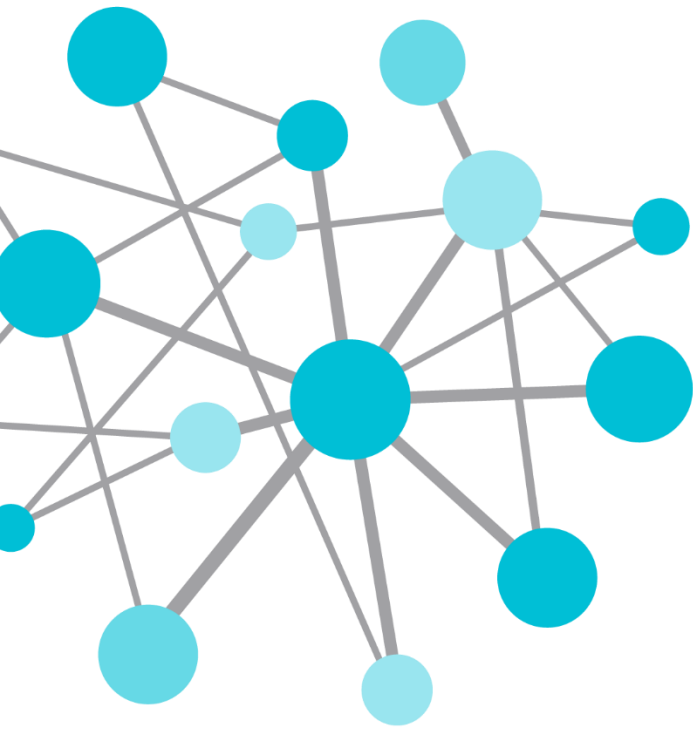
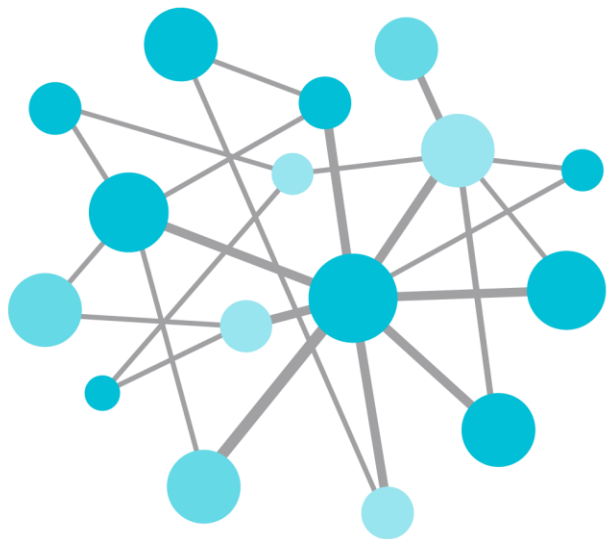




Selected Metals and Mining User Presentations

Presented by **Osvaldo A. Bascur**



OSIsoft[®]

USERS 2014

CONFERENCE

The **Power** of **Data**

E M E A



DECISION READY IN REAL-TIME

Agenda

- Business Challenges
- OSIsoft Users Results
- Operational Competence Centers
- Big Data and PI Cloud Connect
- Conclusion

1

Business Challenges

Challenges Metals and Mining



Sustainable Process Productivity

Volatile Global commodity prices

Lower ore grades means more rocks need to be mined to produce the same amount of metal

Lack of information to understand the current process productivity

Loss of knowledge from aging workforce as they retire

Production optimization (better use of resources, and maximizing returns)



Energy and Water Management

More energy consumption for blasting, mobile equipment, crushing and grinding

Water treatment and reuse

Data silos and lack of integration throughout the value chain (mine to mill)

Higher cost of energy and raw materials



Asset Performance and Reliability

Extending asset life of critical assets

Unscheduled equipment downtime

Improve equipment uptime and availability

Lack of insight into asset performance and benchmarking



Environmental, Health and Safety Compliance

Lack of automation and communication

Monitoring venting operations

Monitoring underground and above ground equipment.

Disparate sources of information for compliance reporting and audits

Compliance risk management for regulations and standards like ISO 140001 and ISO 9001



Quality Assurance

Lack of real-time notifications for product quality deviation

Track of product genealogy

Compliance with regulations such as ISO 17025

Challenges Metals and Mining



Mining

Equipment represents the largest capital investment in open pit or underground mines.

Safety is priority at all times

Fuel consumption has increased due to larger fleets required to maintained the same metal production with the decreased or grades

Engineering and Maintenance costs are critical issues.

Grinding and Concentration

Comminution represents between 45-57% of the operating costs
Changes in ore types and mineralogy produces mill overload which cost valuable production losses when they occur and they are prevented.

Large consumption of energy, water, grinding media (Steel Balls), limestone and chemical modifiers.

