Advanced Solutions

Improving Business Performance
How To Improve Performance?

Anticipate
Collaborate
Act
Improving Business Performance

From …

Gaps in data availability and accuracy

Art - Decisions based on best guesses and back-of-envelope calculations

Slow Response to unplanned events

Product centric deployment that focuses on smaller short term gains

Disconnected Point Solutions for individual function

Expensive and unreliable point to point integration of multiple applications

Open Loop where decisions are made without looking back

To …

Complete Visibility through near real-time operations information

Science – Model-based analytics for decision support

Agility and coordinated execution

Solution deployment that provides business value to the bottom line

Connected Enterprise Solutions supporting operational work processes

Lower Total Cost of Ownership through standardised integration and common data model

Closed Loop where decisions are always matched to outcomes and continuous improvement is realised
Improving Business Performance Means...

- Automatically collecting information from different levels/systems, with context and analytics to
  - Recognise a problem,
  - Determine what to do, and
  - Communicate and track the new instructions

- Getting people, systems to work faster, better, smarter, ...
  - Have analytics watching the plant/production/business to notify the right people that there is something worth looking at
  - Connect experts across departmental boundaries, and give them everything they need much faster

- Improving knowledge management
  - When something does happen, a decision is made – but how do we know if it worked? And how is that knowledge captured for next time?
Introducing Our Solutions

Intuition Framework

Anticipate
Collaborate
Act

**Intuition** (philosophy): *immediate (not inferred) a priori knowledge or experiential belief*

**Intuition** (psychology): *acquiring beliefs in ways that bypass ordinary justification*
Deliver solutions that solve business problems

Consultancy, Know-How, Experience
- Unique fusion of Honeywell and Matrikon experience
- Deep domain knowledge from partners - SAP, IBM, Accenture

Solution Technology Platform
- Intuition™ Solution Family
- Platform and infrastructure for Products and Solutions
- Enables data collection (federation), analysis, workflow, visualisation

Project Implementation
- Delivering the agreed business benefits - in time, in budget
- World-wide standard implementation methodology

Lifecycle Support
- Long-term Application and Solution support
- Sustain the business benefits
Intuition™ Technology Platform

- **Present**: SilverLight; SharePoint or other Portal
- **Orchestrate**: Workflow
- **Analyse**: Analytical services, Process Monitor, Calculation Engine, Alarm Mgr
- **Contextualise**: Semantic DB; OPC UA, ProdML, ISA-95, MIMOSA, PPDMA, etc
- **Measure**: OPC/OPC UA/Web Services/RSS

Roles:
- CEO
- COO
- EVP Ops
- CFO
- CIO
Intuition™ Executive

• Out-of-the-box software that enables the digital plant by connecting people, process & technology for intelligent operations
  – Turn data into actionable decisions
  – What you need, when you need it, where you need it
  – Get people, process, and technology working in concert
  – Make more money from money you’ve already spent
  – Always know your data is right

Anticipate:

*Predict problems & identify opportunities in time to act on them*

Collaborate:

*Capture knowledge, share information and best practices for smarter, more agile decisions*

Act:

*Drive performance with workflows to ensure knowledge is acted on*
Intuition™ Executive

Microsoft® SharePoint® portal brings together web parts and displays from Honeywell and non-Honeywell systems.

- Visualize & Act on data from multiple sources
- Collaborate across functional silos by integrating data from multiple sources and channels of communication
- Squeeze more value out of your current investments: bring in data from current systems and infrastructure

Enable remote operations & collaboration through online workspaces & meeting rooms

Engage your experts when needed for maximum impact through integrated instant messaging and email

Organize your company’s knowledge to learn from experience with document libraries, task lists and wiki communication tools

Get from data to decision faster with visual key report analysis & diagnostic data
Federation: Extend Value of Current Investments

- Gather data from existing process infrastructure, technology
  - Multiple connectivity options to bring plant data together, protecting current investments
- Protect the integrity of data
  - Leave the data where it is, as it is
- Gather and generate data on-demand
  - Eliminate need for another data repository
- Weave data mid-stream to anticipate events you couldn’t see before
How Federation Works

Intuition Model ‘graph’

Intuition Model allows different graphs (‘databases’) to be aggregated by linking shared objects.

