ENTERPRISE OPTIMIZER® 10.1
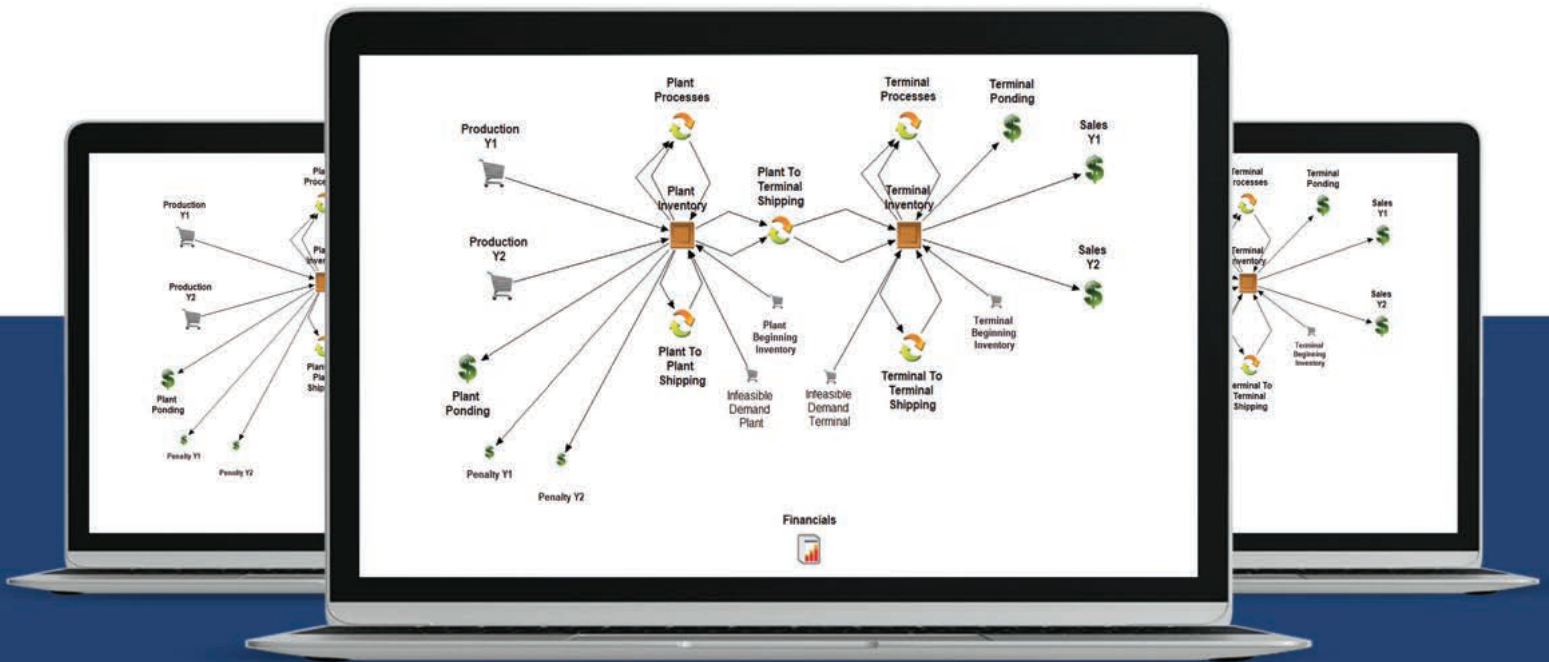
PRODUCT DATA SHEET