Safety and Environmental regulations

Metallurgy (Hydro, Pyro, Electro)

Energy intensive processes
Large Capital Investments
Equipment Availability and Maintenance Costs
High Energy Costs
Products quality
Minimize metals losses in the slags
Safety Issues
Environmental constraints

Product Manufacturing

Quality Assurance and Control
Scheduling Operations
Product Genealogy
Customer satisfaction
Equipment availability
Energy intensive processes
Safety
Increased Environmental Regulations

Typical Metallurgical Processing Plant

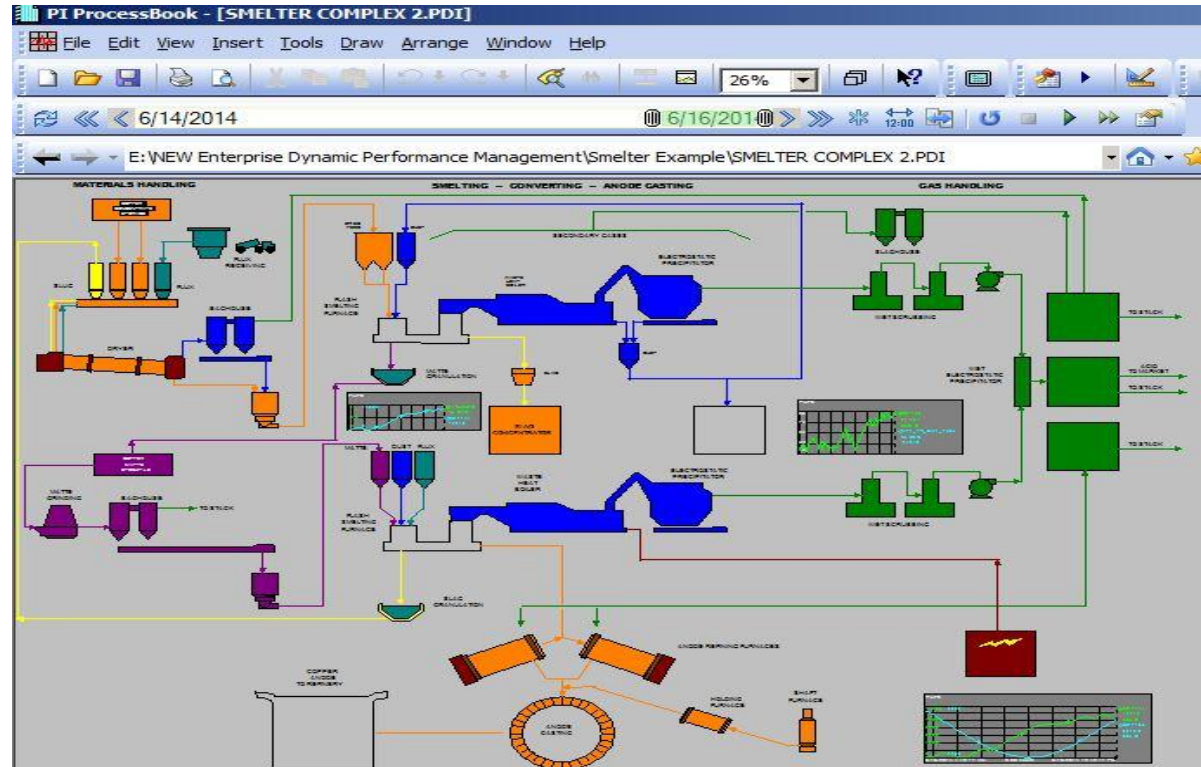
Low Margins, Higher Cost
of Raw Materials

