

JULIAN CHAVEZ: Good afternoon, ladies and gentlemen. Last class of the last day and everybody's ready to go home and tired and let's see if we can fly through this and get this baby wrapped up.

So welcome to Making Data Work for You. I'm Julian Chavez, I work with AECOM, I'm an engineering designer. We're a Plant 3D, SQL databases, Excel, Access, and other third party software.

So in this class, you will learn how to improve productivity and workflows when working with databases between plant 3D, data manager, SQL databases, and exporting those in and out to Excel databases as well as Access. Hopefully, we can teach you more quicker workflows, introduce you to filtering and modification options, and how to make mass changes using Excel to be brought back into Plant 3D through Data Manager.

So current show of hands, everybody here using Plant 3D right now? Majority. Is everybody using SQL databases with those? Some? Here and there depending on the project, right? Well, that's great.

So given objectives. We want to discuss the best practices and approaches to utilize the data and maintain information within databases. Understand the relationship between these databases and how they communicate with one another. Implement best practices and workflows. And where we find, most important, is recognizing the limitations and advantages of working with databases, because there are some things you can do and there are some things you can't and don't want to do.

So Plant 3D databases, there are two that I would like to focus on. The first being a local database, which is usually a SQLite database, which is kept in a text file locally and used for, I'd say smaller projects. And then second is a SQL Express server or a full blown SQL database if you want, and that is for larger projects that are going to have lots of information, multiple users, a lot of people within them-- you don't want to be tripping over one another, because when you're using SQLite, you will start having problems with multiple people in the project.

So SQLite. When creating a project in AutoCAD Plant 3D, you can pick from either SQLite or SQL Express Manager. Based on the format of the application, you can make connections to

the database to have small projects have access to share data amongst themselves.

With SQL Server Express, like I was saying, it's for larger projects. And the great thing that I recommend that even if you have a small project, I would even throw it in a SQL database, a full blown, because the power that you're going to get out of that to extract information, be able to bring that information into third party programs, that's where you're going to leverage cost savings, being able to use data that is already existing, and not have to lose anything in the transition when going between different software programs.

So the benefits of a SQL Server Express are, like I was just saying, is that multiple users have more freedom to work around-- move around-- and that gives you the flexibility to bring that software into third party programs. Now by show of hands, is anybody exporting out data into third party programs? Sir, may I ask what?

AUDIENCE: I use [INAUDIBLE]?

JULIAN CHAVEZ: OK. Anybody familiar with like a LECDEV Instrumentation manager? No? Maybe one? The reason that we like that is because by exporting out to SQL into these third party programs, you're utilizing the data that you're inputting from the front end of the program and being able to have that carry over for you. And with programs like Instrument Manager, you can have it create your data sheet for you for your INC books, instrumentation and control, and anything along the lines of INC.

Now let's talk about prerequisite, because if you already have a project existing and it's existing in a SQLite database, we can migrate that. And in my handout, I've linked to a class that I gave last year with a co-speaker. And it talks about migrating existing projects from a SQLite database to SQL Server. That way, you don't have to start all over, scrap what you have already, you can kind of pick up where you're at now and move forward with that information. So that is in the handout, and that links to last year's handout, which hopefully will be beneficial.

Now if you just start a new project using a Plant SQL database, you're good to go.

Now the first thing we're going to talk about is going to be SQL security. The way I have these slides set up is it's going to play a video that I've had prerecorded. I apologize for the quality, because what IT gave me is not the best. I'm hoping to export those out to Screencast to make those available to all of you.

So SQL security will be the first thing we go over. And in SQL security, we can assign new users, schemas owned by the user, and assign database roles.

So here, we're opening up SQL Studio Manager. Going to my project in the database. And with Plant 3D, it creates these folders for you automatically by appending at the end, P&ID, piping, ortho, and iso.

You can expand that, go down to Security Users, and, depending on how the program is set up, if you have logins already available-- like you have a domain through your company, you can just type in the domain user's name, do a check name search, it'll go through, it'll find that user based off of their windows login credentials, and then you can come down here to the skimmer and assign skimmers for tables within your database, and assign database roles, such as owner of the database, admin, read and write.

