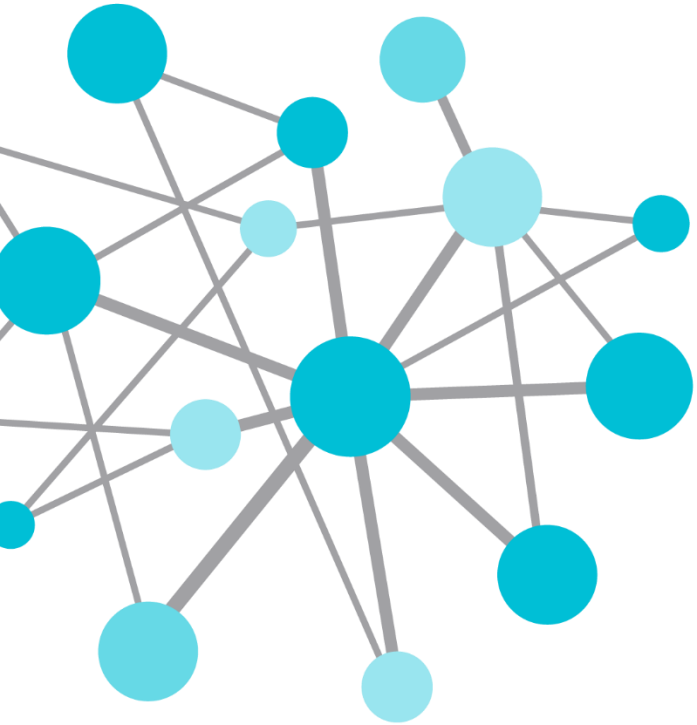

Going BI - Optimizing KPI Management Across the Enterprise

Presented by **Warren Armstrong**

AngloAmerican

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Anglo American Platinum (AMPLATS)

World's leading primary producer of Precious Group Metals
Supplying ~40% of the world's newly refined Platinum.

Process Division:

- 14 Mines
- 18 Concentrators*
- 3 Smelters
- 1 Converter
- 2 Refineries
- 9 geographic operational areas

*** Including managed and non-managed**

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Background

- For 1gm of Platinum
- Amplats mines 1400 kg of rock
- Mills 600 kg
- To 80% less than 75 microns (μm)

  or 0.075 mm

2013 tonnages

100 million mined

44 million milled

71 tonnes Platinum

Why so fine?

UG2 Platinum Group Metal mineral size!

