



PETRONAS: SMOOTHING THE ROAD TO DIGITAL TRANSFORMATION

Engineering isn't always a straight path from problem to solution. Over the past few years, Malaysian oil and gas company PETRONAS has discovered just how many twists and turns there can be along the road to better data management. But with the help from OSIsoft, the company is now well on its way to harnessing the power of real-time data at a massive scale.

The maintenance and engineering team for PETRONAS is responsible for overseeing an upstream plant made up of 130 pieces of hard-working gas turbine-driven equipment: compressors, generators, reciprocating engines, pumps. The super-critical, high-value plant equipment and its data are sourced from multiple manufacturers, many of which do not easily integrate with one another.

In 2015, PETRONAS engineers were looking for a way to monitor all of their assets in real time. The company had a mandate from top management to go digital. The challenge facing the company: There was no clear road map for how to get there.

Over the course of two years, using the architecture of OSIsoft's PI System, PETRONAS developed a proprietary solution that has repeatedly proved its value for preventive action, improved maintenance and bottom-line savings.

The solution, known as PROTEAN (PETRONAS Rotating Equipment Analysis), has proved so useful that PETRONAS engineers have proposed charging their original equipment manufacturers for the data the company is delivering to both parties, turning the standard arrangement on its head.

"Why pay the OEM for remote monitoring and diagnostic services, when the OEM is receiving all the data for his R&D?" asked PETRONAS engineer Gavin Halls, addressing an audience of OSIsoft users at the 2017 OSIsoft Users Conference in London. "The OEM should be paying the operator — us — for the data."

But the path to digital transformation was not always a straight one for PETRONAS. The company had to learn from a few early mistakes before arriving at a data strategy that worked.

CHALLENGE:

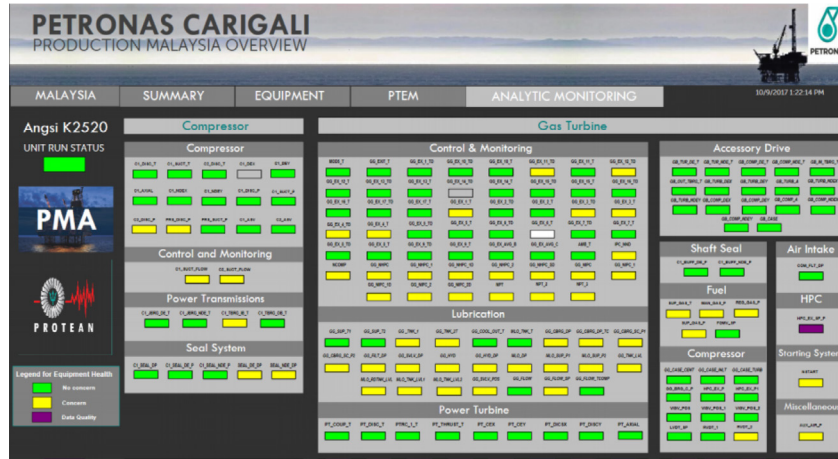
Low operational visibility to gas plant equipment across disparate OEM systems.

SOLUTION:

PETRONAS Rotating Equipment Analysis (PROTEAN) platform for **real-time data monitoring**.

RESULTS:

360 view into asset health with automatic alerts. No more spreadsheets or manual data collection.



Screenshot of PROTEAN used by PETRONAS engineers for operational intelligence.

In mid-2015, PETRONAS crews used hand-held loggers to manually gather data on vibration, lubrication and other important benchmarks, which were compiled into reports. But manual logging and manipulation of data in spreadsheets proved to be too unwieldy and inaccurate to be practical. Engineers needed simple but information-dense visualizations, automated email alerts and analytical tools that could identify issues before they escalated. Most importantly, the system had to evolve and be integrated into other systems.

A year later, PETRONAS began to develop their proprietary PROTEAN software based on OSIsoft's PI System. Armed with the lessons of their earlier efforts, the team made rapid progress, hooking up 32 units to the new system by late 2017. The company plans to have the system installed in more than 100 units by 2019.

The team began by developing a monitoring system for just two critical gas turbine-driven compressor units to see how it all worked. They employed the PI System to collect the data, and PI Vision to run the visuals.

Within two months, PETRONAS knew it was on the right track. The automatic email alert system successfully notified the team to issues.

The dashboards were clear, easy to read and delivered insights.

As they went along the path toward digital transformation, the team structured their data using OSIsoft's Asset Framework, adding context and hierarchy to their assets.

"Replication was the key," said Halls.

More complex algorithms are now being developed in tandem with the PI System to make the infrastructure more intuitive and predictive. A "fault tree" based on previous data is being designed so that repair crews can investigate, diagnose and fix problems as they receive alerts.

The company is also using the PROTEAN system to move away from scheduled maintenance and toward condition-based maintenance, in which the flow of real-time data alerts engineers to the changing status of a piece of equipment.

For more information about PETRONAS and the PI System, watch the full presentation [here](#).

PI System™ Components Used:

PI Server™

- Data Archive
- Asset Framework
- Asset Analytics
- Notifications

PI Vision™



We want to make the solution more integrated and more embedded to the engineers that really need to use it... We're going to increase more equipment to use our solution, because we know it's brilliant, because we know it's simple, and because we know it works."

— Khairil Azwan Khabri, Head Reliability Manager, PETRONAS Carigali

Halls, Gavin Warren and Khairil Azwan Khabri. "PROTEAN - Rotating Equipment Analytics in PI AF at Petronas" <<https://www.osisoft.com/Presentations/PROTEAN---Rotating-Equipment-Analytics-in-PI-AF-at-Petronas/>>