Interfacing Production and Maintenance Data from the PI System to SAP (Codename SAPIO)

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Agenda

- About Vale
- Story of the project
- Challenges & The Solution
  - Technologies
  - Architecture
  - Network & Data Flow
- Results & Benefits
- Demo
- Overview of Mobile Data Capture

About us.

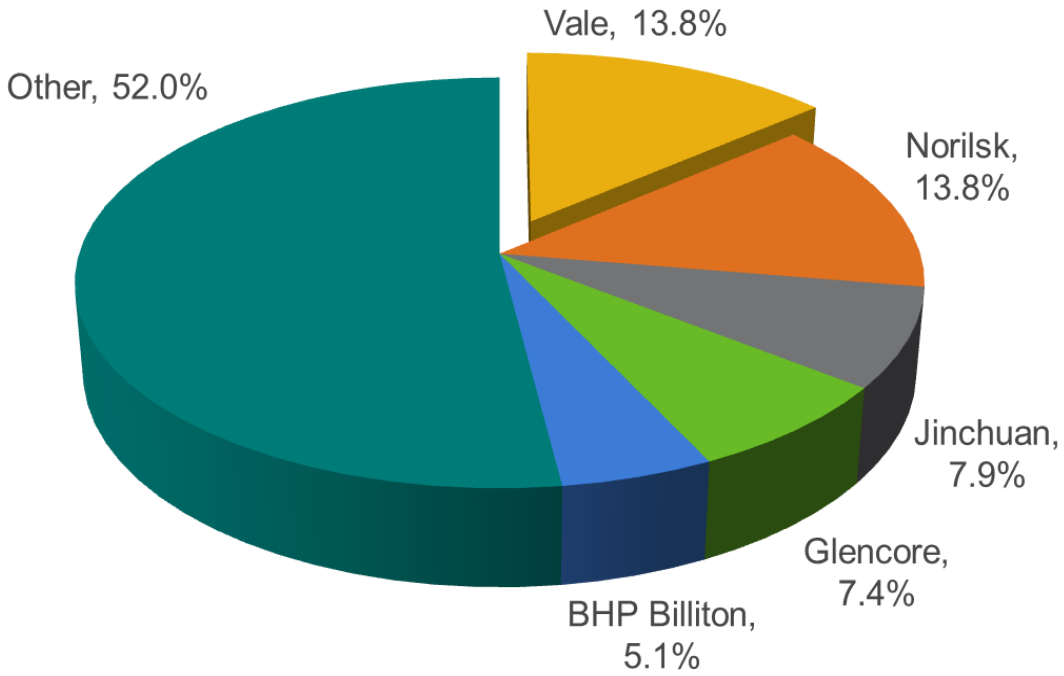
In 1997, Vale was largely a Brazilian exporter with 10,865 employees, and an aggressive strategy to grow its business.

Today, Vale is active in over 35 countries around the world with over 85,000 employees.
It is the leader in iron ore production and one of the top three nickel producers.