This applies to real-time measurements (OPC-UA), maintenance (MIMOSA), production data (ProdML), ISA95, or any other external database.

RTDB (transformed to a graph)

CMMS (transformed to a graph)
What Federation Means to You

• Anticipate, collaborate & act on all data from all sources
  – Example: access all data from all sources at a right-click of a mouse
  • Historian data (trends, plots, …)
  • Laboratory data
  • KPI data
  • Application data
  • Maintenance data
  • ERP/Business data
  • Manuals
  • Work Orders
Introducing Our Solutions

MES Solutions

Anticipate

Collaborate

Act

Intuition (philosophy) : immediate (not inferred) a priori knowledge or experiential belief

Intuition (psychology) : acquiring beliefs in ways that bypass ordinary justification
How MES Fits With Intuition™

MES

Visualisation & Collaboration

Applications & Services

- Planning & Scheduling
- Production Management
- Operations Management
- Energy Management

Data Federation & Storage

Process Data (DCS, Historian, LIMS)

Business Data (ERP, BI, CMMS, …)
## Build All MES Functions on Intuition™

<table>
<thead>
<tr>
<th>Function</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Production Planning</strong></td>
<td>Strategic / investment planning (10+ year); Budgetary planning (annual delivery plans); economic optimisation; Operational planning, including feedstock evaluation; Detailed scheduling; Product blend optimisation</td>
</tr>
<tr>
<td><strong>Operations Management</strong></td>
<td>Manage safe, appropriate operating limits; Ensure process conditions are within limits; follow-up on violations; Define, communicate instructions; Alarm management; Operations reporting</td>
</tr>
<tr>
<td><strong>Production Management</strong></td>
<td>Yield &amp; loss accounting – measure, reconcile actual production; Material tracking and genealogy; Production reporting and order status; Production allocation; Quality control</td>
</tr>
<tr>
<td><strong>Visualisation Workflow</strong></td>
<td>Navigation, organisation, graphical displays, reports; KPI calculation and display; Business and technical calculations; Ad-hoc analysis; Workflow and collaboration</td>
</tr>
<tr>
<td><strong>Energy Management</strong></td>
<td>Calculate, plan, and track energy use; Compare to meaningful targets; Optimise energy use</td>
</tr>
</tbody>
</table>
Some Common MES Solutions

• **Process Historian - Uniformance PHD**
  – Essential prerequisite for collecting process data
  – Basic tool for trouble-shooting, reporting, …

• **Yield Accounting, Mass Balancing, and Data Reconciliation**
  – Essential for reliable production/consumption data
  – Basis for any performance (KPI) calculations
  – Basis for improved Planning & Scheduling

• **Boundary Management**
  – Avoid abnormal situations
  – Safe on maintenance costs, enhance safety & reliability

• **Planning & Scheduling**
  – Better plans make better schedules - huge business opportunity
  – Close the loop and improve models based on actual data
Uniformance: Lowest Cost Enterprise Historian

- Tag synchronisation from plants and off-shore sites to on-shore or corporate sites
  - Automated tag build and maintenance
  - Eliminates cross-site coordination
Uniformance Process Studio

UPS Desktop
- Integrated navigation, menus, favourites
- Trend and multi-trend
- Tag explorer/picker
- Data entry
- Excel Companion integration
Uniformance Process Studio

Navigation Docking Window

Tank Farm Team Shared Works...

