

Good afternoon, I am Linda Whitney, Technical Solution Architect. My specialty is Cognos on SAP and as many of you are aware, I have worked with Cognos on SAP for several years now. Today I would like to talk with you about best practices with IBM Cognos framework manager and the SAP business warehouse. And there are three key take aways I want you to take out of this is where do you do the modeling because to this is relational versus OLAP modeling and there are many differences and three I would like for you to understand that the SAP info query is actually a database for you in our terms. So having said that, let's look at our agenda. First we will go through the list of some of the assumptions for not only this sessions, but assumptions that you need to make for your project as well when you are reviewing it. Then we will talk about pre-requisites that you need to understand this information not only for this presentation, but when you are building a project at and then we will talk about the inter operability that you get with Cognos once you have done your modeling and then we will move in to the meat of the presentation. We will talk about where to model and how to model and leverage the SAP PW Metadata and data. In this section, we will talk about framework manager, the SAP info queries and IBM Cognos 8 report studio. At the end I will show you a slide talking about where you can get a bit more additional information.

So the assumptions, first you need to be familiar with Cognos 8. Second you need to be familiar with the SAP business warehouse. The info providers and the info queries that make up by names such as *PW query, or Abax query [Phonetic]*, or what ever, but pretty much over all they are info providers and info queries and the other assumption is you are seeking some general information, not just tips and tricks of about the metadata and how to leverage it between SAP and Cognos. And remember this is guidance, this is not, this is true in every last situation because you have to look at the big picture to make it happen, but these are some proven practices that we have seen from a higher level that you can apply in your situation. Now the prerequisites and this is true for your projects also as I said, you need to look at your BW overall design, how everything is built from the back end and also the types of structures you are using in BW. For instance DSO versus Infocubes, this is like any other data warehouse. You have to have your data warehouse built to meet your needs, no matter whether it's DB2, Oracle, or SAP BW. So you need to review that first then you need to make sure your Cognos administrators, end users have the right BW security profile so that not only are they able to import and manipulate the metadata, but that they also can pull in the information itself, so that they can see the results that they are getting back with what they are doing. Info Queries allow the application of filters and calculations, what we call this is pushing back to the database, so an info query you must think of as a database view.

What I often tell people or ask people that have done relational reporting, I ask them do they always go directly against the data structure itself and they often tell me or most often tell me no, they built a data base view because they need to filter down the amount of data coming through, that's exactly what the info query is. There is no other way to build a database view in SAP BW. So we leverage the info queries as that BW database view. And remember you are going to need some technical resources and not only you are going to require these we said familiarity, but you are going to require these and they are going to have to work together in order to make this to work in the long run. You

need your query designer or your modelers as they might be referred to, you need your SAP BW administrators and the folks that do the security because they are keen and essential and everything you do, you need to understand Cognos 8 framework manager not just from a relational perspective, but also how to leverage for BW and you also need knowledge of Cognos 8 studios and understand how to do OLAP reporting from BW using them. Interoperability, so once we have accomplished all of these as you have seen with other data sources, Cognos leverages the data sources capabilities to give you the ability to do reporting, querying, planning, metrics, score cards, to build power play cubes, create events, utilize go office for bringing your reports up in Microsoft word and power points. To do GoSearch and use GoMobile. So you get a lot for your money out of it in the end just as you would for your other data sources. So now that we have talked about that how do you get there? So where do we model to leverage this SAP BW metadata. But there is actually three places you do it and we have talked about these a bit a minute ago, the framework manager will do some modeling there, but as supposed to relational modeling, when you bring in your DB2 or Oracle data sources, you don't manipulate the relationships that you are used to manipulating back and those. So where is the metadata modeling done? In framework manager as supposed to relational data sources, you don't do much modeling. Relational data sources often have you building relationships may be modifying them a bit in order to pull the data particular way. You don't need to create parameter maps for currency conversion because that's built in the SAP BW. You don't build parameter maps for language conversion, for the very same reason. So you really don't in the end do near as much modeling and framework manager as you are used to.

