

Mining, Metals & Materials: Shaping Your Journey to Operational Intelligence

Presented by Lance Fountaine

Company Visions

The OSIsoft Vision

We believe People with Data can Transform their world



Typical Mining, Metals and Materials Vision

Commodity Production: Low Cost Producer

Sustainability: Eliminate / Minimize Risk

Value-Add Production: Products that Differentiate



An Operational Intelligence Strategy: The Marriage of our **Visions**

What Challenges / Opportunities Exist within Mining, Metals and Materials?

Challenge – Market Conditions

- Commodity Market Prices
- •New or Improved Operations / Known Technology Competition
- New, Competitive Manufacturing Technologies

Challenge – Cost Headwinds

- Energy Costs
- Raw Materials Costs
- Labor Costs
- Logistics / Transportation Costs
- Aging Assets / Sustaining Capital Requirements

Other **Challenges**

- •Geology Decreasing Yields on Known Mine Reserves
- Environmental Regulations / Reporting Requirements
- Slow Global Economic Recovery

Opportunities

- Commodity Market Growth in Developing Countries
- Market Pull for New Materials / Alloys (Strength, Weight)
- Sustainable Materials



What If Your Company had the Ability to Leverage Its Current Data Assets to...

Improve Enterprise Visibility and Management

(Operating System)

- Establish and Automatically Report Standard KPIs to Measure Performance
- Support Operations through Global and Regional CoEs (Centers of Excellence) or Remote Operation Centers
- Drive Real-time Action in Support of Operational Excellence
- Rapidly Identify and Leverage Best Practices
- Increase Employee
 Engagement with Continuous

 Improvement Innovation

Improve Awareness and Forecasted Impact of Uncontrollable Factors

- Rising Energy Rates
- Rising Raw Material Costs, Reduced Raw Material Quality
- Rising Water Rates
- Rising Labor Rates
- Cost of Environmental Regulation / Mandates

More Directly Impact Controllable Costs / Performance

- Continuously Improve Process Productivity / OEE
- Better Control Product Quality / Improve Genealogy Tracking
- Extend Life of Critical Assets / Reduce Maintenance Costs
- Reduce Energy / Raw Material / Natural Resource Consumption
- Continuously Improved
 Environmental Performance to
 Meet Regulatory Compliance
 and Reporting Requirements



Why the Need to Re-Evaluate Your Information Platform?

· Real Time and Key Talent are devoted Data from all Data is Correlated in · Analytics are Real time reporting available devices Historical data is common reports easily performed and historical to managing the factors trending are readily which drive the bottom is recorded and easily accessed Talent can develop Talentis historized available line Data is Accurate optimized and test new Target Data definitions correlations in the Sharing various · Major excursions are are common and "ad hoc" report space; levels of reporting prevented or reduced (in shared across within and across duration and/or impact) Approved reports can The Data plants plants is be elevated to the Performance levels are sustainable common space Capability Maturity ABILITY TO MANAGE DATA DATA ANALYTICS REPORTING State AVAILABILITY ACCESSIBILITY CORRELATION RESULTS Optimized and RELIABILITY & Managed NTEGRITY OF PROCESSE & DATA Maturity Defined Repeatable Model RISK OF Initial / FAILURE Ad Hoc · Data is manually Data is available Data correlation · Analytics require Key Talent spend time Reporting is but it's not collected or requires individual individual or limited manual. measuring instead of collected manipulated managing results or group heroics group heroics and point-in-time Data definitions Only "point in time" Without Departure of key personnel Sharing across Current are unique to each correlation can be correlated data Alcoa plants is not creates gaps in knowledge plant made Analytics are very practical or easily Ability to prevent or reduce limited in scope achieved Historical data is Correlation across the impact of excursions is lost plant siloes is non- The capabilities highly adhoc of Talent are not existent fully realized



Data to Value: Recognizing the Critical Contributors

People Subject Matter Experts (SMEs) Innovators (Enabled Workforce) Centers of Excellence (CoEs) Change Agents Resources Tools / Visualization Tools Analytical Tools (Big Data) Application Systems Reporting Tools **Applications** Data Data Collection / Historization Data Contextualization / Enterprise Normalization Infrastructure Calculations / Rollup / Aggregation Network Ethernet TCPIP / Proprietary Wired / Wifi / Cellular Connectivity Sensors / Data •loT / IloT Calibration Transactional Databases Sources



Information and the Operational Intelligence Concept

- Hidden information, problems
- Data in many locations & not easily accessible
- Multiple versions of the truth

Traditional Operating Processes

Operational Intelligence Concepts

- Common platform & tools
- Real-time data transparent, available to all
- Standardized Data Model

- Proactive problems solving to reduce Excursions
- Process modeling & improvements
- Customer connections

Operational Excellence in the 21st Century



How Does Operational Intelligence Drive Results?