Equipment Availability and
Maintenance Costs

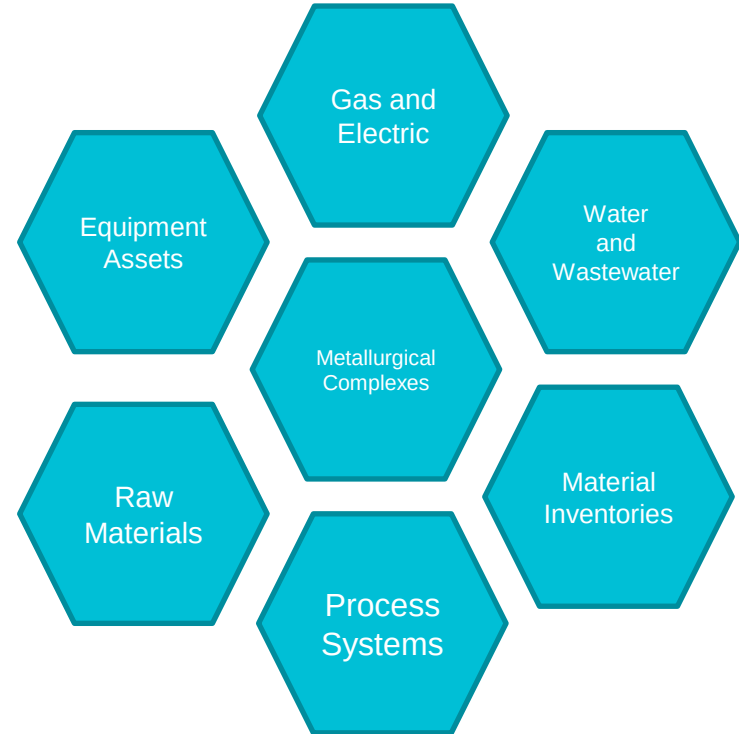
Escalating Energy Costs

ISO50001 Compliance
Energy Management
Strategies

Stricter Environmental
Regulations

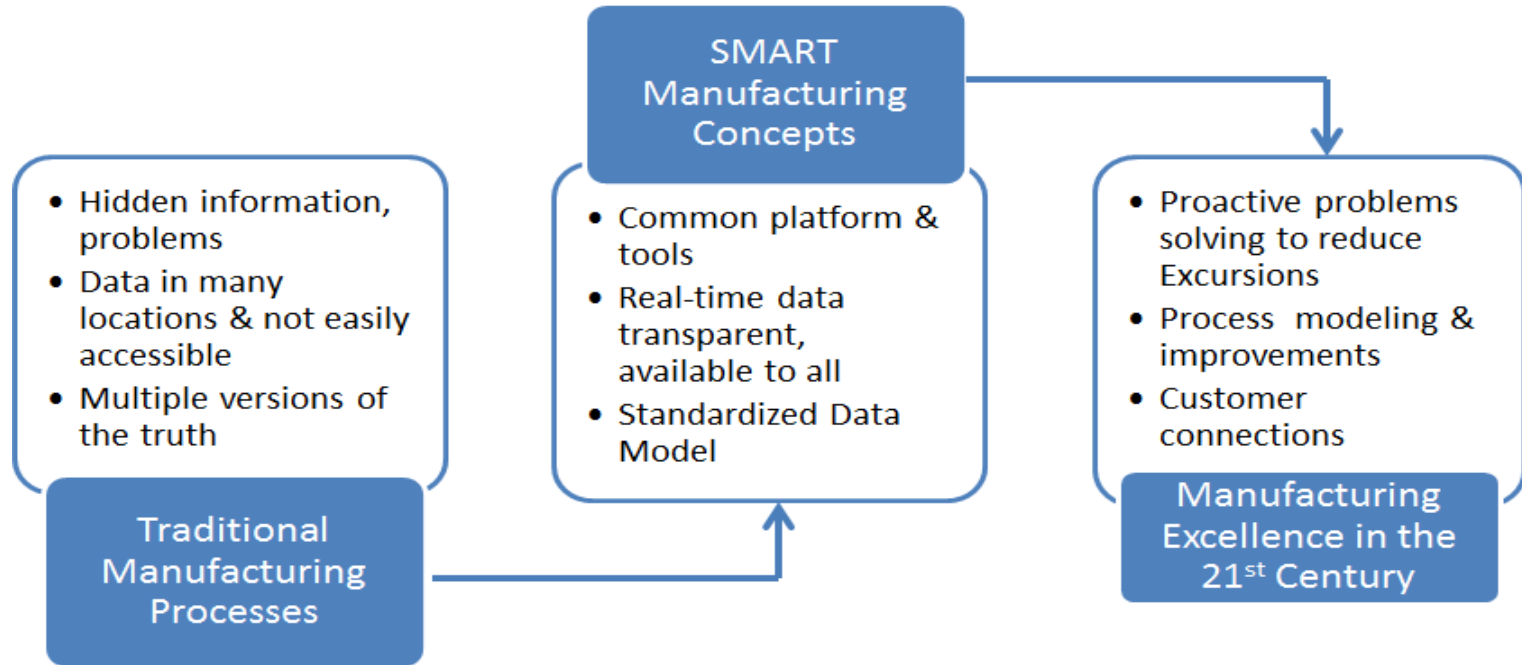


Large Metallurgical are large cities



Information – A Key Enabler for Manufacturing Excellence

New Technology Enables Improved Productivity through Employee Engagement and Enhanced Functionality to the Business Operating System



2

OSIsoft User Results

Mobile Equipment Event Synthesis

Syncrude

“Mining equipment uptime is a key factor in **operating efficiency**, driving both production cost and movement volumes. Optimized **preventive maintenance** programs and **just-in-time intervention** are key to minimizing major component failures requiring days or **weeks to repair**.”

Kyle Goggin, Sr. Technical Lead

Syncrude



CHALLENGES

Effectively leverage our reliability knowledgebase by transforming reactive, time intensive forensic data reviews into automated, near real-time event synthesis and creation
Enable the next level of mining equipment efficiency in our harsh operating environment.

SOLUTION

PI Server, PI ACE, PI AF, PI Event Frames, PI OLEDB Enterprise
OSIsoft workshop to kick-start pilot project
Developed robust triggering calculations to handle data shadows
Exported data to Oracle (MDSP application)

RESULTS

Highly scalable solution with fully validated events generated in a fraction of the time
Blueprint for all future event generation initiatives
Unexpected benefit in applying this solution to safety
Step-change in equipment maintenance efficiency –near real-time notification of events

Enterprise Class Machine Data Access

Freeport-McMoran

"We have real time monitoring in place to prevent catastrophic failure, early detection is key to efficient maintenance planning and overall equipment health. If haul truck engines cylinder kit failures are not addressed it can cause catastrophic failure of the engine resulting in a \$180,000 core value loss. How do we do it?"

Robert Catron, Program Manager/Business Solutions Architect



CHALLENGES

Workforce rollover

15+ data historians across the globe, managed independently

Constant pressure to decrease administrative costs

SOLUTION

Publishing displays on the web and mobile devices for improving collaboration and lowering curiosity cost

Using asset-based analytics for making sense of the operational BIG Data and notifying of problems in real-time

Integrating with SAP Business Objects for enabling real-time awareness of machine information

RESULTS

Common vocabulary across the organization

Analytic capabilities via the web and mobile devices

Robust reporting solution by leveraging the existing Business Intelligence environment

Real-time response to local analytical needs as they arise

Energy and Resource Management

Aurubis

“Simplified the implementation of the ISO 50001 standard.

Enabled the collaboration of all areas of the large metallurgical complexes to identify energy savings strategies.

Thorsten Stolcken, Energy Management
Aurubis AG

Atanas Rusev, Managing Director at
PlantSoft



CHALLENGES

Aurubis is large consumer of electrical power in their Smelter, Refinery and Recycling Copper Plants and other facilities

Implementation of DIN EN ISO 50001 is commitment for sustainable operations.

Many types of energy is used at Aurubis including electrical energy, gas, oxygen, water, and fuel.