Typically 5 microns

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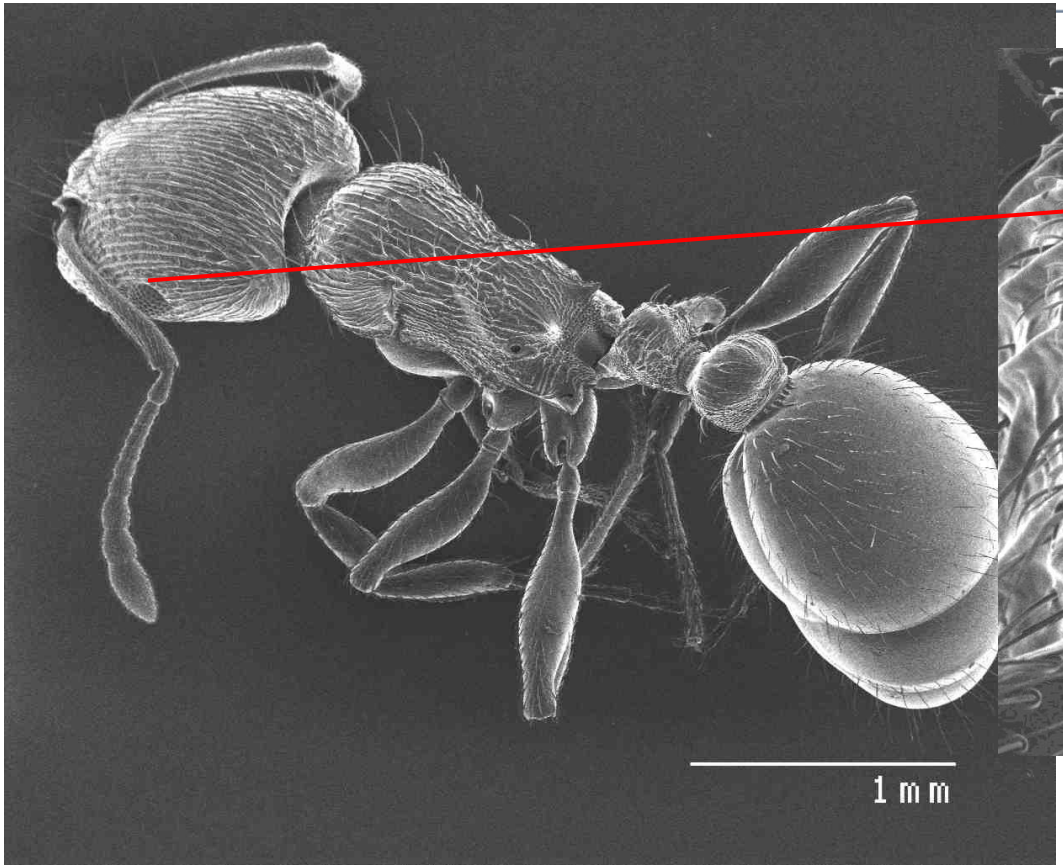
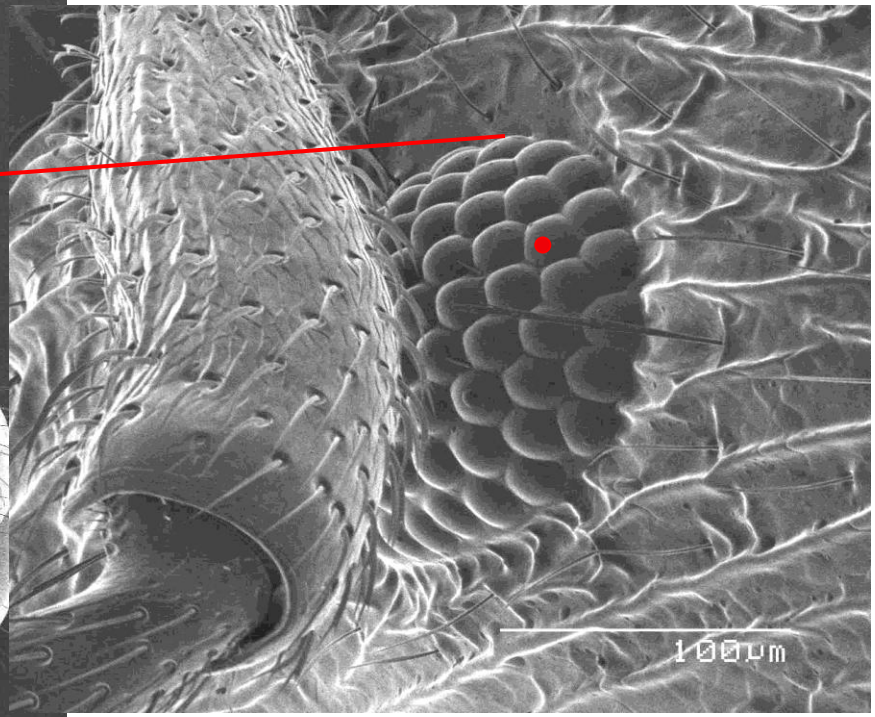
So how fine is bug dust?





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Value Chain

Ore
3.2 g/t

Concentrate
125 g/t

Smelters
2700 g/t

Refineries
99.9200 %

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Business Challenge

The KPI-calculation-maintenance needed to be streamlined!

"Please set up the KPI reports on our plant…"

"Please add these KPIs…."

- **Creating a new KPI took 30 minutes**
  - **The one site had 320 unique KPIs, from multiple requests**
- **KPIs were difficult to trouble shoot**
  - **Multiple configuration linking**
- **1 site had 9 KPI reports**
  - **With 3 sites to go...**

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KPIs

- KPI-system started as an Excel automation
- Daily plant health check: (areas, sections, equipment)
  - Daily, Weekly, Monthly, Yearly values and standard deviation
  - With a run-condition
- The process engineers on site look after areas
  - KPIs are defined in areas of responsibility
  - So KPIs change as problems and people change

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KPIs

- Needless to say; it grew!
  - From: 4 reports and 120 KPIs
  - To: 8 reports and 437KPIs
  - …

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How was it done

- Daily values from PI Totalizers
- PI Advanced Computing Engine (PI ACE) for roll-ups
  - Rollup daily by weighting on run times
- PI Module Database for configuration: aliases, properties
- 4 PI ACE calculation instances
  - Running 484 KPIs
  - Using 2969 tags
  - From 7409 PI Module Database entries

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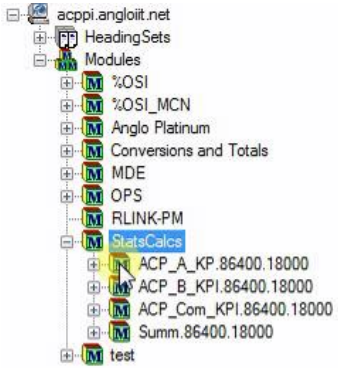
Demonstration – PI ACE configuration



