IBM ILOG Technologies & Services Overview
Agenda

- IBM ILOG Optimization Software
  - CPLEX 12.2
  - ODM Enterprise 3.4

- June 2011 Release
  - IBM ILOG CPLEX Optimization Studio 12.3
  - IBM ILOG ODM Enterprise 3.5

- IBM Academic Initiative
  - No Charge Access to IBM Software for Teaching and Research

- Overview of Other IBM ILOG Software Offerings
  - Visualization
  - Business Rule Management Systems

- Services Offerings
  - Training
  - Consulting

- Q & A
ILOG CPLEX Optimization Studio

*Merging CPLEX, CP Optimizer and OPL Development Studio*

**Model Development Tools**
- CPLEX Studio (IDE)
- OPL Modeling Language

**Optimization Engines**

*Math Programming*
- CPLEX Optimizers
  - Simplex
  - Barrier
  - Mixed Integer

*Constraint Programming*
- CPLEX CP Optimizer

**APIs**
- Java
- .NET
- C++

**Connectors**
- Microsoft Excel
- MSF
- MATLAB
- AMPL
- Python

IBM ILOG ODM Enterprise

Enterprise Deployment Platform

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CPLEX Optimization Studio 12.2
New in CPLEX Optimization Studio 12.2 – CPLEX Optimizer

- **Enhanced speed**
  - 2X* on MIP problems taking more than 100 secs
  - Default 4-core

- Numerical condition number diagnosis tool for MIP

- **New ports**
  - 32-bit x86 Solaris
  - IBM systems zLinux and pLinux

* on average, compared to CPLEX 12.1 (preliminary)
New in CPLEX Optimization Studio 12.2 - IDE/CP Optimizer

- Displays for reviewing & debugging scheduling solutions and models
  - Resource and activities Gantt chart views
  - Graphical views for cumulative and state functions

<table>
<thead>
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<th>Availability matrix</th>
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<tbody>
<tr>
<td>C++</td>
<td>No</td>
</tr>
<tr>
<td>Java</td>
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</tr>
<tr>
<td>C#</td>
<td>No</td>
</tr>
<tr>
<td>Studio</td>
<td>Yes</td>
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New in CPLEX Optimization Studio 12.2 - CP Optimizer

- Search API
  - Write custom search and propagation

### Availability matrix

<table>
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<th>Java</th>
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<tbody>
<tr>
<td>C++</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Through C++ API</td>
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<tr>
<td>Java</td>
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<tr>
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While the modeling objects provided by Concert Technology and the algorithms provided by CP Optimizer will generally be sufficient to model and solve your problem, in some situations you may need the full flexibility of writing and maintaining the solution process in various ways, such as writing custom constraints or custom constructive search by means of goals.

A number of classes and functions are provided in the CP Optimizer engine extensions for implementing custom constraints and custom search. The classes include `IloConstraint`, `IloGoal`, and `IloDomain`. For scheduling applications, the engine classes `IloIntervalVar`, `IloIntervalSequenceVar` and `IloCumulativeVar` can be used in writing custom constraints and search.

These classes of decision variables make it possible to write custom search procedures and constraints. Each class has members and member functions to aid the user in implementing customizations:

- Boolean member functions which return whether the decision variable is fixed or partially fixed.
- Member functions which access the possible values in the current
New in CPLEX Optimization Studio 12.2 - Connectors

- **Improved connectors**
  - **Microsoft® Excel add-in**
    - Dramatically more powerful solver than default
    - Solve from the spreadsheet interface or alternatively invoke a macro to solve models
  - **MATLAB® toolbox**
    - Access industry-leading mixed integer and quadratic solvers from a numerical computing environment
    - Black box approach to modeling and solving
    - Full API access to CPLEX Optimizers allows sophisticated solution procedures to be invoked
  - **Python® interface**
    - Alternative to using the CPLEX Callable Library
    - Bridges the need for both interactivity and programming flexibility

- **New connectors included in installer**
  - Microsoft Solver Foundation (MSF) 2.0
  - AMPL
To be released – June 2011

CPLEX Optimization Studio 12.3
New in CPLEX Optimization Studio 12.3

- Connector to IBM SPSS Modeler
  Integrated modeling for prescriptive and predictive analytics. Use SPSS Modeler streams as data sources
- Interactive Development Environment Available on Linux for Intel®-compatible processors
- Indefinite Quadratic Programming
- Unlimited Row/ Column/ Nonzero Size
- Optimizer Performance Improvements
Creating the Application Data Model (ADM)

- Optional: Import data model from existing DB
- Legacy support: Import data model from OPL model
- Create, edit and refine ADM using graphical editor

Reuse of existing data model from legacy applications. Faster to start.