This works great if you have multiple people working on a project, but you want somebody who's working in P&ID to be able to make modifications, but somebody in piping not going to be able to make modifications to your P&IDs. It creates some granularity, some control, and you can kind of break this out. We find that by adding users, such as I have Danny Boy here, that what this works great for is when creating Plant 3D in a VDI environment, it's kind of hard to control who has access to what.

So by using SQL databases and using Windows authentication, you can use that with login credentials to control who has access to your projects and what portions of your projects, including cables within. Any questions on any of that? Sir.

AUDIENCE: If you were, for a project, you can add more users and wanted to [INAUDIBLE]?

JULIAN CHAVEZ: Yes. So say you have like a new hire come on because you need to buy more staff to support the project, as soon as those people get set up with IT and their login credentials get added, you continue to add them. That's another step I didn't go over, but you may have to-- depending if they're new, you may have to come in to the logins and add the login that's separate than the user.

So next we're going to talk about Data Manager. Now who's familiar with Data Manager, a show of hands? Now who uses Data Manager to export to Excel and then bring back in modifications? Awesome.

So in Data Manager, the video will show you how we assigning tags to equipment, Access project data and reports, and then modify project data.

So here we have a Plant 3D project that we opened up, a P&ID. And I'm showing that I have a pump here, and there is my pump tag and description that I'll highlight just to show that that pump tag is 240P, 8400.

Then we'll go ahead and open Data Manager. Go to equipment pumps. Here you can see the pumps that are listed within this P&ID. No associated information across the top, because when you export this out to the Excel, it will bring whatever is highlighted with the note here. You want to select Display Data, saying that what we have here is what you want to export out to Excel.

I like to name it with the project name and then with whatever note that I'm exporting out, because that will be important when you re-import it back in knowing which one you exported from.

We export that out, open up the Excel file. Here is the information out of Data Manager in Excel. Same column, same rules as you'd see in Data Manager.

Now what I'm doing is I'm coming over here and I'm changing the tag to a 9000 series as opposed to 8400 series. Make save. Now we're going to go ahead and re-import that back in. It keeps a log in the file. You can turn that off, but it's good to keep it in my opinion.

So here is the display data that we're going to import. We're importing back to pumps and all changes that happened or modifications are highlighted in yellow. Here you can notice that the tag number has changed, and at the top, we have new toggles that got added by re-importing the data. Now in the handout, it will give you step by step, and it'll also go over each of these toggles, how we have individually to accept changes or to accept all changes globally.

Now this is great because you may want to come through and change just one pump, maybe one pump changed in an area, not all of your pumps. So be very cautious and be aware of if you're going to change things individually or globally.

Here we go, we saved that information, accepted it. It updated the tag and now we're looking at 9400 series. We did not change the other three. We're going to go ahead now, accept all. And now, all across the bottom have been updated to 9400 series. We'll go back in, assign tag, and notice that the tag is updated as well. Any questions on that? Yes.

AUDIENCE: So specifically the Data Manager. Sometimes you have to adjust the columns, so then they'd be in a different order. Is there a way that can be done globally so that whoever the user is, [INAUDIBLE] you don't have to have that project go to the Data Manager and have-- you know, maybe it's a tag first and then it's flow rate. And after the [INAUDIBLE] and done, can the user-- a different user actually see that core change on the data menu?

JULIAN CHAVEZ: So you're saying something like that keeps a log of the modification that you've made through Data Manager?

AUDIENCE: So let's say, for example, we want to direct support of [INAUDIBLE], that we wanted a different order and add a box in the order that's shown on the database. So what I know is, I can move the column around.

JULIAN CHAVEZ: Yes.

AUDIENCE: And then when I export that, I have a certain order. But if the person next to me were to go into that project and see the Data Manager, he wouldn't have the order I have customized.