Favorites
- Tank Inventory Report - launches Excel
- tank inventory report - opens in desktop

MSDS docs
- water.pdf
- acetone.pdf
- Butyl Alcohol.pdf
- Butyl Chloride.pdf
- Chlorobenzene.pdf
- Cyclohexane.pdf

Tanks
- All tanks overview
- Off-spec blend 2007_07_10
  - KST20001
  - KST20021
  - bad blend period
- Tank 1
  - Tank 1 trend
  - KST20001
  - KST20021
  - KST20031
  - KST20041
  - KST20051
  - KST20061
  - KST20071
  - KST20081
  - KST20091
  - KST20111

Personal Workspace

Debottleneck project share
Tank Farm Team Shared Workspace
Yield Accounting & Data Reconciliation

• Delivers final production/consumption numbers on which many other activities depend
  – Decide on order fulfilment; order new raw materials; perform crude selection…
  – Delivers sound data as prerequisite for any KPI!

• But it also …
  – Delivers ‘measurements’ for unmeasured streams
  – Identifies missing movements and incomplete data
  – Pinpoints bad measurements or lab results (errors, calibration, …)
  – Provides more accurate data for planning (yield vectors, equipment performance,…)

![Diagram](image-url)
Yield Accounting & Data Reconciliation

• **Functions**
  - Production and consumption by product
  - ‘Best’ flows and movements
  - Reconciled production
  - Inventory position by product and/or component
  - Problem meters and measurements
  - Incorrect/missing material movements

• **Typical Integration**
  - Historical real-time data (capture)
  - Laboratory Information Systems (LIMS)
  - Material movement systems (capture)
  - Planning systems (back-casting, yields, …)
  - ERP (SAP/R3, JD Edwards, …) (report)
Boundary Management - Avoid Abnormal Situations

More Than 15 'Serious' Events Per Month
(significant damage, deaths)
Source: ASM Consortium

Cause of Process Upsets
Source: ASM Consortium

- Human error: 40%
- Equipment failure: 40%
- Other: 20%

Cause of Equipment Failure
Presented by N Kosaric at 2005 Defect Elimination Conference

- Operating out of range: 76%
- Improper design: 10%
- Improper maintenance: 5%
- No defect found: 5%
- Improper installation: 2%
- Improper material: 2%
Boundary Management - Avoid Abnormal Situations

- Systematically monitor Operating Envelope
- Detect and assess impact of all deviations
- Capture operator comments and annotations
- Monitoring targets
- Deviation detection and monitoring
- Economic impact calculations
- Add Operator Comments
- Guarantee consistency with defined Operating Envelope (Boundary Manager)
MES - Improve Planning & Scheduling

Value Example (Refining, Oil & Gas)
- Estimates indicate value of 1$ per barrel
- For 100 K BPD Refinery > 35 M$ per year
- O&G: each tier of opt worth 12-15 M$/year

Key Vertical Markets
- Oil & Gas
- Refining
- Petrochemicals
- MMM
- …

Opportunities
- Eliminate hidden buffers
- Better reflect plant capability
- Eliminate decisions in silos

Barriers to Improvement
- Inconsistent Models
- Inconsistent Information
- Business Process in Silos

Disruptions
- Raw material mix, quality
- Product mix
- Order timing
- Equipment capability
- Plan, schedule adherence

Execution (Days, Hours)
Schedule (Weeks, Days)
Plan (Months, Weeks)
Ideal (Years)
Summary & Take Aways

Anticipate

Collaborate

Act
Summary & Conclusions

• Improving Business Performance Requires…
  – End-to-end visibility of the supply chain
  – Systems and people working together

• Honeywell’s Intuition Executive Enables…
  – Data collection & federation, visualisation & workflow
  – Organisations to Anticipate, Collaborate, and Act

• Honeywell’s MES Solutions Enable...
  – Planning & Scheduling, Production Management, Operations Management, Energy Management, Performance Management within Intuition environment
  – Business integration with ERP (SAP), Business Intelligence, Maintenance Systems, …