OSIsoft Regional Seminar Series
Johannesburg, South Africa

23 February 2012

PI Applications in Anglo American Platinum:
Control Loop Monitoring and Reporting

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Real Time Information – Currency of the New Decade

Outline

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- Our Business
- PI and AF in Anglo American Platinum
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- Solution architecture
- Calculation engine for PI
- Reporting and visualisation layer for PI
- Case study: Control loop performance monitoring
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  - Calculations
  - Reporting
- Thanks & Questions

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Introduction

- Anglo American Platinum (Amplats) is rapidly rolling out PI to soon be one of the biggest PI users in Southern Africa

- Economy of scales allows for significant financial benefits of custom built solutions in Amplats

- Blue Nickel Solutions have partnered with Amplats to built process monitoring and reporting solutions for PI systems

- Blue Nickel assisted Amplats with development of a control loop monitoring solution; the subject of this presentation

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Our Business

- Blue Nickel Solutions is a process and systems engineering company
- We specialise in solutions for the processing industry
- Our main areas of expertise are:
  - Reporting and monitoring solutions
  - Process optimisation
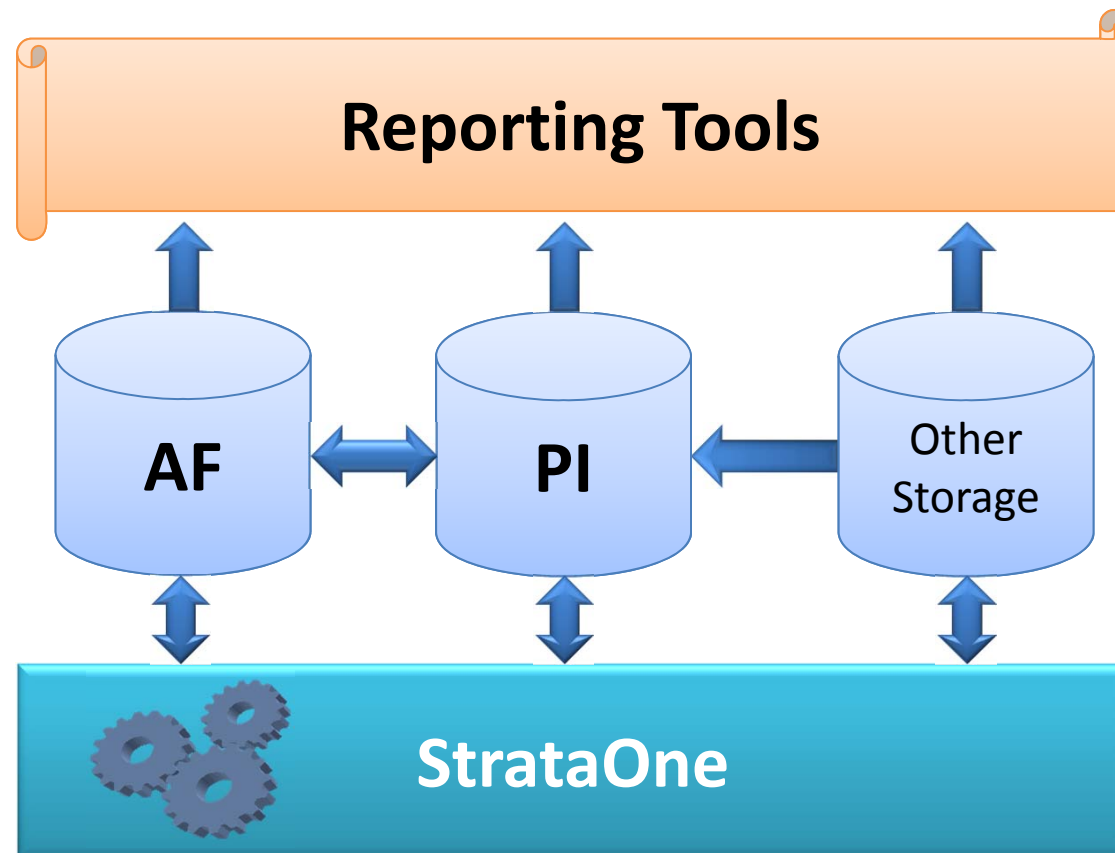 - Advanced process control

The PI system in Anglo American Platinum

- Amplats has installed the PI system on a number of their existing operations
- Currently 9 sites have PI with a complete AF process tree giving structure to data stored
- About 700 000 tags are being logged
- A central PI server have been configured to aggregate data to a central location, retrieving data from historians and relational data sources
- Amplats is an OSIsoft enterprise client

