

# Creating Value

Multi-Mill Advanced Planning and  
Scheduling System  
Implementation – A Case Study

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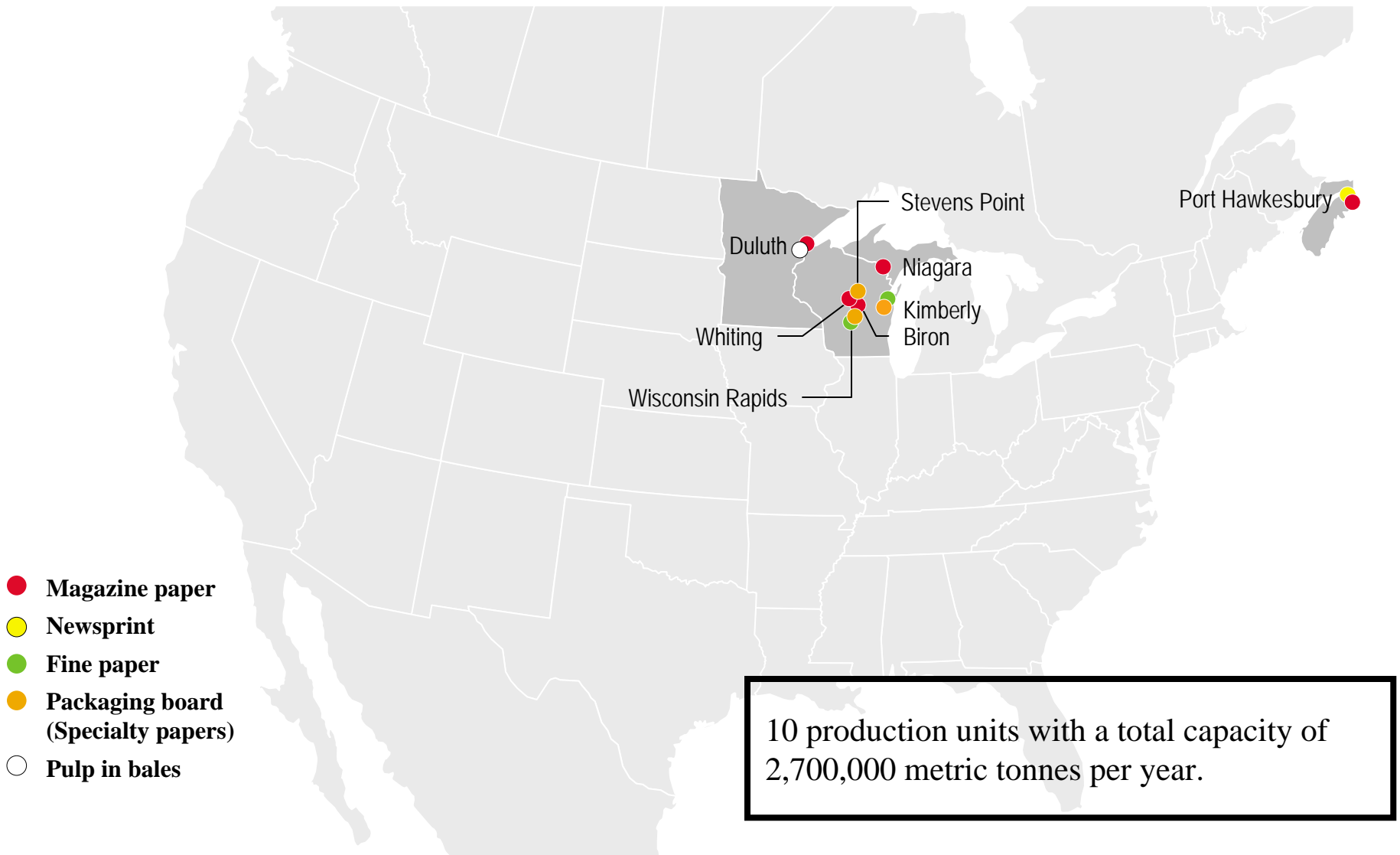
Stora Enso North American Operations

