Moderator: Hello and welcome to today's presentation, Optimization & CPS, brought to you as part of the IBM ILOG Optimization Webinar series.

Our presenters today are Remi Lissajoux and Alain Chabrier. Remi is the Marketing Manager for IBM ILOG Optimization Products. He has 20 years of experience in development and marketing of optimization technology and its applications. He has held various related positions at Talus Group, ILOG and IBM. Alain is the Product Manager for IBM ILOG ODM Enterprise. And in 2009, IBM acquired ILOG, Inc. where Alain had more than 10 years of experience in tech sales, consulting, development, and development management. Alain has broad technical and industry experience around computer science and mathematical optimization and holds a PhD in Operations Research from Ecole Polytechnique and Ecole Nationale Superieure des Telecommunications, France.

I will now pass the controls to our first presenter so we can get started. Remi?

Remi Lissajoux: Hello everybody and welcome to this event, during which we will present the offering from IBM to build custom planning and building applications based on mathematical optimization. Just start by saying that planning is more and more a critical function of modern organizations. As said, the General and then President Dwight D. Eisenhower was a logistician. He said "plans are ruthless but planning is essential." At IBM, we have a very similar vision. The process of planning is as important as the plans themselves. Our products are designed not only to build the best possible plans in a given situation, but also to support a full planning process. IBM tools embed the best possible mathematical optimization technologies and operational techniques available worldwide to enable building decision support tools not only for planning and scheduling applications, but also for all applications requiring mathematical optimization such as review management, portfolio optimization, traffic optimization, etc. So again, planning and scheduling relies on operations research technology and operations research is a science of better decisions.

Operations research is basically of applying best analytical resource to help make better decisions such as when and where and how to locate physical and human resources, which products will maximize the profit, what is the most efficient supply chain implementation and network design and all this without -- with bouncing between the different criteria which might be profit, revenue, customer satisfaction, employee satisfaction, impact on the environment including carbon footprint, etc. But there are mainly applications in all sectors of the economy and of the business. These applications include human and physical resource allocation, production planning and manufacturing, optimization of the supply chain, inventory management in distribution and retail, pricing and promotions management in the different sector including travel, optimization of telecom network, etc, but planning and scheduling is a very complex process.

Let me illustrate this point with a very personal example. Once we presented to a planning agent in a retail company a system for vehicle routing. So the vehicle was a truck in charge of daily replenishment of the different stores of the area. As a planning agent, you are in charge of the

staff, and what's more to be happy when he saw the output of the tool building plans is better than his own plans in terms of both cost and satisfaction in terms of store manager's order. It was a very satisfaction for him to see that it was possible to both improve the cost and user satisfaction. But the true very impressive thing for him was the time required to compute such a plan. Because usually using just an Excel spreadsheet you need a couple of hours just to build the plan. But with our tool, it was possible to build it in a couple of minutes. So suddenly he realized it was possible for him to, during his day of work, not only to build one plan and execute it, but to build different plans, try and compare different alternatives, playing with different priority given to different criteria, to see the impact of any change in the demand for a store manager and eventually having the possibility to call a store manager to negotiate with him in terms of what was really needed or not.

So it was a way and this tool enabled him to completely change his route by no longer continue to spend his time to build plans, which is more as practical actions, but to explore and compare, simulate and modify plans at a more strategic level and something which is more satisfying for the business user. So this is the example that illustrate that planning and scheduling is not only automatically build a plan, maximizing some criteria and respecting business, commercial, and productional constraints, but is also a complete process enabling to explore alternatives and dynamically build and modify plans as quickly as possible.

Let's see some concrete examples. So in this slide you see different benefits from different customers which are in external publications and we are used to see very fast and impressive payback and return of investments in all different -- in all industries. These industries are from telecom to manufacturing, from transportation and even the finance industry for very different applications from long-term strategic planning, including designs just to get the UPS application for which is more or less a fleet sizing application, to very short-term tactical rational scheduling and resource allocation.

So what we have to remember always that optimization technology applies everywhere, for all type of resources, and systems with different time horizons. The business today in all industries is full of bottleneck and also source of potential profit which are just waiting for the right tool to be addressed using optimization. So when such a problem is identified where optimization could help to provide both return on investment and important payback, the challenge is to define what should be the best possible tools and what are the different alternatives which are available today. So let us see the benefit and drawbacks of the different options existing for building planning and scheduling solutions.