RL RIVERLOGIC

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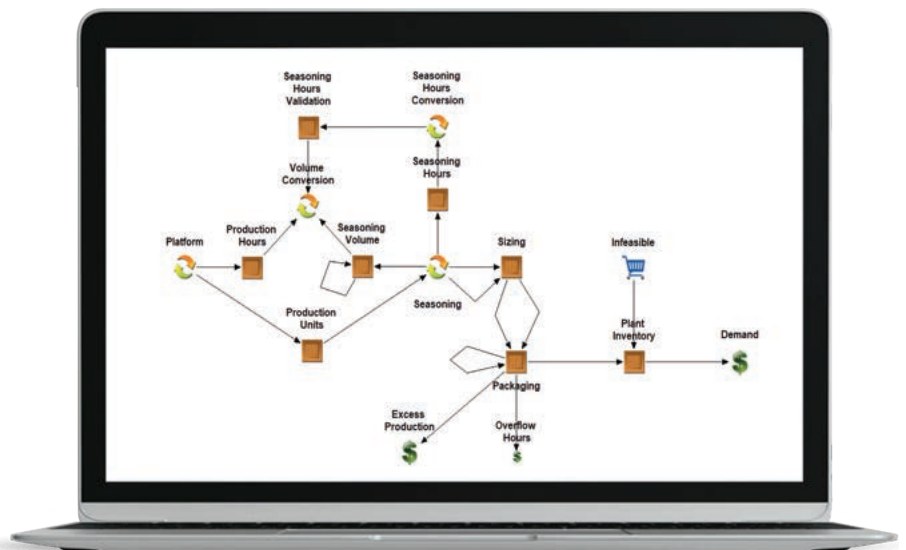
EO ENTERPRISE OPTIMIZER®

ENTERPRISE OPTIMIZER (EO) IS THE LEADING PRESCRIPTIVE ANALYTICS, OPTIMIZATION-BASED ANALYTICS PLATFORM FOR INTEGRATED BUSINESS PLANNING AND ADVANCED DECISION-MAKING.

EO complements today's business intelligence and planning solutions by enabling a new level of decision support – one that incorporates a more realistic, more accurate representation of an organization's business context and its constraints. EO helps users predict how certain forecasts will impact their business operationally and financially, while identifying opportunities, evaluating risks, and conducting what-if/optimization analyses to determine the best path forward.
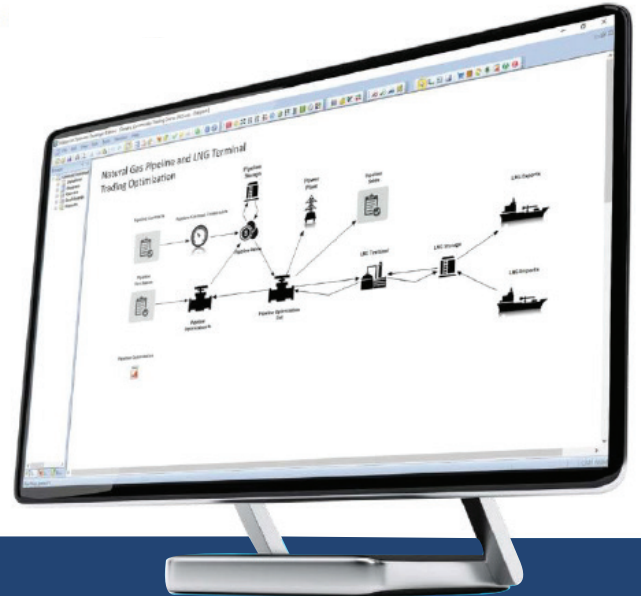
EO EMPOWERS USERS TO IMPROVE PERFORMANCE ACROSS THE ORGANIZATION IN AREAS SUCH AS:

INTEGRATED BUSINESS PLANNING

POLICY AND STRATEGY PLANNING

SALES AND OPERATIONS PLANNING (S&OP)

ENTERPRISE OPTIMIZER MODELING FEATURES

SUPPLY CHAIN NETWORK OPTIMIZATION

RESOURCE ALLOCATION

PRODUCT / CUSTOMER MIX PLANNING

MARKETING SPEND OPTIMIZATION

ENTERPRISE OPTIMIZER® MODELING FEATURES

EO's visual modeling language has built-in tools for constructing an integrated model of the business, including everything necessary for physical and logical processes and financial flows. EO models are rigorous, self-consistent, highly scalable, and customizable. Modelers can quickly build and deploy solutions that improve decision making right out of the box:

OPTIMIZATION AND MONTE CARLO SIMULATION SUPPORTING 360° WHAT-IF ANALYSES

VISUAL DRAG AND DROP MODELING WITH INTUITIVE USER INTERFACE
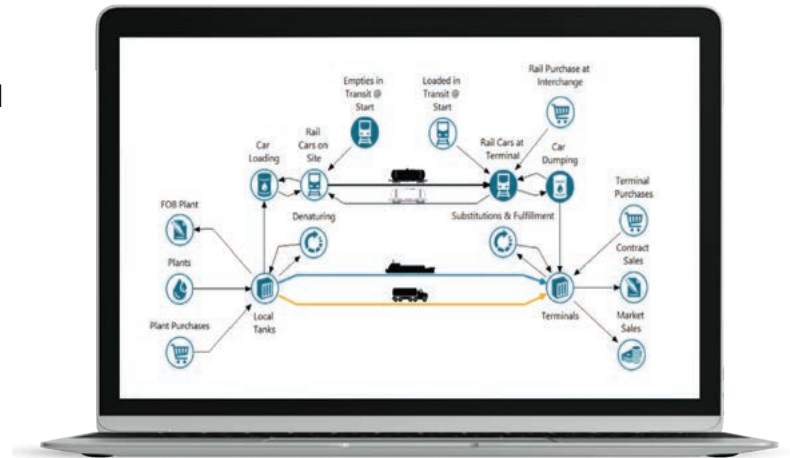
PHYSICAL FLOWS INCLUDE:

- Purchasing, transforming, transferring, holding, and selling of materials

- Common process idioms such as discount curves; multi-level BOMs, rates, yields, straight time, overtime, and slack hours; holding and transportation costs; currency and unit conversions; on/off and buy/sell decisions; many others

- Embedded expert knowledge supports batch processing, sequencing, blending, constraint sets, sole sourcing, pooling, open/close decisions, inequalities, and many others

- Modeling of stochastic variables to specify uncertain or random values for prices, costs, rates, volumes, yields, transit times, other parameters

FINANCIAL FLOWS INCLUDE:

- Driver-based allocations, summary accounts, aging, horizontal and vertical roll-ups, transfer prices, taxes, source and use of funds, NPV calculations

- Automatic generation of complex underlying mathematical representations for input to the market leading commercial solver Gurobi Optimizer from Gurobi, LLC and River Logic's Mixed Integer Optimizer (MIO)

- A truth maintenance system that ensures model consistency and reduced risk of errors through data checks, mass/energy balancing, and financial auditing

ENTERPRISE OPTIMIZER® ARCHITECTURE

EO's main system architecture includes a Visual Modelling Interface, Data Store, Translator Engine Mathematical Representation, Solver(s), and Knowledge Bases.

VISUAL MODEL INTERFACE

A clean Visual Model Interface enables real-world processes, activities, and constraints to be rapidly prototyped using drag and drop to define model objects and links. The interface allows the model design to then be clearly communicated to all stakeholders for better understanding of the problem definition.


DATA STORE

Data is imported into the Data Store by easy-to-use wizards that map internal tables to external data sources such as Microsoft SQL Server and Oracle relational databases, Microsoft Access, Microsoft Excel or text files. Once imported, data is saved inside a COR data file format, similar to Microsoft Office file.
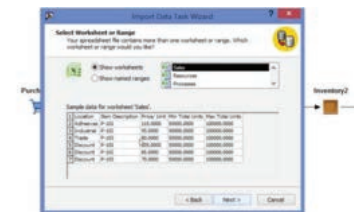
TRANSLATOR ENGINE