You are going to do a bit more modeling in the info queries, I said their database views and they are and the reason you want to leverage those database views is because it pushes the processing back to the BW server. You want to push as much processing back to the database server as you can. Then when you push that processing back you filtered out most of your data on the back end and then what you bring forward, you can do your final manipulation in presenting Cognos. If you don't filter on the back end and you bring everything forward that's a load you are putting on the Cognos server. So you always want to push back to the BW server where it can manipulate and filter much faster. Then there are something that you will do in the IBM Cognos 8 report studio that in, you are working with relational sources you might do back and framework manager. So the bottom line here is not all metadata modeling is done in framework manager as you have with relational sources.

Framework manager. So what is the purpose of framework manager? You are going to connect to the SAP BW data, you are going to select the content that you want to import your characteristics and key figures, higher keys, what ever and then you are going to bring it in to framework manager, create a package and then publish it out for the user community. Okay, let's talk about creating a monster query. Okay, just bring in what you need, limit the selection based on the user requirements, it will grow over time. We have found as far as proven practices that often when you bring in too much there might be some embedded filters or variables with in a structure or with in a restricted key figure. There might be filters that you have applied for one subject area and they do not

apply for another. So keep it small based on the end user requirements for a subset of reports and then as your needs grow, then you can bring in additional information. Here is a diagram kind of outlining what we have talked about. So starting from the bottom, if you are looking at SAP BW, this is your info providers. Your info cubes and your DSOs, then as I spoke out before the BW query designer is where you are creating this info query, where you are building in, you added business value and filtering out unwanted data. So once you have designed it here you save it and it becomes your info query. Then you turn around and using framework manager, you are building a framework manager package, once you have it created, then you are going to publish it out and use it in Cognos 8 for your reporting.

Now some import guidelines, as I said before BW query designer is database view modeling tool. Now I have said this, but there isn't an exception and this would be the instance of when you are bringing in SAP and non-SAP data, so BW query designer would handle your modeling for the BW data whereas you are familiar with if you have done relational reporting with Cognos. You will do much more modeling in framework manager for your relational sources and or virtual view manager. Okay, SAP info query, so looking at it from a modeling perspective, you have built your database on the backend and it's complete and so now what you are doing is you are adding additional value and that does not exist in the info provider or info cube itself. So you are going to expose the characteristics you require for framework manager and not necessarily bring in the universe. At the same time, you don't want to limit it too much. The goal is not one info query for one Cognos report. It is one query or one database view for many Cognos reports most typically for a subject area or for a particular user group. What else can you leverage in the SAP BW info queries? You can build in your variables, this pushes your filtering back to the BW server. You can put filters in, in the filter area of the BW query itself, these could be physical variance or an organization code because that's subject area may only be required by one particular organization. You can build structures if you translate structures to Cognos terms, if you are not familiar with them, this would be like a custom subset leveraging the SAP info queries. Now let's look at the info queries themselves. You have built your info provider out and now you are going to add additional business value with the BW info queries. So we will look at variables, filter structures, calculated key figures and restricted key figures.

So first let's look at the variables of filters, you want to use as much as possible. You want to push everything back to the BW server as much as possible so you are bringing less data to the Cognos server. BW variables they can be mandatory or optional, if you do make them optional you can turn around and also make them mandatory in Cognos if you require so you could make them all optional if you chose to unless it is something that must be there. I have seen times when physical variant needed to be a mandatory prompt. BW variables when you leverage them, when they come in to Cognos for query studio for instance, they will go ahead and pop up automatically, they would also do so for report studio, but what you can take advantage of in report studio is you can build a prompt page and format these variables using the Cognos prompting scenario. SAP info queries let's talk about the variables and filters. You want to use them as much as possible. You want all the processing as much as can be done by the BW server. Filters

are generally on the filter tab and those are very valuable. At times though, the physical variance that I spoke of might need always be a prompt value because it could change over time. So in that case you would want a mandatory variable which we can leverage. We also leverage the optional variables which is nice because if you required for particular report, you could still make them mandatory from the Cognos side. The BW variables can also be leveraged by the Cognos prompts instead of making a parameter of building one on the Cognos side, you can use the BW variables in their place and add additional formatting to them. A couple of reminders about variable support, the hierarchy selection variables where you select the hierarchy want to use it run time or not supported, but they can be simulated on the Cognos side. There is another session that takes place on *Wednesday [Phonetic]* at forum that you can review to see how this is done. There is also a proven practice documents out on the treatment practice site on the same subject. Another reminder is the selection option variable when it's brought in to Cognos comes in is a single select drop down. You cannot bring these in obviously and use them but they can be simulated, you can build BW variables for your ranges, for your single and multi select, what ever you want for the search one itself can be created using a Cognos search prompt.

