

PROGILE: Agile methods in Supply-Chain Management

Prof. Dr. András Pataricza

Zoltán Matisa

Budapest University of Technology and Economics

IBM Data Storage Systems & Information Technology Kft.

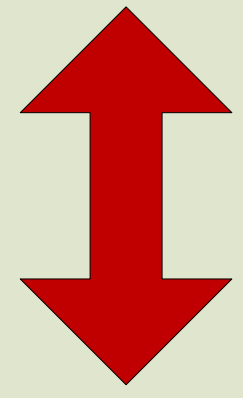
pataric@mit.bme.hu

zoltan.matisa@hu.ibm.com

Motivation

BTP (Built to Plan)

Flat manufacturing schedule
PRODUCTIVITY

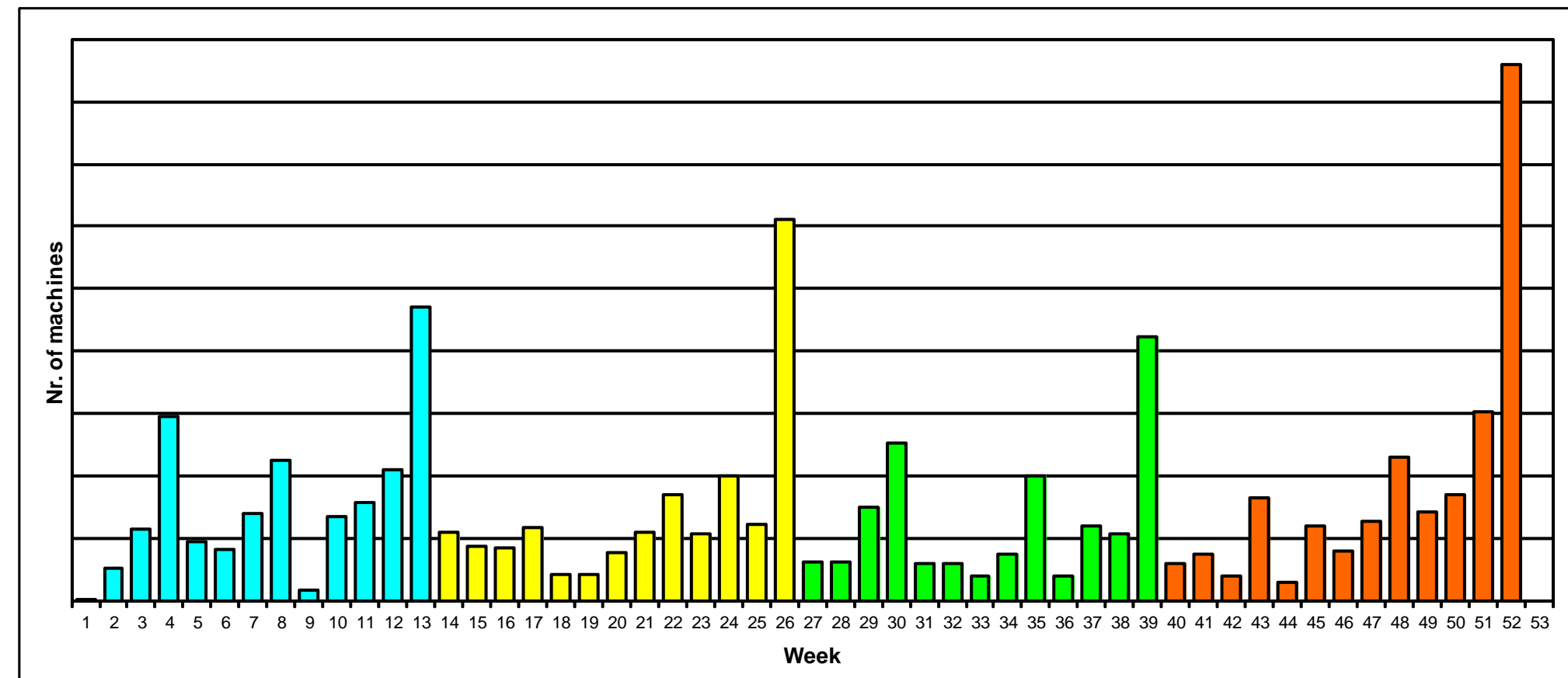


BTO (Built to Order)

Driven by customer activity or external factors
AGILITY

Context within IBM DSS Vác

- Bursty order load
- Low volume-high mix
- Quickly changing individual orders
- Uncertain production times