Diversifying our business portfolio

Vale is one of the world's leading nickel producers

Share of World Finished Nickel Production - 2014



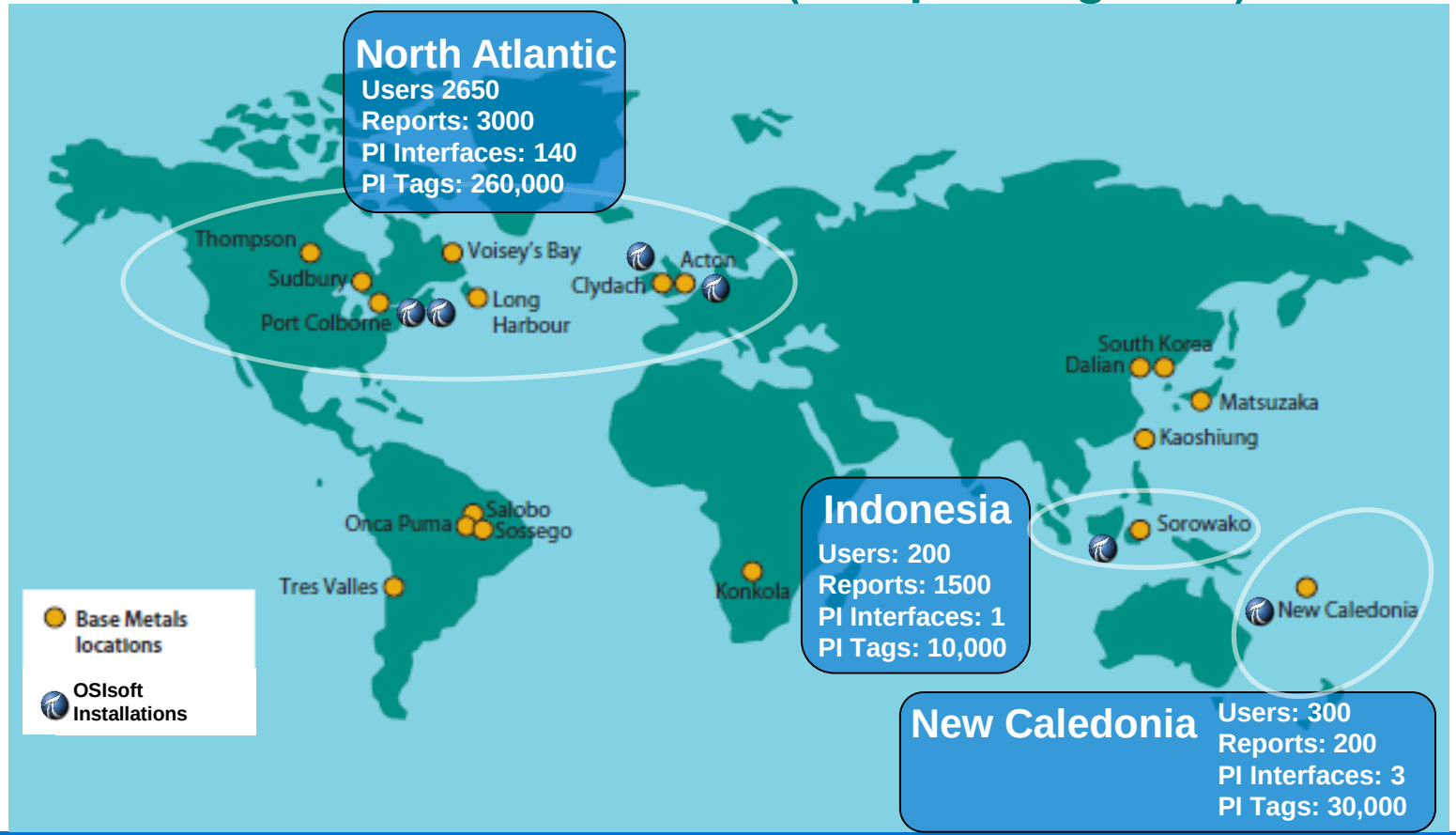
Source: Wood Mackenzie, company reports

Vale Base Metals

Vale's Base Metals Business consists of nickel, copper, cobalt, aluminum, precious metals and PGMs. Vale (through the former Inco), has been operating in Sudbury for more than a century.

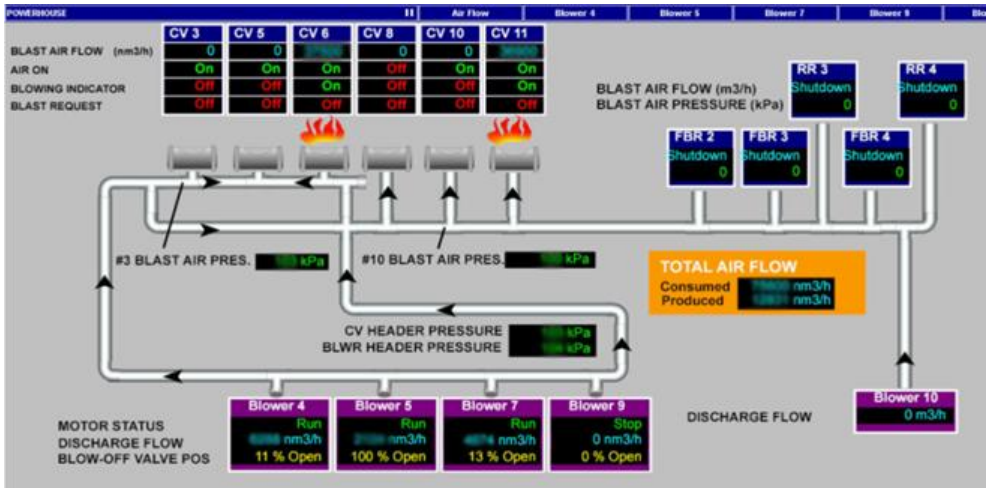
- Headquartered in Toronto
- North Atlantic Operating Regions:
  - Manitoba (Thompson)
  - Ontario/UK (Sudbury, Port Colborne, Clydach & Acton)
  - Newfoundland/Labrador (Voisey's Bay & Long Harbour)