SOLUTION

Integration of energy meter data from many sources at many sites in Hamburg, Pirdop, Olen and others plants in Europe.

PI System real time acquisition infrastructure and interfaces to many systems and devices. More than 2000 units.

PI System data validation, event data aggregation and analysis.
Integration with SAP.

RESULTS

Simplified ISO 50001 implementation

Integration with SAP ERP System

Increased awareness and proactive alerting of demand supply and water temperatures.

Development of calculations and balances

Enabled the identification of many energy savings strategies

OSIsoft, LLC.

Increasing operational awareness

First Quantum – Cobre Las Cruces

It is important to deliver data operation data across the company but focused on who will access it. The right data in the right hands provides value by obtaining better operation control and performance.

Joaquin Gotor, Process Control Chief at Cobre las Cruces



CHALLENGES

- Optimize copper production by monitoring the leaching process and water balance.
- Enable operation and process control areas a standard way to track and analyze the operation for decision making
- Provide quick data balances to monitor plant objectives, improvements and process modifications.

SOLUTION

- Implemented the PI Infrastructure to have a central data, parameters for analysis and decision.
- Created a set of displays based on PI Process Book, PI DataLink and PI ActiveView for the Operation and Process Control areas.

RESULTS

- One consistent data source that provides same criteria for decision makers in real time.
- Operation area can monitor real time data and compare it with previous data – “What is happening?”
- Process Control area can analyze data resulting in KPIs. – “Why is it happening?”
- Enable decisions to be made not by “I guess” but by “I know”.
- Having data usage across the company enables each people to become aware of the importance of their role in the overall process.

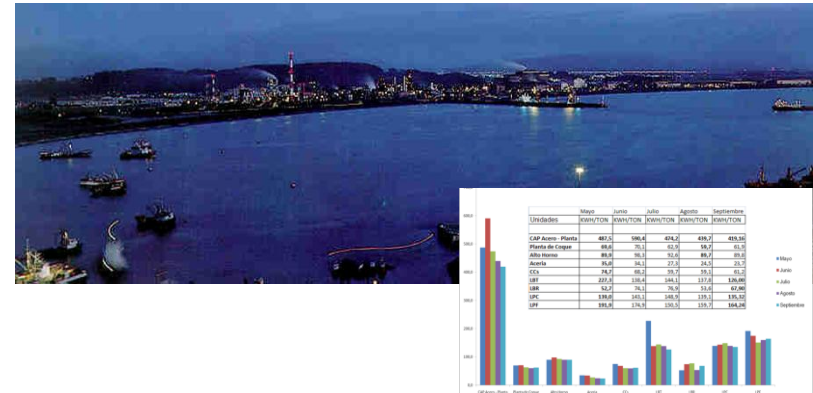
- Provide benchmark reports

Energy and Environmental Reporting

CAP Steel

For the first time able to do a global gas balance of the entire plant. Process Operations and Electrical monitoring for the all areas of the plants resulted in 10% Energy Saving. A list of more than 20 initiatives detected for further improvements.

Rene Aroqui, Business Process Improvements Coordinator,



CHALLENGES

Increased Maintenance and Equipment Costs

Community Environmental Restrictions and Reporting

More than 50 interface types

Large Steel Mill Metallurgical Complex with old and modern technologies

SAP and MES integration

SOLUTION

Interfaces to gather in real time process data, equipment, fuel, electrical and laboratory information

Integration with MES to collect the time interval events of the production units

PI Webparts and structured data base

RESULTS

10% of Energy Savings by monitoring in Real Time the energy, operating conditions for all major areas of the plants.

Reduced gas consumption
First time able to do a gas balance for the entire metallurgical complex
Shared with the community via Internet net Environmental Air quality and Weather monitoring

Statistical Analysis and Target KPI's

Southern Peru Copper -Cuaajone

“There is a 1 to 1 relationship between the resources and production. If the productive resources are increased, the production curve gets higher. Then, for the same level of work the production increases as well, but if technology is included , the production curve increases remarkably.”

Nelver Benavides, Technical Services Manager, Cuaajone, Peru



CHALLENGES

Decrease Ore Grade

Increase Hardness and Variability of the Copper Ore

How can technology help place value on our production processes?

If we can increase productivity of resources, then we can increase production without increasing our work level.

SOLUTION

PI System keeps plant data by gathering data from 3 different control systems, Laboratory, Equipment, Water and Energy

Multivariable statistical analysis

Analysis done by PI ProcessBook, PI DataLink, and PI ACE

Data forwarded through browser so that it is available to any level

RESULTS

Easy to understand user displays and productivity KPI's to allow SCC to meet Targets

Support with availability reports and information for maintenance management

Increase of ore milling: 4.6%

Decrease of mil power: 3.9%

Decrease of fresh water consumption: 6.8%

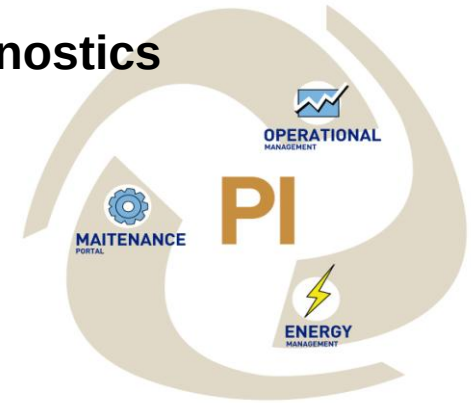
PI System contribution: Savings of US\$ 7.95 million per year