- Factory:** IBM Data Storage Systems
 - Single source WW production of IBM high-end storage servers
- Product:** IBM System Storage
 - Price: from few hundred thousand up to multi-million dollar configurations
 - Weight: ~ 1.2 tons
 - Number of HDDs ~ 400
- Possible Configurations:**
 - ~4.000.000.000
- Volume:** a few thousands in a year



Overview of the Progile Approach

•Order Load

- Low volume-high mix
- Quarter-end heavy
- Large number of cancelled and modified orders
- Many Reconfigurations

•Factory state

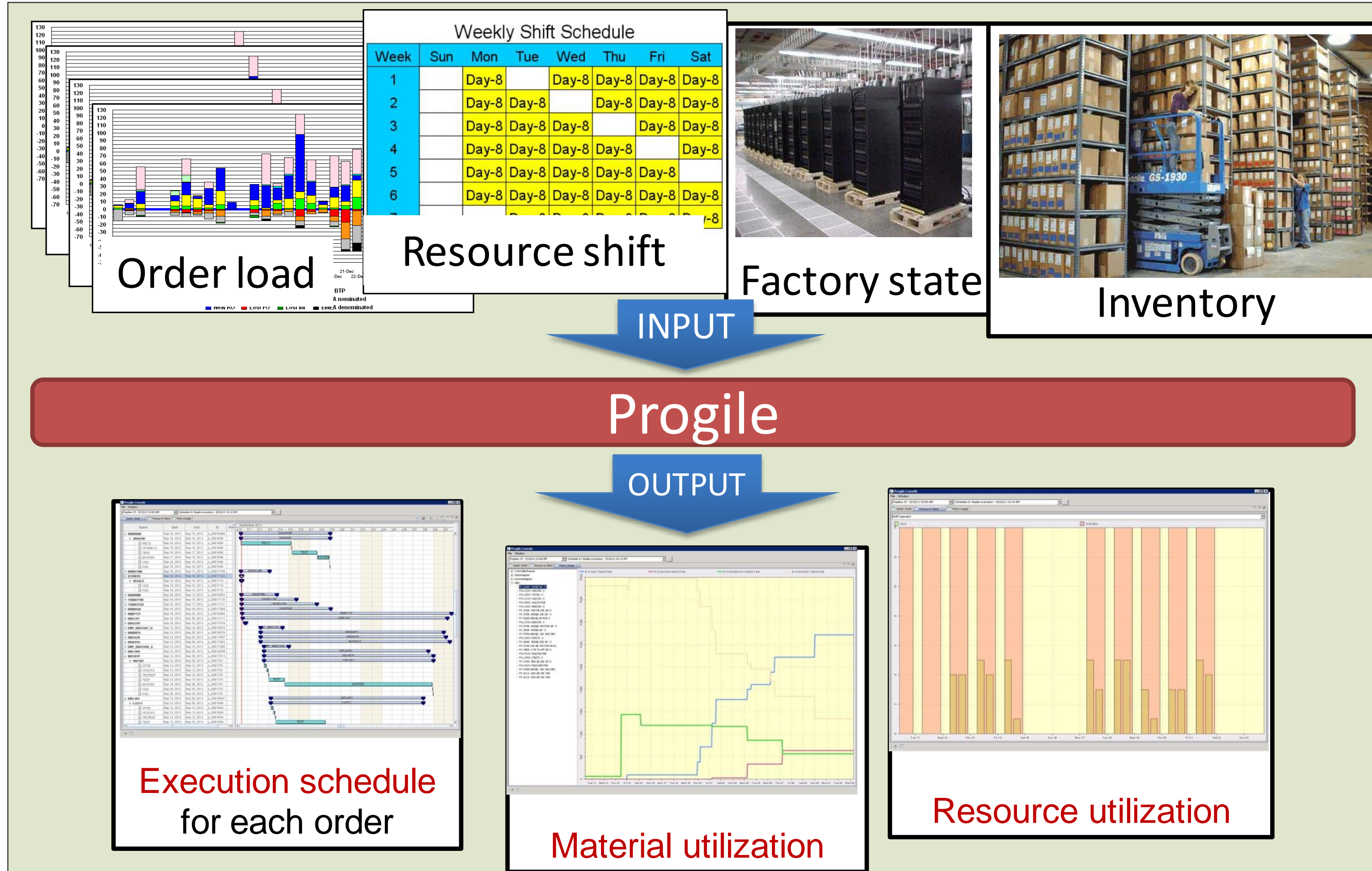
- Complex state representation
- Distributed information sources
- Changing activity runtime lengths
- Uncertain production times