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Old-System - To add one KPI

Procedure to add one KPI

1. Create 2 daily total tags; KPI, Standard Deviation, Weighting?
2. Create 4 roll up tags
3. Create PI Module Database import – 14 items per KPI
4. Create KPI targets in SharePoint list
5. Update Excel report
6. Upload Excel report to SharePoint (Excel web services)

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Start with a clean slate - Requirements

- Maintainable
- Simplify configuration
- Let the reporting do the aggregations - dynamically
- Have one report
- Get users to start maintaining their own KPI’s

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Design and Implementation

- Consult with OSIsoft and Microsoft
- What has been done elsewhere?
- Centre of Excellence (CoE)
- Microsoft
- Used a 3rd party to implement ETL, Data Warehouse and Analysis services

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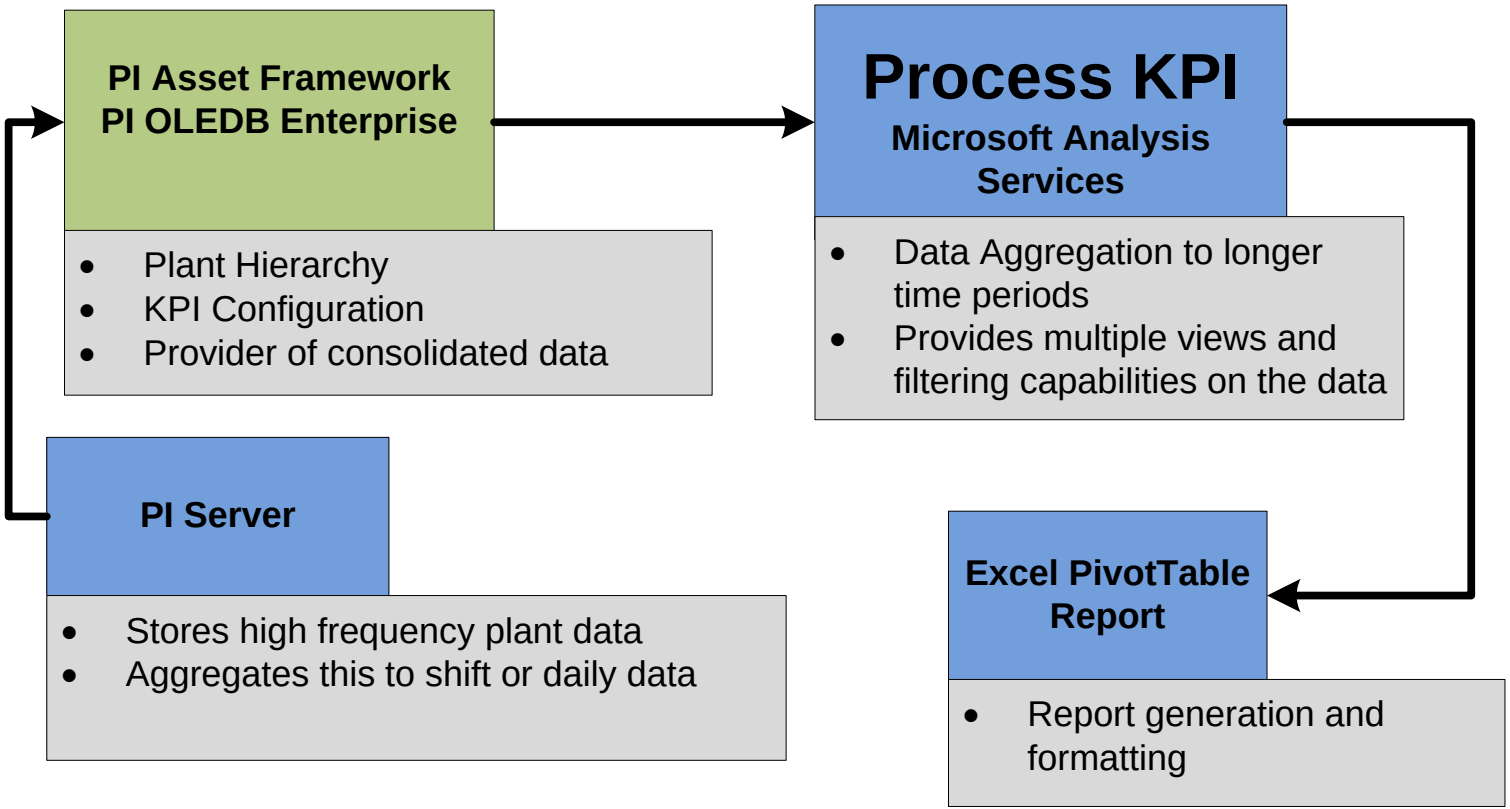
Architecture