May 23, 2006

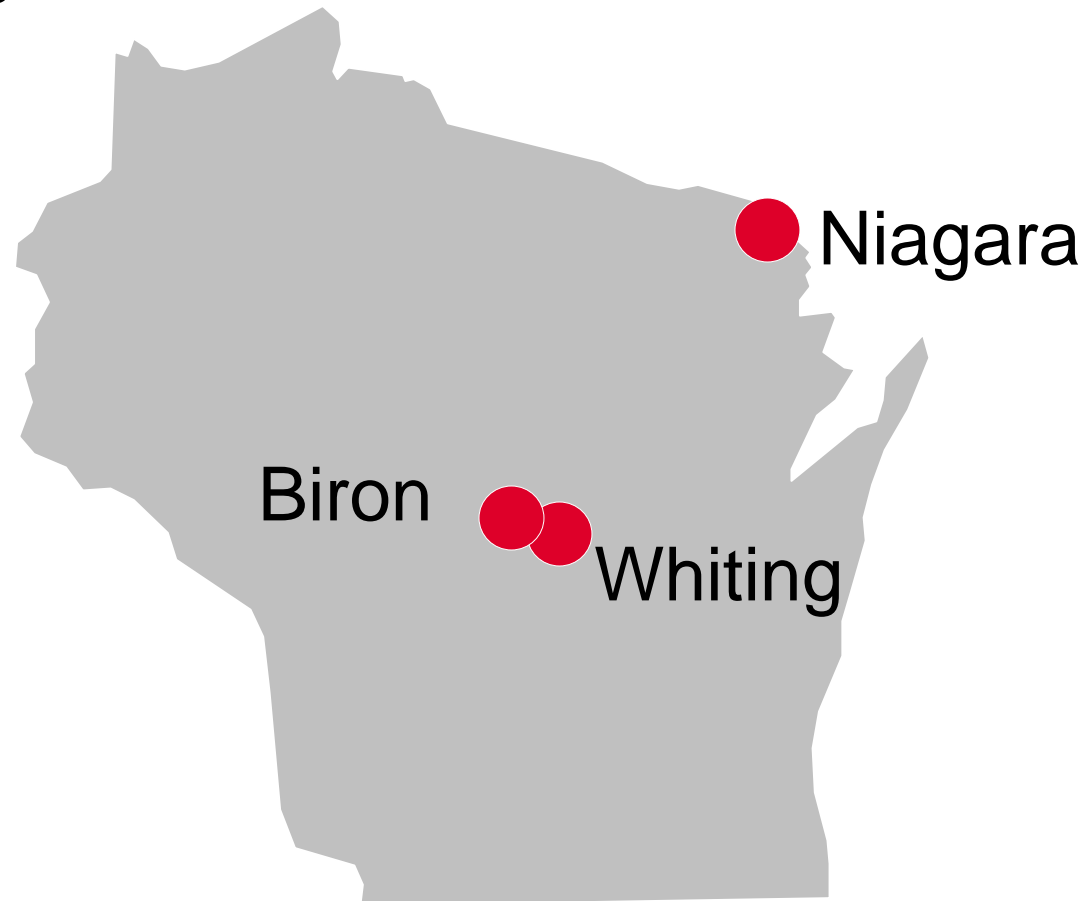
# Topic Summary

- Overview of Stora Enso's North American Coated Mechanical (CMR) Operations and Scheduling
- The Role of Master Planning
- What is an Advanced Planning & Scheduling (APS) system?
- Why did we choose an APS?
- Feasibility and Justification
- Implementation
- Results
- Challenges

# North America - Mill Locations



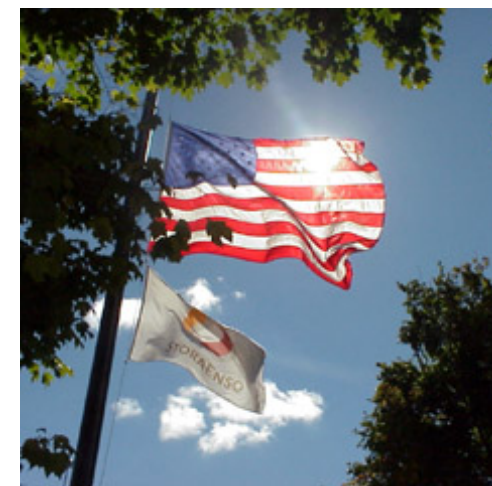
# North America – Coated Mechanical Mill Locations



# Stora Enso North American Capacities

## Coated Groundwood

Location	PM	Capacity (short tons)	Grades	BW Range
Biron	25	140,000	No. 5 WO & Roto	28 - 40#
	26	260,000	Nos. 4/5 Roto	30 - 40#
		<hr/> 400,000		
Whiting	63	90,000	Nos. 4/5 WO & Roto	36 - 45#
	64	150,000	No. 5 WO & Roto	26 - 36#
		<hr/> 240,000		
Niagara	43	135,000	Nos. 4/5 WO	36 - 50#
	44	110,000	No. 3/4 WO	38 - 50#
		<hr/> 245,000		
<b>Total</b>		<b>885,000</b>		



- Mill standardization and multiple assets on common grades
- High service and delivery flexibility

# The Role of Master Planning

Master Planning is basically a balancing act, assembling and maintaining the “best” schedule to satisfy the simultaneous and often conflicting objectives and constraints of Manufacturing (the Mills) and Sales (Customers).