The first alternative is to use a spreadsheet. It is both the first and the most common answer. These are simple and reintroduced tools, easy to use, easy to customize, it's well known, widespread in the industry and it's very easy to start with. However, it very quickly becomes very difficult, hard to maintain and it's generally very limited in terms of problem size, complexity, number of constraints, and so on. And maybe more important, it's very difficult to support any collaboration or what-if analysis.

The second option is to use software package, pre-packaged or semi-packaged software solutions. So there are many of them in the marketplace and some sectors are full of such packages and some of them, not all of them, some of them embed optimization technologies

which is very often provided by IBM ILOG. The example is supply chain where many applications benefit from such packages and most of them use IBM ILOG optimization technology. So the benefit of package is that they embed the knowledge and expertise and know-how of the industry and are, I would say, claim to be -- it's not always the case -- ready to use for the problems of their target. If such a package fits the need of a company -- almost fit because a perfect fit doesn't exist -- this is generally the best alternative and because it will provide the level acquisition and deployment cost with very fast implementation. However, when the application poorly fits the problem requirement in terms of business and operational constraints, optimization criteria, user interface, architecture, functional capabilities required, data integration and so on, it is no longer true.

The third alternative is to develop custom solution based on software components. It is what we did for years and we have lots of customers worldwide to implement such solutions. But such applications need also to build a graphical user interface, data integration capability and a lot of different features in order to provide all of the required functionality. So that's why, after years of experience building such planning and scheduling applications, we discovered that most of them require same basic functionalities and principle. So this is why we developed ODM Enterprise which is sort of platform to ease the development of custom solutions. Custom solutions based on this platform -- we are still in some specific developments, product logic optimization model, maybe the data integration and graphical interface, but we largely take advantage of pre-built functionalities which are common to most of such applications.

So, let us see what are these common requirements. For this we have to explore what are the key challenges of any planning and scheduling application and other optimization-based applications. So these requirements can be grouped and summarized in the following ways. It's about the decision, it's about the user, it's about the organization and it's about the process. So decision, the user, the organization and the process.

By decision we mean defining before building what is a good if not the best possible decision. By the user we mean that it's about supporting the decision of the user. It's about a tool for human being not necessarily and really an automatic tool. By organization we mean that the tool must be integrated in the IT infrastructure and in the human organization. And by the process we mean it's about empowering a planning process, executed and managed by human beings. So let's go and see the details.

First, the user. It's about supporting a business expert taking the right and the smart decision and not just taking the decision for him. This means providing informed solution, providing explanation, providing recommendation, evaluate different alternatives, making some trade-offs, balance between criteria, propose what-if capabilities, simulation and so on. It's also about modifying a plan, adapt a plan to a new situation, new data and new criteria.

A very simple example is that -- whenever there is for any planning and scheduling problem no solution given a set of constraints, so the best answer is not to say there is no solution. The best answer is to propose to relax some constraint in order to find a solution and in order to fit the different business requirements.

Let's continue to what we call a decision. What is mathematically an optimal solution according to any formal or mathematical model is not necessarily the best possible decision. There are always some reality which has to take into account that does not fit the model, that is very hard to model in an optimization model and this is very important for the business users. So as business expert which is the final user, or the final application, must be able to interact with the system in order to add its own experience, knowledge and understanding of the current situation of the business.

There are also some issues like robustness, providing the best optimal solution when the final condition has changed does not make sense. In some industries, the final situation and what will happen in operational conditions are 50% different from what was expected during the planning process. So what is important is to provide and to be able to build a very robust plan, enabling the business user to take different possibilities, to see and to evaluate the impact of any change in the data and to make any kind of business analysis in order to build and to finalize the best and the most robust plan possible.

Continue now with the organization. Optimization is no longer, or, I should say, less and less a black box. How it was used to be in the past, but which is no longer the case, that you can use as either a service providing data and requesting solutions. It is also less and less standalone, I would say desktop tool for a single user. It is more and more a software module which must be deeply integrated into the corporate system and used by a wide range of users. For example, being the planner themselves they might be reviewers checking for plans and providing some feedback and other stakeholders only need to have a high level view of the plan and making, for example, the final approval.