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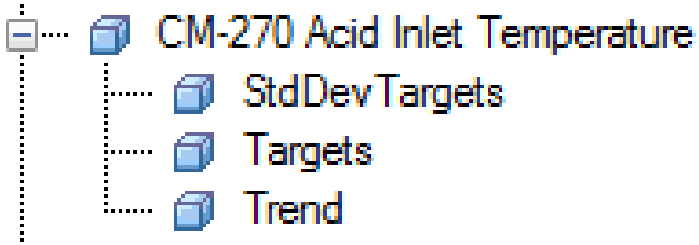
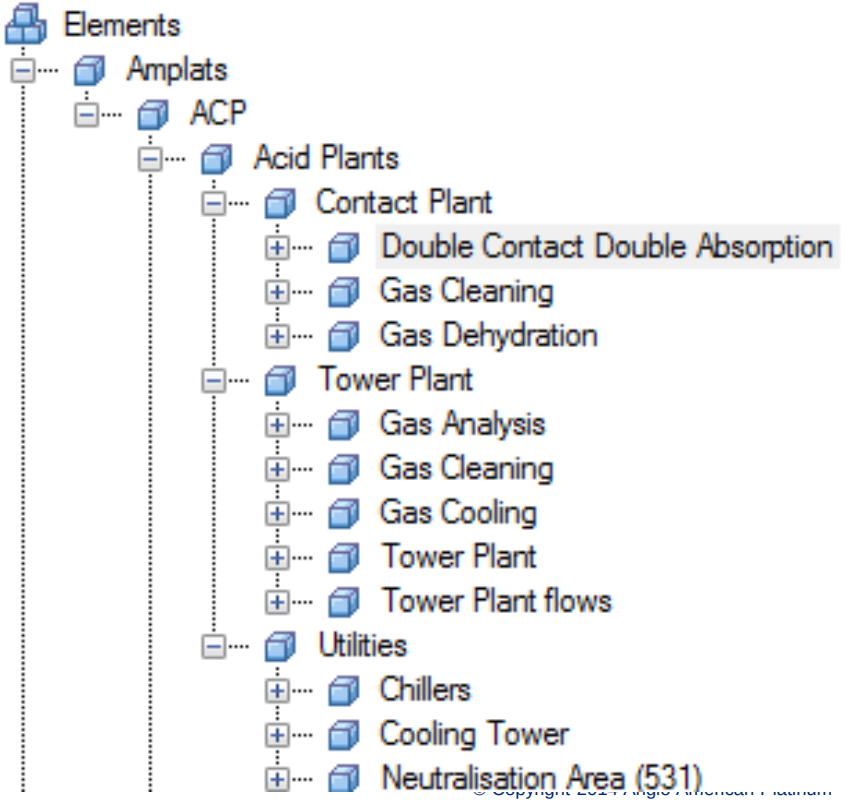
Solution