JULIAN CHAVEZ: And from my understanding, you can go into the project set up and maybe work with the reports section. And instead of kind of taking the out-of-the-box approach, take the report approach, because that way you can customize exactly what you want, save those reports out, and in handout it talks about reports. And what's great with that is you just create one, save it, create a template based off of that, and share it.

Any others questions before we move on?

So next we'll talk about SQL export to Access. So the SQL export to Access and Excel are pretty similar as we go through these steps, it's just a different selection dropdown Access will require a little pre-setup. You have to have an empty MDB file to export to. I have uploaded that in the class materials, it is included in the zip, just because it's kind of hard to track those down sometimes.

Otherwise, what you're going to do is we'll do destination to an empty MDB, copying the data from the SQL database, and choosing the data sources we want to export.

So here we are in SQL Studio Manager opening up the database again. We go down and open P&ID. Tasks, right-click. Export. Data The SQL Server wizard, import-export wizard will

show you. Here at the top you select Export to Microsoft Access. Browse-- and I'm sorry, I'm flying fast on this one, my apologies.

I selected the empty MDB file. Here I chose to copy my tables instead of using a script, you can have a pre-setup script. I come into my list of tables. You can select all tables or, in this case, if we wanted to do pumps again or equipment, select equipment. Next. You will get this error, and this error happens because of truncation. So we're going to set that to ignore. Next. Run immediately. Next. Finish.

Go through, tell you if it's successful. Close. You can go out to where you saved it. Empty MDB file. And there is all of your tables that were in Excel exported to Access. And here you can see your equipment area, pump number, tag, and so forth. Same information that was in Data Manager.

Now the great thing about this is, is by exporting to Access, it gives you the flexibility of bringing into third party software, making it available to other engineers, other users who maybe are not really good with SQL or who you don't want to get into Plant 3D. Any questions? All right.

SQL export to Excel. Now it's going to be the same workflow except at the top, we're going to accept Excel instead of Access. You're not going to need an empty Excel worksheet, you can just do a Save As and export that out.

So we're going to be a destination to an Excel workbook, copying the data again, and choosing the data sources. Now people who are good with queries, you're not going to have any scripts, you're not going to have to always copy the data. If you want, you can write a specific query that will go out and grab specific tables, you can create filters, modifications, and so forth.

We have a SQL guru in-house. He comes upstairs and he can create these scripts for us to filter out information relatively quick. And it's a way to customize your data once again.

So once again, SQL Studio Manager. Database. And I apologize, I could not get it to not stop flashing, so I apologize for that. Go ahead and expand your P&IDs, right-click tasks. Export data. Next. Select your database. Choose to export to Excel. Browse to where you want to save out your worksheet.

Copy the data-- this is where you can write a query to specify the data that you want to have

exported. Come in, either select all sources or, once again, select equipment. Next. Once again, you will need to hit Ignore for the truncation error. Run immediately. Make sure everything is correct in that window. It will run through succeed. Close. Go out, open your Excel file.

Down at the bottom, that's how it will break it out. So if you just want to have one specific column or table, it will actually create just a sheet within that workbook. So the great thing is, is with Access, if you noticed, if you were to select all, you get all the databases on the left hand side within that project. The great thing is, is now, if you want to start breaking items out, Excel allows for a little more flexibility to say this group of engineers need to have the pumps or equipment, this group needs to have pipelines, and you can break out sheets that way.

Any questions on that?

AUDIENCE: Do you get anything additional exporting here to Excel than you do from Data Manager?

JULIAN CHAVEZ: I would say the power in this comes from the queries. Now, the way that I just kind of show now, it's pretty much the same whether if you export from Data Manager-- export from SQL, you're going to get a similar result. But if you notice, it's based on the SQL tables, not the Data Manager node.

So that's where the power comes in of having someone-- you can get *SQL for Dummies*, learn filter, learn some syntax to type in and create queries, and leverage the power of SQL to create custom outputs for you.

I flew through that. Wow.

AUDIENCE: [INAUDIBLE].

