



# Stream Systems Ltd.



***SimOpti – Simulation, A.I. and Optimization Software Solution  
Improve Decision-making in near real-time to support your Business Goals***



# Stream Systems

## Introduction



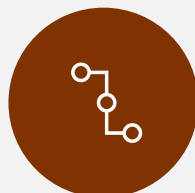
Providing innovative software solutions since 2014



Implemented in various industries: mining, oil and gas, renewable energies



Applied Machine Learning and Reinforcement Learning in predictive analytics



Streamline your mine planning/O&G development plans & operations

Private and Confidential

- Stream Systems' SimOpti software is a simulation and optimization solution that improves decision making capabilities in real-time to support your commercial goals
- SimOpti uses its proprietary AI/ Reinforcement Learning stack to enable clients to achieve dynamic solutions to asset, market and supply chain challenges in order to meet desired business objectives in real-time.
  - Enables testing, experimentation and optimization of a global multi-site business system or an integral section of the supply chain
- SimOpti's algorithms and sophisticated analysis techniques support combinations of multiple simulation methods in one model to evaluate various optimization scenarios



# SimOpti

## Introduction

01

### CLOUD-BASED PLATFORM

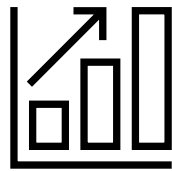
Easily access your data in a secure environment



02

### RAPID RISK EVALUATION

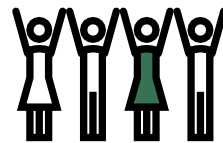
Dynamic modelling space to quickly create new testing scenarios



03

### UNITED WORKFORCE

Bridge the gap between finance, operations, engineering and I.T.



04

### SEAMLESS INTEGRATION

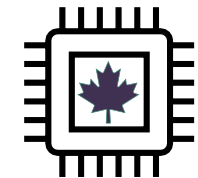
SimOpti is designed to be implemented with existing technologies