- Business locked on certain machines.
- Customer priority
- Transport mode
- Requested Diameters
- LDC's (is order firm?)
- Required delivery dates (customer service)
- Press Dates



- Trim
- Production costs by machine
- Machine constraints (grade/BW capabilities, min/max roll sizes, max # of rolls/set, core constraints, etc, etc, etc.)
- Machine capacity (finite)
- Run transitions
- Inventory costs (making early)

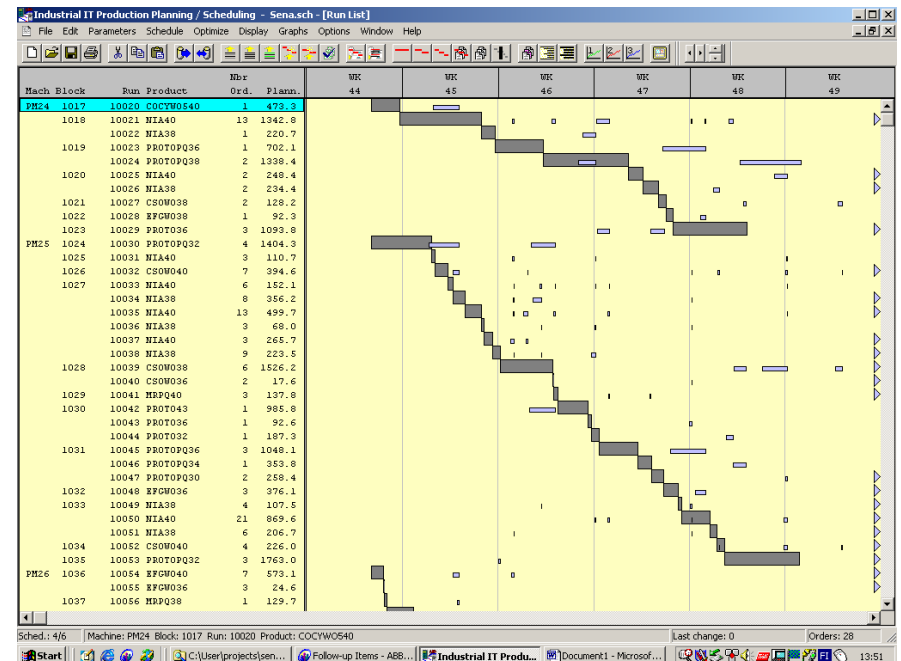
## What is an Advanced Planning and Scheduling (APS) System??

*“APS systems are interfaced decision support technology that use advanced algorithms to model supply chain constraints and enable intelligent supply chain planning and decision-making”.*

“Advanced Planning Systems Spark the Supply Chain” – APICS the Performance Advantage Magazine, August, 1999, pg. 25.

# Advantages of APS Systems vs. Legacy CMR Scheduling Tools

- Objective/Cost Driven Solutions
- “What If ?” Functionality
- Available to Promise (ATP) and/or Profitable to Promise (PTP) Capabilities
- Platform
- Support



# Stora Enso's Objective Regarding APS Tools for CMR Master Planning in NA

*“To provide Stora Enso’s North American CMR operations with a platform to determine the ‘best’ schedule across the available machines given current orders, and to maintain/reevaluate this schedule as changes occur. **The ‘best’ schedule needs to be based on a quantitative measure of goodness (i.e. cost, profit, machine utilization), and needs to concurrently consider issues of trim loss, grade/basis weight transitions, due dates (early/late penalties), logistics (rail vs. truck transport), machine constraints/capacities, customer priorities, etc.”***