Vale's Global Base Metals Locations (18 Operating sites)



Vale's Base Metals PI Fact Sheet

- More than 300K PI Tags configured at our locations
- Interconnectivity with most plant systems (SCADA ,DCS, PLC's)
    - 140 + Interfaces (like OPC, Foxboro, IFIX, UFL, etc..)
- Calculated tags
    - + 10,000 PI Totalizer tags
    - + 1,500 PI Performance Equations
    - + 2,500 PI ACE Calculations



OSIsoft Technologies at Vale Base Metals

- Standardized architecture
  - DMZ implementation
  - Standardized PI Interface hardware
  - HA PI Servers (High Availability)
- PI Server 2012
  - PI Notifications 2012
  - PI Asset Framework (AF) 2014 R2
    - PI Event Frames
  - PI ACE 2010 R2
- Data Access
  - PI OLEDB Enterprise
  - PI AF SDK
  - PI Web Services
  - PI OPC Server

- PI Visualization Suite
  - PI DataLink 2014
  - PI ProcessBook 2014
  - PI Webparts 2013
  - PI DataLink Server 2014 (Sharepoint)
  - PI Manual Logger
  - PI ActiveView 2014
  - PI Coresight 2014

SAPIO

Story of the SAPIO project

- One Vale Program
  - Replace Ellipse\Oracle ERP with Global SAP Implementation
  - Empower SAP users with intelligence data On-Demand

- How can SAP gather this real-time data from the PI Systems?

Business challenge

- Integration of plant production and maintenance data into 

Non-functional requirements

- Maximize COTS functionalities
- Design a robust, reusable, configurable interface
- Stay secure using Vale & OSIsoft best practices
- Advanced logging and technical support

Solution Technologies

- TIBCO® as a middleware
- Migrate to OSIsoft. PI System 2012
  - PI Asset Framework to structure our information
  - PI Notifications & PI Analytics
    - Custom delivery channel to create PI Event Frames
  - PI Event Frames to keep track of events
- Vale Web Service process logging