The BW structures which I talked about is custom subsets, definitely you would rather leverage them in the SAP info query itself. The other part is when you put them in the BW query not only are they faster, they are typically cached for the session that you are using them, so when you are rerunning or building your report, they are out there and cached and they will come back even more quickly. One last reminder about them as supposed to a hierarchy that you are used to where you are able to drill down and drill up. Structures come in as flat, you cannot drill down even though you may have multiple levels within them.

Calculated and restricted key figures. These are not stored at the info provider levels. So when I refer to building at additional business value that's where the calculated and restricted key figures are since they don't exist in the database itself, you are able to add them in with the info query and once again when you build them here it does push the processing back to the SAP server. And it reduces the result sets, sent back to the Cognos server and the manipulation required. Okay, IBM Cognos 8 report studio itself, what do I need to do here and what do I need to remember. So let's talk about that is an OLAP style report design. We are going against an OLAP source, let's talk about prompting the MDX versus sequel filters and then your relational object like if then else logic case win. Let's talk about these considerations, the modeling that you don't do in frame work manager and the query, let's talk about what you do here in report studio itself. Remember that BW is an OLAP data source or *[Inaudible]*. It is not flat, with the two axis like relational data, which uses sequel, OLAP sources have the three axis so you have to come from the three directions to get to one point and this is what MDX or the multidimensional language was built for as the sequential query language was built for the relational data sources. This gives you value though even though you are using MDX. You are able to use things like hierarchy navigation. So if you are used to power play where you built the levels for a particular dimension that would also be considered the hierarchy and that allowed you to drill down to the different levels of detail. Well

when you are leveraging a BW hierarchy, you are able to also drill down in to the different levels of detail with in one report. When you talk about the MDX functions, there are the functions to do the same thing you would do in sequel, they are just a bit different syntax. So aggregate, accept, descendants, if you want to find the next level down in the hierarchy, filter etc. you leverage those as supposed to the sequel. You may have noticed that you can put in sequel statements, but remember if it's a sequel statement we cannot pass that back to the *OLAP baby interface [Phonetic]* to SAP BW so that means the data will be retrieved and then those sequel functions will be applied. And last but not least you must remember to filter early and filter often and why is this. Unlike relational reporting where if I build a list report with 10 columns and 10 key figures and it's going down and doing a sequential read. I am pulling that information back with an OLAP source. If I am bringing in 10 years and I am bringing in 10 products, that's what's called a cross join. These do not exist in the relational side of the world. So the way this works is you take the 10 products in the 10 years, multiply that, that's 100 rows of data that will be brought back from an OLAP source.

So then keep adding your different characteristics you are going to be bringing in and how many members. This is to make the point, this is why you need to filter early and filter often to reduce that results said. Let's talk about prompting just a bit, what you can do with the BW variables? I have heard complaints about if you bring the BW variable, the end users do not want to see the technical name and a drop down, you can leverage the use and display values with in Cognos for the Cognos prompts for these BW variables. So that I can display my products as supposed to the key and then I can pass back the key. Optional variables can be hidden and they do not have to appear. The mandatory variables do have to appear if you try to hide them, they will pop up. So remember to hide, you can hide your optional variables, so if you put and want to meet the needs of that whole subset of reports, they don't have to be all on each report. Remember that you can simulate the hierarchy selection variables and this is selecting the hierarchy at run time, remember we do support the hierarchy node variables, where you can expand the trees and select from different levels in the trees are the hierarchy itself. And the selection option variables are not supported but they can be simulated using other BW variables and the Cognos search and select. MDX versus sequel filters I spoke of that and there was a brief list. So an MDX filter for instance would be this example at the top where I am filtering the children of a parent, so may be I am filtering the children of my product line so that I get back my product types, but I wanted where my key figure that I am pulling in is not null and not equal to zero and so forth and so on down. The second example product line, this is actually leveraging a BW variable which instead of a parameters that you built in Cognos you would leverage the BW variable. As supposed to the sequel filters, the detailed filters this is where you can invoke the local processing, so things like products in or order methods in facts and email, this is invoking that once I bring back all the data, I am going to filter all of my results on these two items. And this can increase your local processing load quite a bit. The *[Inaudible]* logic, in the beginning when we first rolled out the door with CRN on SAP, we only allowed SAP functionality. Our problem was our customers reviews to the functionality that they were able to do with in the relational world. The other problem was concatenate *subs treeing [Phonetic]* if the *[Inaudible]* are not available in the info query with out going back and