•Resource shift

- Large impact on overall cost

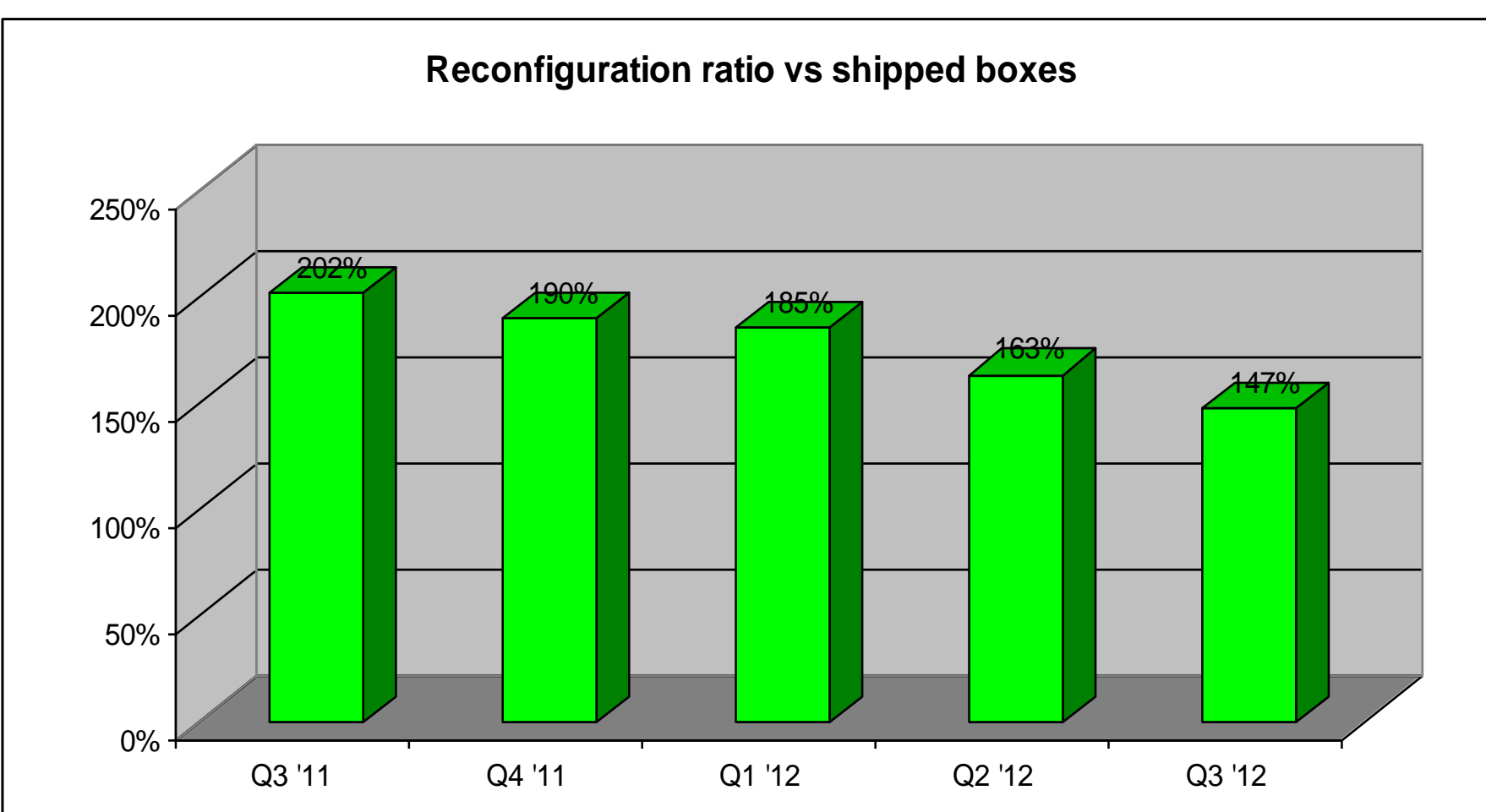
•Inventory

- Multiple storage and availability
- ~30% is spare part production



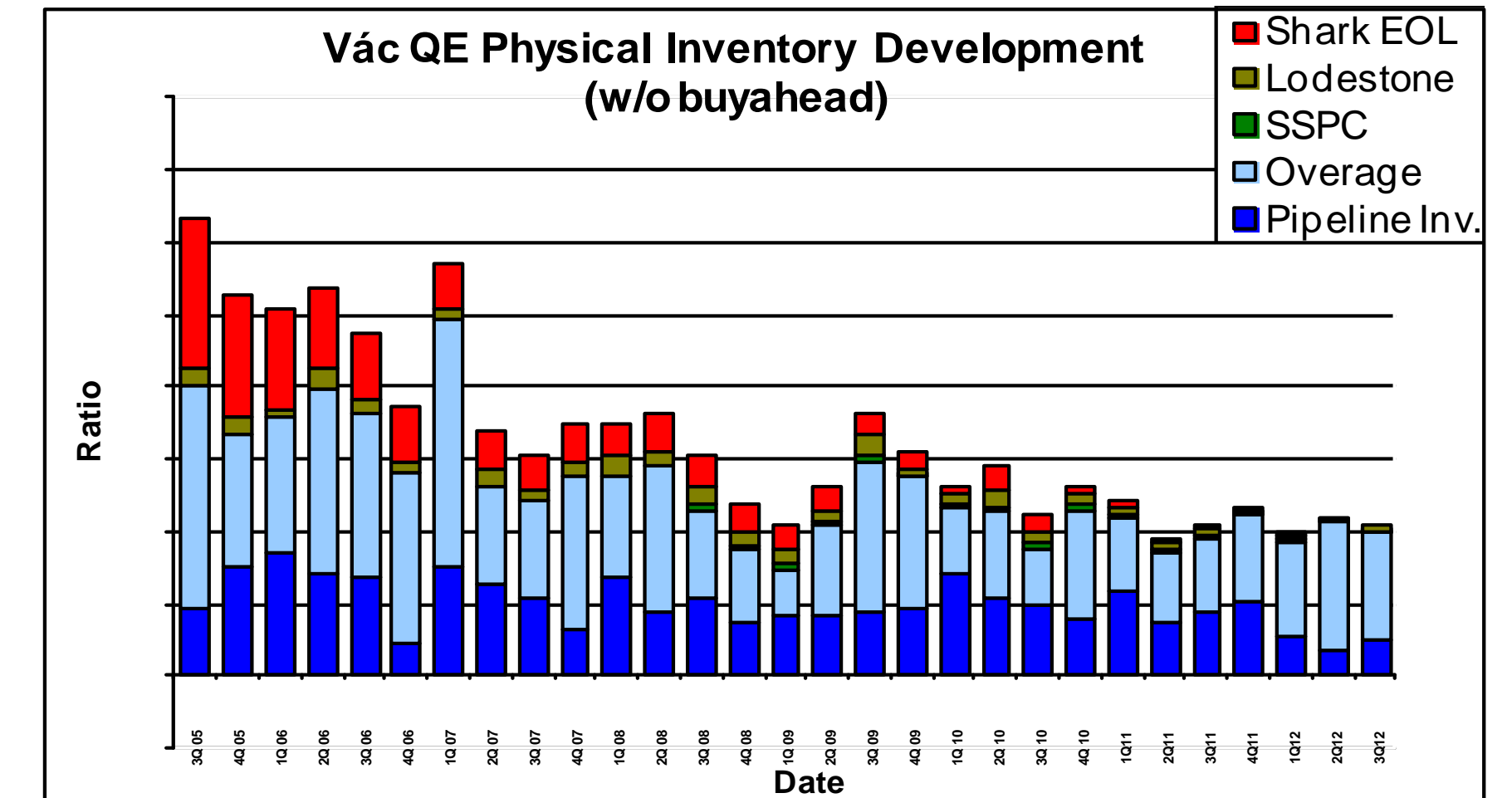
- Multilevel optimization is carried out at the global level of capacity planning and **individual order scheduling**
 - Material and resource utilization
- Exploitation of the typically partial information** available on the incoming orders
 - Detailed prediction for 30 days
 - Synthesize proactive manufacturing strategies
- Used information is completely **synchronized to the existing real-time data sources**
 - Run-times are less than 30 minutes per analysis and design cycle
 - Remains synchronized with progress and deviances

Benefits



Progile announced as winner of the 2012 Supply Chain Technology Award

- **Inventory turns**
 - Decreased in inventory carrying cost
- **Operating cost**
 - Reduced FTE cost through higher resource utilization and lower overtime cost
 - Lower reconfiguration rate (50%)
 - Lower inbound expedite cost
 - Lower cost of quality
- **Revenue maximization through no pending orders**
- **What-if simulations for strategic planning and decision making**
- **ROI within couple of months**



