Company Profile

Green Technology Services (GTS) was founded in Adelaide, South Australia to preserve the knowledge and experience of the former Ericsson Utilities group when it ceased operations in 2011; and to continue supporting Ericsson's customers in South Australia.

With an unrivalled knowledge of OSIsoft's PI platform and decades of engineering experience, GTS was established with a strong focus on building long-term relationships and delivering successful outcomes for our customers.

Today, GTS is Australia's leading OSIsoft PI specialist, providing solutions to customers across Australia including APA Group, SA Water, Melbourne Water, Rio Tinto, Arrium, Energy Australia and Origin Energy.

Why Choose GTS

We believe the greatest asset we can offer our customers is our experience, because it is only with the benefit of experience that the right decisions are made. When it comes to PI there is simply no other integrator in Australia with our expertise and experience – **we are 'the PI guys'**

Our experience helps us support our customers to develop their data infrastructure goals from 'blueprint' to finished solution. We understand our customers' specific business needs but our wealth of experience means we can also bring to the table our own toolkit of software enhancements as well as best-practice recommendations gained over many years of building big data solutions.

We place a great value on customer relationships; we want to understand your business and build a partnership with you based on honesty, reliability and a common sense approach to delivery. If you're not happy, we're not doing it right.

Some of Australia's leading blue chip companies and major public sector organisations have put their trust in GTS and as a result, seek to build strong and lasting relationships. Our customer retention remains very high.

We're a small integrator with big solution experience; we have the agility and flexibility of the boutique integrator, while maintaining the quality practices of our big organisation background that are the core of good engineering services.

OSIsoft partner

Business Partner IBM
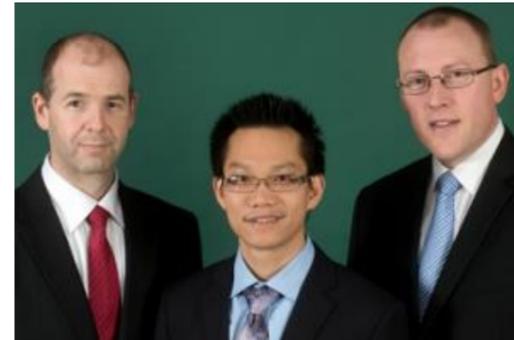
Founding Partners of GTS

Nyrstar

Roasting KPIs

Case Study
Nyrstar

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Details of the Case

Business Situation

Nyrstar is an integrated mining and metals business, with market leading positions in zinc and lead, and growing positions in other base and precious metals. Nyrstar has mining, smelting, and other operations located in Europe, the Americas, China and Australia and employs over 6,500 people.

Nyrstar's Hobart smelter is a large-scale zinc smelter located on the western bank of the Derwent River Estuary in Hobart, Tasmania. The facility uses the RLE process for zinc production. Hobart is closely integrated with the Nyrstar Port Pirie multi-metals smelter, which processes Hobart's paragoethite by-product as well as a relatively small volume of other leach by-products. The site has operated for more than 90 years and is one of the world's largest and most efficient zinc producers, with a capacity of 280,000 tonnes of market metal.

Nyrstar Hobart employees around 490 people directly and a further 120 indirectly. It is focused on high value added products for export to growing markets primarily in Asia. The site has been significantly upgraded and modernised over the last 25 years, with improvements such as modernisation of gas purification and acid plants in the roasting facility, the modernisation of the leaching and purification processes, the introduction of mechanised zinc stripping in electrolysis and the automation of the casting plant. These operational improvements have increased the plant's annual operating capacity from approximately 170,000 tonnes of zinc in 1977 to approximately 272,000 tonnes in 2013.

In 2015 GTS was engaged to help Nyrstar develop KPI data for the roasting operation (a metallurgical process of purifying ore with very hot air) at the Hobart smelter with key the requirements being:

- Implementation of calculations to derive KPIs from operational 'raw' values
- Integration with tabular data contained in a SQL Server system

Technical Situation

Nyrstar had an existing OSI PI system at Hobart collecting operational data from the smelter. The PI system included an Asset Framework instance and there was a predefined set of AF Elements required to feed into an existing KPI report. Some additional KPI data was provided in an SQL Server instance and the business had defined some 30 KPI calculations.