But more and more what we see and what we observe from the industry is that there is a need for collaborative decision making, where not single a person but a team of planners collaborate together to build the plans. The modern planning and scheduling tools must support collaboration.

Let's finish with the fourth challenge which is about processes. It's common that projects fail when one's focus is on the difficulty of optimization and the development of the optimization model which is very exciting for engineers and rocket scientists. They just forget sometimes that it is about people and processes. Now the application needs to fit with the people with their skills, hobbies and [wherewithal] of the existing processes. The perfect example is a graphical user interface. It cannot be any longer a very standard graphical interface. It must be rich, interactive and very business oriented. I always personally will be very impressed by what a planning agent can identify like bottlenecks, cash resources and so on by just looking at the graphical interface which is business oriented. It is something which is very meaningful for them. It might be simple tables, it might charts, Gantt charts, map-based, space-time diagrams, but in all case it must be customized to fit them -- customized to the business and to the usual representation of the plan.

So now we have identified the challenges and we will see in the rest of the presentation of our offering portfolio and some of these challenges, but before this let's see what are, from our experience, the keys to success when developing a planning and scheduling tool.

First use the best possible optimization components. It's not the topic of this presentation but we -- IBM ILOG provides best technologies in terms of software engines, CPLEX for linear programming and complex programming engines, to provide the best results and to boost best performances which is critical given that optimization is very time consuming -- computer time consuming.

So it's important to do the appropriate methodology just to build the -- to implement the best process, to build the best possible solution. Then propose a full set of product features not only building an optimal plan but also launch a simulation, recommendation, exploration and so on.

And finally rely on the right architecture for the best service and for the best performances. So IBM ILOG provides best optimization components in the marketplace for functional services, also design and implemented successfully the right methodology for such applications, but this is not the topic of this presentation, of this seminar. And we will focus the rest of this seminar on how ODM Enterprise supports the last few item and key criteria.

So before letting Alain presenting the products in detail, let me summarize again some basic principles which is a part of the design of our tools.

Through interaction with our customers over the last 15 years and worldwide, we identified the main practices which make such applications successful. First, I would say advanced analytics which has used advanced and the most modern optimization technologies to build intelligent decisions and quickly modify them to cope with any change in the business conditions.

Second, customizability. We need to have a tool enabling fast and easy customization in order add the tool to user skills, processes, organizations, business conditions, IT infrastructure and any change of them.

And last collaboration, that is support teamwork and collaborative planning to enable, I would say, enterprise-wide planning and scheduling. So now, we can shift to our presentation of the products themselves and I will let Alain present the product in detail. Alain?

Alain Chabrier: Yes, thank you Remi. As you know we have seen some earlier presentation -- we have introduced what is optimization. I think we have highlighted the possible benefits, the possible quick return on investment with this kind of application. Remi also introduced the different alternatives when someone is faced to a need for an optimization application. And finally when someone has to go for the building custom solution path, we have seen what are the challenges and what we think are the key to success and what are the functionality, we have tried to package into the ODM Enterprise platform so that we can build such kind of system optimization solutions with some lower time to build the solution, some lower cost of ownership and some lower risk. All of this we may come back when we see more in detail what are the modules and the functionality that comes with the platform. So I will come back on this in my second part.

Before really looking at these modules in the second part, what I want you to do is, as optimization can be seen as a part of a broader area which is business analytics, and as we also wanted to put some focus on what is newly possible with the last release of ODM Enterprise 3.4,

where we unlocked our chains with pure optimization and we are able to leverage a more complete business analytic perspective. I wanted again before looking precisely at the different modules to see how ODM Enterprise can be used from this perspective of business analytics.

So let's start by looking at this first slide, which is a report done by Davenport some years ago and that highlights the different kind of analytics, what is the analytics landscape now. We should probably look it from bottom to top, which corresponds to the way we are adding complexity to these analytics. So the first level is about what is we saw that descriptive analytics. It's mostly about reporting, being able to look to display to analyze sometimes huge amounts of data and to answer some questions such as the one listed on the right column such as what happened, what is good, what is bad with what I have been doing over the last period with my previous plans, what are the problems, but we don't really look at what could happen in the future or what I should react to in the future?