Solution Architecture

SAPIO Installer

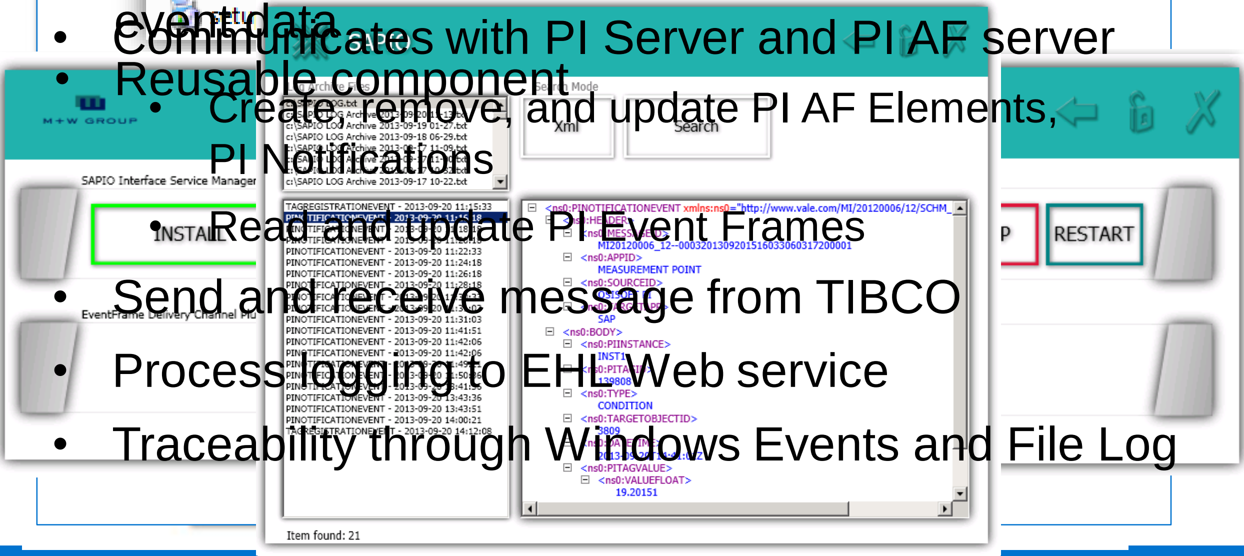
SAPIO ConfigUI

SAPIO EFDC

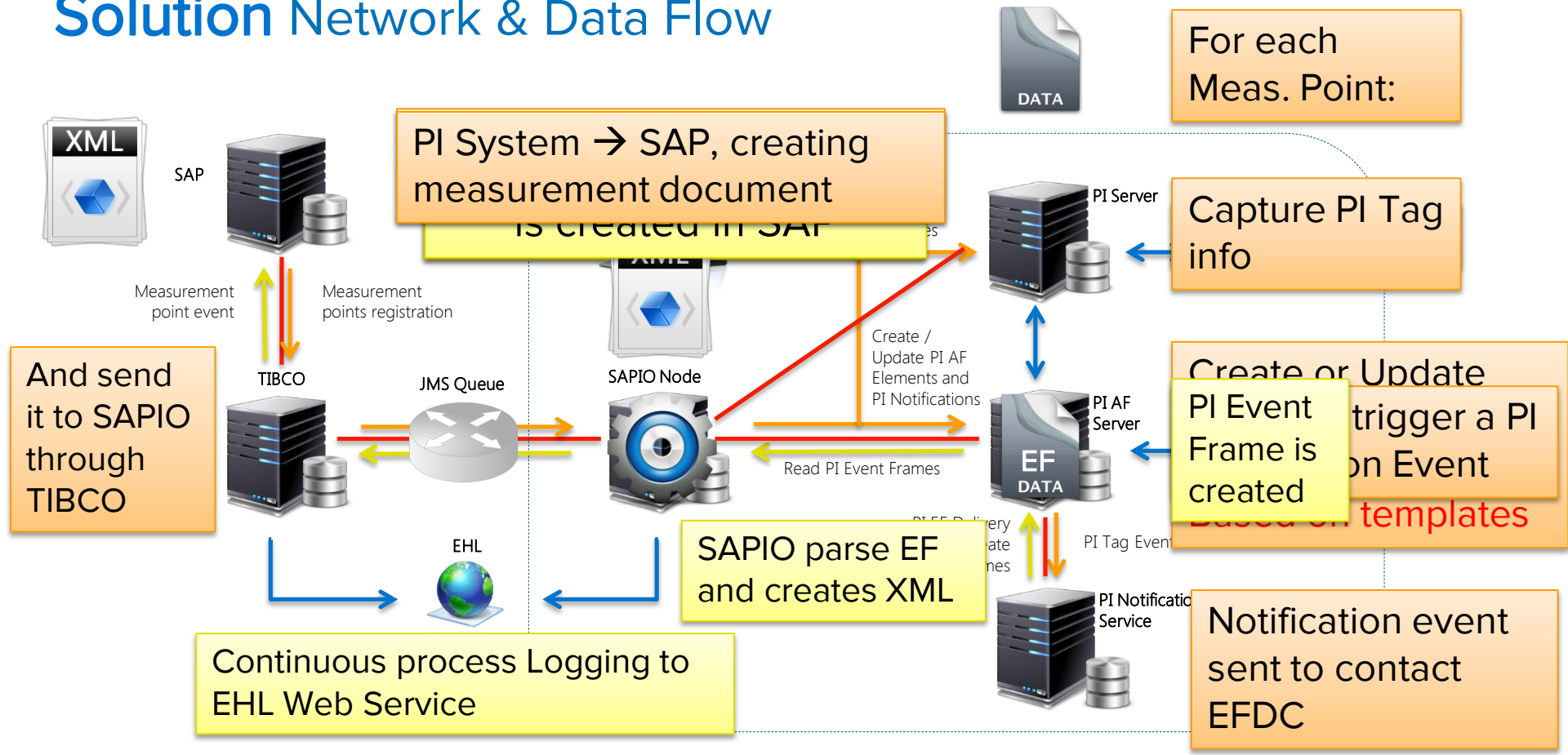
SAPIO Service

PlugIn built in C#

- … (EFDC) PlugIn event data
- Communicates with PI Server and PI AF server
- Reusable component
  - Create, remove, and update PI AF Elements, PI Notifications
  - Read and update PI Event Frames
- Send and receive message from TIBCO
- Process logging to EHL Web service
- Traceability through Windows Events and File Log



Solution Network & Data Flow



Results & benefits

Results

- Automated collection of production data to support SAP process orders and Maintenance Planning and Work Orders

Tangible benefits

- Reusable interface for deployment throughout Vale Base Metals PI Systems

Intangible benefits

- Knowledge acquisition on using the PI Asset Framework

Key Points to Take Home

- Vale has created an integrated system (PI, PI AF, PI EF, PI Notifications, and TIBCO) to meet the challenges of the One Vale Program.
- What we could not accomplish with COTS, we were able to do using PI System Access
- All design issues were solved and required enhancements were achieved.
  - Documentation & Manuals, Tech Support, PI Square

DEMO

Interfacing production and maintenance data from the PI System to SAP

Centralize information to empower SAP users with the ability of accessing intelligence data on-demand. Maximize asset performance through real-time data using the latest PI System components including PI AF, PI Notifications, and PI Event Frames

VALE

Business Challenge

- Integration with plant data in the implementation of SAP

Non-Functional Requirements

- Maximize COTS in developing a robust, secure and reusable interface.