Enterprise Dynamic Performance Monitoring and Diagnostics

AngloAmerican

“Our ambition is to be the leading global mining company, the investment of choice of our customers by enabling our people to make a difference in a company making a difference. Information is the key for collaboration and decision making for operational excellence”

Fernando Romero, General Manager for Automation and Industrial IT
AngloAmerican Chile



CHALLENGES

- Need of information for operations management
- Integrated approach for assets optimization (Operations Technologies + Informations Technologies)
- Define a model and architecture for information integration

SOLUTION

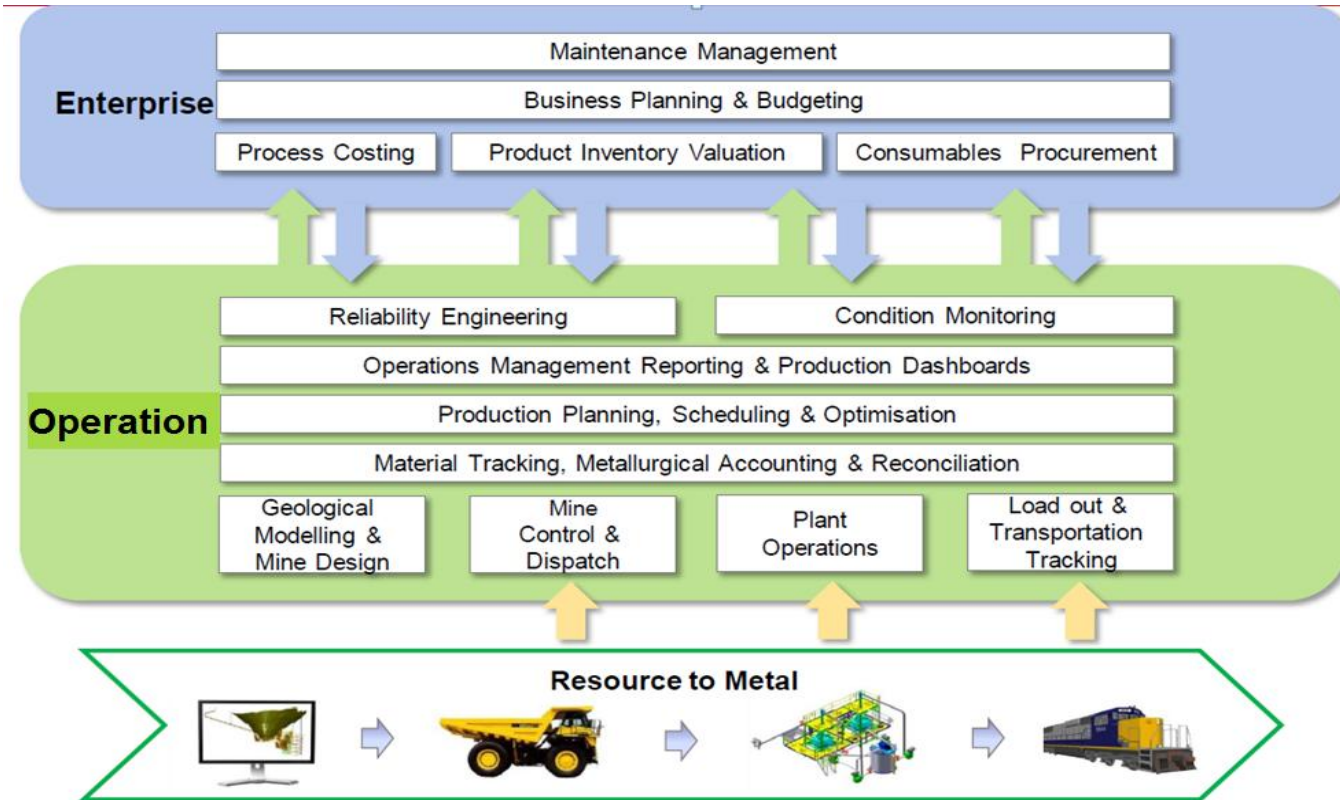
- Benchmarking of PI System platform across the enterprise
- Multidisciplinary team: Process Control & Automation, Management, and Operations
- Single platform to integrate all data from operations value chain
- Transforming data into information with an asset-based model
- Platform to develop value applications in real-time