Modern editors for data model.
Data Model in Center of Development Process

Mapping Data Model to Optimization Model

Generation of OPL data structures
JViews Enterprise included with ODM Enterprise Developer Edition

- Develop custom views with Gantt, Charts, Diagrammer and Maps
  - Note: Development only. JViews Enterprise licenses required for deployment
Improved support for WAS in Optimization Server

- Supports latest Websphere Application Server (WAS) 7.0
- Installs pre-configured instance of WAS
- Supports cluster deployment
  - For load-balancing and high-availability
  - Technical note provides guidance on cluster architectures
- Scripts provided to automate deployment on WAS
IBM® ILOG
SUPPLY CHAIN APPLICATIONS

Packaged applications, built on ILOG Optimization, addressing common challenges associated with global supply chain design & sourcing strategies, production planning & detailed scheduling, transportation planning, and the optimal flow & placement of inventory
Packaged Supply Chain Applications

Strategic Supply Chain Planning

- Network design and planning
  - Determine optimal number, location, territories, WH sizing, plants, and lines
  - Determine where products should be made
  - Determine /optimize the network carbon footprint
- Transportation planning
  - Strategic routing for fleet sizing, load consolidation, backhauls, mode/carrier selection and more
- Strategic inventory optimization
  - Determine push/pull and buffer locations
  - Determine postponement opportunities
  - Analyze inventory policies
- Flow path optimization
  - Determine flow considering inventory and transportation costs & modes

Enterprise Inventory Planning

- Enterprise Inventory Optimization:
  - Maintain correct inventory levels on an on-going basis by integrating directly with your ERP system

Production Planning/Detailed Scheduling

- Planning and detailed finite scheduling for process plants
- Strategic and tactical process design

LogicNet Plus XE
Transportation Analyst
Inventory & Product Flow Analyst
Plant PowerOps

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IBM Academic Initiative
The IBM Academic Initiative

Our mission

- Partner with academic institutions worldwide to better educate millions of students for a smarter planet and more competitive workforce

Our offerings

- No-charge access to IBM technology & tools (thousands of software titles)
- No-charge access to course materials and curriculum (hundreds of modules)
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www.ibm.com/academicinitiative
ILOG Optimization joined IBM Academic Initiative August 2009

- Now targeting both teaching and research in engineering & business schools

- **Teaching**
  - Full version modeling and solver software supports undergraduate through graduate programs
  - Professionally-developed courseware

- **Research**
  - Full version modeling and solver software

http://www.ibm.com/developerworks/university/teachingtopics/or_ms.html
Overview of other IBM ILOG Offerings
A Brief Introduction to ILOG Products

Powerful Business Rule Management System
Adapt and respond dynamically, automating process-based decisions with business rule management

Efficient Supply Chain Management
Optimize supply chains, design & planning tools for improved efficiency and productivity

Advanced Suite of Optimization Tools
Produce the better action plans & schedules, enhancing abilities to explore alternatives, understand trade-offs, and respond to changes in business operations

Innovative Visualization Tools
Transform insight into action, enhancing collaboration for smarter role-based business decisions
Overview of IBM ILOG Decision Support Technologies

- Business Facts About ILOG and IBM
- Products and Services
- Industries and Partnerships
- IBM ILOG JViews
- IBM ILOG Business Rules Management System
- IBM ILOG Optimization Suite
- IBM ILOG Supply Chain Applications
ILOG Background

Changing the rules of business

- Part of IBM Software Group
  - Founded in 1987
  - Acquired CPLEX Optimization in 1997
  - Acquired LogicTools in 2007
  - Acquired by IBM in 2009
- World leader in business rules, optimization & visualization
  - Over 2500 customers
  - Over 700 ISV/OEM partners
Supply Chain Applications
Supply Chain Planning Apps

- LogicNet Plus XE:
  - Network planning

- Inventory And Product Flow Analyst:
  - Inventory level and stocking strategy optimization

- Transportation Analyst:
  - Strategic Transportation Planning

- Plant PowerOps
  - Integrated planning and scheduling for discrete and process manufacturing
IBM ILOG JViews
IBM ILOG JViews: What’s inside

- Java based graphics libraries and components for building sophisticated, interactive GUIs
  - JavaBeans
  - Class libraries
  - Design Tools
    - Designer
    - Cascading Style Sheets (CSS)
    - SDK
JViews Suite: For every visualization need

Gantt

JTGO

Maps for Defense

Charts

Diagrammer

Maps

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IBM ILOG Business Rules Management System (BRMS)
What are business rules?

