GAME CHANGER

2014 Software Global Customer Conference

Avantis by Schneider Electric
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Connect People, Process and Technology for Intelligent Operations

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Dr. Stuart Parker
Director, Global Consulting
Paul Feder
Consulting Director
Amount of Information Managers Receive that has no Value

Source: Accenture survey released January 4, 2007
Time managers waste each day searching for information

Source: Accenture survey released January 4, 2007
...by minimizing the “value leaks” along the value chain.

How to maximize value for the business…
Supply Chain Value Leakage

What prevents fixing value leaks (performance) right away (near real-time)?

<table>
<thead>
<tr>
<th>Hurdle</th>
<th>Reason</th>
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<tbody>
<tr>
<td>You don’t even know that a leak is happening…</td>
<td>• Value leak was too small to detect</td>
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<tr>
<td></td>
<td>• Detection mechanism was not sophisticated enough</td>
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<tr>
<td></td>
<td>• No idea how benign / serious the leak is</td>
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<tr>
<td>You get alerted but don’t/ can’t make a decision because…</td>
<td>• You don’t have enough information</td>
</tr>
<tr>
<td></td>
<td>• You are overwhelmed with (the wrong) information</td>
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<td></td>
<td>• It’s too late to do anything</td>
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<td></td>
<td>• You lack the authority</td>
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<td></td>
<td>• You are not sure if the action will have a positive business impact</td>
</tr>
<tr>
<td>You made a decision but don’t know if it was actually executed on…</td>
<td>• The decision/instruction was verbal and not formalized into a paper trail</td>
</tr>
<tr>
<td>The action was taken – but you failed to learn from it &amp; adapt</td>
<td>• It was ignored by the person you directed</td>
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</tbody>
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Lack of alignment between tools, data, and processes create gaps & lost synergies

Gaps and Lost Opportunities

- Different Assays
- Different Topologies
- Different Unit Models
- Different Constraints
- Different Pricing
- Different Optimisation

- Discourages Collaboration
- Slow Process Improvement
- Slow Decision Making
- High Maintenance Effort
- Opaque, Point Answers
- Needs Point Toolset Expertise
Operational Challenges

Fewer skilled people must respond faster, handle more complex processes, make better decisions, with bigger consequences across the global enterprise...

Inability to consistently “close the loop” across the various planning domains

Inability to measure value drivers across supply chain

Response time inadequate to address disruptions

Skills and competencies mismatch across value chain

Technology does not support rapid decisions

Fragmented processes, objectives, and applications

“Silo-ed” operations along value chain

Lack of communication and transparency leads to sub-optimum business decisions

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“Silo-ed” operations along value chain

Lack of communication and transparency leads to sub-optimum business decisions

...as we address these trends, we create more data to manage...

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Challenges Across Organization Levels and Time Horizons

- Ability to monitor and manage the business to deliver on shareholder expectation
- Ability to monitor and manage via an integrated view of demand and supply across the value chain
- Ability to monitor and manage via an integrated view of operations
- Ability to monitor targets, % control variables and manage corrective action

Now, Minutes, Days, Weeks, Months
How are Best-in-Class Companies Responding?

• Improving visibility and management of operating boundaries to ensure safety
• Better management of plant assets to ensure reliability and extend uptime
• Increasing supply chain efficiency by improving supply-demand visibility and better operations planning & scheduling
• Improving operator competency for better performance & safety
• Improving collaboration in a site and across multiple sites, and with corporate teams
• Improving decision making by getting the right information to the right people in a more timely manner
• Avoiding risk through better cyber security and compliance
How is the Performance Journey Evolving?

- Closing the gap between “knowing” and “acting”
- Integrating the people & technology silos
- Building out the portfolio of refinery systems

**Performance Driven Integration**
- Process & KPI Alignment, Digital Dashboard, Predictive Analytics, Empowering the Front-Lines

**Refinery Performance**
- **1980’s**
  - Plant Automation
  - Distributed Control, Regulatory Control, Advanced Control
- **1990’s**
  - Production Mgm’t
  - Planning, Scheduling, Production Accounting, LIMS, Process Historian
  - Regional Demand Forecasting & Availability, Back Office Automation & Enterprise Trading & Risk Management, RIM, RCM, Handhelds
- **2000’s**
  - Supply Chain Mgm’t
  - Planning, Reliability & Availability
- **2010’s**
  - Asset Mgm’t
  - Business Process Integration, Application Integration, SOA, People, Culture & change Management

**Time**
Innovations Enhance the Performance Journey

Improved Visibility and Decision Support
- Able to capture opportunities; manage disruptions
- Connected to the Business Leveraging SOA
- Visibility across the Enterprise
- Shift from Data to Information
- Focus on Performance Management

Information Explosion
- Many, many more sensors
- Broader view – process, assets, energy, …
- Smart devices
- Wireless (video, audio)

People are Still Key
- Embedded expertise
- Skills Development
- Shifting role

Pervasive Automation
- Control Systems
- Safety Systems
- Process Control & Opt
- Operating Procedures
- Maintenance Integration

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As margins continue to trend downward...

