

# GREEN RaTIO

## Industrial process optimization - Supply chain optimization in oil industry

Presentation

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## Abstract

In a world where every transaction counts, how an order is executed can drive sales, customer satisfaction, and profits. The ability to integrate a solution across the entire supply chain operation can make or break the success of supply chain execution.

Supply Chain measurements are used to track Supply Chain performance. They can help you to understand how well your company is operating. Supply Chain Measurements should cover every areas including Production, Distribution, Warehousing, Inventory, Transportation. However, a strong performance in one part of the chain is not sufficient. Your Supply Chain is only as strong as its weakest.

## GREEN RaTIO – Concept

- ➔ Business Process modeling through dynamic resource availability and workflow constraints. Petri Nets.
- ➔ Genetic algorithms to create optimum SCM schedules for all process stages.
- ➔ Strong Supply Chain Event Management. System to System collaboration. Respond to supply chain events that occur across multiple, disparate systems within the enterprise and at your customer's and supplier's sites.
  - Instant response capabilities bases on priorities, real-time alert messaging
  - Model multi-enterprise data and integrate to various systems
  - Real-time re-optimization across supply, manufacturing and distribution constraints
  - Measure key performance indicators to see the health of the supply chain
- ➔ Web Portal dedicated module for each SCM Process stage. Web portal collaboration. Easy accessibility of information to all involved stakeholders. Strong, unified, communication channel.

## GREEN RaTIO – General components

- ➔ **Tool for process state monitoring at every moment, at every process stage** and evaluating the possibility of touching the delivery plan with chosen optimum cost
  - Collecting live data from existing systems based on proper defined triggers (loading orders, inventory levels, transportation vehicle state and location, etc.).
  - Disseminate information and present clear view of each process stage, detecting possible bottlenecks. Historical analysis possible.
- ➔ **Collaborative decision support tool**

- Generate operational schedules to be chosen against all process stages (entering of transportation vehicle, pairing with orders, tank lining up, manouvering to loading point, etc.). Associate each schedule scenario with costs. GA algorithms used to obtain quick and optimum proposals.
- Back propagation flow used for activity scenario generation.
- Provide collaborative decision possibilities where scenarios have impact over several process stages.
- Inform user about the impact of chosen scenario over local and global optimum.

➔ **Scenario execution monitor tool**

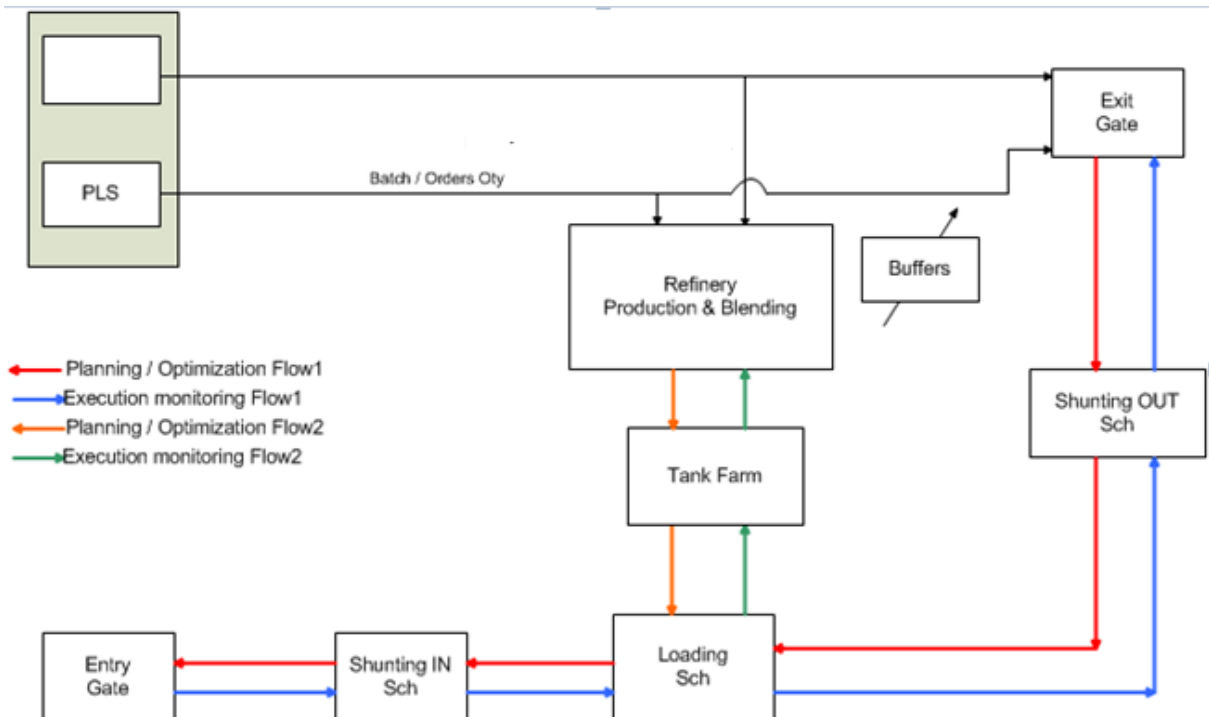
- Selected scenario monitored in terms of fulfillment and proper alignment with global optimum (KPI, Local KPI, Global KPI)
- Alerts issued when deviation from optimum will occur in order to investigate if total rescheduling is needed or only a local one is sufficient.