Business Policies
Statement of guidelines governing the business decision

Business Rules
Translations into detailed conditions and actions that unambiguously enforce the policy.

Example:
An ‘under age applicant’ for insurance on high-powered sports cars is not eligible for coverage.

If number of accidents is greater than 2
Then flag applicant as a high risk driver
Reject high risk driver

Business Applications
Pricing / Quoting
Underwriting
Billing
Claim Processing
Order management
Scoring
Fraud Detection
…

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Traditional Approach = Business Rule Rigidity

**Business Rules are typically found in**
- Spreadsheets
- Databases
- Manual Processes
- Mainframe
- Monolithic Applications

**Issues**
- Rules are hidden in code
- Most changes have to be programmed or at least require IT resources
- Duplication and multiple versions of the same rules
- Copy and paste versus reuse of the business rules
- Lack of auditability, traceability
- No easy way to test/simulate the change
Professional Services

- Technical support – Maximize your product utility
- Training – Enable your product expertise
- Consulting – Leverage our experience
- Product Development – Influence the future
Our Services expertise is a key component of our overall Optimization solutions offering

- **Expertise**
  - Leader in development of custom optimization-based applications with a focus on how to maximize business value for clients
  - Unparalleled experience across various industries – CPG, Retail, Hi-Tech, Pharma, Chemical, Government, Automotive
  - Over 50 large projects in last 8 years – domestic and international

- **Experienced Consultant base**
  - Unique combination of strong technical expertise combined with business domain knowledge
  - In-depth knowledge of ILOG technology suite

- **Time to Value**
  - Our consultants’ experience and knowledge enables us to deliver quick time-to-value
  - Enable client teams on software and help build modeling expertise
IBM ILOG Optimization – Professional Service Offerings

- **Turnkey Solution**
  - IBM responsible for design, development and implementation of a custom optimization application.

- **Optimization Jumpstart**
  - IBM consultant(s) help the client team with solution design, approach and development of the initial optimization model

- **Optimization Tuning**
  - IBM consultant assists with improving the performance of an existing optimization model developed by the client

- **Training**
  - Custom or standard training focussed on specific application and environment
IBM-ILOG uses a phased methodology for solution implementation

IBM Optimization Solution Implementation Methodology

**Phase I**
- **Inception & Elaboration**
  - Discovery Workshop
  - Application Assessment
  - **Identification of main business problem(s) and technical goals, and high-level solution with expected benefits & risks.**

**Phase II**
- **Construction**
  - Baseline Development
  - Iter 2
  - Iter 3
  - …
  - Iter X
  - Detailed design and development of application with iterative incremental delivery.

**Phase III**
- **Transition**
  - User Training
  - UAT
  - Go-Live & Support
  - Final application refinements, user training and testing, with go-live support

The approach is based on **ISIS (IBM-ILOG Solution Implementation Standard)** to manage and deliver projects by **minimizing project and technical risks and costs** and **maximizing client’s return on investment** in our products.
Consulting: Leverage our experience, minimize your risk

- **Enabling customer projects**
  - Over 100 consultants worldwide
  - Over 500 projects over last 10 years
  - Field-tested practices, methodologies and packages
    - OpenUP-based development methodology: ISIS

- **Product and solution experts**
  - Experiential product knowledge
  - Interaction with IBM ILOG product developers
  - Strong project management experience
  - Nearly all optimization consultants, averaging many years of practical experience, have PhDs
  - Extensive integration and middleware skills
Next Steps
Next Steps: After the workshop

– Trial Software available online
– Training for CPLEX Studio and ODM Enterprise
  • Online, Classroom, On-Site
– For Additional Information – Contact your Account Manager
THANK YOU