So the second level is predictive analytics. It's about being able to forecast how the trend of the data will continue in the future so that we can start to think about what will happen next and what are the different kinds of automatic actions we could do based on analysis and simple rules.

The third and last level which is one where optimization is prescriptive analytics. After we have seen what could happen, where we could see also what…how old plans, how they would react with respect to what could happen, what we really want to do is take these actions with respect to what could happen and this is what prescriptive analytics and optimization is about.

So, now in IBM we have a wide range of projects and we would probably cover -- there is a picture and we can associate Cognos with a descriptive analytics path. We can associate SPSS largely to the predictive path and we can associate ILOG optimization to the bottom data. And so what I wanted to do in this part of the presentation is to show how we could have a more global business analytic view in the way we are using ODM Enterprise particularly to develop this application but also to use this application in the final process.

So, I will basically show different functionality supporting the different levels of business analytics adding to different steps one on top of the other. We can see the three main steps, descriptive, predictive and prescriptive as different steps while we are building the application, while we are developing the application. This is probably indeed the way we suggest to build the application because it also corresponds to the needs of the customer. Of course a customer first has a need to understand what happened in the past. Until he has a good understanding of that it is very difficult to think about what will happen in the future and of course even less probable that he will be interested in how to better on the possible future trends. So, I will not go into details, but I am just describing what I will do after on.

So in preview for the ODM Enterprise release season, we were already optimization-centric. We were developing all the solutions around an optimization model, which is that representation of the constraints of the objectives of the KPIs that an operation research person can write. Now we have been focusing, we have been moving the application. We are moving the product to be able to focus more on the business application and on the business data. So the first steps we will do by building such kind of application is to reverse engineer not only the application data models, but also the application data. So what we can see on this slide I think in this new release is we

have introduced, on the two screenshot on the left, different set of tools to be able to capture what are the data model from the application that is most of the time existing before we are thinking about adding optimization because this decision process was probably definitely done before with other tools. So we are able to capture, to reverse engineer, this application data model and we also have tools to maintain, to improve, to evolve this data -- modern graphical tools to be able to fulfill.

And as soon as we have captured this business data structure and also this business data, we are able to start in the ODM Enterprise platform to create some business user interface using a lot of user interface components that are out of the box, that are pre-built and that are common to most kind of application that are using optimization.

So very quickly we can come to a result where we can start doing some kind of descriptive analysis. We have two screenshots here showing on the left showing what we could do using, for example, pivot tables in a way similar to what the spreadsheet can do. But with two different scenarios, you can take two different historical data and start to look at what are the main differences between these two scenarios. What are the important changes that are highlighted here in orange between these two different barriers of these two different ways, the two different plans we were thinking about applying.

There are lots of other functionalities, charts, tables etc and this is the kind of thing we have referred before when Remi for example said there is a platform of all these prebuilt components that are common to most of these applications and that will be used in most of the applications with optimization. So of course in some applications -- this pre-built -- this component may not be enough. So in that case we would have the possibility, as the platform is open with lots of documented APIs, to be customized. This is one of the three main points and three main advantage of the platform. It's open to lots of customization. We see here examples of cases where out of the box way to analyze the data or the solution is not enough. We also have ways to customize these views and for example to provide maps for other -- most of the application will require such types of thing or provide goals for most of the workforce optimization kinds of problems.

So, but here we still have no optimization and we are still looking at what has been done in the past about historical data and eventually about historical plans. We can start to compare them, but this is not really what-if analysis because we are not looking at what could happen. So the next step is to indeed go to the next level of analytics and to look at what could happen and how our old plans would react to these new realities. So there are different ways. We can, still without any optimization, start entering into the predictive analytics path.

So the first way is to take new plans and eventually with old data and we can manually change what the decision we would make on the new plans and looking at what could be the result with this old data. So we could again analyze the different KPIs and drill down to see where the impact is more important. Or we can also -- we have a similar screenshot that we have seen before on the bottom right where we can see if we do this manual change this new plan and the old data, these constraints would be invisible and this business requirement will be impossible. So we can start to look at what would happen with this manual change.