## GREEN RaTIO – Outside refinery transport monitoring

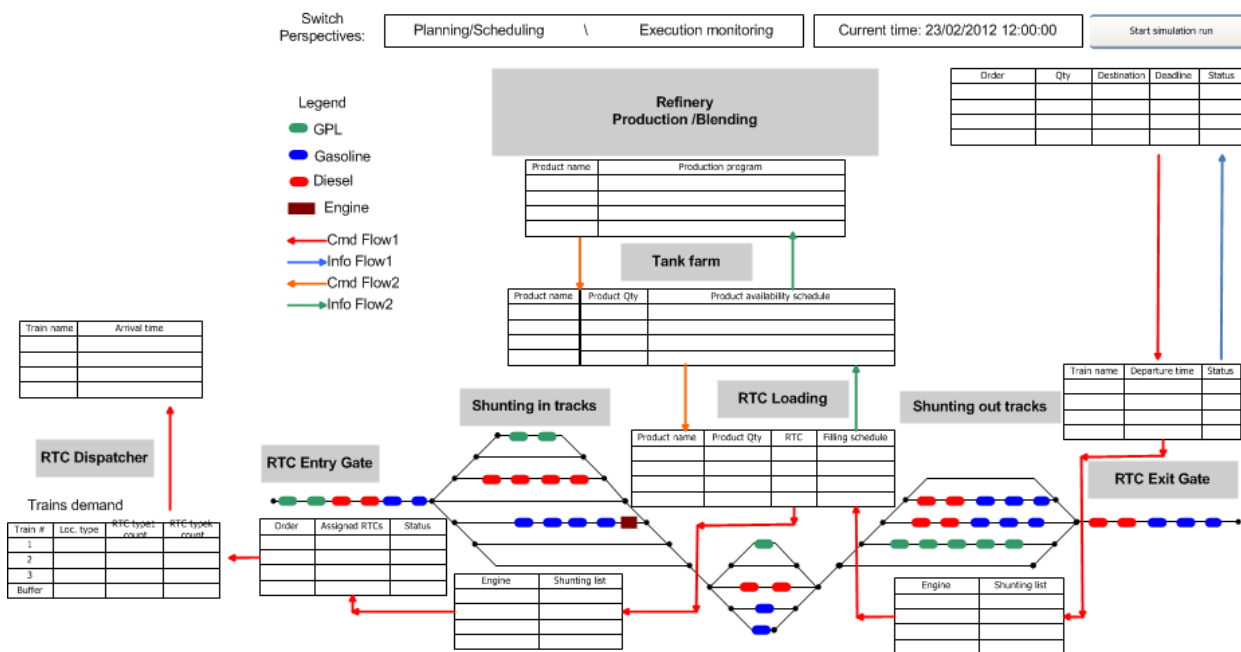
- ➔ **GPS monitoring / GIS**
- ➔ **Confirmation of delivery at destination (client, warehouse)**

