

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.



Founding Partners of GTS

NIMDS

A national Networks
Interval Metering Data
Solution

Case Study APA Group

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Key Facts

Customer:	APA Group
Budget:	AU\$3M
Duration:	18 months

Key Facts

GTS Team:	Technical Lead, Project Manager, PI Designer & Lead Developer, PI Developer and Web Developer
Products Used:	OSI PI Interface Configuration Utility, OSI PI Universal File Loader, OSI PI Historian, OSI PI Asset Framework OSI PI Notifications, OSI PI Advanced Calculation Engine, OSI PI Coresight, ASP.Net

Details of the Case

Business Situation

APA is Australia's largest owner of gas infrastructure and a top 50 company on the Australian Stock Exchange. APA owns and operates two thirds of Australia's onshore pipelines totalling more than 14,000 kilometres of gas transmission assets valued in excess of \$12 billion.

APA is broadly divided into a transmission business responsible for bulk movement of natural gas from processing or storage facilities to domestic markets around the country; and a networks business for the distribution of gas to consumers. Both transmission and network operation is strictly regulated by the Australian Energy Regulator.

In 2004 APA implemented a PI-based system for managing gas consumption data for South Australian high demand customers in order to meet regulatory requirements for Full Retail Contestability (FRC). GTS partners Gavin Man and Andrew Todd were part of the original FRC project team establishing the PI system and the now expanded GTS team has been supporting it ever since.

APA had established a program of standardising their SCADA systems across Australia and in 2014 were planning an upgrade to their Queensland networks SCADA system. Integrated with the legacy SCADA system was a component providing some of the features of the South Australian FRC system. Rather than rebuild the Queensland FRC component as part of the SCADA upgrade (and maintain two similar FRC systems) it was decided to create an enterprise-wide FRC solution that could consolidate the needs of all states into a single application.

Technical Situation

GTS had completed the development of a national PI system for APA in June 2012 as part of the Metering Data Management (MDM) project which was already integrated into APA's various SCADA systems across Australia. The PI system comprised primary/secondary server pairs for the PI archive, PI Advanced Calculation Engine (ACE) and PI Asset Framework (AF).

The original FRC system was still functioning perfectly and most of the business requirements were unchanged since 2004; however the more recent MDM system was built on a newer PI platform and offered many improvements over the FRC environment and design.

It was decided that the Network Interval Metering Data System (NIMDS) project would therefore be built on the national PI platform and its functionality modelled on the original South Australian FRC solution.

The business process and therefore solution requirements were complex, so despite having a solution 'template' to leverage, an analysis phase was undertaken to validate and capture the

detailed requirements which included:

- Data capture from SCADA sources (through PI), from files (in multiple formats) provided by FTP or email; or manual entry
- Implementation of a complex network model for all site configurations including multiple meters or runs, different data types and pressure correction factors (PCF) etc.
- Processing of SCADA data to derive hourly and daily volume and energy based on site configuration (e.g. calculation from index values using PCF)
- Automatic estimation of missing values according to industry rules
- Implementation of complex, user-configurable validation rules to be applied in real-time
- Scheduled report generation and delivery to internal and external stakeholders
- Data processing, validation and delivery within timeframes defined by the gas market regulator
- Implementation of a retrospective monthly reconciliation process on receipt of manual meter read data
- User interface allowing users to review, revise and approve data
- Design and build the dashboard model and presentation layer

Solution

Asset Framework

A Gas Distribution Network model was developed in OSIsoft's Asset Framework (AF). AF is a powerful data infrastructure tool because it allows a logical, hierarchical structure to be defined that combines data from any source (such as PI points interfaced to SCADA, databases, or other systems) with calculations or static data. This is a great way to abstract any complexity in deriving data from the users. For example a user looking for the gas volume through a gate station can simply navigate to the gate station in the model and look at its volume attribute. Behind the scenes there may be multiple data points and complex calculations but all of that is hidden from the user.

The NIMDS AF model included all of the relevant SCADA-based PI points as well as relatively static network data such as gas retailer information and Meter Installation Registration Number (MIRN); and processing instructions including real-time processing and validation methods to be applied to the data at each site in the network.

Advanced Calculation Engine

The main use of the AF model would be to provide what was essentially a large and complex configuration file for processing scripts developed in OSIsoft's Advanced Calculation Engine (ACE).

The solution delivered a powerful, reliable and scalable enterprise application providing for the replacement of the legacy system but also for the eventual migration of similar systems in other states.

Following the approach established through the MDM project, ACE was used to create data processing scripts that extracted the AF model configuration, tapped directly into the PI Event Pipe to process data in real-time using the rules supplied by the AF model, apply data selection and estimation algorithms and output the results to PI points.

Additionally, and also in common with the MDM application, the data produced needed to be pre-validated according to both regulatory requirements and business processes so that possible issues could be detected and flagged for human review. A set of validation rules and associated parameters was defined by the business, configured in AF, and scripted in ACE modules. After the incoming data was processed, it then passed through a validation process with a validation record point used to record the history of test results.

User Interface

The NIMDS solution was required to facilitate a number of day-to-day business functions via a web-based interface including:

- Maintaining certain system configuration settings
- Reviewing and authorizing data to be released to the market
- Resolving any data validation issues
- Manual correction of calculated values
- Monthly reconciliation processes involving loading manual meter read data and reconciling against telemetered data received

An ASP.NET web site was created to serve the user interface needs and combined with a data access component responsible for interfacing to the AF and PI database to fetch and return datasets to the web site.

Reporting

In addition to user interface screens for day-to-day processes, there were dozens of scheduled or ad hoc reports required. While some legacy reports could be replaced by auto-validation, many more were required for a number of purposes, from simple end of day or end of month gas consumption reports, to troubleshooting data sets (for example when queries were received from customers), right through to data process status reports and reconciliation reports.

Some of these were used internally while others needed to be provided to customers, retailers or other external parties.

The solution design included a number of different approaches to best suit the different requirements:

- Scheduled reports could be automatically generated, validated and delivered without any human effort
- Some reports were intended to be displayed for review (much like a manager's dashboard) and these were integrated into the user interface to be generated on demand
- Others were more dynamic and content varied widely according to a user's needs; rather than developing a fixed report for all scenarios, OSIsoft's Coresight was integrated into the user interface to provide users with a simple but powerful tool to search or browse data sources and easily create custom displays to suit their own needs

Benefits

Although at the time of writing the solution was still under development, the expected result is a powerful, reliable and scalable enterprise application providing for the replacement of the legacy Queensland FRC system but also for the eventual migration of similar systems in other states.

This system will provide the following benefits:

- Reduced application maintenance effort and license costs with multiple systems consolidated into a single platform
- Less reliance on third party support with fewer applications involved
- Data that was previously unavailable or difficult to source will be easily accessible across the enterprise
- Labour intensive manual validation processes will be replaced by automated processes
- Quality will be improved with a consistent business process applied to data from all states
- Duplication of effort will be removed by centralizing data processing to a single national team