Daily/Real-Time Operations

Process Stability/Improvement

Production and Operations Management

Intelligent Action Frequency: Real-time to Daily

Intelligent Analysis Frequency: Any

Intelligent Reporting / Integration Frequency: Daily to Monthly

Learnings Applied: Manual or Closed Loop

Visual Information / Notification

Learning / Knowledge Expansion

Evaluation / Decision Support

Audience:

- Operators
- Craftsmen
- Supervisors

Objectives:

- Achieve Daily Targets (DMS)
 Situational Awareness
 Resolve Immediate Issues (RCA/Problem Resolution)

 Maintain Schedule/Plan

Audience:

- Process Engineers (Location)
 Production Superintendents
- CoE Experts (Regional/Global)

Objectives:

- Detect Excursions (Leading)Maintain Process StabilityImprove Productivity

- Improve Quality

Audience:

- Location ManagersRegional/Global OperationsBusiness Leadership

- Objectives:

 Understand/Grade Performance
- Adjust ExpectationsEstablish Plans
- Calculate Forecasts

OSIsoft PI System Data Infrastructure



21st Century Operational Excellence: Leveraging Information as a Key Enabler

Common Operations Programs

- SPC (Statistical Process Control)
- Lean Manufacturing / Six Sigma
- TPS (Toyota Production System)
- Continuous Improvement / Deming Cycle

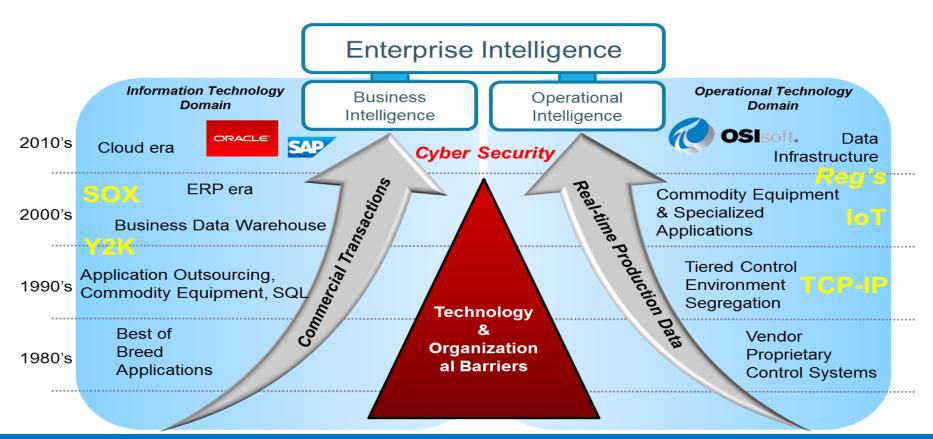
Improving Plant / Enterprise Performance Management

- Established / Managed KPIs
- Visibility into Uncontrollable Impacts (e.g., Energy Rate, Raw Material Rate, Metal Prices, etc.)
- Engaged Workforce driving Collective Innovation
- Enabling Platform for Process CoEs (Centers of Excellence)
- Leverage / Adoption of Best Practice



Meeting the Technical Requirements: Recognizing IT / OT Convergence

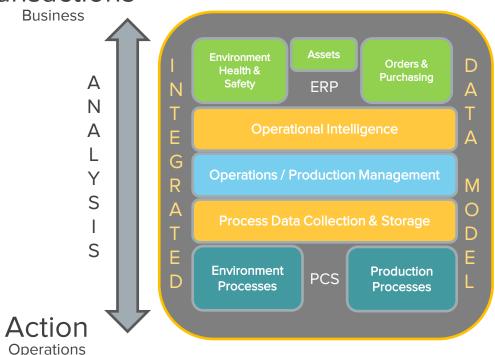
Recognizing IT/OT Convergence





Defining a Standard Technical Architecture

Transactions



Definition:

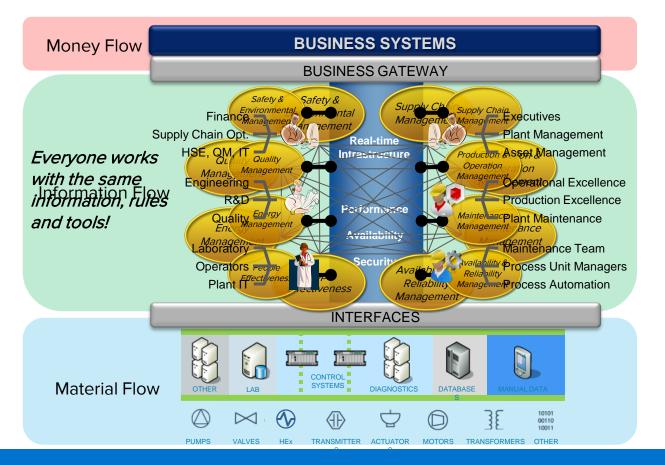
The integration of data with process expertise to enable proactive and intelligent manufacturing decisions in dynamic environments

Key Components:

- REAL-TIME and HISTORICAL process data capabilities
- 2. Network / Data integration from shop floor to the enterprise
- 3. Comprehensive analysis toolset(s)

The Architecture Ties Together Information from All Sources within a Plant and Across the Enterprise

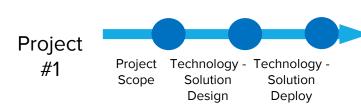
Streamline and Simplify Information in Operations





Adopting a Project or Program Approach

Project Based Approach



Typical Scenario:

- Limited Technical Scope (Sources of Information / Tags)
- Fixed Project Timeline
- Working Group: Location Operations Resources working with IT / OT Resources

Pros (often):

- Well Defined, Limited Scope
- Single Design / Deployment
- More Manageable Initial Cost

Project

#2

Project Technology - Technology -Scope Solution Solution Design Deploy

Cons (often):

- Site Based, One Off Solutions
- Not Easy to Leverage / Deploy 'Best Practices' or 'Standards' across Multiple Sites
- New Projects Require New Software / New Solutions / New Funding / New Start
- Cost / Complexity Increase Over Time

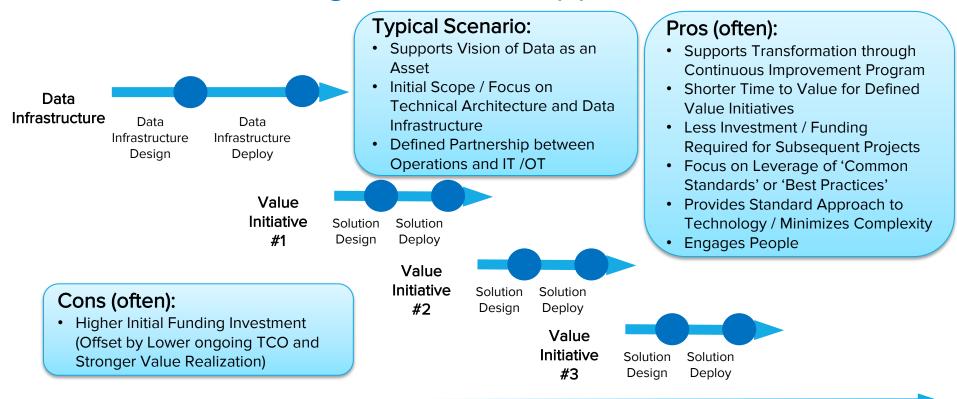
Project #3



TIME



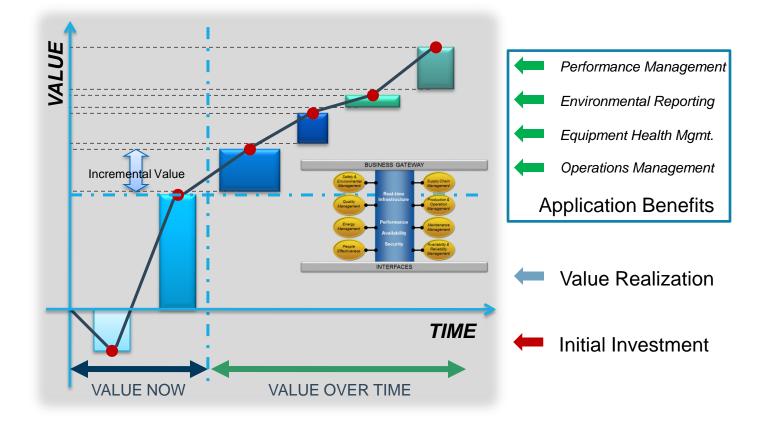
Program Based Approach



TIME



Value Creation – The Project vs. Program Approach





Conclusion

Key Considerations for Today's Session

 What is your vision for the use of information within your company / division?

 What role does OSIsoft PI System play as an enabling technology?

 How can OSIsoft help you establish and execute your strategy for success?

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Questions

Please wait for the microphone before asking your questions

State your name & company





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