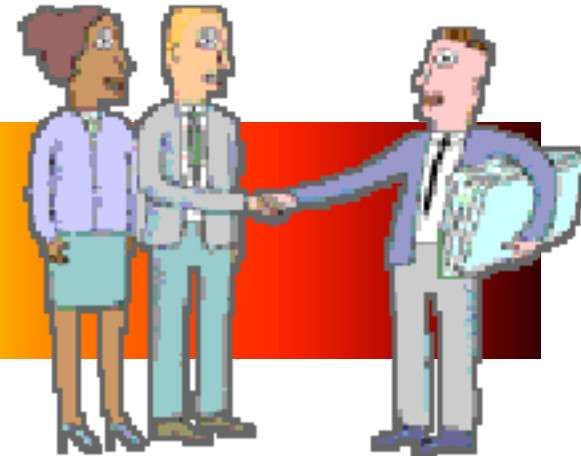
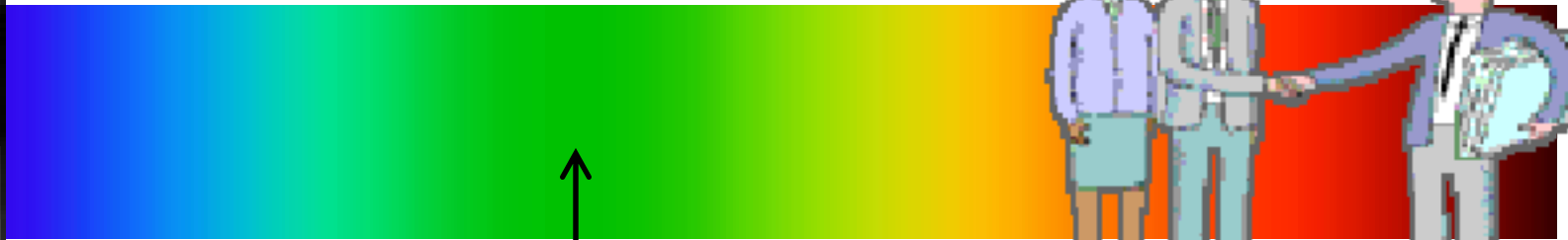
“Requirements for an Advanced Planning and Scheduling (APS) System” – Stora Enso’s North American Operations CMR Master Planning, October, 2002.

# Main Cost Variables Defining a Paper Machine Schedule

- Variable Production Costs
- Trim Loss
- Machine Transition
- Freight (Closest Mill or Rail vs. Truck)
- Small Run Costs
- Produce Early – Storage
- Produce Late – Penalty

Goal is to minimize the overall schedule cost while satisfying all of the “hard” mfg. constraints.

So, where along the “spectrum” of possible machine schedules does a Master Planner aim his/her efforts...?



... in the **GREEN \$\$** !

# Feasibility

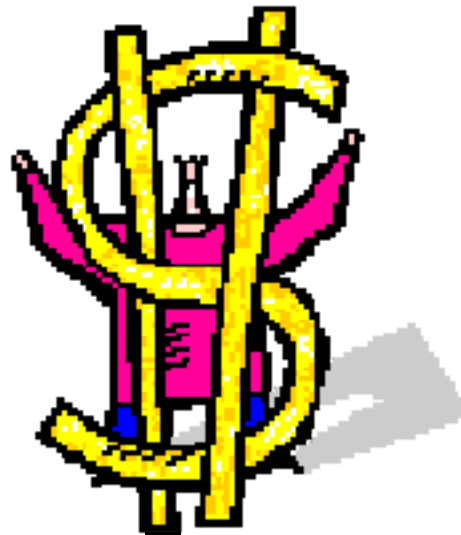
- System Requirements Documented by Stora Enso
- Proposals solicited from qualified vendors.
- “Pre-implementation Study” conducted with top candidate (ABB)
  - Point-by-point discussion of requirements vs. system capabilities (both out-of-the-box and mods).
  - Mapping of current IT systems and data streams available to “feed” APS system.
  - Deliverable was a Functional Requirements document and project proposal and budgetary quote.
- Demo conducted to help quantify potential benefits of APS.

# Quantification of Projected Savings

- ABB created a demonstration of their system using one month's worth of Biron Mill orders. ABB's resultant scheduling scenarios were compared to how Stora Enso actually had these orders scheduled at the time the order set "snapshot" was taken.
- Stora Enso supplied best available constraint and cost information. Same data was applied to the original schedule and the "optimized" results.
- Results from demonstration were scaled into projected annual savings in a manner which conservatively states the value of such a project.

## Demonstrated Financial Results

- **IRR on project** – Got peoples' attention!
- **Payback Period** – Months (not years)



