etc., so let's say I want transaction type of workload.

On the next step it asks how many SQL transactions per workload? More than 10, less than 10; let's say fewer than 10. Priority, do you want faster performance or faster recovery? Populated—is the database populated, yes or no. Clicking on these tabs and clicking on Next is the same thing; click on Next. How many connections there are on average? Isolation, this is used for locking, for example, what type of policy you want to use for locking. And then finally when you click on the results tab, you will get this dialog or window, where you can see the current value for the parameter and the suggested value, and you can tell from the values in bold—the ones in bold are the ones that were changed by DB2, or basically those are the ones that are being suggested by DB2.

So this is a very nice tool because you don't need to know what value to put since DB2 will help you to choose what value you should use. And this is a very good tool. There were tests when we were creating this tool where we used a performance expert and we compared his results with the ones from the Configuration Advisor, and the performance, after the changes suggested, were better for the performance expert, but were not better by a large margin. So this means that this tool is very very good and it's basically using the brain of DB2 to calculate these values. Then you can click Next and you can schedule when you want to make the changes. You can click Next, and you can see all the commands that will be executed. If I click Finish, I will be executing those commands, but in this particular demo I'm not going to execute those to save time.

Demo: Control Center 10
Alright, now what else can I do if I right-click on the SAMPLE database? Well, there is another nice tool, which is the Design Advisor, and we'll talk more about the Design Advisor when we cover indexes, but basically it allows you to design indexes, depending on your workload. Some of the things that are here will also be discussed in other lessons of these e-learning courses. Now, this is basically giving you a brief but good overview of the Control Center.

Demo: Command Editor 1
Now we're going to talk about another tool called the Command Editor. So the Command Editor can be started using this button here, so if you click here, you can start the Command Editor. You can also start it from Start > Programs > IBM db2 > db2copy 1 > Command Line Tools > Command Editor, so that will be the long way to do it. The second way is within the Control Center, you can click on this button. Another way to do it is to click on Start > Run and type **db2ce.** All of these commands, **db2cc**, **db2ce**, and more that I will show you later could be used in Linux as well to start the different graphical tools, which are exactly the same as the ones I'm showing you here on this Windows demo.

Demo: Command Editor 2
So let me start another window for the Command Editor, c is for command, e is for editor, so it's very easy to remember. Then if I click ok, I will be starting another window, so now I have two Command Editor windows, Command Editor 1 and 2. Ok, let me just close one (that was just for demonstration purposes). Now let me just show you what you can do with the Command Editor. From here you can click on Add and let's say again, you are going to use the SAMPLE database, and click OK, and that's how you will be connecting to the SAMPLE database.

Another way to disconnect, from here you can choose the blank space, and that will be disconnecting, which is invoking the Connect Reset command. From here you can also do a connect, you can say, **connect to sample**, and then click on this button to execute. Now I'm connected, so I can connect by using the Add button, or just by executing the command. And also from here I just do connect reset, if I want to reset the connection, so the reset is finished. Or, I can do many other commands. So let me connect again to sample, and this time I'm going to put a semicolon here; I'll explain what that means in a minute, and then I'm going to do **select * from employee;** (semicolon), **select * from department;** (semicolon). Right; then I'm going to right-click on this area and I'm going to choose Clear results; you don't really need to clear the results, but I want you to see that I'm getting new results here.

So why do we need this semicolon for each statement? Well the semicolon indicates that that's the end of the statement. For the first case, when I was doing a **connect to sample**, and that was the only sentence, or the only query, then I didn't need to put a semicolon because that was the only one, but in the case where I have several statements, in the screen, then I need to put a semicolon because DB2 will execute each statement, one after the other, like a script. So if I now execute this, and by the way, here at the bottom you will see what the statement terminator character is, in this case it's the semicolon; the semicolon is the one used by default. You can change it from here, let's change it now, if I change it to the @ symbol, I will have to change it here, here, and here, so that DB2 knows exactly how to, or what is the statement terminator for each statement. Now if I click here to execute, DB2 will execute the three statements one after

the other: this one first, then this one, and then the third statement. So if I look at the results, I'm going to go up to the top, so I scroll up to the top, and then you can see that it executed the **connect to sample** and this is the output; then it executed **select * from employee** and all of this is the output; and then it executed **select * from department** and this is the output. So it executed the three of those statements, one after the other. Let me clear the results here; let's put back the original semicolon as the terminator.

Demo: Command Editor 3

And now what I'm going to do is, if I just want to execute one statement, and not the three of them, let's say I just want to execute the second one, I can highlight it the way I did it here, and I can execute, and it will only execute one statement. Now we've got the output in a different tab and that's the default behavior if you get the result of just one query, to just display it on a different tab called the Query Results tab. Now if you don't like this, and I particularly don't like it—and when we talk about XML, you will see that it's not good to present the results like this. So normally what I do is I go to Tools > Tools Settings and I choose Command Editor (let me maximize this window) and I remove this checkbox from here, right; so let me close this, let me close this, and let's just close this to make sure the changes take effect. And let's start the Command Editor again, so if I type Command Editor again, then it should start the Command Editor and we will make sure if I now quickly type **connect to sample**, **select * from employee**, **select * from department**. Now, let me first of all connect from sample from here, ok, because what I wanted to do..., let me just clear the results, is to highlight this statement, this time if I click on the run button, you can see now the output is appearing on this same window, right.