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Problem Statement

- Control loop performance monitoring (CLPM) is critical for stable operation of any processing plant
- CLPM can be done manually by the instrumentation technician or process engineer but this is very labour intensive, especially on sites that have many control loops
- Best practice is to automate CLPM for which a number of off-the-shelf packages exist
- At time of development no AF loop monitoring solutions existed and Amplats had an in-house CLPM solution

- The PI system
- Analytics
- Visualisation

Reporting Tools

AF   PI   Other Storage

StrataOne

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Analytics

- Requirements for reporting often requires processing of large amounts of data to provide meaningful insights
- There currently exists a gap in the analytics capability of AF
- Blue Nickel developed a robust, real-time calculation engine which provides strong integration with the PI system; StrataOne

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StrataOne Overview

- StrataOne is a real-time execution and calculation engine
- Provides intuitive procedure to build calculations
- Most calculations can be built using predefined functions
- Unique calculation tasks can be built using .NET
- Tightly integrated communication channels for the PI system

Visualisation

- **Technology Stack**

- **Benefits**
  - High degree of customisation and control
  - Fluid and satisfying user experience
  - Strikes an elegant balance between robustness and ease of development

- **Technology Overview**
  - Microsoft .NET Framework 4 allows for quick and easy setup and access to Stored Procedures, created in SQL Server, which access the PI AF Server via a PI OLEDB Enterprise linked server
  - Telerik RAD Controls for Silverlight make UI development simple and effective

The PI System

PI OLE DB Enterprise

MS SQL Server

Silverlight 4

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Visualisation Example

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Case Study: CLPM – The Challenge

- Control loop key performance indicators are well documented in literature (and there are too many)
- Select the simplest and minimum amount of KPIs to still get the full picture
- Visualisation and KPI rollup critical for site acceptance