The best way would be to look at what would be our old plans with new data. So we can really use predictive analytics to, for example, forecast some new data for the coming periods and look at how all plans would be reacting to these now. So in this example we have connected SPSS statistical engines to be able to take some historical data, generate some new forecast data and from that we can look, still without optimization, at how old plans would react with respect to this new data. So virtually all this is really still about predictive analytics. Now, it's really about what could happen and what would happen with my plans if this data will change with (history).

So of course the next level is really where we provide value with our engines and via optimization technology that is inside the platform is when we want to make smarter decisions. We want to decide the best future of plans with future data. So this is when prescriptive analytics enter and where we will start discussing about optimization. So as before and we can well better said that's the opposite as before, we are in this new release able to not have any optimization in the application until that we are able to as I have shown before, show historical data, historical plans, predictive data without any optimization. At this point we want to add optimization, so as before an optimization expert would implement this optimization model, would connect data to the rest of the application, to the rest of the application data model and we could start executing optimization. So, on the right you can see a typical optimization running, where the different KPIs optimize. A global objective is made of the different KPIs with different priorities and this is where we will able to run the different scenarios with different priorities and compare different possible plans and take the good informed decision at the end. This is what I tried to highlight on this last screenshot.

As soon as I can play with different priorities, I can with the tool play with different requirements make some more important than others, some can be mandatory and some of the requirements can be, well it's better if I respect that but it's not at all mandatory and based on that I can create different scenarios and analyze very efficiently what is the impact on my different plans.

Okay. So, that's about what I wanted to present in this first part. How, with this new release with the fact we have been less centered around the optimization model, we have introduced this application data model as the core component of the application we are developing. We are able to work with the application data without optimization, to start looking at historical data to introduce some predictive analytics and to introduce some optimization at the time it is really needed by the customer. And this is really important because many business customers, probably not the one that comes from the operation restructure. Most of the times they come to us saying something like, well, yes optimization is really nice. It looks like it could be very useful for my problem, but before this I have lots of issues about my data. I am not good at forecasting or my data is not clean and this is really what is the real important first step for the system. And so this is why this move, where we have allowed people to even if at the long-term to think about doing optimization. We are now able to walk on these first important steps on cleaning the data and getting the data they need for the optimization so that when they come to the real need for optimization, they are on the right platform to do that.

So to conclude, I would like to -- on the second part to do a more, I would say, standard presentation of the different modules that of the ODM Enterprise. Until now I have focused on the new functionality about this application data model of the last release. At the end of this part, I will also fill you out on what other new functionality has been added in this last release.

So the main component, which is a slide that if you have been at other webinar about ODM Enterprise, it's a common slide on the important modules of ODM Enterprise which are basically four, three modules for the deployment, one module for the development. I will come back on one slide for each of those. So basically we have -- on the right we have the Studio, which is standard business user interface, graphical user interface where we have all this out-of-the-box component and all this kind of interaction that are useful for all the planning and scheduling applications. In the middle we have the two important deployment components. On the bottom, Scenario Repository, this is where we will be able to stir and manage all the different scenarios we will look at when we do this what-if analysis, when we do this process to start from one optimal solution as we would have with this old black box application and we move to what is in fact a big decision, looking at different scenarios and what are the different impacts of different scenarios.

On the top we have this Optimization Server. This is what will allow a scalable deployment of these applications when we have multiple users. We have seen that more and more of the applications are on corporate-wise. So more people are looking at more scenarios and we have to scale not in terms of the complexity of one particular scenario, but of solving more and more different scenarios so this piece will bring the scalability.

And on the left we have an integrated development component both for developing the optimization model, but also for configuring and customizing the application from all these aspect from the data integration to the user interface configuration. So let's focus one slide on each of these modules. So the first one that is probably the most visible is the Studio. Most of the screenshot we have seen are from on this one. So it's a user interface for the planner or the reach in most of the process where there is some collaboration between a team of people taking the decision. We have seen that some people some really interact with the plan and some people are just reviewing and providing feedback, so this interface is common to these two users. We have lots of out of the box components, configurable to a very large extent and customizable as we have seen with example of the maps, Gantt charts, dashboards and diagrams.