When the model is solved, the Translator Engine interprets the diagram and its stored data, and then applies built-in rules and consistency checks from EO's Knowledge Bases. EO then generates the Mathematical Representation in memory by converting the model and data into a matrix of equations.
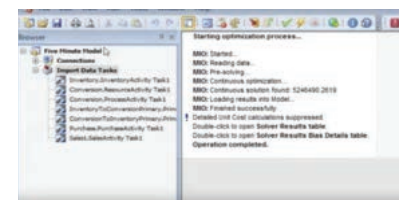
SOLVER

Once the mathematical representation is complete the problem is loaded into the Solver where optimization occurs. This step can include solving for the primary problem and complex summary and detailed unit cost calculations. Once complete, solve results are automatically translated and loaded back into the model. Results are immediately available for further analysis in EO dashboards or to be exported to Microsoft Excel or any relational database and viewed in Microsoft Power BI.
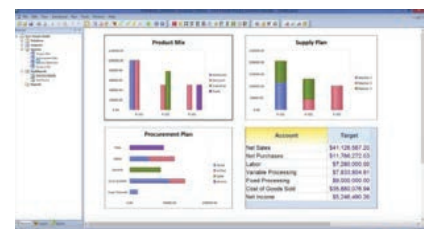
Partner or Client Modeler

Visual Model Interface
- Modeler Tool
- Object and Link Properties
- Data Table Definition

Data Store
- Proprietary Data Format
- COR File Structure

External Data

Client App Data

Data Warehouse

Real-time Rules Application

Translator Engine
- Interprets Visual Model
- Applies Knowledge Base Rules
- Generates Matrix

Knowledge Bases
- Process Rules
- Business Rules
- Mathematical Rules

Pre-solve Matrix Optimization | Post-solve Error Checking

Mathematical Representation
- Problem Definition
- Solution Matrix
- MPS File Format

Scripting and Automation
- T-SQL Query Designer
- Python
- Microsoft VBA

EO Solutions

Packaged Applications

Custom Applications

Advanced Solver
- Gurobi Optimizer

Basic Solver
- Mixed Integer Optimizer (MIO)

Key
- ☐ EO Windows Application
- ☐ Advanced Solver Application
- ☐ External Technology Components
- ⬌ Power User Interface to EO
- ⬌ EO Server + Alteryx, SSIS, other ETL
- ⬌ EO Server and EO APIs

RELATED READING

River Logic's Packaged Solutions
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ENTERPRISE OPTIMIZER® SERVER™

(EOS) facilitates the deployment of EO models in multi-user, multi-tenant situations; to manage complex jobs requiring many tasks or multiple solves; or, to utilize multiple servers distributed across a network, both behind a corporate firewall or a public or private cloud. EOS includes over 50 different tasks including all commonly used EO API methods as well as executing Rest API web requests, Python scripts, SQL stored procedures, SSIS packages, and PowerShell tasks. The Service Oriented Architecture (SOA) allows application developers to quickly build robust, secure, and scalable solutions. End-users can access EO models from a browser by leveraging EO Server's REST and SOAP web APIs.

THE SCIENCE BEHIND ENTERPRISE OPTIMIZER®

Enterprise Optimizer® is built on Constraint-Oriented Reasoning™ (COR), a 5th Generation Programming Language (5GL) that enables users to quickly create high-value analytical solutions in complex problem domains. With COR, problems are defined as constraints expressed with an intuitive specification. The specification can combine multiple forms of constraint representations, including graphical, symbolic, quantitative, and relational. Unlike conventional approaches where modelers use visual techniques to define and sequence equations, COR automatically generates mathematical representations of all system constraints and their interactions. This enables users to easily modify the problem they are solving without requiring them to restructure mathematical representations or redefine input and decision variables.