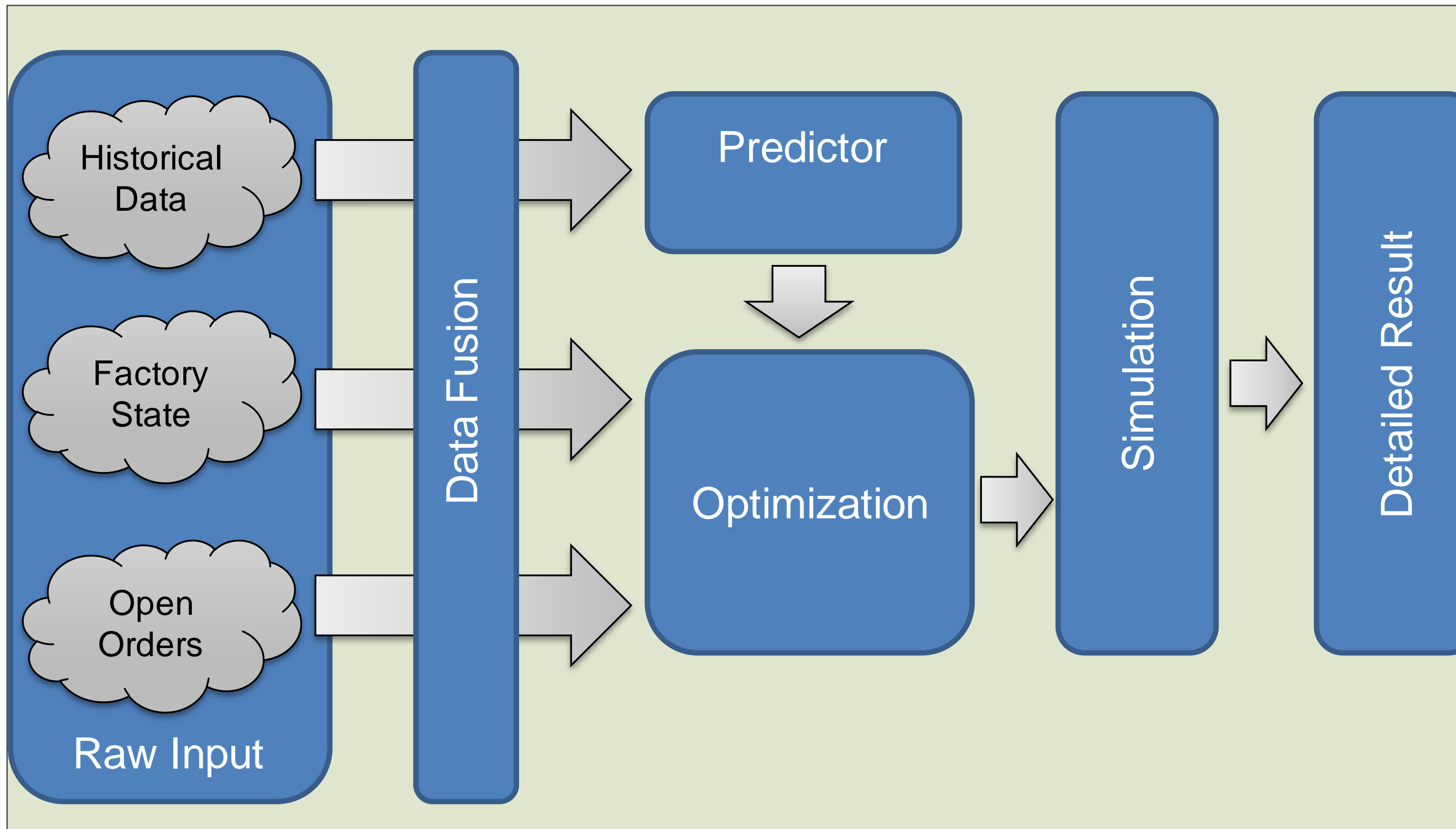
Implementation and Technical Details

Data Fusion

- Input**
 - Real-time data sources
 - Inconsistent and missing data
- Output**
 - Uniformed, filtered data
 - Transformed to required domain
- Technology:** DB2

Simulation

- Detailed simulation**
 - Fine grained factory workflow
- Validation of optimization results**
 - Detailed graphical feedback
- What-if-analysis**
 - Scenario based
- Technology:** JRules



Optimization

- Multilevel Optimization**
 - Based on business KPIs
- Feasible solutions for**
 - Scheduling
 - Resource allocation
 - Inventory management
- Technology:** ILOG CP

Prediction

- Adaptive algorithm**
 - Based on huge historical data set
 - Sliding window algorithm
 - Fast adaptation to changes
- Detailed prediction of**
 - Order load, inventory
- Technology:** SPSS