JULIAN CHAVEZ: Well, I flew through it! I mean, I expected the videos to go longer, expected more questions. I can go through, I can show stuff. The problem is, is everything is connected to MySQL database and VPN, I cannot log in through the computers, everything has to be prerecorded. But I'm more than happy to go through, replay stuff, ask questions, show specific items. Yes? So the the last step when you are mass exporting the data from SQL--

JULIAN CHAVEZ: Wow.

AUDIENCE: Mm-- Yeah, so can you save that? Can you create templates? In the future, so if somebody

were to come in and go directly to SQL and want a pump list template, you have all those selected parameters in a class pre-selected and exported.

JULIAN CHAVEZ: Yes. And that's where the power of the query comes in, because if you have it pre pre-written and-- let's see if we go back here. See if I can pause it.

That's why I put everything in the video, Christian.

AUDIENCE: No, it's because reading the through the documentation, the description on the docs, [INAUDIBLE].

JULIAN CHAVEZ: Well, the DBConnect part comes in with the migration in the second documentation that's attached in the handout. So the handout itself is 22 pages and then on top of that I have the migration and the DBConnect. And there, it's a additional part in there.

So your question was, is back here at this part-- let's rewind that up, sorry. Right here at this window. So this is where, if you write queries, you can have a query set up within your company that you have specific columns, specific information that you want that is tailored to your needs. You can save that off, bring that into SQL, and have it sort your data appropriately. Question.

AUDIENCE: Yeah, so you mentioned earlier that the SQL database itself have multiple users.

JULIAN CHAVEZ: Yes.

AUDIENCE: How do manage-- [INAUDIBLE] SQL thing, but, how do you manage for users [INAUDIBLE] for other locations? Is there a way to house it? So cloud-based or open programs?

JULIAN CHAVEZ: Yes. So the way that you-- what?

AUDIENCE: You could use Vault for that.

JULIAN CHAVEZ: You could use Vault. Or, if you can actually create a VDI environment, I would recommend that the most, because then you have everybody within the database. That's not necessary what you need to do, because if you set up the database to be accessed throughout your company, you can just have multiple offices just linked to that database.

AUDIENCE: So do you find that that speed over just network connections between offices is ever that information for the small amount of data you need to transfer out?

JULIAN CHAVEZ: Give you an example, we created a VDI server recently for Plant 3D, and it's using GRID cards from Nvidia. Now there is some delay, there is latency. The latency, though, I would say is not an issue. granted with the fact that you have synchronized data in one location. So I mean--

AUDIENCE: --little bit of time. Just some time to want to create a new [INAUDIBLE].

JULIAN CHAVEZ: Yeah, it's a trade off of a little bit of giving up time for the processing rendering power just from the latency of the connection, but getting that back from having data in one location with multiple users in one environment.

AUDIENCE: Is it [INAUDIBLE]?

JULIAN CHAVEZ: That is true as well.

AUDIENCE: If you have a [INAUDIBLE]. Say that your files [INAUDIBLE]. So it's really into-- Just looking into [INAUDIBLE]. The latency on a network is [INAUDIBLE]. So it's interesting is just the fact that the server itself for the SQL database has to have its own password. Is an actual cloud-based version, you think?

You can host it.

JULIAN CHAVEZ: You can host it in the cloud.

AUDIENCE: OK. Again, it's the speed.

So it is for that reason that we implemented [INAUDIBLE] And trust me, [INAUDIBLE] there's nothing easy about that, using the [INAUDIBLE].

JULIAN CHAVEZ: Yeah.

AUDIENCE: And it's much, much better now. For this reason, [INAUDIBLE] more offices and applications [INAUDIBLE]. I've managed projects for several different locations, and we had to go to Vault in order to stop [INAUDIBLE] from losing data.

Say what? Just on a Vault? So he worked with local databases? And knowing SQL database, it would be all the time we had [INAUDIBLE].

JULIAN CHAVEZ: Yeah.

AUDIENCE: P&IDs [INAUDIBLE].

JULIAN CHAVEZ: Question?