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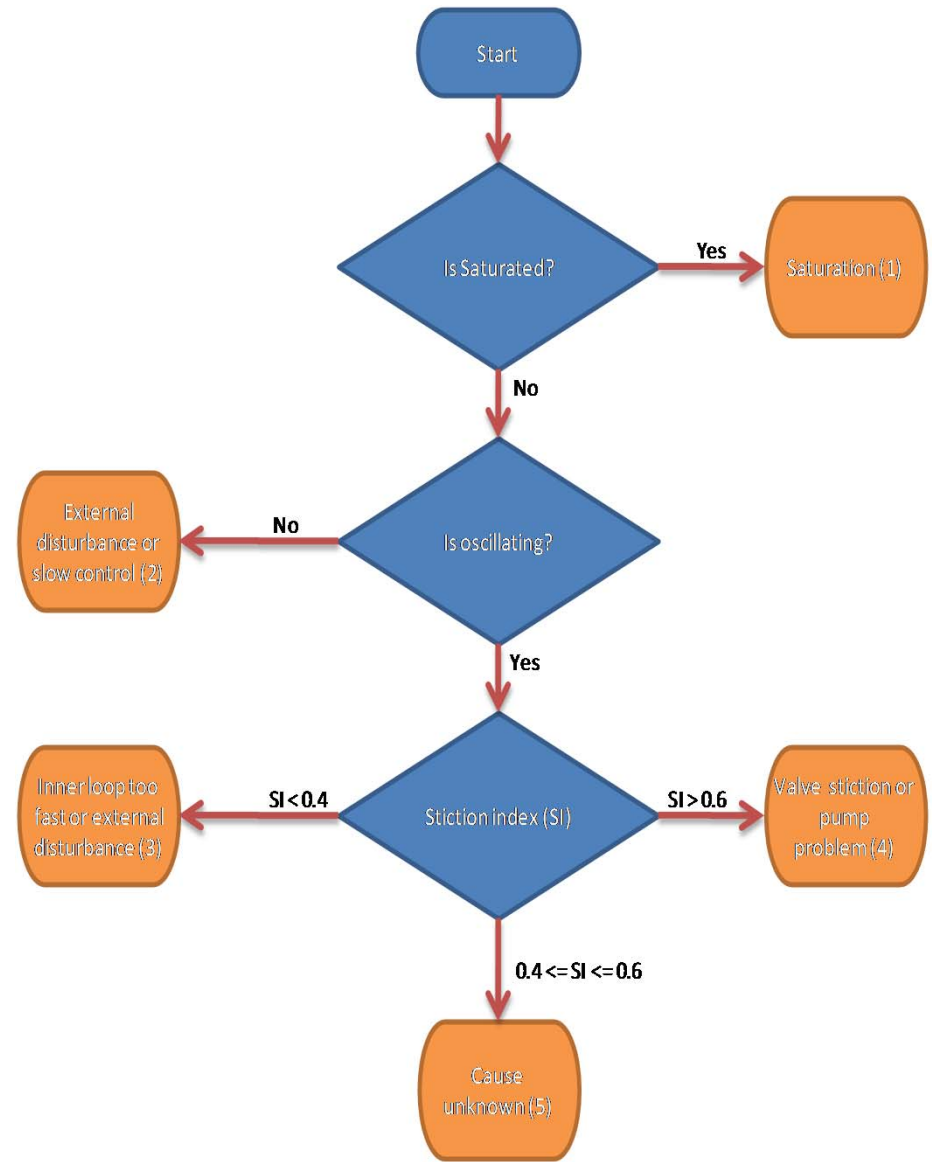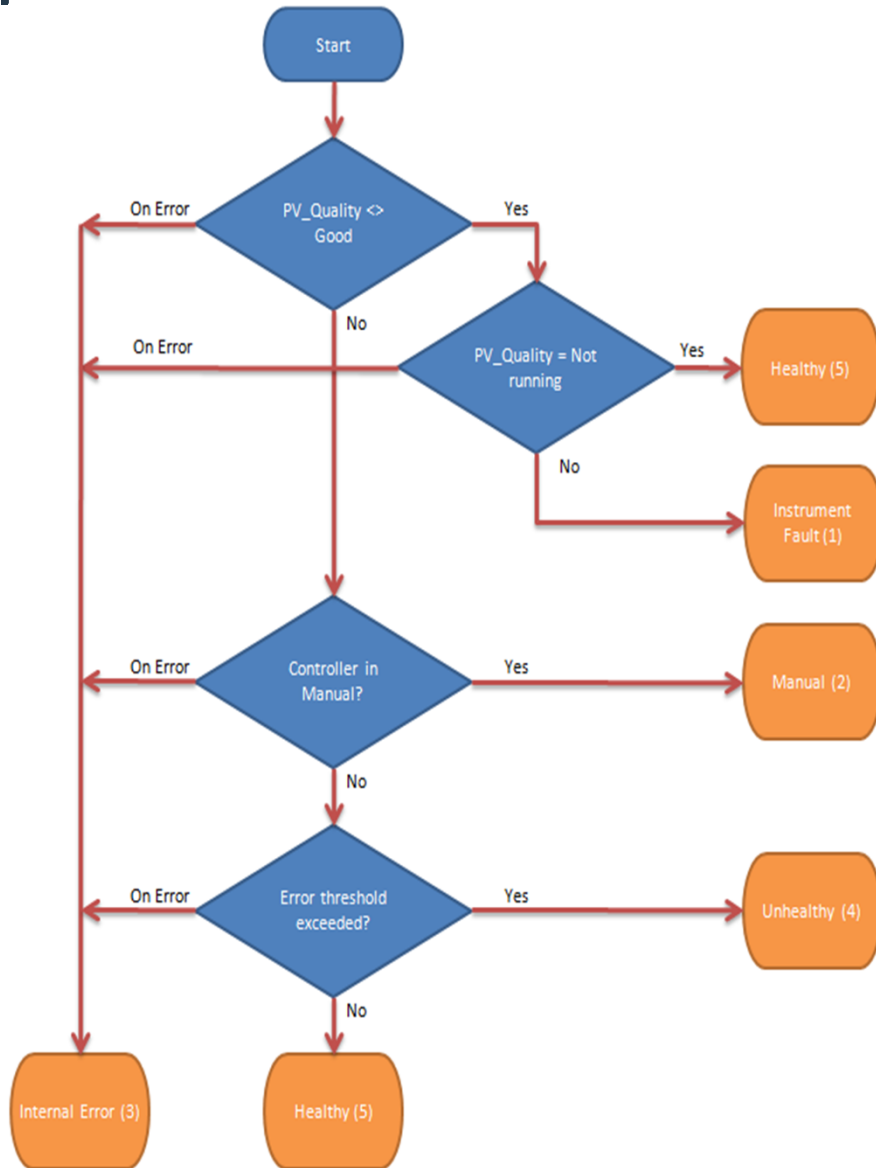
- Building the CLPM calculations in StrataOne is easy
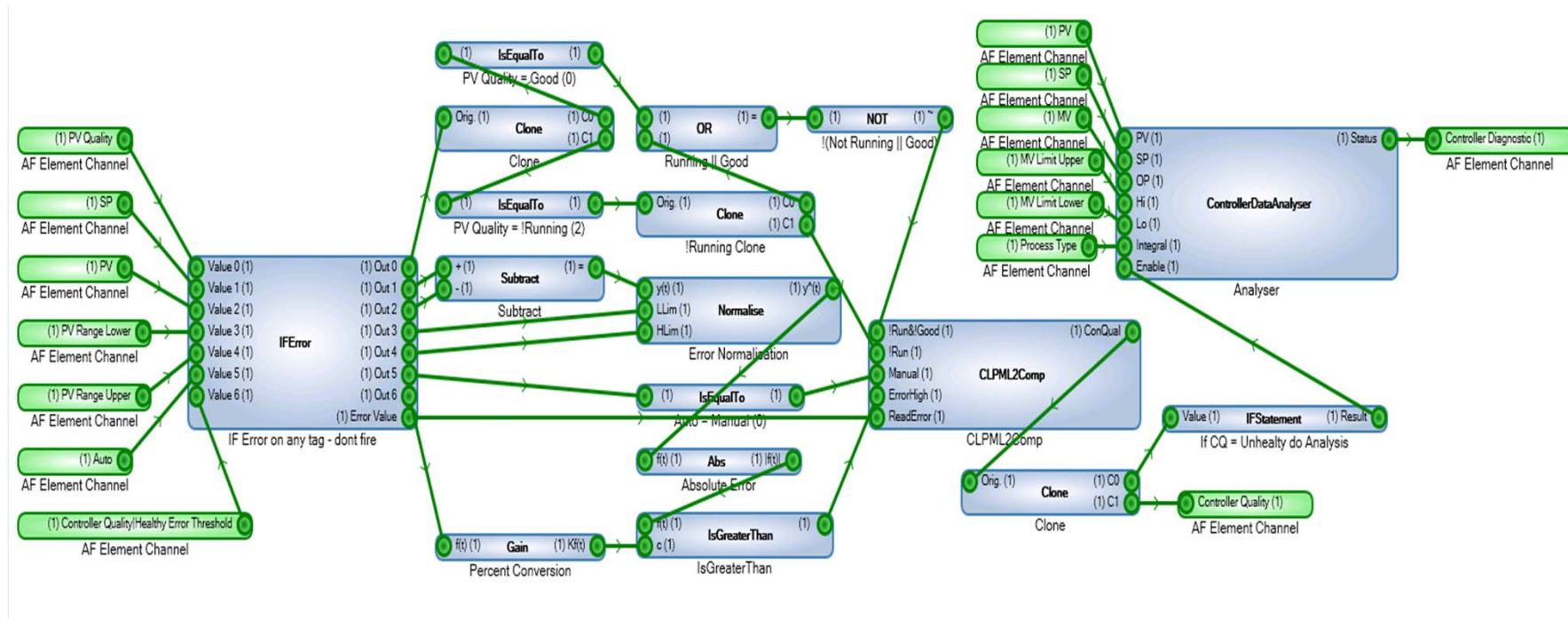