The requirements were to implement the calculations to produce the KPI data and to configure AF with both the PI-based and SQL-based KPI data.

The KPI calculation requirements could be summarised as follows:

- Simple statistics such as average, total or maximum
- Totalizers i.e. deriving a total from a rate over time
- Simple logic i.e. selecting from one or more values based on specified criteria
- More complex formulae such as performing calculations on data only where it falls above or below predefined set points

Solution

Overview

GTS considered a number of possible solutions including PI Performance Equation (PE) Points, AF calculations and purpose-built AF Data References. Given that consuming Points was not a limitation and Nyrstar's preference was to avoid bespoke components, GTS recommended using PI PE points for all calculations using PI data. Although simpler calculations could have been performed in AF using Data References, using PI PE Points offered a consistent approach with a single point of configuration and also allowed the possibility of future changes in calculations introducing complexity.

PE Points

Performance Equation Points offer a convenient and powerful ability to perform calculations on PI data. PE points can be calculated based on a schedule (i.e. using a scan class) or triggered by data changes and a wealth of functions is available to cater for simple statistical equations through to quite complex algorithms.

The Nyrstar solution required daily values calculated at the end of each working day (7:00 AM); a new scan class was created using a 7 hour offset which would provide the schedule for most of the PE Points.

The simple KPIs such as daily average or adding one value to another are quite easily configured for example using the PE TagAvg function and using basic formula notation such as TagA + TagB.

In some cases a daily total needed to be calculated from rate data (e.g. tonnes per hour). For these circumstances PI offers a TagTot function which calculates a total based on the rate value provided and the duration that rate was sustained.

Where some simple logic needed to be applied to select a value from a number of sources based on certain criteria (for example to choose the greater of two values) PE Point configuration permits 'If – Then – Else' syntax for example If A > B then A else B.

Complex PE Configuration

The more interesting challenge was to perform more complex calculations, for example to calculate availability, the first task was to capture a subset of data that fell below a set point. The algorithm required was:

If the value of the source Point is below the value of the set point then store the source Point value otherwise ignore it.

This was created using a dedicated PE Point triggered by data arriving on the 'raw' source data, using simple logic syntax and the NoOutput function to ignore unwanted events (the set point was also defined using a PI Point in order to preserve historical changes).

We could now perform calculations on both the original and a subset of the source data; ideal for calculating availability which required the average when below the set point and the total time below the set point (PI provides two very useful PE functions to find time less than and time greater than a specified value).

AF Configuration

Having built the PE Points the task of configuring AF was relatively straightforward with the majority of the KPI Element values being simple PI point data References.

The final requirement was to provide the same daily 7:00 AM KPI value for data stored in a SQL Server database. AF is well-suited to this task providing a Table object that can pull data from a remote SQL Server source and use SQL syntax to define the fields.

For Nyrstar's requirement, built-in SQL functions allowed basic statistical data to be calculated (such as Standard Deviation and Average) and date functions allowed the source timestamps to be offset to align the end of the day with 7:00 AM so that they could be grouped by date.

The result was a table emulating the PE equations containing daily KPI values timestamped at 7:00AM. The AF Elements using the table data were configured using a built-in Table Lookup Data Reference.

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Benefits

While only a small piece of a much larger PI system, this was a robust solution showcasing some of the powerful built-in features of Performance Equations and the Asset Framework.

A comprehensive set of PE functions combined with logic syntax allows complex calculations to be performed in real-time as data arrives in the PI system or on a scheduled basis with the results output to a PI Point and accessible to AF or PI client tools.

The AF Table object provides a means of accessing data from many different tabular sources and seamlessly integrate it into an AF model – a great example of abstracting the data source to present a single logical structure to data consumers.

Benefits include:

- A completely out of the box solution requiring no additional licence fees or maintenance
- A robust and reliable design leveraging built-in tools
- KPI set points editable by simply changing a Point value and therefore historical changes are preserved