It's optional, so in some cases the customers have a native user interface for the decision process and they can still use all the rest of ODM Enterprise and plug their own user interface there into it. Interface report lots of planning concrete functionalities that I probably have commented when I mentioned in the description before.

The next module is the Scenario Repository. So, it's important particularly in the strategy kind of practical kind of application is just important to separate the planning data from the operational, the production data. We are able to do this kind of sandbox where you do the different scenarios without any risk to interact with what is really executed. So we have created these repositories that can store and that can provide the data for all this analysis and it was a specific repository. We tuned this repository to best insert with the need of what-if analysis and collaborative planning. So we have designed it to be able to handle as well as possible when you have very big copies of scenario which are slightly different. But you just want to see what happened if I change any data in that scenario and we also choose a repository for collaborative planning. So we have lots of interim versioning and people can edit different plans altogether and work collaboratively until they find together the better possible plan to execute.

The third important module is the Optimization Server. So it's what will provide the scalability of the application. So again it's not really from an optimization point of view. It's not sort of a bigger optimization model or (inaudible) optimization model. Now this is the objective of our engines, to solve bigger models with bigger data factor. What we resemble it is in the case that we have more planners that are eventually using the sam application, but we have some potential in different application. I mean a company that we have either workforce problem and workforce scheduling and workforce planning, so have different application. They want to centralize the CPUs to be able to solve this problem. So, they wanted to be quite scalable, to not be limited when there are more people doing more scenarios. And so it's based on the J2EE technology with the main application server which you bought with the application server and indeed the value provided could be describing to the front we like to see it from the planner point of view. It is basically what will allow you to say, I want to solve five scenarios and you can continue to work with your machine. Your CPU is not 100% doing that. It's done somewhere else. It's a very simple view of that. It's done somewhere else and I don't have to worry. I can solve 100 scenarios and eventually I have some big machines behind that are taking care of balancing this effort.

For the IT department, it's the same thing but viewed from a different perspective. There is a need to standardize as to where the applications are deployed. You want to be able to see the functionality such as load balancing but also high availability. My optimization capability is to be available to install all of this, so I need something to do that and the application servers are readymade for that. And so with your optimization server, you have a way to deploy optimization based on the technology to achieve all this IT functionality.

The last path which is sometimes less important that is of course critical because it's about developing this application. So we have an Eclipse-based IDE which can be used by different personnel that are involved in the development process. We usually recommend we have clearly different personnel being involved in the process of developing this application. Of course this optimization expert that will develop the optimization model. But we most of the time need some kind of business analyst that understand clearly what is the real business problem to be able to model most part of the application at the higher level optimization. And the sort of personnel that is most of the time needed is some kind of IT architect or Java developer that will be able to do all the non-purely optimization related configuration and customization. All the user interface, data integration et cetera, et cetera.

So it's Eclipse-based, we have different perspectives. These different users can work on the same project, but for example the optimization expert will use this OPL perspective and be able to develop the optimization model, debug it with some test data or tune it as well. For example, the Java developer will have a Java perspective to develop some custom visualization capability for this application.

Okay, so that's some simple view on the four modules. Again I have not spent so much time on continue. I wanted to just say a few words apart from this new focus on business data more than on optimization model that we have in ODM Enterprise before that I tried to illustrate with this analytics analogy. Several other important new functionality in this last release that I would -- the most important one I would put them into categories. First is around Websphere Application Server. So this Optimization Server has much better support of this particular application server

which is an important innovation. We also have in the development environment some preinstalled and preconfigured application server. So it's much easier to test in the development process how the application would work with Optimization Server. We have better configuration inscriptions and also scripts to be able to deploy production with Optimization Server on the application server. It is quite standard J2EE ways of deploying, but it's better to have a discrete and smaller implementation. And we officially and better support the cluster deployment when you have really more users. So instead of one machine you want 10 machines and work together for load balancing and for high availability. We support this in a much cleaner way with much more documentation.