## Other Tangible Savings NOT Directly Included in the Justification

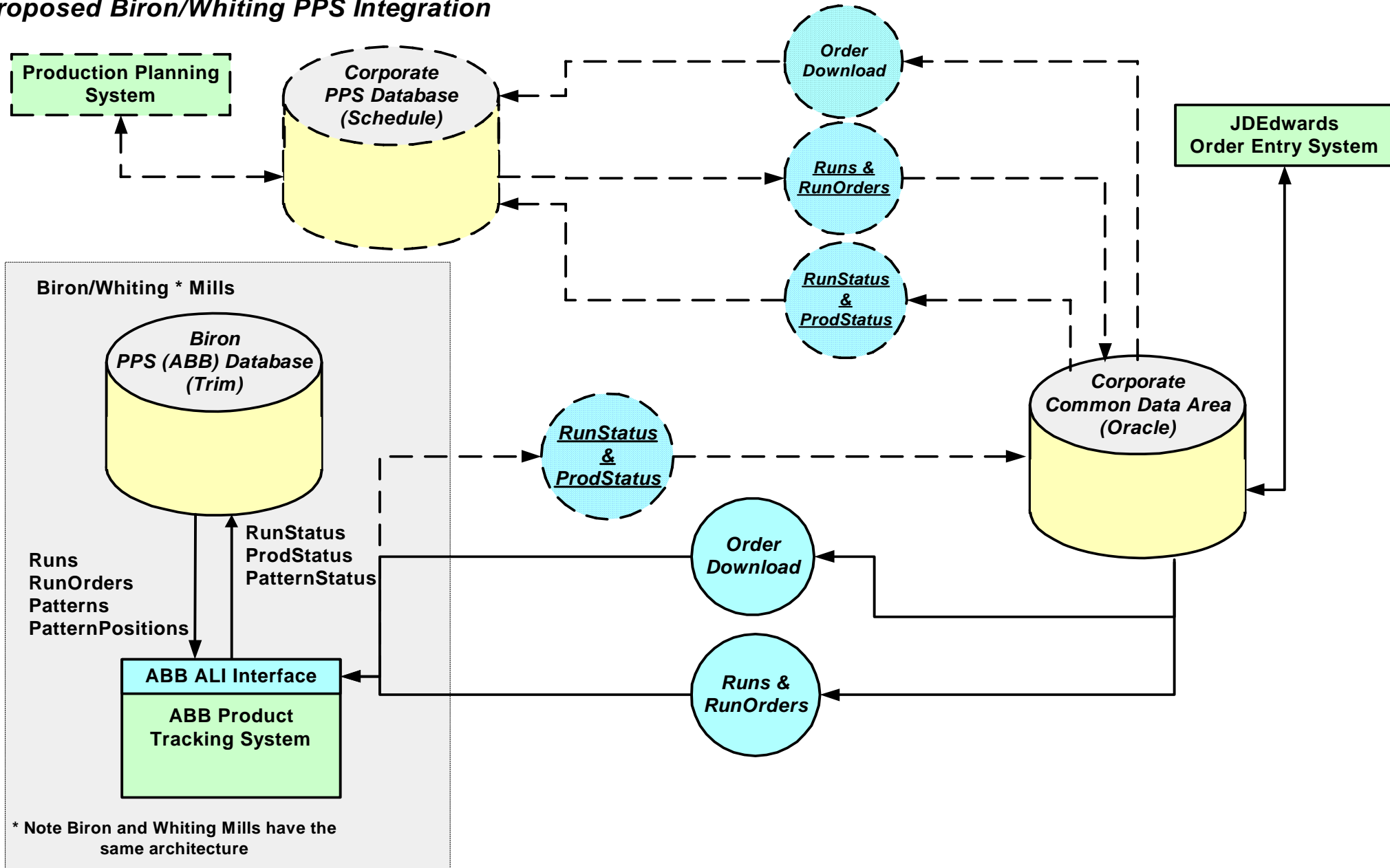
- **Order Lateness** – Order lateness cost estimates were included in the analysis. Optimized results showed a 34% reduction in order lateness, thus improving our delivery performance and avoidance of additional trucking.
- **Order Splitting** – Demo results indicate the potential for additional trim loss savings by allowing orders to be split between machines. These savings were not included in the project justification at this time due to a variety of system and customer issues. However, we may wish to challenge past business practices (given the proper tools) if the potential gains warrant.