RESULTS

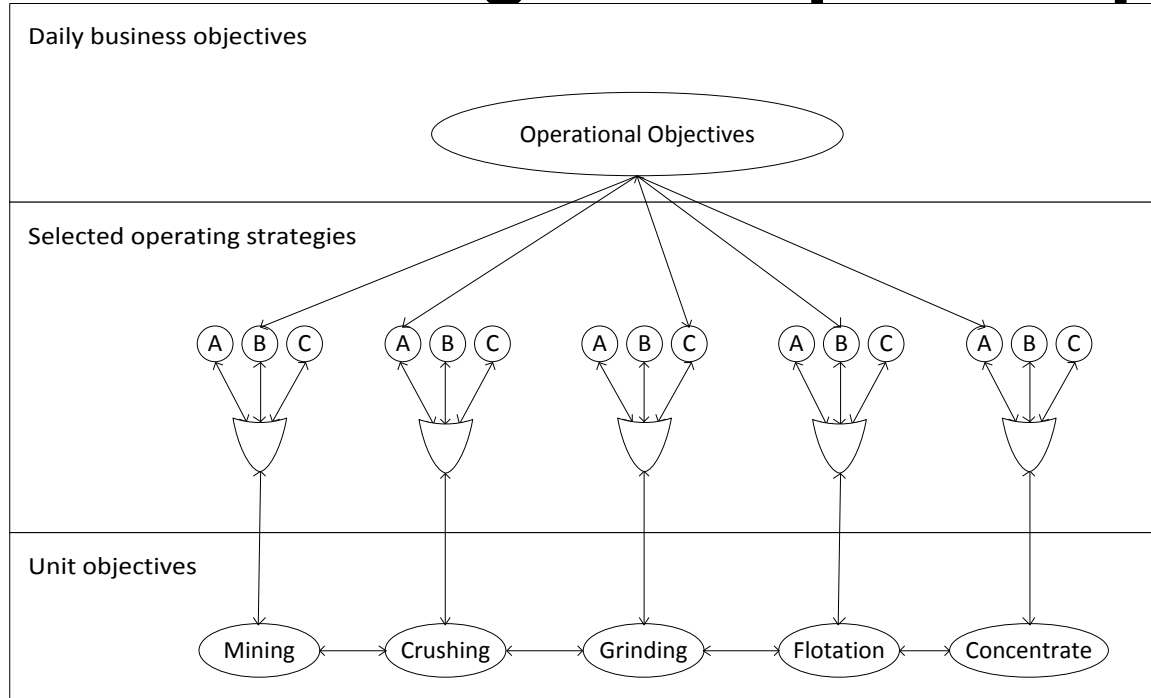
- Better process analysis
- Unique and standardized Reporting
- Lower complexity in value application management
- Key enabler for Integrated Operations Management Centers (IOMC) – easy Access to information, more collaboration and sharing of best practices

Data flow implemented

PanAus



Operations management philosophy



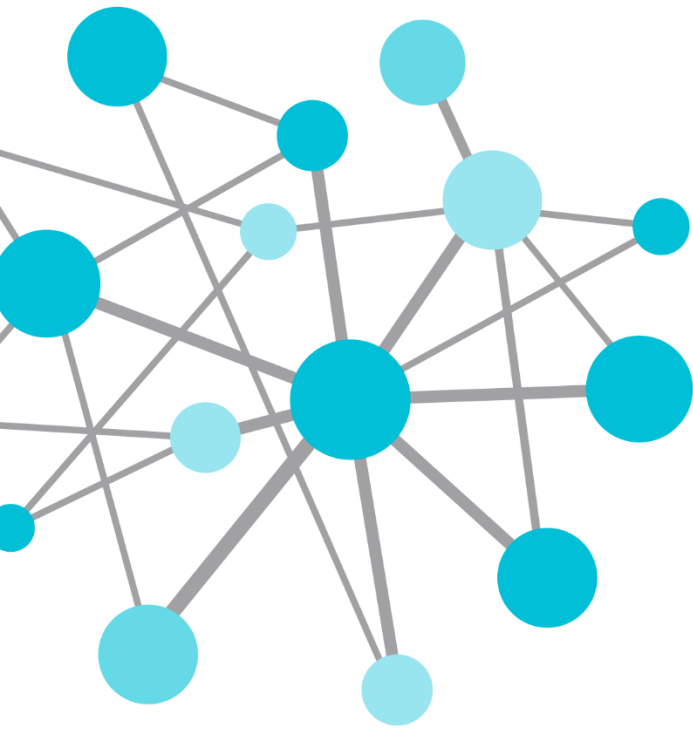
PanAus, Australia, Dirk Baas, Senior Process Controls Engineer

Picture of control room



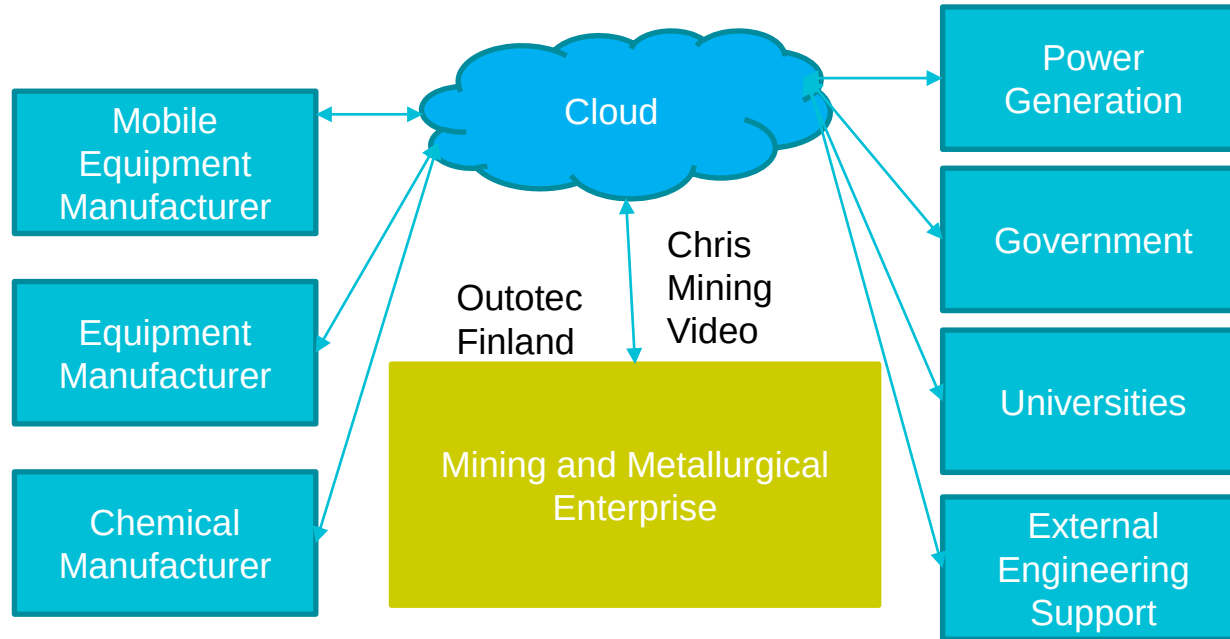
Benefits of the Center Monitoring Diagnostics