...refiners continue to look for new ways to gain more efficiencies in their performance journey.

Latest Frontier:
The connection of people, process and technology for intelligent operations through the institutionalizing of Real-Time Performance Management

“Know” (sense)  “Act” (respond)
ISA 95 – Industrial Best Practices of Manufacturing Information Technologies

Levels:

- **Level 0**: The physical production process
- **Level 1**: Intelligent Devices (Vision, Flow, Mobility …)
- **Level 2**: Control Systems (DCS, PLC, Scada, …)
- **Level 3**: Manufacturing Operations Systems (MES, Batch, LIMS, …)
- **Level 4**: Business Planning & Logistics Systems (ERP …)
Integrated Operations Management

ISA95
Level 4

Business Level

Supply Chain Planning
Trading Distribution

Advanced Planning & Scheduling
Production Planning
Assay Management

Production Scheduling

Operations Management
Operator Logbook
Integrity Operating Windows
LIMS

Advanced Control and Optimization

Mobility
Asset Management
Alarm Management

Reliability

Operator Training
Modeling & Simulation

Historian

Enabling Infrastructure
Avantis SimSci Wonderware Foxboro Triconex

ERP

Production Management
Yield Accounting

Optimization; Order Management

Blending & Oil Movement

Real Time Performance Management
HSE

Level 3
Operations & Execution

Level 1, 2
Plant
No One Said It Would Be Easy …
Hurdles to Acting Closer to Real-Time

Accessing the right information

No shortage of real-time data

50% of information received by managers has no value*  

Managers spend 1-3 hours a day searching for information*

Lots of dashboard within silos with partial information – wrong diagnosis as a result of incomplete context.

Navigate up or down – depending on access privileges

Role-based (and secure) “version of that truth”

Single, integrated “version of the truth” of performance data

* Source: Accenture
Hurdles to Acting Closer to Real-Time (cont’d)

Accessing the right information…

Contextualizing it for actionable intelligence…

Upper Management
EBITDA
Gross Refining Margin
Solomon Ranking

Middle Management
Throughput
Actual vs. Budget
Solomon Indices
Energy Costs

Operator
Temperature
Reflux Flow
Catalyst Circ. Rate

Top management is looking at what happened in the PAST. (Lagging indicators as Financial KPIs)

Those on the front-lines are seeing what is happening NOW. (Leading indicators as Operational KPIs)

Now
Minutes
Days
Weeks

- Develop rules and options that maximize business objectives
- Define alerts and actions based on boundary deviations
- Link and align KPI hierarchy

Accessing the right information…

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Hurdles to Acting Closer to Real-Time (cont’d)

Ensuring that decisions get acted upon.

- Codify the rules and options into a process workflow
- Empower the frontline while ensuring accountability
- Monitor the process and continuously improve – with data

Accessing the right information…

Contextualizing it for actionable intelligence…

Assumes humans will “do the right thing” – in reality, people ignore good information or fail to follow procedure.

Unable to institutionalize response closer to front-lines, and continuously make it smarter.

Ensuring that decisions get acted upon.

Unable to institutionalize response closer to front-lines, and continuously make it smarter.
What is Required to Successfully Make This Journey?

1. Well Defined Business Processes
2. Structured and Linked Performance Measures
3. Clear Concise Dashboards
4. Accountability & Empowerment Integration & Workflow Mgmt
5. Flexible and Extensible/Scalable Technology Solution

Real-Time Performance Management
Well Defined Business Processes

Key functions:

- Understand the ‘As-Is’ Business Processes
- Compare ‘As-Is’ Business Processes to industry best practices and gap analysis
- Establish ‘fit for purpose’ business processes from Performance Management perspective
- Filling the Gaps to automate data flows and create the ‘To-Be’ Business Processes
- Supporting the definition and development of the lead/lag Performance Indicators that drive the execution of the Enhanced Business Processes
Structured and linked Performance Measures

Diagram:
- High-level Strategy Review
- Management Review
- Operations Review
- Technology Review
- Strategy Decomposition and Analysis
- Operations Decomposition and Analysis
- Financial Decomposition and Analysis
- HR Review and Analysis
- Dynamic Performance Measures Model Determination
- Dynamic Performance Measures & Dashboard Determination
- Training and Baseline
- Continuous Improvement and review
Structured and linked Performance Measures