AUDIENCE: If you set the user control and convert the user level like--

JULIAN CHAVEZ: Yes

AUDIENCE: --you were showing, what does the user has to see [? to load ?] that information?

JULIAN CHAVEZ: Well, when they go to load up the project, they will not be able to. It will say, project data cannot load, please contact your administrator.

AUDIENCE: So they won't able to load the project at all?

JULIAN CHAVEZ: Well, yeah, if they're not in the project. So if you're not on the project at all, you're not put into one of the SQL users, you cannot open--

AUDIENCE: Is that for just [INAUDIBLE]?

JULIAN CHAVEZ: So in that case, since the piping is housed in a different file and the drawing has a specific GUID associated to it, they can access orthographics, isometrics, the actual Plant 3D models, but they can't get into the P&IDs and make modifications to--

AUDIENCE: So it-- gets an error probably in the drawing of the project?

JULIAN CHAVEZ: Well, that's when you open the P&ID, since-- the whole part that's specific with P&ID, when you open the P&ID, that's when it says, project data cannot be--

AUDIENCE: You won't able to load that drawing.

JULIAN CHAVEZ: Yeah, it won't be able to load, because it's going out, it's looking at the SQL, and then it says, oh, this user does not have access, please contact the administrator.

AUDIENCE: So can you build your piping models from P&ID then? If you have them locked up in the P&ID area?

JULIAN CHAVEZ: I see what you're saying. You can--

AUDIENCE: Will it reconnect the model?

JULIAN CHAVEZ: Yes, if you have a 3D model and you have a pipe, and then you want to click on that pipe and

associate a P&ID value to that pipe, you can still do that, because you're not modifying any of the data, all you're doing is pointing it to it. Question?

AUDIENCE: Can you [INAUDIBLE] from the P&ID? I'm sorry, instead of create item, [INAUDIBLE].

JULIAN CHAVEZ: Not that I--

AUDIENCE: Create a tool that it can do it, then use it--

[LAUGHTER]

JULIAN CHAVEZ: Yeah. No, not by default, but you do.

AUDIENCE: Yeah! Not by--

JULIAN CHAVEZ: We'll give Christian a plug, right? What was it? I saw him reading the book.

AUDIENCE: I had [? doubts ?] database yesterday, but here is data flow. Actually, yeah. Make the use more-- so make the user more [INAUDIBLE]. So took online, [INAUDIBLE] with me I took yesterday.

JULIAN CHAVEZ: Any other questions? Anybody want me to go back through anything? I expected some more, but granted, we are a small group, so.

All right.

AUDIENCE: I have a question.

JULIAN CHAVEZ: Yes.

AUDIENCE: What are some of the recommended don'ts when you're exporting to Excel, modifying the data in [INAUDIBLE] so you don't break your data.

JULIAN CHAVEZ: So if you go back to Data Manager, and let's see if I can pull up that video here. So when you were to export, they'll get a dialog box that will say that the first column of exported are your headers. So for example, you're not going to want to start renaming headers, moving headers. You can move columns, but you have to be very cautious.

The data export, the way the nodes are set up, and I'll show you that as soon as Data Manager pops up, here, we'll pause it. Right here. So these nodes, you need to be very specific on which nodes you're grabbing, at what level within the hierarchy of the tree, because

if you grabbed information-- you want to grab information at the hierarchy of it, so pumps, for example, you want to grab that node, export that node out.

The headers will come in as your first line in your Excel worksheet, you're not going to want to modify those. You can move them, but do not start naming area to location and things of that nature. You're going to want to do that in your project setup through project properties and change that in that area. So changing things that are associative to bringing importing back into Data Manager.

AUDIENCE: So at this depth, are there nodes that should not be exported?

JULIAN CHAVEZ: Actually, we've exported everything. To be honest, we try to break it just to see if there's anything that won't come back in. We haven't had anything that didn't successfully come back in.

AUDIENCE: The reason I'm asking you is you sometimes will have people, though, they export at the very high node. There will be group level columns and there will be segment level columns, and that's where it gets messy.