## GREEN RaTIO – Schematics

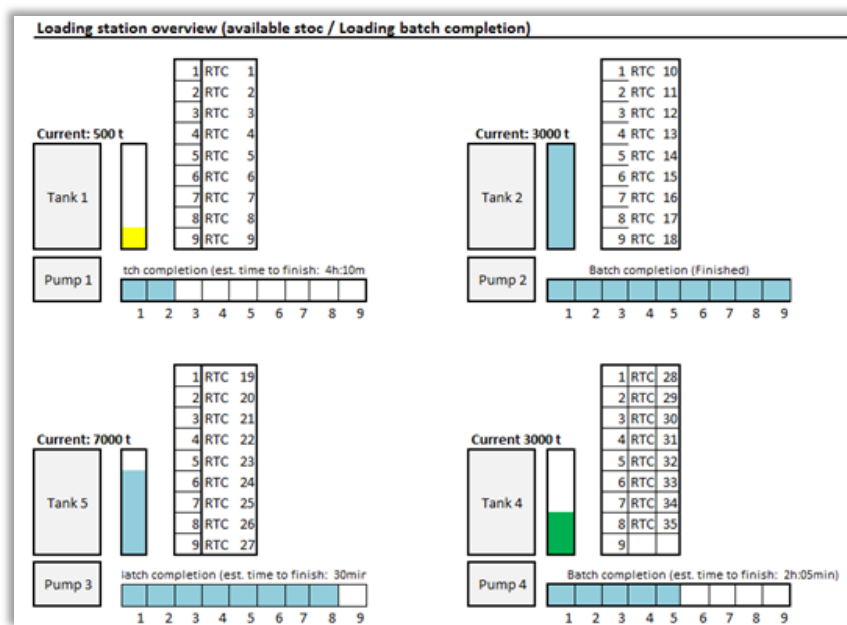
- ➔ **Back propagation for schedule generation. Fwd propagation for execution deviation monitoring**



## ➔ Schedule dependencies between SCM stages



## ➔ Live monitoring of loading point / tank stock



➔ **KPI Overview**

RaTIO

Inventory

**Perspective**   Planning   **Execution**   KPI

**Existing trains at Exit Gate**

Train	Track	Planned departure time	Train composition						Current status	Departure date/time	Deviation (h)
			Order	RTC no	RTC type	Product	Qty (to)	RIV / RID status			
Train 1	20	02.03.2012 13:00	Order 1	RTC 1001	Type 1	Product 1	50	OK	Finalized	02.03.2012 13:00	0
				RTC 1002	Type 1	Product 1	50	OK			
				RTC 1003	Type 1	Product 1	50	OK			
				RTC 1004	Type 1	Product 1	50	OK			
				RTC 1005	Type 1	Product 1	50	OK			
RTC 1006	Type 1	Product 1	50	OK							
Train 2	21	02.03.2012 15:00	Order 2	RTC 2001	Type 2	Product 2	45	OK	Waiting for shipping documents	-	4 Delay
				RTC 2002	Type 2	Product 2	45	OK			
				RTC 2003	Type 2	Product 2	45	OK			
			RTC 2004	Type 2	Product 2	45	OK				
			Order 3	RTC 3001	Type 3	Product 3	50	OK			
				RTC 3002	Type 3	Product 3	50	OK			
RTC 3003	Type 3	Product 3		50	OK						
Train 3	20	02.03.2012 19:00	Order 4	RTC 4001	Type 1	Product 1	50	OK	Finalized	-	0
				RTC 4002	Type 1	Product 1	50	OK			
				RTC 4003	Type 1	Product 1	50	OK			
				RTC 4004	Type 1	Product 1	50	OK			
				RTC 4005	Type 1	Product 1	50	OK			
RTC 4006	Type 1	Product 1	50	OK							

**Train completion**

Train	Departure time	Remaining qty to be loaded	Status	Delay (min)	Obs / Reason	Composition
Train 1	02.02.2012 07:00	2000	Canceled	-	Missing product	[+]
Train 2	02.02.2012 08:00	500	In progress	-	Loading ... / Composition /	
Train 3	02.02.2012 10:00	2000	Warning	-	Waiting for RTC	
Train 4	02.02.2012 12:00	0	Delayed	60	Composition	
Train 5	02.02.2012 12:00	0	Departed	10		

RTC	Type	Loaded	Qty (to)	Product
RTC 1	Type 1	Yes	80	Product 1
RTC 2	Type 1	Yes	80	Product 1
RTC 3	Type 1	Yes	80	Product 1
RTC 4	Type 1	No	-	-
RTC 5	Type 1	No	-	-

**Order completion**

Order	Product	Qty (to)	Loaded qty (to)	Deadline	Status	Obs	Deviation
Order 1	P1	2000	1500	02.02.2012	In progress		-
Order 2	P2	2000	2000	02.02.2012	Completed		0
Order 3	P3	2000	0	03.02.2012	Pending		50
Order 4	P4	2000	0	03.02.2012	Canceled	From PLS	-