Solution

- Use TIBCO as middleware
- Handle information within PI Asset Framework (Elements, Notifications, Event Frames)
- Support oriented process logging

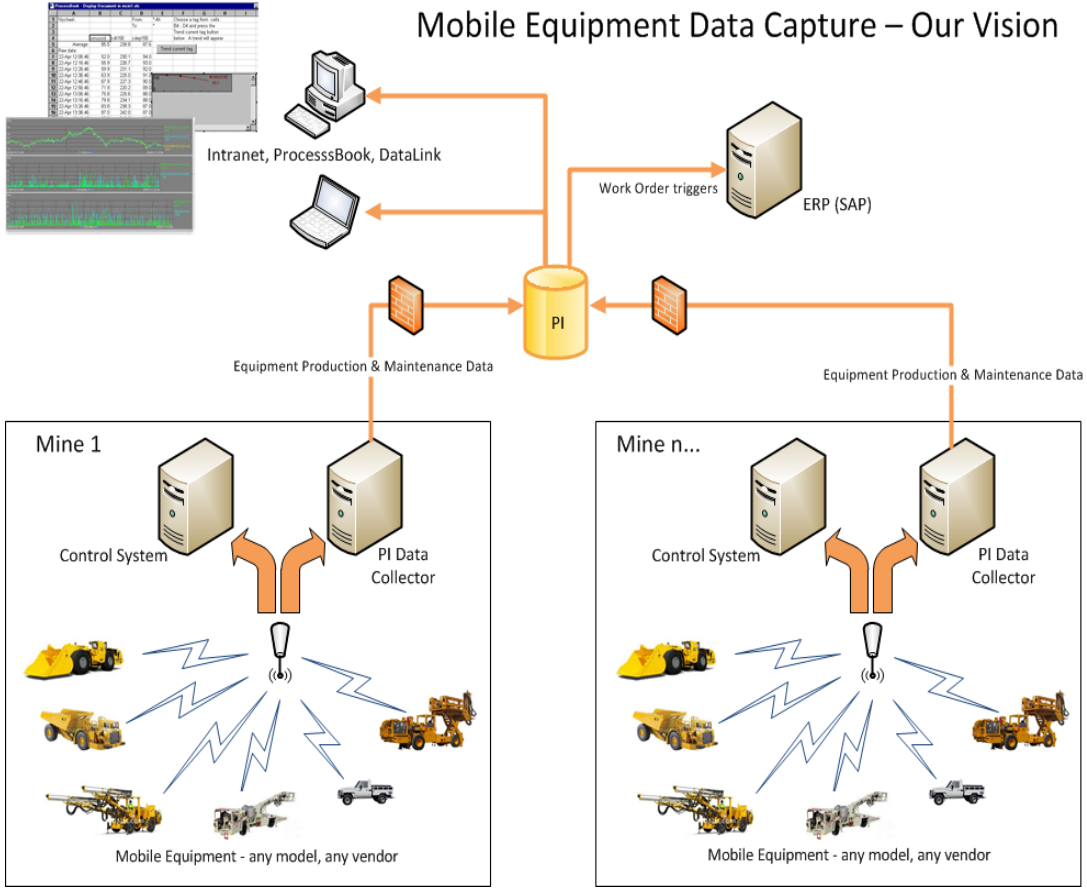
Results and Benefits

- Automated collection of maintenance data to support SAP measurement points
- Knowledge acquisition on using the PI Asset Framework

Leverage Existing investment to capture Mobile Equipment Data

- **Utilize wireless network to provide "real-time" mobile equipment data for the purpose of:**

- *Making informed production decisions during the shift*
- *Observing and improving operator practices*
- *Reducing effort on manual equipment maintenance inspections*
- *Planning and scheduling the right equipment maintenance at the right time*
- **Leverage existing data capture & reporting tools (PI & PIMS)**



Questions

Please wait for the **microphone** before asking your questions

State your **name & company**

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