And then they modify something, because you got basically two different-- some of the data's coming from your P&ID-- like take service for example. Service is one that it is, in our office, at least, we had to slap some wrists when they go changing those, because they change them when they should just be working on others.

JULIAN CHAVEZ: Correct.

AUDIENCE: Because is child to the other.

JULIAN CHAVEZ: Yes.

AUDIENCE: So that's why I'm asking you. And there's no way-- once it's spreadsheet-- that it's obvious to the user, don't touch this column and that column.

JULIAN CHAVEZ: See, and I think that comes with a little bit of-- and you're right, there is nothing that shows that. And the only way that you really can visually see that is in the properties when you're setting up these items within the Plant 3D setup.

In the hierarchy, you have the asterisk next to the property. I wish I could open Plant, but I can't. But that little asterisk will indicate if it's a child or not. And I think having some training

that goes through and introduces that this level is at a child node, not a hierarchy, is the solution to that.

There isn't a global answer as in how to handle that when importing and exporting, because it's just about you have to maintain the relationship of where it came from and how it's going back, that's how it talks to itself.

AUDIENCE: [INAUDIBLE] at all is to not export properties of nodes, but export from report. You can read a [? foundation ?] report at all [INAUDIBLE] as opposed to hierarchy.

JULIAN CHAVEZ: Correct.

AUDIENCE: [INAUDIBLE] export. They only have the options, you want the rest.

JULIAN CHAVEZ: And that kind of feedbacks into his, because then you can control what's going in, what's coming out, who can actually change what.

AUDIENCE: So would it make sense to not have an all-inclusive report?

JULIAN CHAVEZ: Oh yeah. You're definitely going to want to break things out. That's why we were even talking about security here.

AUDIENCE: And then you probably do not want to the P&ID in the [INAUDIBLE].

JULIAN CHAVEZ: Yes! There should be a disclaimer down there, no P&ID or the GUID. Granted, they'll be changing GUID, sometimes it can help you.

AUDIENCE: If you know the GUID is, you can do anything!

JULIAN CHAVEZ: That's right. Any other questions? Anything else I can show? Yes.

AUDIENCE: I've got a question. We've got a couple instances where we'll be writing on something, you'll assign a tag to a PAL, and you save, for some reason, there was an error in your network or your machine locks up, it creates like a ghost tag out in the database. It won't show up in your Data Manager, and go save and retry and reassign a tag that [? fell, ?] it says it's assigned in the Plant Database Manager. How do go about fixing that?

JULIAN CHAVEZ: So in the handout, there'll be a link to the last presentation I co-spoke on, it talks about the connection between there. that will have your answer. But the way that you do that is by-- let's

see here, If I could show it.

Now I can't remember that directory off the top of my head, but it's under like C/Program Files/Autodesk/Autodesk Plant 3D. And then within there they'll be executable file, and it is this guy right here. As you can see, there's one for every year.

So this is P&ID, local data cache purge. So for that-- and there's one for 2016, I haven't added 2017 yet. I always copy these to my desktop, because then you can run this, it cleans out your cache for your SQL database, and frees up all those numbers that it thinks exist.

AUDIENCE: You know someone [INAUDIBLE].

JULIAN CHAVEZ: True.

AUDIENCE: Say that again, sorry.

So [INAUDIBLE] functions, you right-click on project, search the project, and then you can remove the history, then [INAUDIBLE].

JULIAN CHAVEZ: Correct.

AUDIENCE: Thank you.

JULIAN CHAVEZ: Any other questions? See if I could click all the way down. Please remember to rate and review and provide feedback. I'm sorry that I flew through that so quickly.

Hopefully you learned something from it. If you have any questions, there's anything I did not discuss or touch, please feel free to contact me, reach out. My information is associated with the handouts. More than happy to go over anything. And the videos will be uploaded as well.

AUDIENCE: Thank you.

JULIAN CHAVEZ: You very much.

[APPLAUSE]