The reason that it's appearing on this window and not on the Query Results tab is because of the change that we just made in Tools > Tools Settings, the one I showed you before, Command Editor, and then this one; we got rid of this one, so that's why we are getting the results on this line. Again, this is probably the best way to display the results, especially for XML. Anyway, as you can see, when I executed just the second line, when I highlighted it, if I go up, it shows me that it only executed one statement, great. I'm going to clear the results here.

Demo: Command Editor 4

Now what else can I do here? Well, I can also click on this button here, which is to show me some history on my current session. On this session, I just executed only this **select * from employee**, but I can select it and choose paste and in this case it pasted it where my cursor was, but there is **select * from employee**, so it's just a history to save some time; so that you can copy and paste. Another thing you can do from here, let me delete this, is that you could save this into a file. So you could specify where you want to save this and later on you could—so, let's say I'm going to put it in this directory called erase and I'm going to call it raulscript, I can say .txt and say OK. So basically, I just saved this into a file and I just created a script, right; if I want to run that script later on, I can open from here and I can look for that script in the erase database and I'm going to look for raulscript, which is there, so I click OK, and say Yes. And then you can see that my file is open, and my script is open and I can execute it by executing, by clicking on those three lines and you get all the results back again, great.

Demo: Command Editor 5
Now what else can we do from the Command Editor? From the Command Editor I can also choose let's say this particular statement, and I can click on this third button and what that will do is create a graph. This is called Visual Explain, and Visual Explain shows you how DB2 is accessing your information, you data, so in this case it's first accessing the department table, and it's doing a table scan that is costing 7.61 timerons, and that's the final return.

Timerons are a special unit in DB2, and basically they are used to determine the cost of this query—but timerons depend on where you're running this query, because the calculation of a timeron is based on the CPU speed, on memory, etc. etc. So you may be running this same query on a different computer and you may get a different value for the timerons. So timerons are good if you'll be running the same query on the same machine and you see a reduction on the cost of the timerons, so then you can tell, for reference, that you are improving the cost of this query and the performance of this query. You can also double-click on these buttons here, and you get more information, and that may be useful to you when you're doing performance analysis.

Now if I do, for example, I start from that where that number is equal to E01 and I execute this third button, you will see that in this case you get a different access plan, where rather than doing a table scan as in the case before, I'm doing an index scan. An index scan, what it will do is… I'm looking at this table, and using an index, which is PKdept, which happens to be a primary key and then doing an index scan and from there, this cost is 0.03. Then I'm going to do a fetch, which is: I look at the index, I scan the index, then I find what I want, and then from the index I will point, or I will have to go to the table data, so I'll fetch from the table data, and that will cost the cumulative of this, which is 7.6, and then the final cost it will be 7.6. Anyway, that's just to give you a quick overview of what could do with the Command Editor.

Slide 7: Launching Control Center for the First Time
So with this, let's just go back to the presentation, to see if I missed anything; that means the Control Center where we talked about this.

Slide 8: Launching the Control Center
This I didn't mention before, but you can also start the Control Center from this green icon. So let me just quickly go there.

Demo: Control Center
Here, at the bottom, you will see this green icon. If I just click on the icon, right-click on the icon, I can see that I can start the Control Center as well from here. You can also stop and start DB2 from here as well. When you see this icon all green, that means that the instance is started; if you see a red square, on top of the green figure, that means that the instance is not started.

Slide 9: Control Center
We already talked about the different panes in the Control Center.

Slide 10: Changing to Control Center's Advanced View
And we'll cover these in more detail in other lessons.

Slide 11: Advanced Control Center View
And over here, I think this pretty much has been covered.

Slide 12: Command Editor (and other slides)
We talked as well about the Command Editor, we showed you how you can start the Command Editor from this 4th button from the Control Center, we showed you the different areas in the Eommand Editor, how to connect, and how to run. And this is probably the part I missed, which is the SQL Assist Wizard, so let me go back to the Command Editor.

Demo: Command Editor
And let me clear the results here. And here what we have is this button called SQL Assist. This is a wizard that allows me to perform some assistance in terms of building SQL. So for example, you could even choose delete, update, insert, or select, and this is very useful especially for teachers who want to teach SQL to their students, or for students who don't know SQL, they can use this tool, and say OK I want to do a select.

Now I'm going to say from which table?, let's say from the ACT table, and when I click on this button here, look what's going to happen at the bottom of this screen. So if I click on this button, now here you will see that the SQL was generated. Now if I continue, say select from this table where, let's say where act # is equal to a given value, let's say 1 and I click on this arrow again, now here the SQL has been built, select * etc. etc. Once you're happy with the SQL, just click on OK, and then as you can see the SQL has been pasted to the Command Editor. Now you can run it, and in this case, well I get zero rows back; it shows that the syntax is correct; * so that's how you can use SQL Assist to assist you when building SQL.

Slide 13: SQL Assist Wizard
Going back to the presentation, we already talked about the SQL Assist Wizard.

Slide 14: Show SQL Button
Here is the Show SQL Button; it's similar to the Show SQL button that I showed you before, and it's fairly useful for showing you the syntax. So it's a good way sometimes when you don't exactly remember the syntax, use the Control Center or the Command Editor to show you the exact syntax that you want, maybe later to put to the script.

Slide 15: Quicklab #4 -- Populating the EXPRESS Database using scripts
So with this, I suggest that you pause this presentation and start working with Quicklab #4 so that you use a script to populate the EXPRESS database which was created on a previous quicklab.

Slide 16: To be continued...
So with this we have finished Part 1 of this lesson, and we hope you move on to Part 2 to complete the lesson of tools and scripting. Thank-you and have a good day.