- PI AF Configuration
- Structure and Values
- Ad-hoc trends



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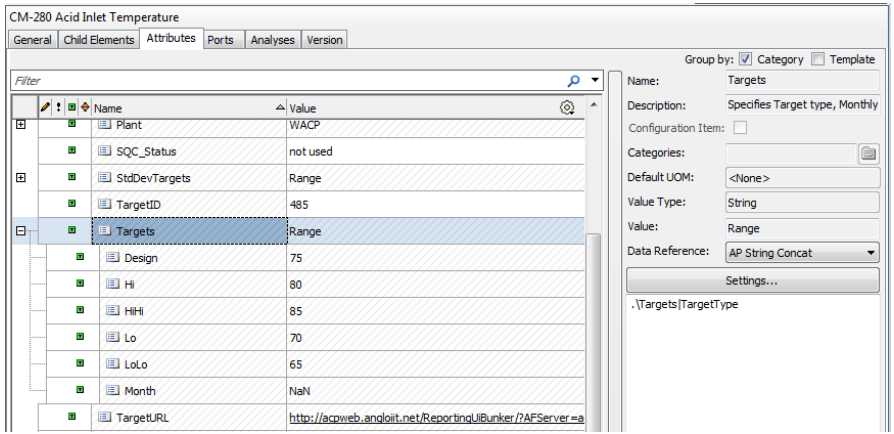
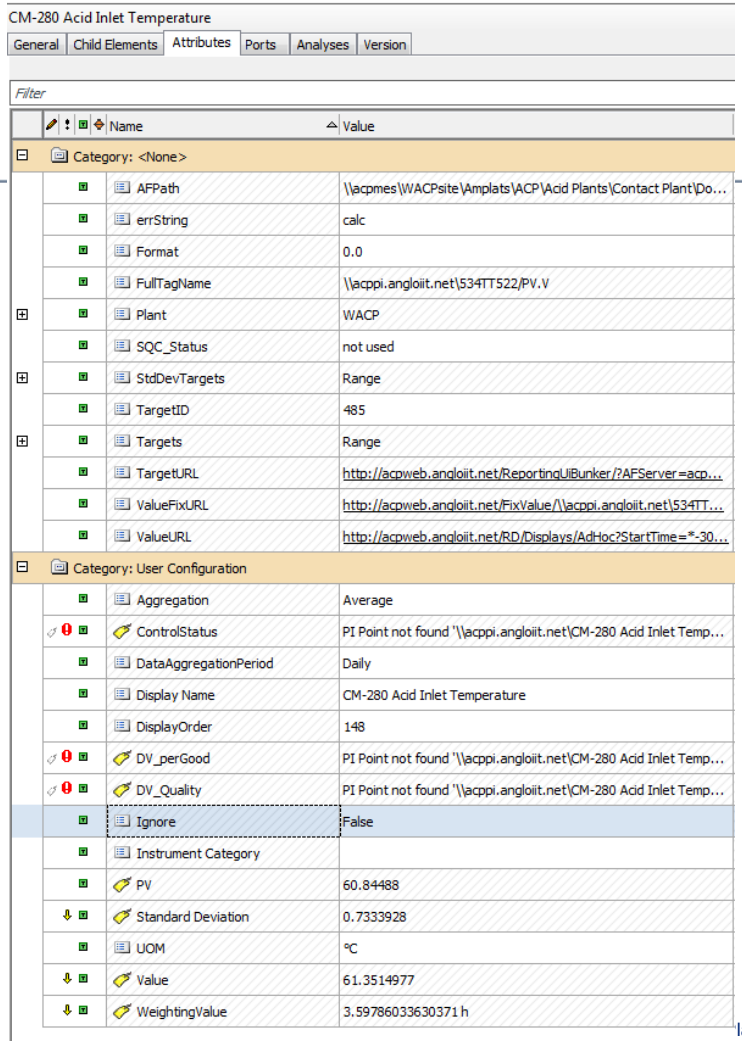
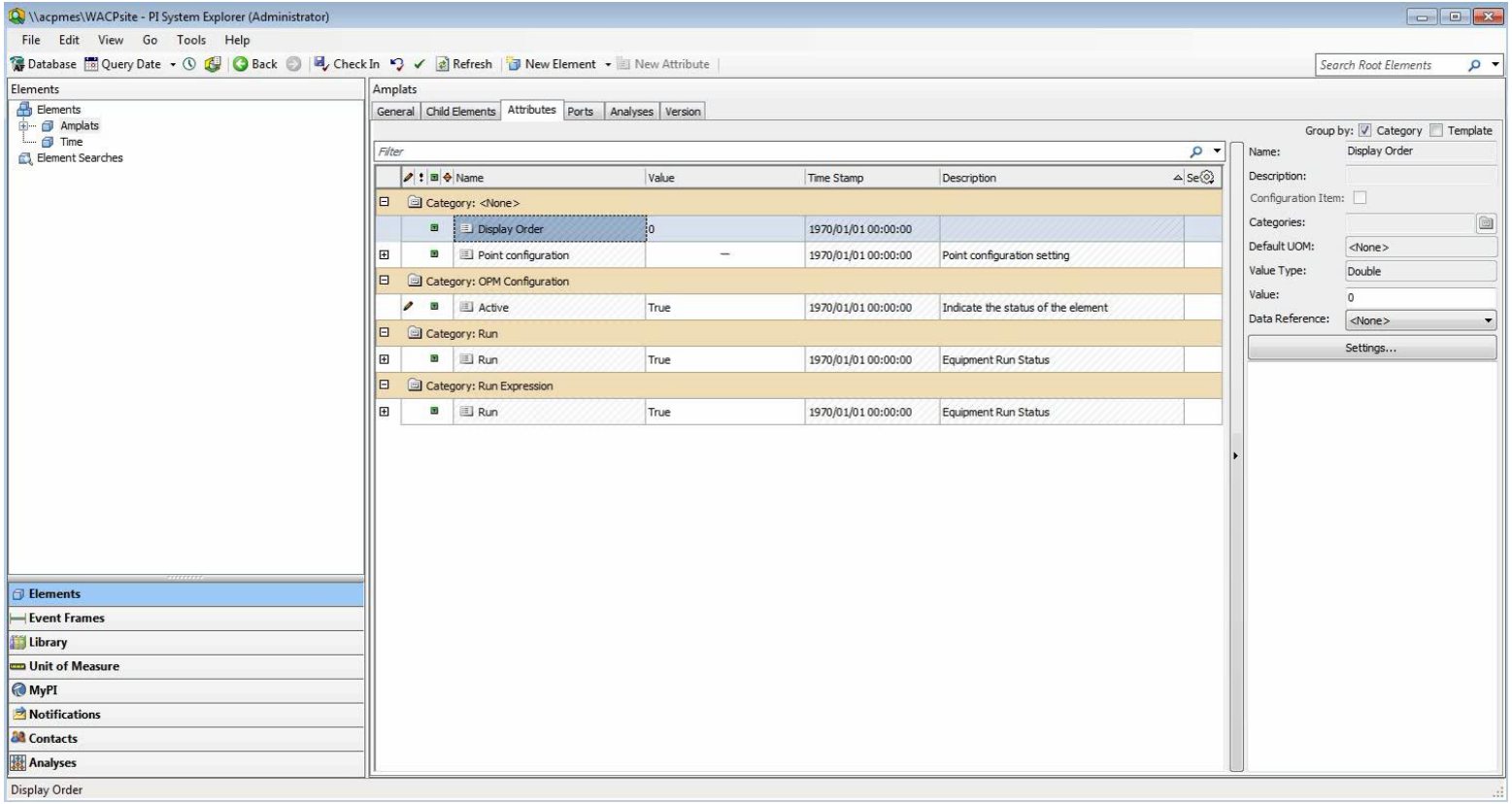
Solution