building in some *[Inaudible]* code or something. So we turned around and we listened to our customers and we built these capabilities in and they do come in handy and they are required at times. You just need to remember they are processed locally. So don't use them as you would in the relational world because you are used to it and it's going to go back to the sequel database. It's not going to, it will have to be performed on the Cognos server itself. So now that we have done this, let's go ahead and go out and look at just a few of these things. Let's look at framework manager, you may be familiar with it, but just as a big overview let's look back quickly. In this particular case we have imported four different info queries, we have one this just a basic query with no variables. I often do this if I think I want to bring in and populate something without a BW variable interfering. The BW variables we have a query with those and we can look at the different items that come in and as you see they are both the same queries. We see our key figures, our attributes, if we look with in product, we see the hierarchies available for product and then when I expand this I see the levels with in that hierarchy and if I expand further, I see the attributes including display attributes associated with that level within the hierarchy.

Now if I want to go down and see the actual variables associated with that data source, I go to that data source itself and this is where I am able to view the variables. I could see the technical name, this is multivalued, this is optional and you can have a default low and high value. I can change this, the things I can change, I can change the hierarchy pick list to a hierarchy type in or I could change a normal pick list such as order method, I can change it from pick list to a type in. These are things you can change with in framework manager and this is some of the modeling you might do. The other item you can change is using the default value and a very nice one is to show the key and the caption if your users want to be able to see the key along with the description of what they are selecting. Adjust the pins on what you require by that particular person. So this is where you would go and view your variables and change the information about them. Pretty much based on that info query we pull in the information as it is, the things that we do accept out, when I showed you the two different hierarchies for product if they were 25 hierarchies here, I would only pull in the hierarchies required so that I do not have 25 to keep track of. The other thing to think about is when you are promoting this from development to QA to production, you need to remember that those 25 or 60 that existed in the *delve [Phonetic]* environment may not exist in the production environment and this could impact you when you are trying to get ready to go to production. Then parameter maps, we do not do as I stated before, all of your currency translation and language translation happens back on the BW server. So now you are going to build your packages, and with in these packages based on the group they are focused at, you may publish more or fewer items from this particular set. If I have an end user group building reports and query studio, often they just want what they need to get the ad hoc numbers out there where I can go in and figure out if I need to order more widgets today, they don't want every thing. They just want what has value to them, so you are able to go out and hide the items within the package that they do not want to see and then you can publish it out with only the information they required. In this case they only want to see if the orders basic cube and I could deselect further down and you are quite familiar with this, I am sure. So now you have seen this is what we do within the framework manager. We do not

manipulate any of the joints, there are no joints to manipulate. If we had an additional data source coming from sequel server or something or DB2, that would come in, but we would not do the joint here in framework manager. So this shows you the functionality and the general modeling capabilities that you would leverage within framework manager. There may be other scenario where you may go create a query view or what ever, but this is the standard proven practice what most do.

Moving on now let's look at BW query designer or backs query designer, where we are building the info cubes or the database view. A minute ago, we were looking at the basic query invariables and we looked at some of the items you could change in frame work manager. Let's look at the actual info query that we build to import in to FM. You see the characteristics that we are going to be using, they are all in the free characteristics they are not required in the rows, we do not care, that's not required for Cognos. You see your key figures that we brought in, I would like for you to know that several of these are calculated key figures, so the actual revenue USD etc are actually calculated even though in Cognos they are treated like any other key figures and we can also leverage the restricted key figures. I wanted to also point out the variables and you can see the actual definitions of them up in SAP BW query designer. These are good things to know to understand, when it gets in, when you get in to customer exits or SAP exits, and actually building some of these restricted and calculated key figures, you know that they are done now. You know that they are back on the BW query, but you, once you are BW query designers to help you with this. And in this particular case, if I turn on my key in texture, I can see this is the technical name for order method and this is a variable if I go down to my variables I can select this particular one and if we look at it, we can see the definition. And now you can see the actual type of variable that it is and this one is mandatory variable. You see that it's multiple single values and mandatory. So this is where the information is set up and built in to the info query, this is also where we would go out and build your structures and there are queries out there to do that. So now you have had just a very quick look at where you would design your info query or your data base view and how to gain that additional business value in filtering that you could build in.