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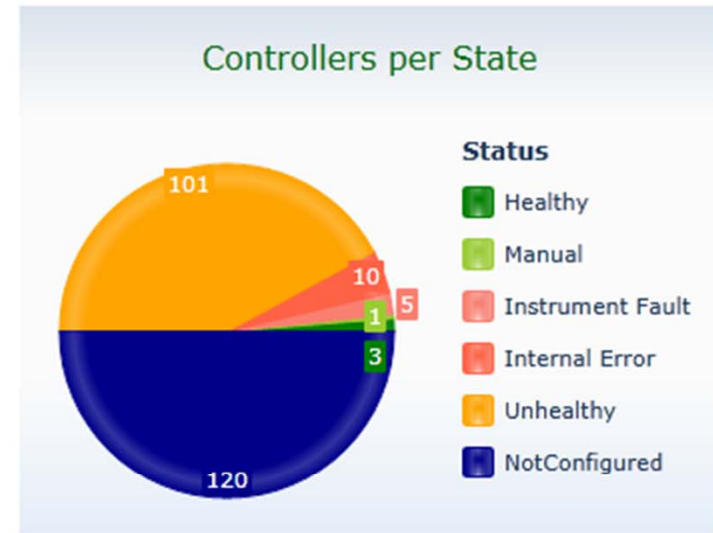- StrataOne integration with AF allows for rapid deployment of CLMP calculations to all configured control loops