- **39 Attributes**
- **14 are user configurable**





Demonstration – PI AF configuration



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Solution

Procedure to add one KPI

1. Create 2 daily total tags; KPI, Standard Deviation, Weighting?
2. Create PI AF Elements; KPI, (create Trend, Target only)
3. Check display order

Currently

- 656 KPIs
- 3 Sites

It took only 8 hours to translate the old KPIs (~450) into the new system.

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Systems and Services

OSIsoft

- CoE (Centre of Excellence)
- PI Server, Totalizers
- PI Asset Framework
- PI AF Builder add-in for Excel
- PI OLEDB Enterprise

Microsoft

- SQL Server
- SQL Server Integration Services (SSIS)
- SQL Server Analysis Services (SSAS) in tabular mode
- Excel Pivot Tables

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Results

- KPI creation was reduced from 6 to 3 steps
- One report
- Quick rollout (30min for a new site)
- More user control
- Flexible reporting (Period comparisons)
- Quicker access to data

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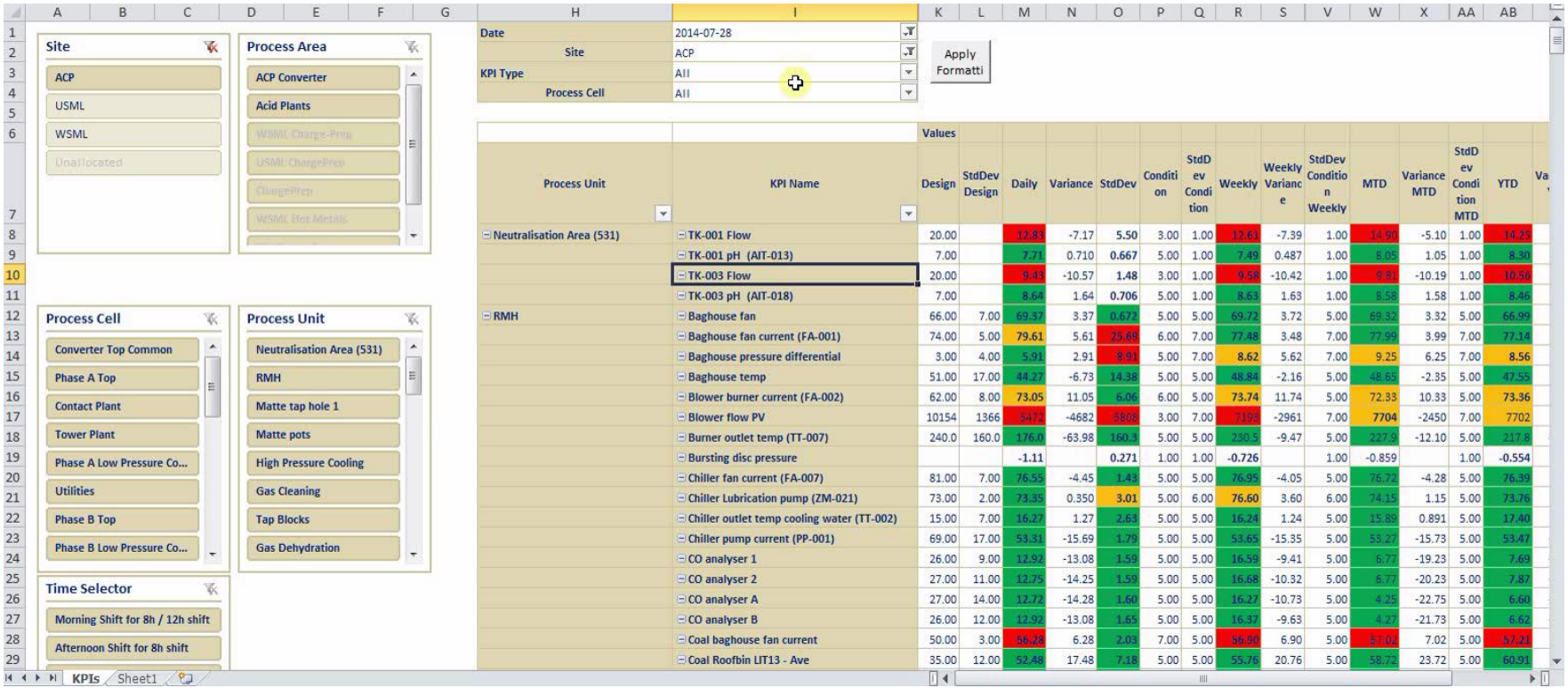
Demonstration – Report