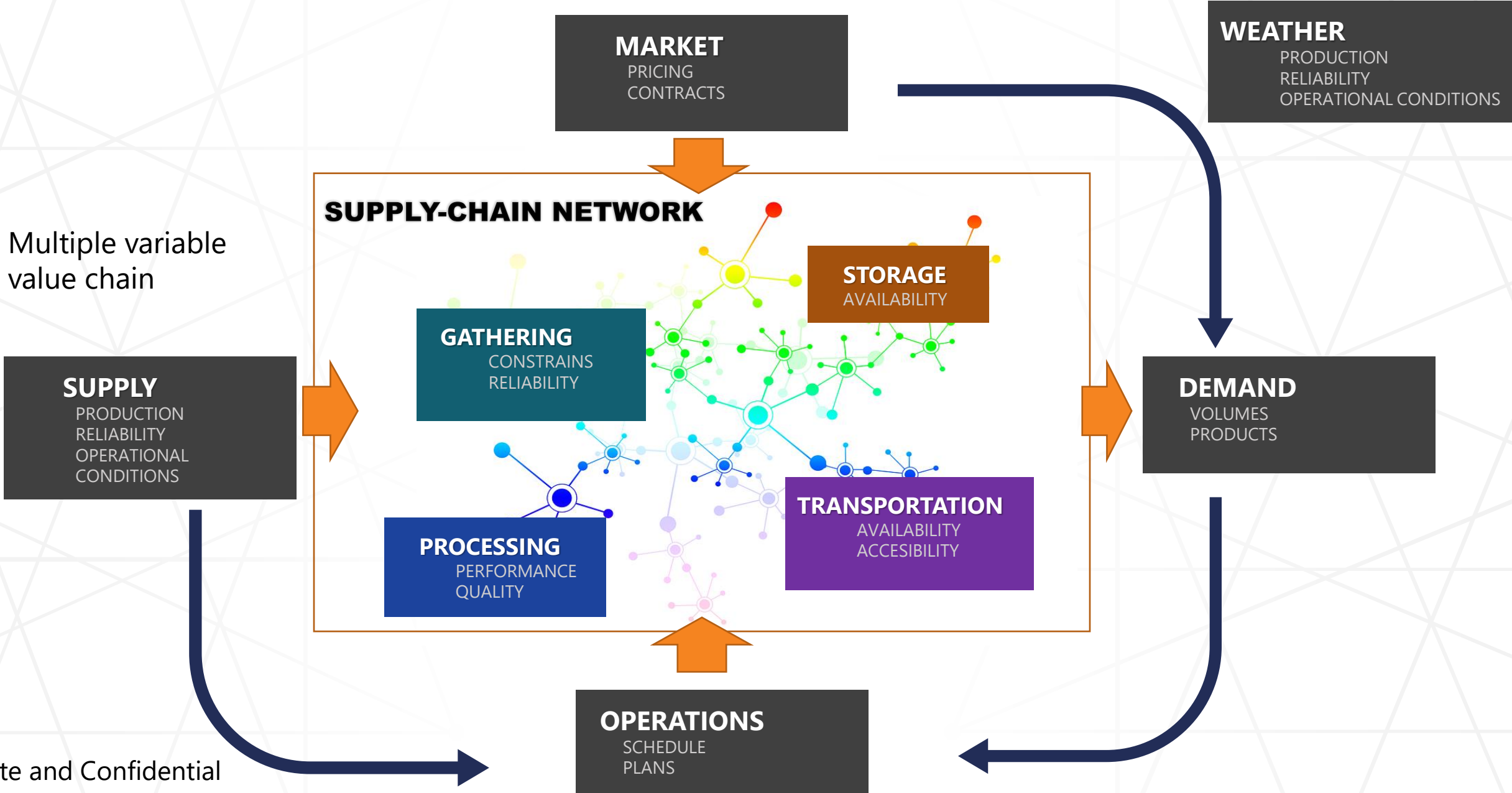
05

### LEVERAGE A.I.

Make intelligent decisions using digital twin simulation and optimization



# SimOpti: A Systems-based Solution to Maximize Value from the Network

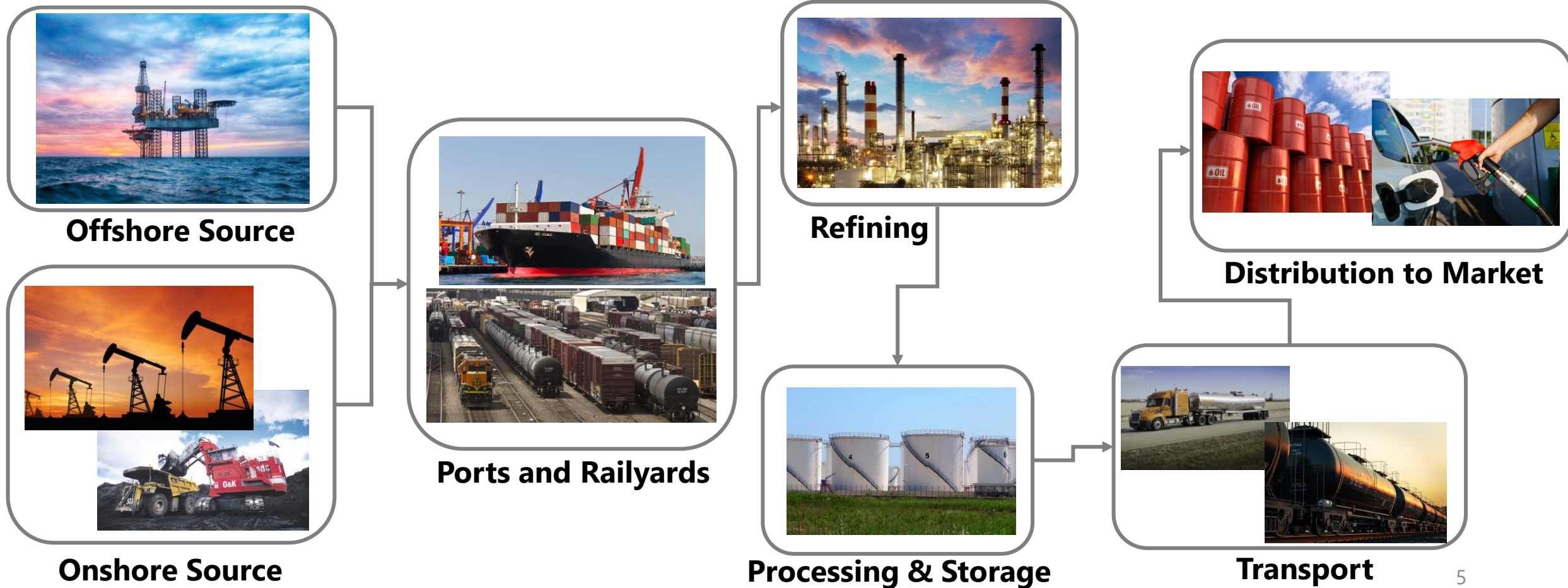




# SimOpti: Systems View to Modelling

EXAMPLE: The Oil and Gas System

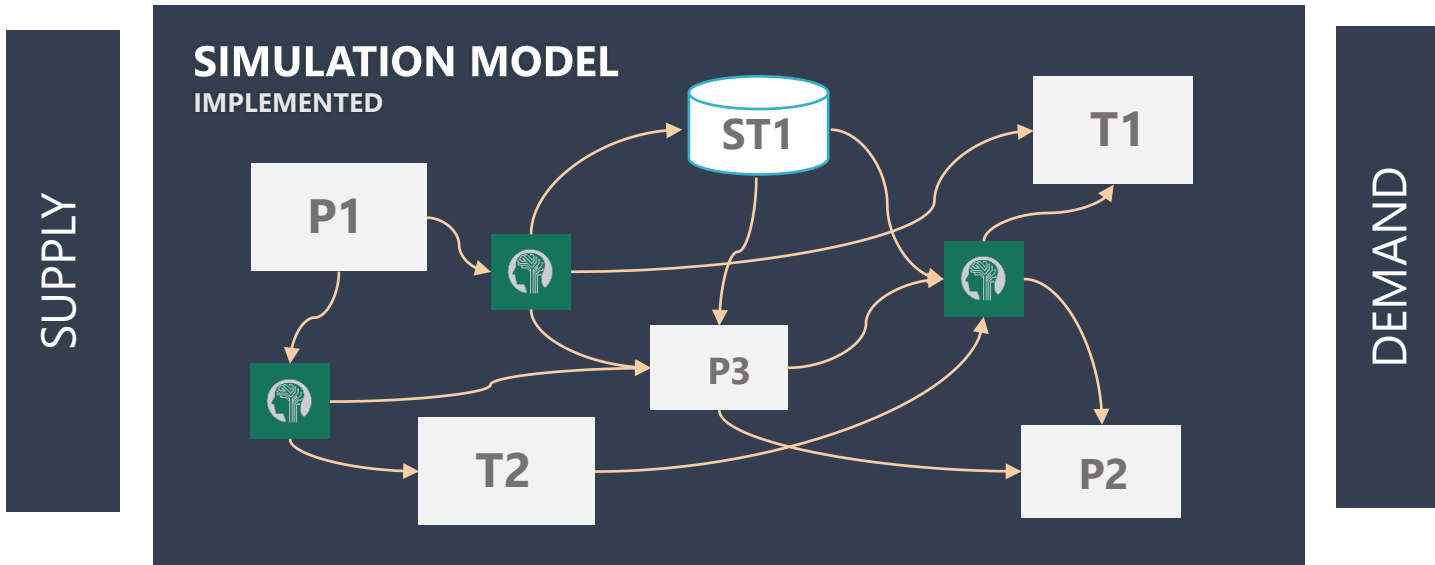
SimOpti simulates & optimizes complex asset networks from production/supply through to distribution and sales



# How the SimOpti Solution works

## A. TUNE SIMULATION

Tune supply chain simulation model using AI driven components



## Simulation Nodes Examples:

- ST** Storage
- P** Processing
- T** Transportation
- S** Supply
- D** Demand
- Key AI decision nodes

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## B. TRAIN META-AI

Use dynamic simulation model to train a Meta-AI model (reinforced learning)



## D. CONTINUOUS LOOP

Continuously monitor, tune, train and optimize

## C. OPTIMIZE

Optimize real time data feed using heuristic optimization engine with Meta-AI model



## AI DRIVEN DECISION MAKING



REPORTING  
SCHEDULE  
UTILIZATION  
MARGINS  
THROUGHPUT  
QUALITY

### Color Legend:

- Existing Models/Components implemented by Stream
- AI components to be integrated as part of this project
- Existing Implemented Systems with project partners and SME (IBM, Egistix, etc)