The second and last field I wanted to comment is about the support of JViews. So I have shown some examples of custom views that when sometimes the default displays are not enough for what you want to map, you want a Gantt chart, you have the possibility to plug some other graphical component into the application. We at IBM ILOG have a set of such graphical component, the JViews set of products. They are now much better supported and basically they are included in the ODM Enterprise Edition. You are entitled to use all the modules on diagram maps and charts. In development you can try very much easier the different products. And if one of these is a good fit for the application, we just have to get some entitlement for this particular product for the deployed application. But it should be much easier than before to do this.

So that's what I have and it concludes my part.

+++ q-and-a
Moderator: Okay. Thank you Alain and Remi and at this time we would like to ask the attendees two quick polling questions before we move on to the Q&A.

So our first question is, in the typical business analytics application you are working on, how many different fields does the user-facing application need to cover? And the choices are between descriptive, predictive and prescriptive. And if you could take a moment and answer A, B, C, or D. A is only one is a single user-facing application. B is two are needed in a single user-facing application. C, the three areas are usually needed in a single user-facing application. Or D, you don't know, you are not involved in analytics applications. And if we could post those results when they are ready. I am sure everybody has had a chance to answer, thank you. That will help us during the Q&A session to understand the answers to these questions.

And the next question. What area is most difficult to implement into business analytics applications, descriptive, predictive, prescriptive i.e. optimization or d, you don't know. And I am sure everybody has had a chance to answer. If we could push those results and then we can go ahead and move on to Q&A. Thank you for answering those questions.

Okay, so let's move over to Q&A. So, our first question is for Alain or Remi, either one of you can take it. The question is how can you demonstrate your capacity in my industry if you don't provide a vertical package?

Alain Chabrier: Is it for me Wendy?

Moderator: Yes.

Alain Chabrier: Yes. So, indeed that's a good question. So, we have seen that most of the functionality of ODM Enterprise, the ODM Enterprise is a horizontal platform. We have seen in the slide about the alternatives that basically the main disadvantage of this approach and the other full system approach is that there is no predefined optimization model. There is no predefined business application data model, so you have to build that. So, of course we have some experience. So we have some such optimization model and some application data model for some industries. But, this is not what we are jointly discussing, so the question would be how we would do that. Now, so the approach we provide to that is to do proof of concept to be able to demonstrate our capacity to be able to develop a solution for that.

So, the normal process would be to do some -- have some discussion with you to understand what we call a discovering workshop to understand what are the needs and with a different set of persons from your area in one room for some time. And based on that partly do a proof-of-concept showing and demonstrating this capacity for this joint effort for the development.

So, the demonstration could be on the optimization model, but as you understand from what we have said, it is not probably the only ones we could demonstrate, we are capable of handling these kind of constraints, but we can also demonstrate we are capable of supporting such kind of process with a user interface with interactions, with decision support capability and we are also able to support -- we have the capacity to support the data management now in some cases it has been sometimes the most important part, the prospect where within us to demonstrate we are able to support large amount of data, we are able to support not clean data and so proof-of-concept is what we will really allow to show that in that particular industry or particular problem we are able to demonstrate, we are able to handle these issues.

Moderator: Thank you. Our next question, one of our attendees wants to what does KPI stand for? Remi?

Remi Lissajoux: Excuse me?

Moderator: What does KPI stand for?

Remi Lissajoux: The KPI means Key Performance Indicators and basically they are the main indicators for which we help to evaluate a solution with a business criteria which might be largely very different, might be the gains of costs, might be the revenues, might be the fairness among employees, for example, for a stats application it can be the return on investment, it can be the carbon footprint and marginally any impact on the environment, it can be the level of satisfaction of customer orders for a retail company, can be the stock levels, can be a lot of different things. And one has to evaluate a solution on the business side, the planning agent has to evaluate and compare all of the different criteria and evaluate these different KPIs and the optimization tool also optimize compared to some criteria but not all of the KPIs. So there is one thing which is the optimization which does try to build the best possible plan in regard of these criteria and then you have to evaluate the qualities, the complete quality of the solution with these so-called KPIs.

Moderator: Okay, thank you. Next question, which team organization and process do you recommend in order to address the needs of the end users who want to rely on an SI or a partner? Alain?