The one thing that I need to point out in order to see these queries with in Cognos, the one thing I need to point out is you need to go to the query properties and order for these to be seen with in Cognos, you need to go to the advance tab and make sure you allow external access to this query. Once you check that off and save the query, it can be imported and leveraged with in Cognos. So now we have looked at the frame work manager, talked about it, saw a bit of how it works with in the actual frame work manager. We talked about info queries and leveraging them as database views and then we also spoke of okay, there are some things you need to understand and realize that you need to do within report studio itself. So I am going to open up report studio and we will go ahead and go against the power users, this is one of the packages that I showed you out in frame work manager and this particular one would display all of the four info queries that were imported. And now let's select to create a new report and we will say cross tab, and it's loading the package and we see the four queries. So we see the basic query plus variables. And we will start there, so in this particular case lets look at how I could leverage a SAP BW variables themselves. So in my report I am going to just bring

in order method and we will bring in our product lines, so from product grouping we will select the line hierarchy and we will bring in a key figure. So let's go back up to my key figure folder and for this particular case let's just bring in order quantity, now if I execute this, of course this is going back out to this *[Inaudible]* let your query and it will return, so let's execute the query and what this will return is because we have not done any formatting of the variables themselves as I said before they automatically appear for you. So you see all of your BW variables, the order date it's a date range, you see that your customer it comes in, it's been set up as a single select with in SAP, so it's a single select here, also for your product it's a single select, we see the hierarchy variable that we saw back in framework manager and I see that I can bring in my different levels. I can select a different levels if I want to bring in just Japan, I only want to bring in Perth and may be all of here up, I can select those particular items. I also want to point out that the order method was a mandatory variable, we also saw in *Becks [Phonetic]* BW query designer, and we must select a value here and as I said before it is a multi select item, and when I click okay, it will take what we have run and it will pass it back to the BW server. Now one other things I wanted to point out in a results that passed back by SAP, I talked about the cross joints and how it builds that huge MDX query. Well, that's one scenario, something else that you are going to want to take note of is now when we get this results set back, we see this some rows and items are blank.

Okay, so we see the interval prompt for order date, single select for customers, single select for product and we can go down and bring in the different values, we can format these and bring these in to the Cognos prompt page and if we do so, we can make the optional variables disappear if we do not need them, we see the hierarchy variable, we saw this in frame work manager and now I can select Asia, I want to see Australia and I want to see Hamburg and in the order method variable shows and it can be a multi-select and it is required. So we will select and click okay and all the filter in is done on the SAP server and now we see all of our information returned. You see not assigned and not assigned here and there and they are blank, the reason you see these blank items is because this is an OLAP report and when the data is returned, they return with it. In power play what you would do is click you also press zeros. So we can also do that with in Cognos report studio here and we can save, suppress rows and columns and re-execute the report, but this is the pressing from the Cognos side. How could we do this with in report studio and push it back to the SAP BW server. What are the ways we can do this is we can go out and for our order quantity we can put an MDX filter out there and it will go out and filter, it's a detailed filter, so it will filter the rows and the columns. Now let's create a filter, create the filter just as we are used to, but in this particular case, we will go back to our query and let's bring in the order quantity, say order quantity is not known and order quantity not at zero, click okay, and now let's run this and we will no longer see our not applicable columns appear.

So sit back down, I am just going to randomly select a couple of these and then select our mandatory variable which is most important. I will select all of them again, so we can make sure that the not assigns are not being filtered out back at the data source and now we only see the items returned with actual quantities that exist either on the column or the row. I talked a bit about hiding the optional variables, so let's look at this quickly. To



build the prompt page is you are familiar, you drag over the page and double click, we had a mandatory variable out there and that was the order method. So I am going to add couple of blocks, I will go down and we are just going to generate a prompt and I will drag it in, we will use an existing parameter, this is where you will see your BW variables. The V9 I know is the order method we saw this actually back in the BW query earlier. Now the other thing I would like to do is we talked about the selection option variables and you can recreate those using BW variables and Cognos prompts or a combination of, so I will create a quick new parameter.