## Businesses are not Static

- Informed Business decision-making requires Speed and Flexibility to deal with Disruptions to the entire value chain from Supply to Demand

# Competitive Advantage

## System View of Business Value Chain

- ✓ SimOpti Intellectual Property
- ✓ Hybrid approach between simulation tools and artificial intelligence
- ✓ Wrapping Methodology = Competitive Advantage

Business Value Chain Visualization

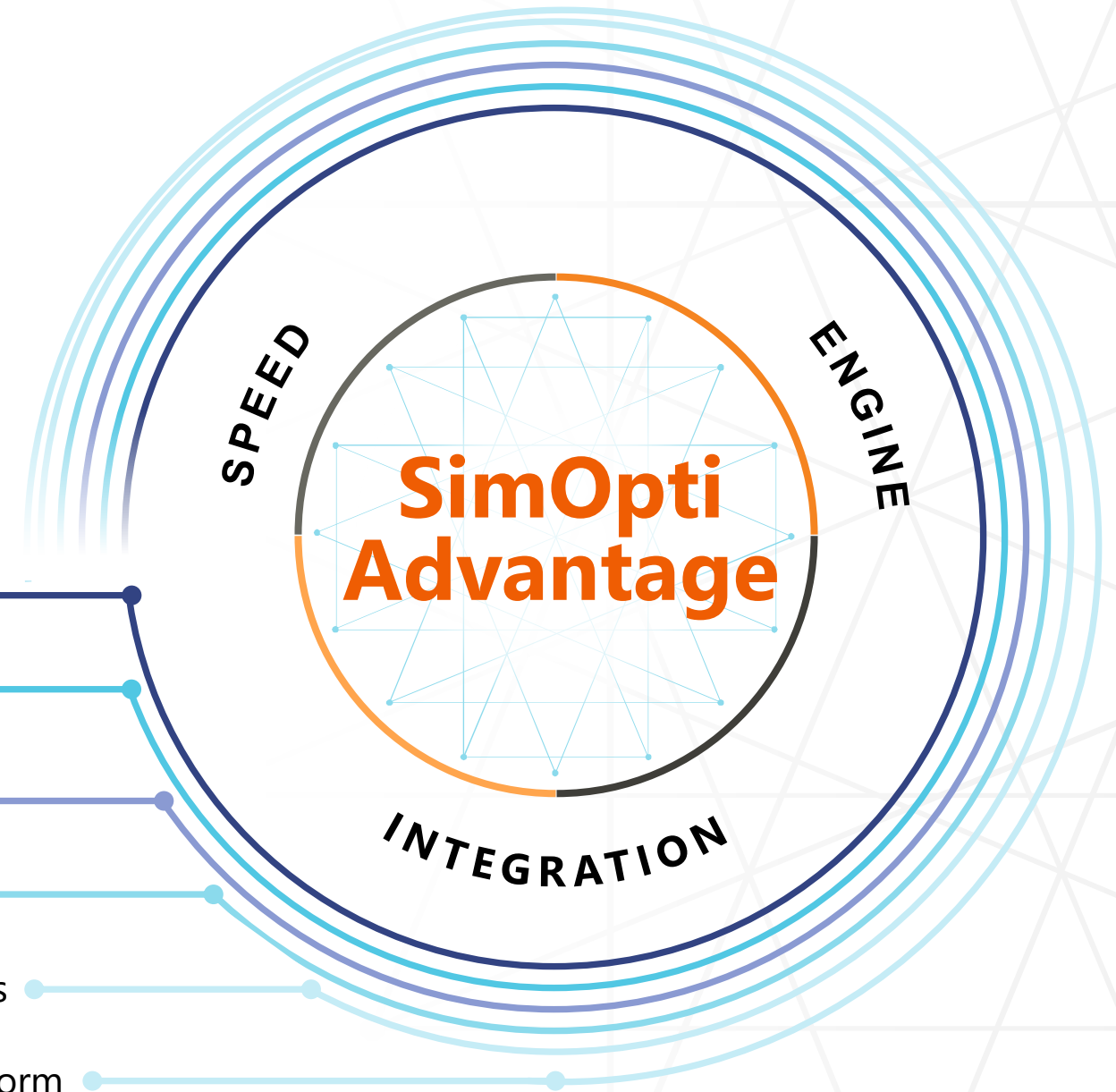
Machine Learning, AI, and RL

Disruption Management

Predictive Analytics

Agent Based Methods

Cloud Based Platform











# SimOpti

## Adding Value with SimOpti

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Aspect	Outcome
	<b>Timely Decision Making</b> Have the <b>right person</b> , making an <b>informed decision</b> , in a <b>timely manner</b>
	<b>Data Integration</b> Understand the interplay of key variables in your business, and optimize these business levers for the <b>desired operational AND commercial outcomes</b> (keep the ' <b>Big Picture</b> ' in mind)
	<b>Value-Driven Decisions</b> Ensure the most cost-effective delivery of high-quality products to the customer <b>maximizing ongoing value creation</b>
	<b>Plan Recovery</b> Make decisions quickly in response to <b>unplanned disruptions</b> that allow operations to get back on plan and/or <b>maximize netbacks</b>
	<b>Risk Analysis</b> Understand where the <b>largest risks</b> reside in the business value chain network and their impact on downstream commercial for accurate reporting/guidance
	<b>Institutional Knowledge</b> <b>Capture, retain and leverage institutional knowledge</b> across the customer's entire asset base