Alain Chabrier: Yes, I am not sure I understand well the question. Which team organization and process do you recommend in order to address the needs of end user? I understand the question as I think commented at some point in the presentation. There are different skills that are needed, if we want to rely on an SI and the partner we have to see -- depending on the SI or partner which of the skills available for this SI or this partner. The different skill I see as I commented before are what I used to call the OX pair for operational research, the science of data we referred before, the optimization expert, the Java or an IT person capable of looking at this customization and business analyst that is knowledgeable in the industry we are discussing. So depending on the SI and the partner some of the skills can be available in the customer or someone may have some optimization skill, but not feel comfortable. We have many cases of that people who are I have the -- I come from this base and such an area, I understand optimization model but in order to do my complete application I require some skills about this UI customization or the enterprise deployment about application server and so on. So this is where our partner would help providing these skills. And of course each kind of configuration among these different kinds of skills can be distributed between the customer, the SI and the partner and the eventually IBM could provide the missing skills in case it's necessary.

Moderator: Thank you. We have a couple more questions here. Can it do multi-echelon inventory optimization?

Alain Chabrier: So, I think this is referring to some specific and so -- at some point we have no discussion. I am not sure what from the question is from but we have spoken here about ODM Enterprise which is this platform making making some solutions. We have two other set of products that we have from IBM ILOG, one is CPLEX Optimization Studio which is -- which are tools at the lower level I would say engines and tools including the optimizing technology without all the application development capability, without the decisions you want, without the scalable development as well. And at the other end we have the CPLEX application. We have a set of application with a lot of vertical content. In the same we said at the beginning in some fields we have some self-backing application that are packaged and include the optimization technology. We also provide in IBM ILOG some application package in the case of (inaudible). And some of these application I think like inventory analyst, sorry, I would be able to say it, are supporting, as I will need to check and I am not as good as I should on this product. I think so it's kind of way of using. It's a kind of optimization model. We could develop the amount of (inaudible). We could develop a particular model doing that and use all the features to deploy this model with the UI data integration that we have at this point. But again we have no -- it goes in line with the question on the -- if we don't have a vertical package we would have to develop this model. We could develop it as part of system development or we have a CPLEX application that I think have this capability for inventory planning.

Moderator: Okay, thank you. We have time for one more question. The question is, this person is a strategic planner for a large FMCG and they are responsible for recommending GS expansions and plant closures. They have a very mature process and utilize optimization tools from, I guess, from ILOG competitors and their biggest problem is that an optimal solution carries a certain

amount of risk from a company in terms of stock-outs, SLAs, et cetera. How can ODME -- how can ODM Enterprise help determine the potential risk in the investments chosen by the optimizer in a scenario and how can this company use ODM Enterprise to help them come up with a solution with a lower risk profile?

Alain Chabrier: Remi want to take it or I take it?

Remi Lissajoux: Yeah, there is -- I would say two answers to this question. But the very first one and the very standard one is that a way to do this is to simulate different situation, different possibility, and different scenarios to evaluating the potential I would say risky situation, evaluating different plans, make some comparisons, some trade-offs and so on and this is where ODME helps a lot by providing a way to change the original data, build plan, evaluate, make some comparisons, make some simulations, some what if stimulation, and capability. This is the very first answer and it is usually what is done in the supply chain that is what we observed that that our customers, they test I would say one low-end scenario, high-end scenario and medium and be able to have different solutions and they do some tradeoffs between the different solutions they have. Another more advanced situation, I don't know if it applies in such a case, but maybe it is possible to evaluate more complex mathematical model for this using some kind of stochastic model and trying to implement it using our tool which is another possibility.

And again ODME simplifies the development of such a tool because the development of the pure standard capabilities is easy and the only thing do to is to work on the optimization model which is in such case it might be very complex. So, the standard very simple answer is just using ODME in a very standard way by taking benefit of the what-if simulation capabilities and I would say scenario management capability. An advanced answer is to implement more advanced stochastic optimization model and then use ODME to run it on operational data.

Moderator: Okay, great. Thank you. That is our time today and thank you everybody for joining us today. We realize that you all have a very busy schedules and we thank you for spending some of this time with us. This concludes the webcast on Optimization and CPS from the IBM ILOG optimization team. Thank you and goodbye.