One other things I talked about a minute ago was the selection option variables and how we lone leverage them as a single select drop down. So using that combination of BW variables and the Cognos search and select prompt, you can recreate the same scenario. So we will create a new parameter, and the package out I am going to use in this case, I am going to say product line and is going to equal parameter one. So now we will select the package item, we go back to the same query we were using, we expand product, we go down to the product line because we need a search and select on product line itself. We can also I talked about the use and the display, we can have it build the second query to populate, if we do this I can leverage my basics query with out the variables that we don't have to worry about additional prompts at any point and I can also say if this played the technical names as supposed to the actual descriptive names, we could select and choose what we wanted to show and here we are saying what it's actually going to pass back. For product line it's going to use and pass back the same item. I click okay, we will execute the report one more time and it will return us the prompt page. We see our mandatory prompt, I am able to select the values that I want to see in this time I will select the fax, telephone, mail and email. Now for my product line I will need to see all of the product lines that have the name home in them. We will go out and search it returns the product lines do contain the name home, the other part I want you to see is you do not see the other optional variables.

So by taking in to account that mandatory variable on your prompt page, then this allows all the others to be hidden in the back ground as the end users do not have to see them unless I choose to. We take in to account our mandatory variable, now we are going to put in a Cognos prompt, so if I wanted to recreate the options available in the selection option variable the one thing that I can create variables for the others, but for the search and select it would be a Cognos prompt. You have taken care of the mandatory prompt, now if you want to do a Cognos prompt for search and select to help emulate the selection option variable, I could create a new parameter, click next, what is it that we want to create the parameter against? We need to go to our same query, expand product, product grouping, we want to filter the product line. I can go to next for the use and display as I discussed before, I can actually go to another query like the orders basic query. I can go back and use product line from it and say I want to use this to pass back, so I am actually pulling from a different query, but this is that query to populate and use. And then I can go back and say from that same query because this is both going in to a query called query 2, we now have use and display items from there. I can click finish, when we click run, we now see our mandatory variable comes through and we also see our search and select, you do not see any of the optional variables appearing. So now I

am able to select the order methods I choose to see. I want to see all the product lines with the word “home” in them and now I can select one or both and we can click finish.

In summary now that we have seen the end results and some of the things that we would do in report studio, you can see that framework manager does not play a big role as it does in relational data sources. You see the SAP info query design is about creating a database view in building subsets and creating additional business value that’s not stored back in the info provider itself. With in Cognos report studio you are going to need to think about things like prompts, you want to leverage, you would be *[Inaudible]* variables as much as possible. There may be times that you need to use a Cognos prompt for instance the search and select. You want to take advantage of filters that leverage things back on the back end in the BW query whether it be a BW variable, an MDX function etc. You want to limit the local processing as you would for the *[Inaudible]* as you may need to use because you are not able to do them within the BW back end or you would may need to do substring or concatenation, but you want to keep the data filtered that returns back to the Cognos server and you want to limit the use of the substrings and concatenations and the other relational functions. The one last key take away, I want you to remember that you see at the bottom is start small. Don’t roll out a huge project at once because your multitasking trying to learn how to build the queries, do the modeling, build the reports, you are going to be promoting them from development to QA to production. What you want to do is take a small set of reports, a small subject area, take this as a learning experience, learn from your queries, learn from what you are doing in framework manager, learn from what you are doing in report studio. Get this moved to the three environments to production and in the end you will learn a lot. You will learn additional information as you move to the other subject areas, but this will give you a foundation to begin with.

So in summary the key take away that I talked about, we talked about differences between relational and OLAP reporting. Info query as a database view and where to model in and how? Now there is additional information out there and the link is in the slide itself. There are many proven practices, documents, and cleaned the ones listed in many more they are being added to on a regular basis. So I want to thank you very much for your time today, I hope this provided some benefit, just remember to think about it from a little different perspective, step back, take a global look at it. A good luck in all your reporting. Thank you.