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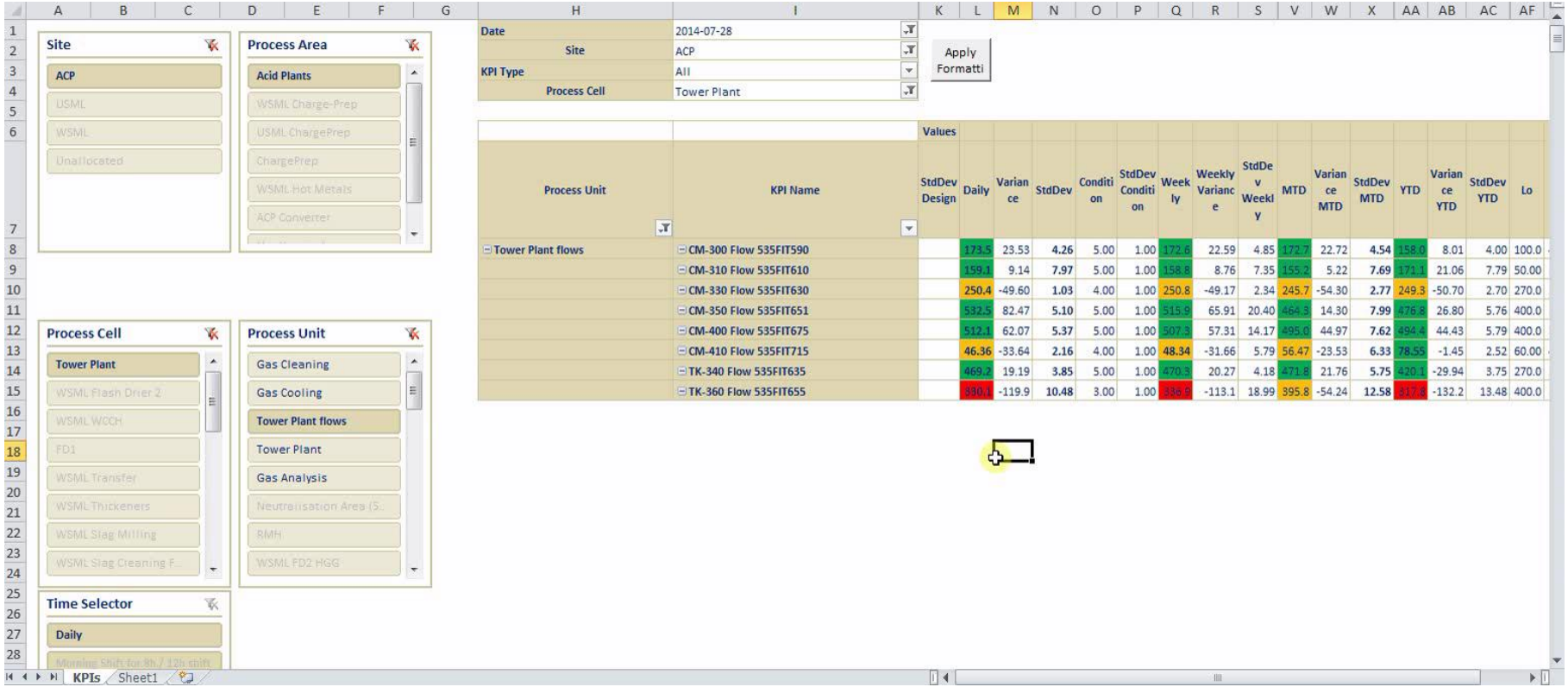
Demonstration – Report Modifying