# SimOpti

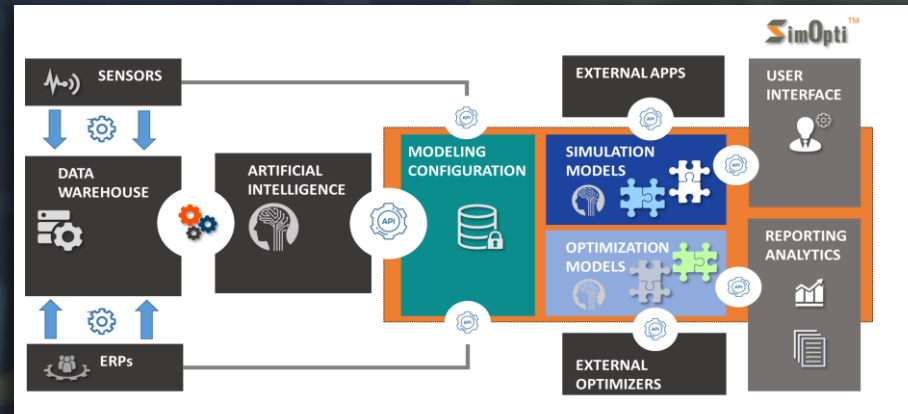
## Core Applications in Oil & Gas

	<b>Application</b>	<b>Description</b>
	<b>Facility Simulation and Optimization</b>	Economic optimizers, in facility, terminal, refining: bridge between Linear Programming (LP) or pipe hydraulic models and the unit optimizers, includes factors such as inventory; have a 'days to weeks' timescale, highly connected to scheduling. Optimize the operation of multiple units.
	<b>Production (Crude/Product) Scheduling and Blending</b>	Optimal scheduling for crude/products and blend optimization in short or long-term in response to operational or market-based fluctuations that may present commercial opportunities
	<b>Asset and Value Chain Optimization Models</b>	Economic models, including techniques other than LP, weekly/monthly time horizons, includes single-facility models as well as whole value chain models
	<b>Maintenance, Planning and Scheduling</b>	Includes schedule optimization. Simulate different maintenance sequence scenarios or stochastic events across the value chain and identify the optimal event sequence within given constraints.
	<b>Pricing, Sales and Market Intelligence</b>	Sales price optimization, collection and processing of market intelligence data. Market intelligence decision-support platform to monitor and analyze both internal and external strategic, operational, market, supply, demand and price intelligence.
	<b>Workflows/Dashboards/Reporting Tools (Management System Tools)</b>	Management system tools that provide, end to end visualization of processes, and reporting along the integrated energy value chain.