- Common model for the operational and maintenance of the processing plants
- On-line expert support distributed for the operations and maintenance
- Transmitting core best practices to the operations
- Maintain internal know how
- Technological center of operational excellence

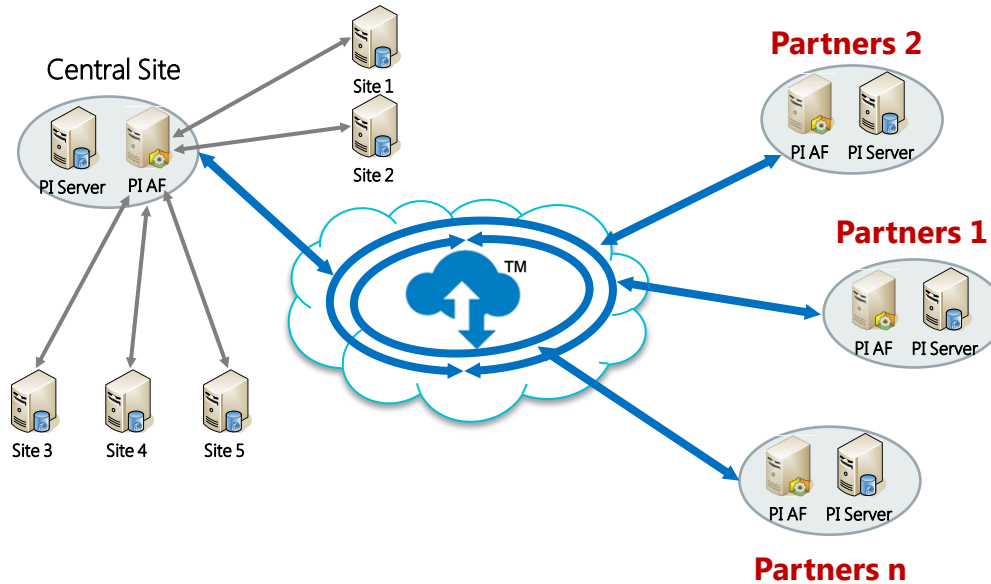


Leveraging External Community for Smart Process Management

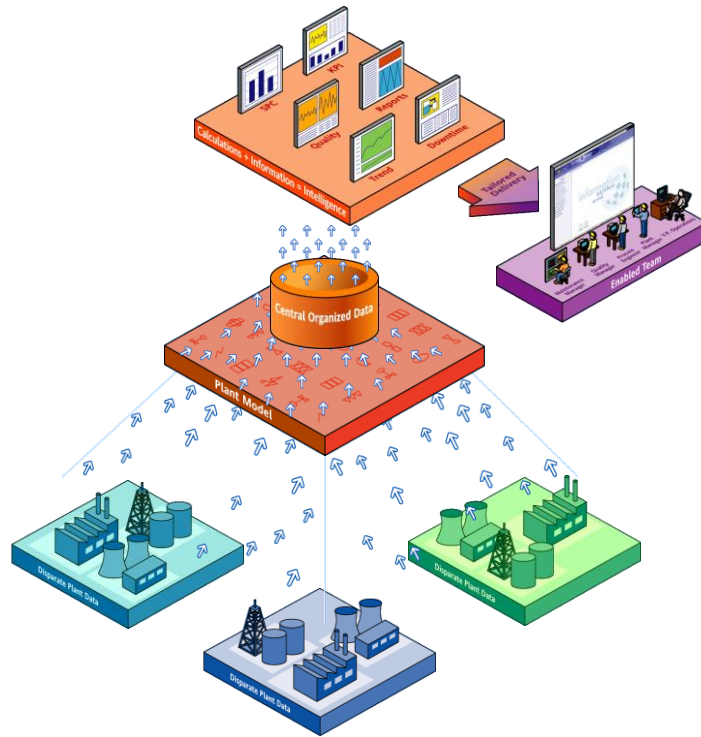
Moving into Interconnected Systems



PI Cloud Connect – Amplats Architecture

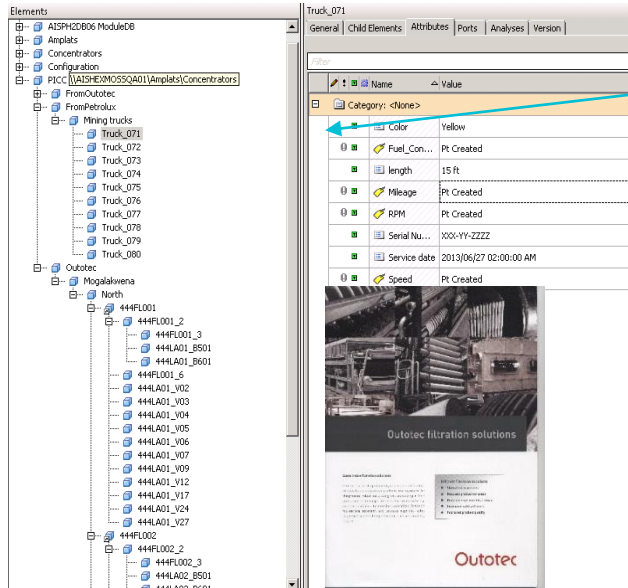


Enterprise Real Time Dynamic Continuous Improvement and Innovation strategy

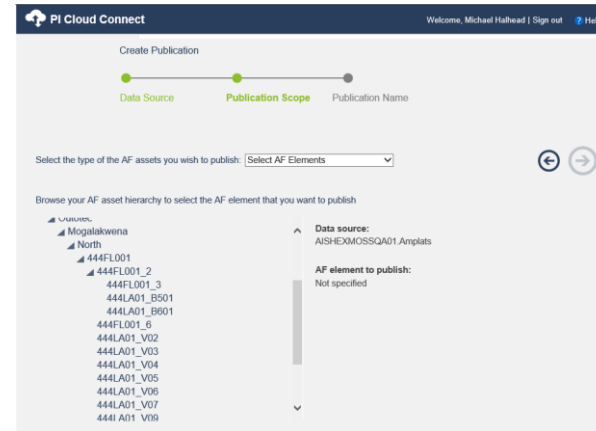


- Calculations are performed primarily on the sites
- The central PI System is used for:
 - Group wide analyses
 - Maintain Knowledge and Strategic BI Analysis
 - Maintain Models and Plan Targets

PI AF Accessible from the Cloud to others

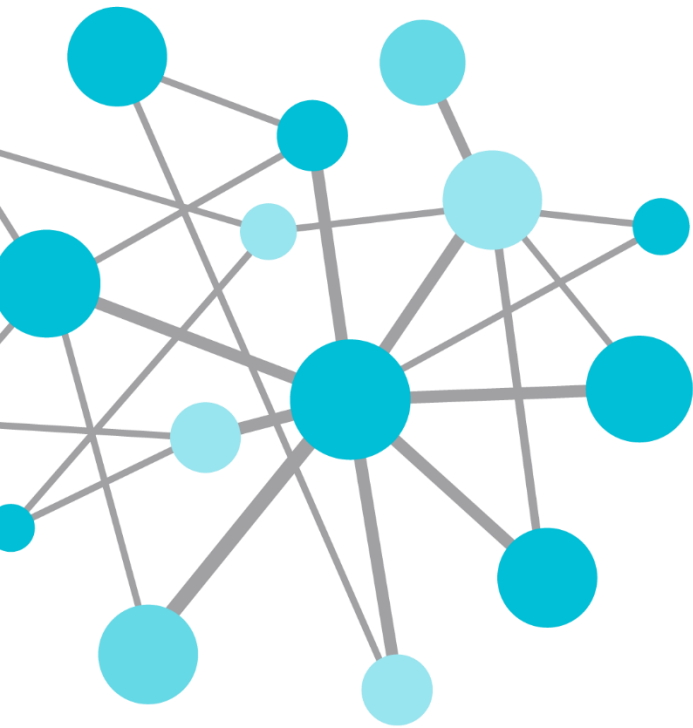


The PI AF Models are
“replicated” by PI Cloud Connect