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Benefits

- Many of the savings are intangible
- Improved Maintainability
  - 2 sites added – 8 hours saved
  - 172 KPI's added – 52 hours saved
- User Interaction
  - Added 10 KPI's – 3 hours saved
  - Modified 50 – 4 hours saved
- …

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Next Steps

- Continue rollout
- PowerView in Excel 2013
- Production reports
- Office 365, SharePoint and BI in the Cloud

Learning: Use the highest granularity from the start

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Going BI with KPIs

"KPI building and maintenance was a nightmare, creating a lot of frustration due to long lead times"

Date	2014-03-05
Site	(Multiple Items)
KPI Type	All
Process Cell	(Multiple Items)

Apply Formatti

		Values						
Process Unit	KPI Name	Design	StdDev Design	Daily	Variance	StdDev	Condition	StdDev Conditio
WSML FD2 HGG	Bed Temperature			890.1		38.46	1.00	1.0
Gas Cleaning	CM-120 Circulation	65.00		90.23	25.23	0.645	5.00	1.0
	CM-120 Outlet Temperature	60.00		46.06	-13.94	1.33	5.00	1.0
	DC-160 Voltage	30.00		35.32	5.32	1.88	5.00	1.0
	DC-161 Voltage	30.00		0.016	-29.98	0.006	3.00	1.0
	DC-162 Voltage	30.00		34.56	4.56	1.91	5.00	1.0
	VT-140 Circulation	450.0		529.3	79.27	2.17	5.00	1.0
Gas Cooling	CM-170 Outlet Temperature	27.50		29.29	1.79	4.69	5.00	1.0
	DC-190 Voltage	20.00		9.48	-10.52	2.00	3.00	1.0
	DC-191 Voltage	20.00		27.92	7.92	0.757	5.00	1.0
Tower Plant flows	CM-300 Flow 535FIT590	150.0					3.00	1.0
	CM-310 Flow 535FIT610	150.0					3.00	1.0
	CM-330 Flow 535FIT630	300.0					3.00	1.0
	CM-350 Flow 535FIT651	450.0					3.00	1.0
	CM-400 Flow 535FIT675	450.0					3.00	1.0

Business Challenge

- KPIs were onerous to create and troubleshoot
- Configuration was complex
- KPIs were growing
- More plants wanted KPI reports
- KPIs were inflexible

Solution

- PI System for daily/ shift totals
- PI Asset Framework for KPIs and hierarchy configuration and data extraction
- Microsoft Analysis Service tabular model to aggregate up
- Excel Pivot table for reporting

Results and Benefits

- KPI creation from 6 to 3 steps
- One report
- Quick rollout (30min)
- More user control
- Flexible reporting
- Over 70 hours saved …

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Anglo American Platinum

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Questions

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

State your **name & company**

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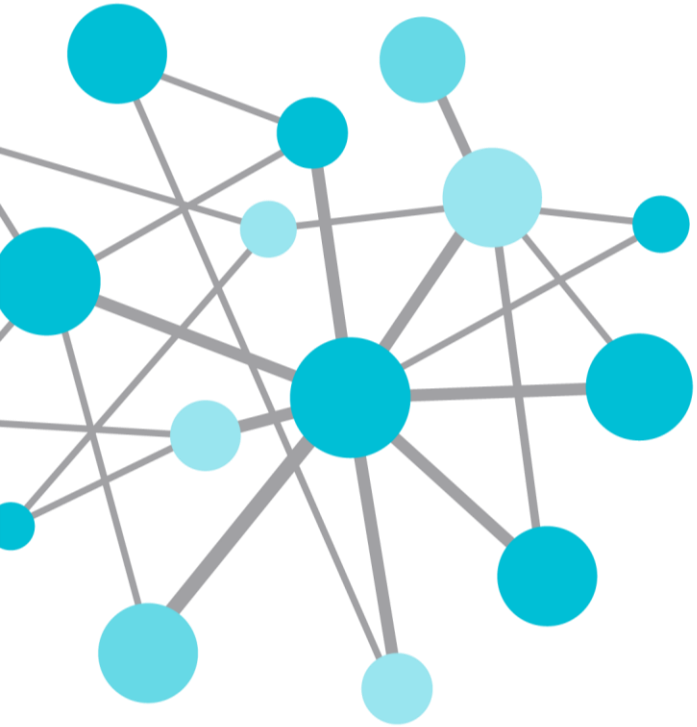

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