# What Makes SimOpti Unique

SimOpti Intellectual Property



**Agent-Based Simulation**

+

**Deep Reinforcement Learning**

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**COMPETITIVE  
ADVANTAGE**



# Modelling Tools

## Scheduled and Stochastic Events

### Method

- Using historical performance data, SimOpti can create predictive failure models for specific components in the supply chain
- With the option of creating stochastic or scheduled events, SimOpti can simulate predicted failure events, scheduled maintenance events based on operating lifetime hours or clock-time hours and other frequency measures that affect equipment efficiency, availability and utilization

The screenshot displays the 'STOCHASTIC EVENTS' configuration window. On the left, a tree view shows the event hierarchy: 'Stochastic Events' > 'Pump 2 Failure'. The main panel is titled 'Pump 2 Failure' and contains the following settings:

- Name:** Pump 2 Failure
- CONFIGURATION:**
  - Apply To: Pump 02
  - Change Type: Fixed To
  - Rate Change: 0.0 bbl/h
  - Time Constraint:
- FREQUENCY SETUP:**
  - Current Life: 2 h
- MEAN TIME BETWEEN EVENTS:**
  - Variability Type: Normal
  - MTBE Value: 312 h
  - MTBE Deviation: 25 %
- MEAN TIME OF THE EVENT:**
  - MTOE Value: 48 h
  - MTOE Deviation: 10 %



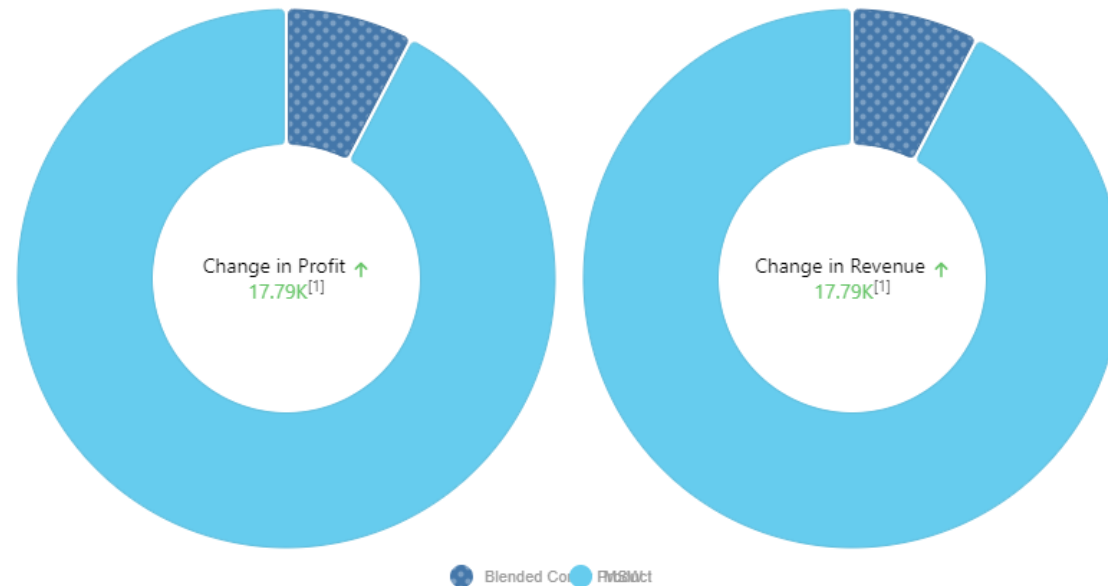
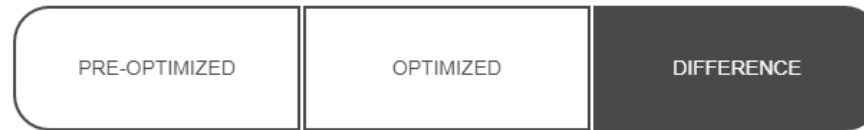
# Reporting Tools

## Interactive Reporting Interface

### Results

A fully customizable, interactive reporting tool is provided to users to quickly analyze simulation and optimization results where data can be easily exported in tabular form to a database.

VALUE	BLENDED COND	MSW	(NO PRODUCT)
Volume <sup>[2]</sup>	↓ -2.85	↑ 74.98	0
Price / Unit <sup>[1]</sup>	0	0	0
Revenue <sup>[1]</sup>	↑ 1.33K	↑ 16.47K	0
Cost <sup>[1]</sup>	↓ -1.63K	0	0
Profit <sup>[1]</sup>	↑ 1.33K	↑ 16.47K	0
Facilities	+ Show 1	+ Show 1	+ Show 2



Show Tabular Report

Cost Movement Breakdown (\$)