# Implementation

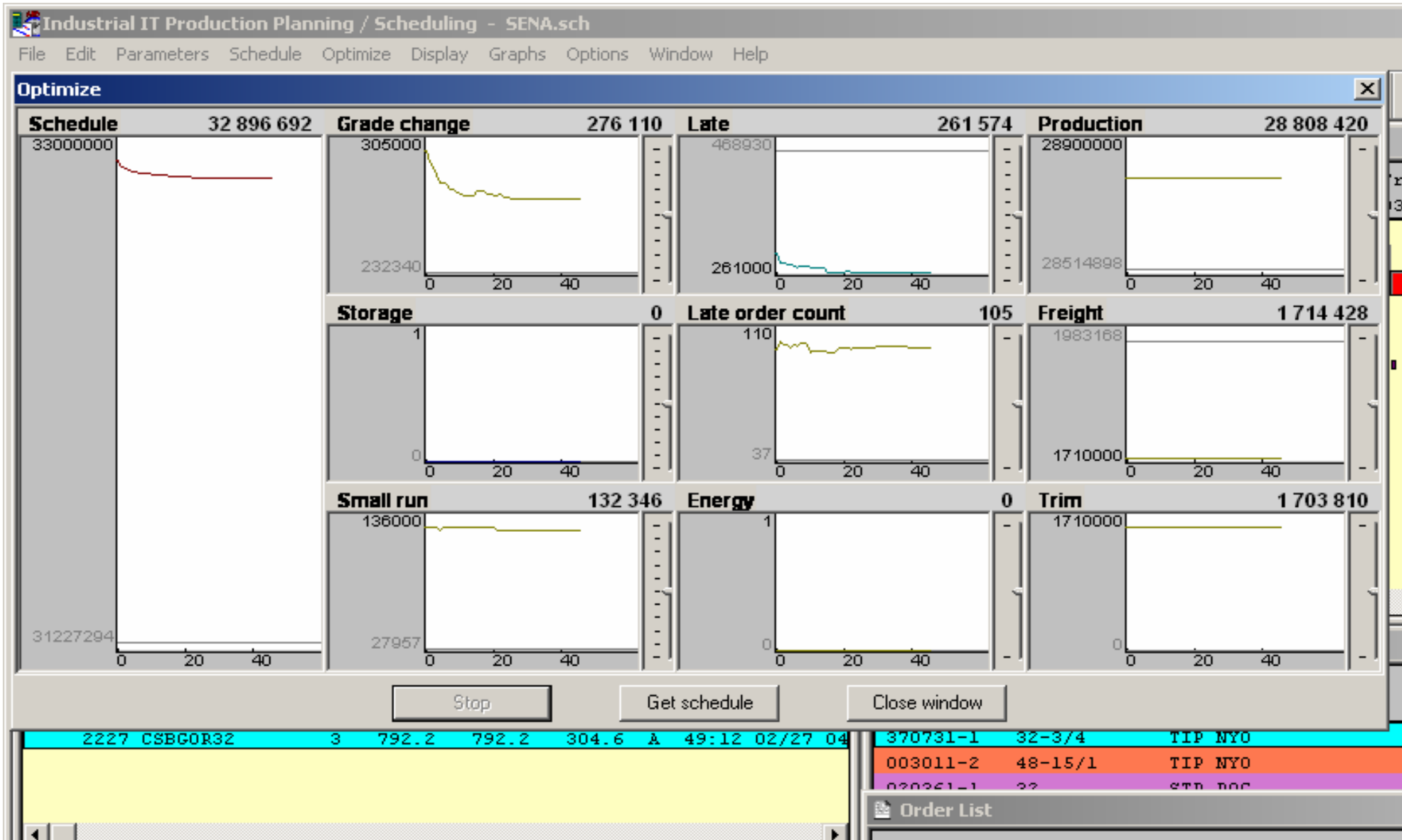
- Order Data
  - Dates\*, products, quantities, prices, customers, destinations, etc.
- Production Data
  - Volumes produced and applied to orders.
- Foundation Data
  - Costs\*, capacities, valid product/machine combinations, mfg. constraints, etc.