Conclusions

- Real Time Data and Events transform data into Actionable information
- Data Validation- Event Classification- Predictive Analytics - Collaboration
- Real time predictive event framing (analytics) is crucial to increase equipment availability to reduce specific fuel, electricity and water consumption.
- Integration and standardization of systems for local and enterprise collaboration are essential strategies to transform the organization using new proactive analytics and data analysis tools
- Drastic reduction in operating costs, increase productivity and add sustainable value to the enterprise.
- Competence Centers are **Knowledge Centers to promote change via people collaboration** at the local and enterprise business levels.

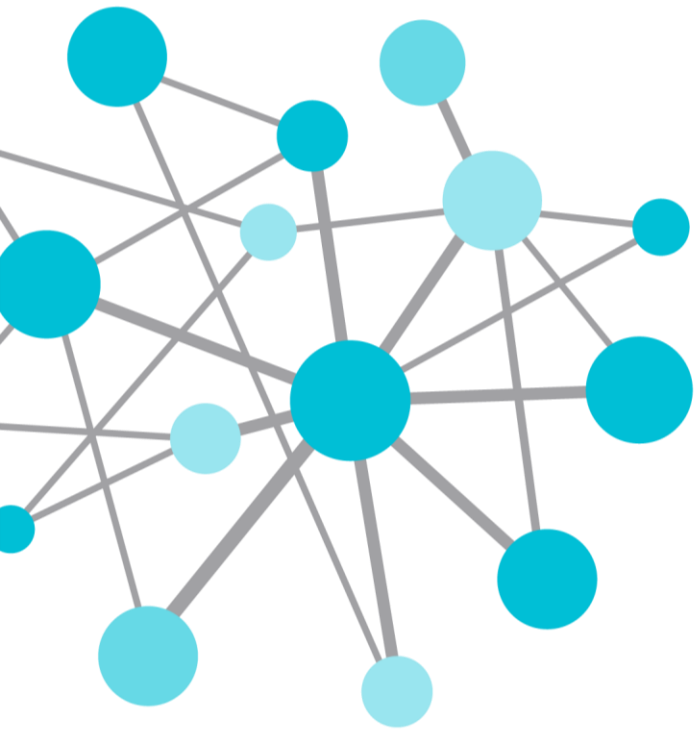


Questions

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**name &
company**



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YOU

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