- An overall control loop performance monitoring KPI is displayed at the top of the page as a dial (the manager's number)

Element	Instrument Fault	Healthy	Unhealthy	Internal Error	Not Configured
Waterval Retrofit	0	0	0	0	120
Waterval UG2	5	3	101	10	0

- Control loop performance is grouped and sorted per process area (or process cell) according to controller states (Healthy, Unhealthy, Manual, Instrument fault or Internal error)

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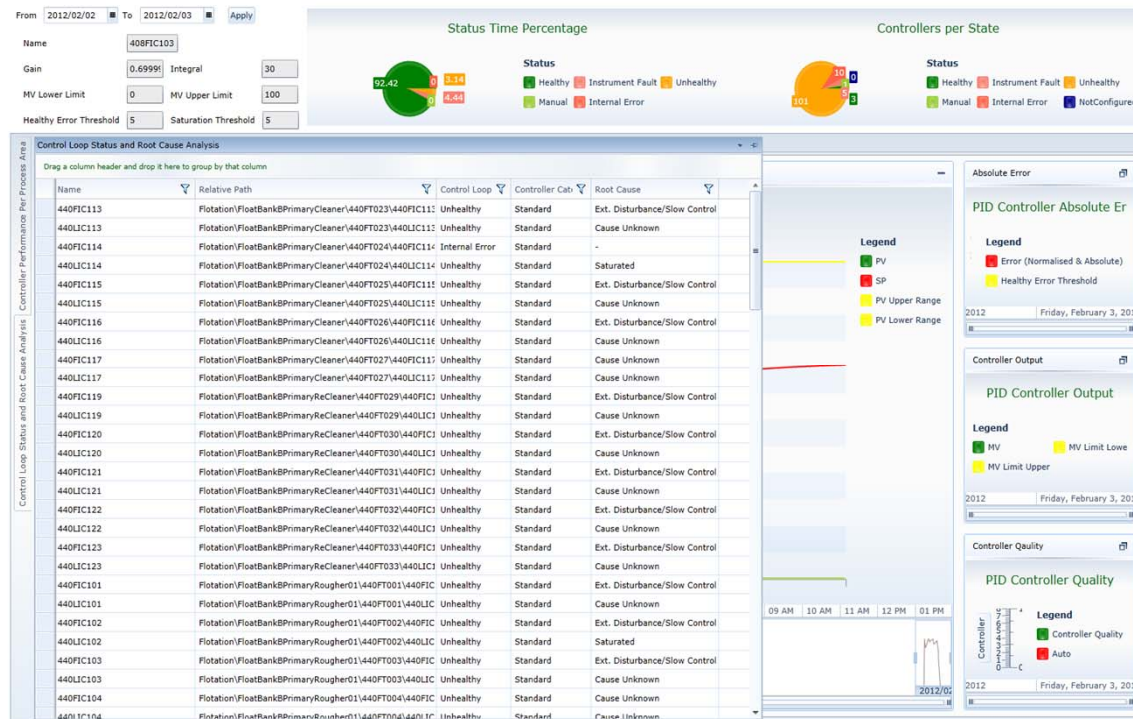
# Case Study: CLPM – Reporting and Information Rollup

- Per process area, all loops are shown and sorted according to states

- Diagnostic information is supplied for loops that are unhealthy (Control element fault, External disturbance, Controller tuning, Saturation or Cause unknown)

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- Individual loop performance are shown on a graph (PV, SP, OP and controller states) with zooming and scrolling capability
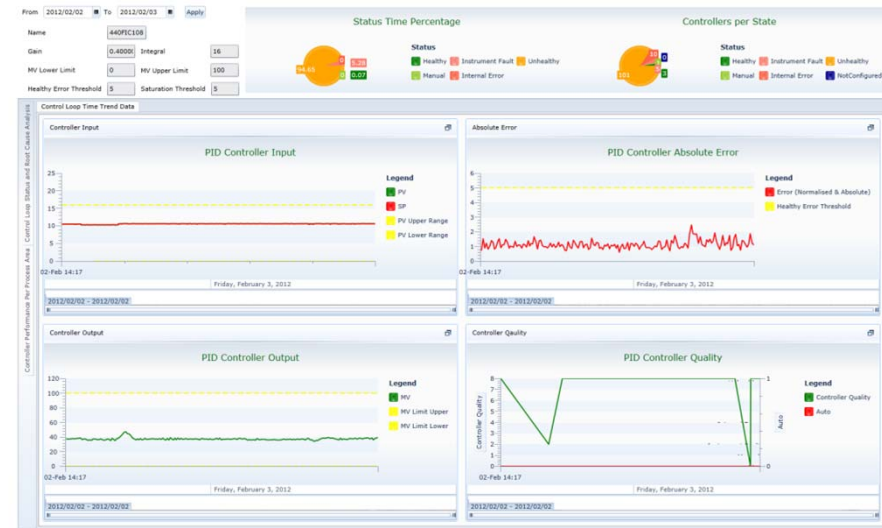
Questions?

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Thank you