# Example Future Data Flow w/ ABB PPS

## Proposed Biron/Whiting PPS Integration

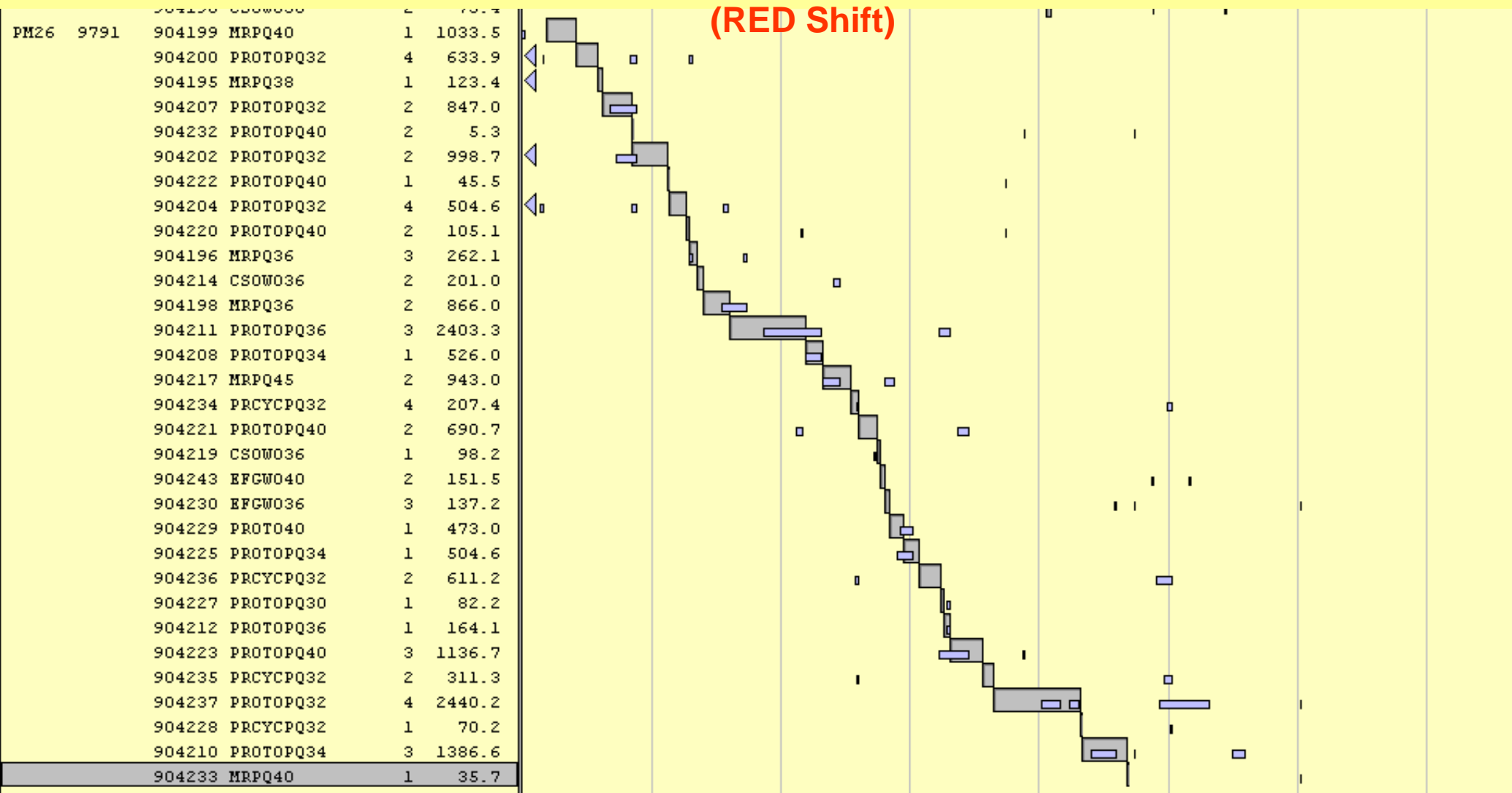


# Optimization “in progress”



Mach	Block	Run	Product	Ord.	Plann.	35	36	37	38	39	40	41	42
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# Customer (Sales)-Focused Schedule



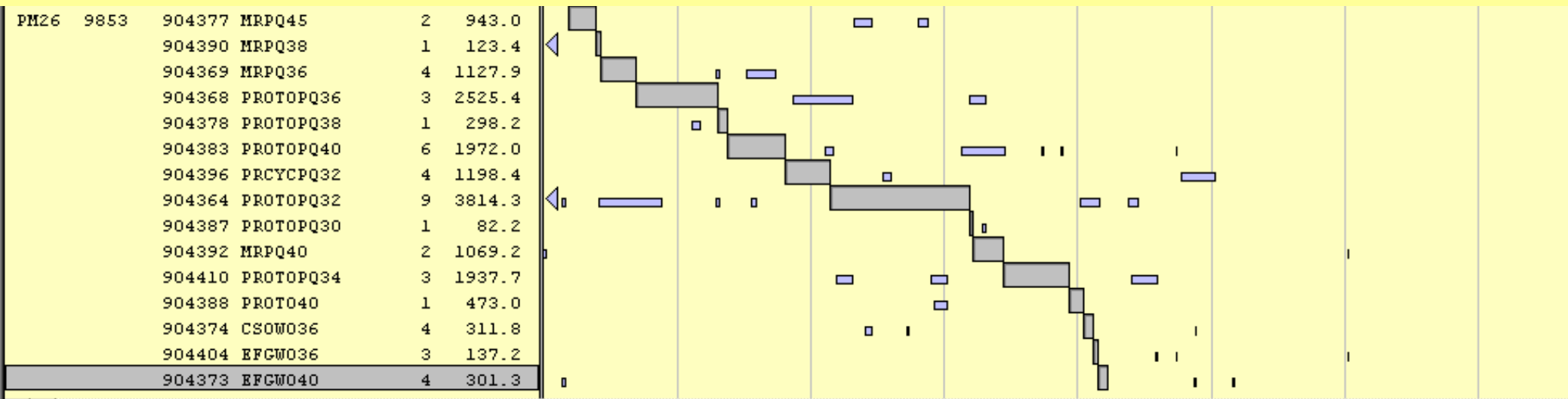
Sched.: 1/3    Machine: PM24 Block: 9747 Run: 904080 Product: PROTOC38    Last change: 48734    Orders: 27

Windows taskbar showing Start button and various application icons including ABB D..., Sep02..., SENA2, SENA..., Windo..., Indust..., Indus..., and Sep02...