Total Cost Reallocation <sup>[1]</sup> :	-1,630.08
Required Reallocation Change <sup>[1]</sup> :	1.63K

Volume Movement Breakdown (m<sup>3</sup>)

Total Volume Reallocation <sup>[2]</sup> :	73
Required Reallocation Change <sup>[2]</sup> :	11.28K

(1) Figure(s) in \$CDN  
 (2) Volume(s) in m<sup>3</sup>



# Client Cases

## Oil & Gas Industry

### O&G PRODUCER



**Objective:** Find opportunities to maximize netbacks at a single oil processing facility

**Solution:** Modelling revealed 3 biggest levers for tangible value were:

- Opportunistic heavy crude blending
- Reducing shut-in production by 10-20% through predictive analytics insights
- Increasing product sales pricing by identifying product quality arbitrage opportunity

**Client Benefit:** Able to demonstrate to client **C\$ 100k-200k/mo of additional bottom line netback** potential over the 6-month historical period **totaling C\$ 1.1MM** over the 6-month period

- **Line of sight to > 10x first year ROI**
- Scalable to additional corporate assets

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### CRUDE OIL RAIL & MARINE TERMINAL



**Objective:** Stream engaged to determine if scope of rail & marine project could be reduced while still providing required volume throughput

**Solution:** Simulate the operations to identify optimal design of the rail/marine connectivity and facilities, while maintaining schedule and product quality by focusing on rail yard operations including rail car offloading operations, train movements and car switching

**Client Benefit:** Simulation revealed excess tankage. Allowed client to **re-task 4 tanks into generating net C\$ 1MM+/month**, resulting in **first month ROI of 5x**

- **CAPEX reduced by 40%** of initial project estimate resulting in **over C\$ 200MM in savings** while maintaining targeted throughput

### O&G PRODUCER



**Objective:** Maximize the throughput for a complex infrastructure (wells, pipe, terminals, tanks, distribution network).

**Problem:** Capacity constraints and bottlenecks causing an overall 10% loss of oil production of a 15k bod facility (over \$25MM a year loss)

**Solution:** Simulate the forecast to validate the schedule and unlock opportunities for overall capacity efficiencies

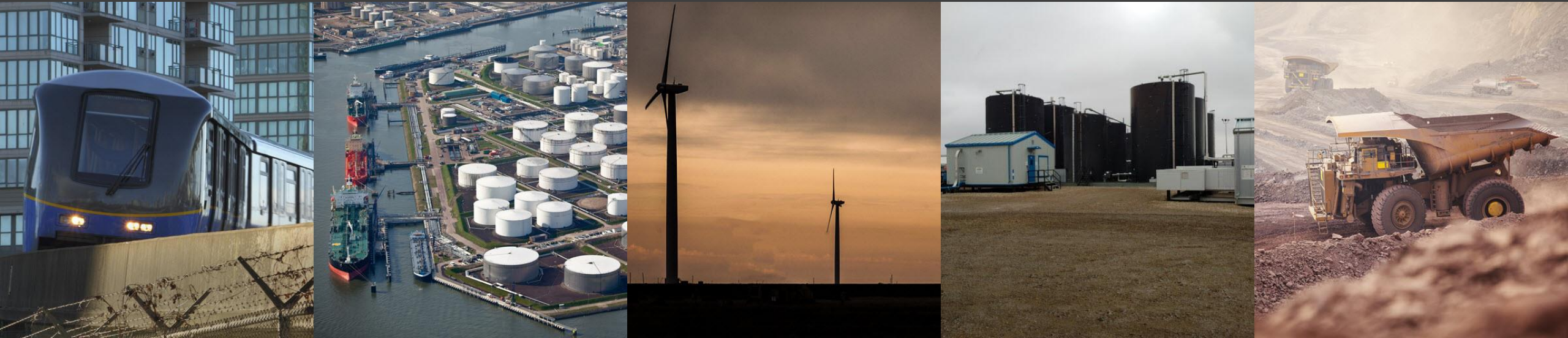
**Client Benefit:** Bottleneck source identified; mitigation plan enacted; **5-24% per month netback optimization identified**

- **Best month optimized result represented an incremental ~C\$ 1MM netback representing a 5x first year ROI potential**

**User:** Oil & Gas Marketer, Facility Engineer, Production & Development Planner



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**QUESTIONS?**

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