Dynamic Performance Measures is the Schneider patented methodology for defining and linking KPIs:

- Structured interview and data gathering
- Strategic, operational, and financial approach to analysis
- Identify Important Goals
- Identify real-time performance measures
- Real-time accounting at plant floor
- Roll-out and Implementation of dashboards
- Baseline and validation
- Strategy/execution alignment
- Role-specific
Structured and linked Performance Measures

Upper Management
- EBITDA
- Gross Refining Margin
- Solomon Rankings

Middle Management
- Throughput
  - Actual vs. Budget
  - Solomon Indices
  - Energy Costs

Operator
- Temperature
- Reflux Flow
- Catalyst Circ. Rate

Lagging Indicators
- Gross Refining Margin
- Maintenance Costs
- Hydrocarbon Inventory Costs
- MRO Inventory Costs

Leading Indicators
- Solomon Rankings
- Energy Costs
- Throughput
- Yields

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Clear, Concise Role Based Analytics & Visualization

• Utilize patented and proven methodology to design, develop and implement KPIs and dashboards leveraging:
  - Business Process Enhancement for work process/business process
  - Balanced Scorecard, Key Important Goals, other KPIs
  - Structured interview process and analysis
  - Strategy, financial, operations, HR, and other dimensions
• KPIs for each relevant process unit, process area and overall refinery scope
• Dashboards for relevant personnel in the organization

• Role-based
  - Time
  - Domain
• Strategic alignment
• Strategic messaging
• Performance Zones
Integration & Work Flow Management

Real-Time Engine
- Continuous Monitoring
- Deviation Detected
- Send Info to Workflow

Workflow
- Workflow Initiated
  - Identify personnel to be notified (Email, Mobile, ...)
  - Collaboration for Corrective Action
  - Execute Work Instructions
  - Maintain Event History
  - End

Process Log
- Log entry of the deviation
- Log notifications and actions by users
- Log actions initiated and executed

Analytics
- Generate Charts and Reports
- Generate Trends, Mean Times etc.

Workflow ensures “Sense & Respond” loop and provides audit trail!
Flexible & Scalable Technology

• System Platform - enabling manufacturing operations layer integration
  - Common Infrastructure
  - Centralized management and Information
  - Modular Add-ons
  - Scalable
  - Open

• Workflow – Unified approach to Business Process Management
  - Native workflow
  - Integrated
  - Enforce
  - Real time
  - Knowledge management

• Intelligence – Enabling enterprise manufacturing intelligence
  • Multi-site or multi-database
  • Build KPIs
  • Leverage existing data
  • Dashboards with “drill down” capabilities into analytics
Key Features of Real-Time Performance Monitoring

- Consistent and comprehensive refinery-wide set of KPIs covering all performance aspects
- Powerful visualization and analytical capabilities
- Alerts/notifications and actionable information in case of KPI excursions
- Embedded workflows with predictive and preventive actions that are established to maintain high performance
- Flexible and easily expandable functionality from Asset Integrity and Operational Integrity to Operational Excellence
Key Benefits of Real-Time Performance Monitoring

• Improved safety and operational integrity due to alerts in case of KPI excursions
• Empowered operations through access to refinery-wide performance data and self-service capabilities
• Better operational and business decisions due to visibility into decisions impact on refinery-wide performance
• Increased personnel efficiency due to use of timely and accurate data
• Personnel is accountable for maintaining high performance all the time
• Potential savings of 3-5 % in feed stock cost and 2-4 % in operating cost
Why Schneider Electric

• Strong consulting team with extensive knowledge of Refining & Petrochemical plant operations

• Patented methodology for identifying and implementing Key Performance Measures

The goal of Real-Time Performance Management is not just to create dashboards but to enable the Enterprise to become a High Performance Organization through intelligent operations and the connection of people, process and technology.

• Schneider strongly believes in Technology Transfer

• Real-Time Performance Management potentially can save 2-4 % in operating cost

*: Note that benefits can vary based on various factors such as effective utilization, process conditions, etc.
Next Steps

For further information or to schedule a demo of Real-Time Performance Management, please contact:

- Omar Halaseh: Global Pursuits Leader; omar.halaseh@schneider-electric.com
- Stuart Parker: Director, Global Consulting; stuart.parker@schneider-electric.com
- Paul Feder: Consulting Director; paul.feder@schneider-electric.com

Half day workshop with key stakeholders to:

- Explore the potential of Real-Time Performance Management in your company
- Learn what other companies are doing
- Learn what to look for in a Real-Time Performance Management solution

Typical stakeholders:

- Enterprise Management
- Plant Management
- Operations Management
- Tech Services Management
- Maintenance Management
- Planning & Scheduling Management
Thank you!