Mach Block	Run Product	Nbr	WK	WK	WK	WK	WK	WK	WK	WK
		Ord. Plann.	35	36	37	38	39	40	41	42

# Mill-Focused Schedule

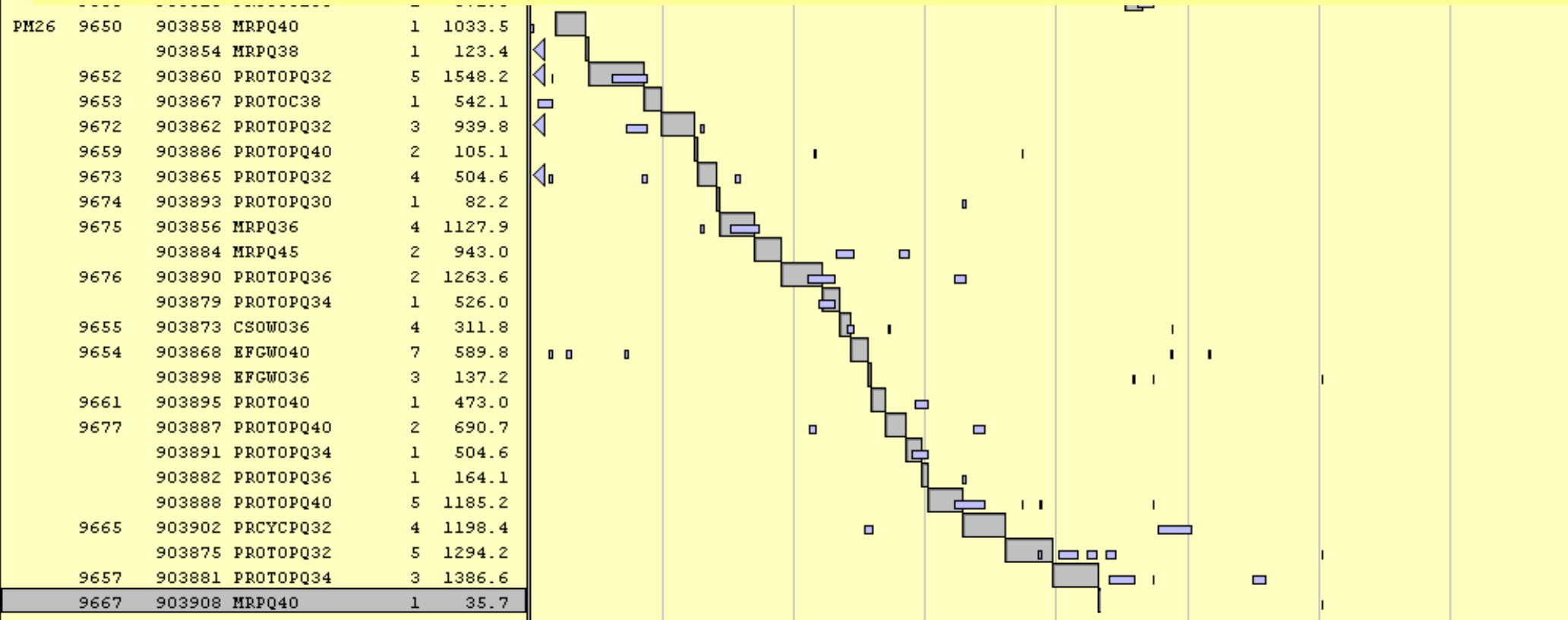
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Mach Block	Run Product	Mbr Ord. Plann.	WK 35	WK 36	WK 37	WK 38	WK 39	WK 40	WK 41	WK 42
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# “Balanced” (Low-Cost) Schedule

(In the GREEN \$)



Sched.: 1/3    Machine: PM24 Block: 9612 Run: 903745 Product: COCYW0540    Last change: 0    Orders: 24

# Challenges

- Data, Data, Data...
- Cultivating trust in the system amongst ALL parties impacted.
- Did I say Data!?
- IT Support for a stand-alone system with very limited user base.
- Oh, yeah. Keeping the Data current and accurate is a big challenge.

# Questions