TECHNICAL REQUIREMENTS

MINIMUM RECOMMENDED HARDWARE REQUIREMENTS

Operating System: 64-bit

Memory: 8.0 GB or higher

Processor: 2 GHz or faster with multiple cores

Hard Drive Space: 8 GB (for program, models, and secondary files)

OPERATING SYSTEMS

Windows 10, 8.1

Windows Server 2019, 2016, 2012 R2 and 2012

ENTERPRISE OPTIMIZER®
FUNCTIONAL AREAS AND CAPABILITIES

BUSINESS ANALYSIS

- Consideration of financials, markets, operational variables, business constraints in one integrated, simultaneous representation
- Optimization to any financial (e.g., profitability, revenues), process (e.g., volume, inventory), or managerial metric (e.g., NPV, SLAs)
- What If questions to changing assumptions or loosening constraints
- Modeling of stochastic variables to specify uncertain or random values for price, cost, volume, others
- Monte Carlo simulation analyses of impact from a range of values
- Opportunity Values™ identify profit improvement opportunities on the margin for products, customers, resources, and any other constraints in the system
- Improvement and opportunity costs of over-constrained variables
- Complex inter-dependency modeling to identify maximum potential from each scenario
- Infeasibility analysis of over- constrained operational and financial resources of managerial metrics (e.g., SLAs, emissions)

MARKET MODELING

- Linear, piecewise-linear, and step-change price and demand curves
- Contractual commitments and SLAs as constraints
- Competitor financial structures, potential actions, and impact on prices and demand
- Purchase and sale of WIP and by-products

PROCESS MODELING

- All inputs and outputs, including by-products and emissions
- Resources (personal, physical) and activity
- Batch and continuous process flows
- Conditional minimums
- Production sequencing
- Pooling of inventory and resources
- Automatic mass/energy balancing
- Full and partial-load transportation
- Inventory (LIFO, FIFO), holding cost degradation, and shrinkage
- Product mix analysis and optimization
- Resource open/close decisions
- Network design and optimization

FINANCIAL MODELING

- Full financial reporting structure replicating a company's GL
- Audit quality income, balance sheet, and cash flow statements using GAAP accounting
- Financial, budget (vertical and horizontal) consolidations, including beginning balance
- NPV, Economic Profit, and all other financial ratios at corporate and division levels
- Detailed unit costs and profitability by customer, products, resource, channel partner, and facility (includes ABC)
- Resource utilization and implications on unit costs and profits
- Capital expenditure allocation and optimization
- Transfer cost and tax planning
- Full and partial ownership of assets
- Working capital management
- Sources and uses of cash (treasury)
- Multiple currencies in a single model with automatic conversion
- Customized depreciation schedules
- Customized aging of accounts and inventory value

VISUAL DIAGRAM AND MODEL MANAGEMENT

- Intuitive drag and drop interface
- Automatic propagation of categories through the model (e.g., material names, locations)
- Visualization of constraints and material flows
- Automatic propagation of constraints (e.g., min/max)

DATA AND ERROR CHECKS

- Full consistency check for names, labels, units/unit conversions, and constraints
- Identification of unconnected graph elements
- Flagging of mutually exclusive and/ or infeasible conditions
- Flagging of pre- and post-solve imbalances in financial accounts
- Checking and application of factors and adds to a given variable
- Mathematical checks and automated error correction of problems related to scaling, computational efficiency, and other issues

About River Logic

River Logic has a global innovator in prescriptive analytics since 2000 by offering an optimization platform that is purpose-built for business users rather than data scientists. Its solutions enable enterprise-wide optimization via a revolutionary cloud-based scenario experience that supports collaboration, data management, workflows, and more. By understanding how to best utilize cross-functional resources and manage complex trade-offs, companies make more impactful decisions.

River Logic goes to market primarily through partner organizations like PwC, Deloitte, Accenture, and Microsoft, helping them develop high-value applications that monetize their IP. Recent clients include Unilever, BHP, Boise Cascade, McKee Foods, Boral, and the Russian Post. Typical client value-add ranges from 10% in cost reduction to profit improvements equal to 2-5% of annual sales. River Logic strives to help every customer achieve at least 10X return on investment, but it is common for customers to see even higher returns.

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