



Case study :

EMS

Disrupting The Petroleum Industry With The Internet Of Things





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Environmental Monitoring Solutions enlisted the help of DiUS with building an end-to-end IoT solution to help tackle the global petroleum industry problem of petrol station inefficiencies.

DiUS prides itself on helping companies innovate and grow by developing custom-designed technology solutions. Its agile and lean approach mobilises the development of its customers initiatives. By starting small, engaging the user community and iteratively building on its value proposition to achieve speed to market, DiUS gives its customers a competitive advantage.

Environmental Monitoring Solutions (EMS) is a global specialist in statistical inventory reconciliation leak detection, real-time fuel analysis and fuel system automation. With over 25 years of experience, EMS is an industry leader, innovator and disruptor.

Wanting to increase efficiencies, drive product innovation, and make a significant positive environmental impact, EMS sought to tackle the global petroleum industry problem of petrol station inefficiencies and real-time fuel management.

Protecting our environment one petrol station at a time
Minimising the human and environmental impact from restocking fuel tanks and storing fuel in retail petrol stations is complicated and important work.

Each day, petrol station agents must physically check the fuel levels in each tank using a dipstick - accessing the tanks from holes in the ground on the petrol station lot. They risk getting run over by cars entering the station and are exposed to deadly chemical fumes from the tanks.

Further complicating the situation, fuel can leak from underground tanks into surrounding soil and water stores. It only takes a few hundred litres of fuel to contaminate up to one million litres of drinking water, and the average petrol

station can store 150,000 litres of fuel at any one time.

Historically, there have been cases where fuel from a retail petrol station has unknowingly leaked into waterways for many months before the spill was detected and the source found.

DiUS and EMS partner to minimise environmental impacts
Looking for a technology partner specialising in the Internet of Things (IoT), EMS enlisted the help of DiUS with developing an end-to-end solution that would remotely collect real-time fuel levels and usage data from petrol stations around Australia.

“When looking for a partner to help us build what eventually became Fuelsuite, we needed a team we could trust with experience in the IoT space.”

- Russell Dupuy, Head of Innovation, EMS

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Building a next-generation IoT platform
Scheduling fuel deliveries, early detection of equipment malfunction and business optimisation all require near real-time data, which due to limited visibility into petrol station operations, is currently challenging.

Wanting to build a service solution that would detect and quantify petrol leaks in real-time; quantify known leak related losses in real-time; establish a reliable real-time data feed for improved logistics; and provide predictive analytics on fuel movements at a wholesale and retail level - the team started small by developing a Proof-of-Concept (PoC) device to demonstrate functionality in a lab environment.

The initial PoC focused on a key client requirement; monitoring of pump data by using a non-intrusive method that did not electrically load existing pump communications. Two non-intrusive methods were also proven - a fibre optic interface coupled to an existing data activity LED and a magnetic sensing method, both being intrinsically isolated. The hardware for a Pump Communications Module (PCM) was subsequently developed for this solution.

To support improvements in business operations, the overall solution needed to incorporate three capabilities; monitoring of pump and underground tank data, and the ability to remotely set station price boards in petrol stations.

Introducing Fuelsuite

The overarching product, called Fuelsuite was developed to present real-time data and support applications that assist in managing retail petrol operations. Fuelscan acts as the data provider for the solution and as a component of Fuelsuite performs this function by remotely capturing, aggregating and uploading station data in real-time from the disparate fuel outlet monitoring solutions.

“The team successfully built a next-gen, end-to-end product that delivers essential insights in real-time - a first for our industry.

“Not only will Fuelsuite dramatically improve petrol station efficiencies, it will also help to better manage the impacts undetected fuel leaks have on our environment.”

- Russell Dupuy, Head of Innovation, EMS

Fuelsuite leverages core AWS services including Kinesis Stream, S3, Firehose and Elasticsearch amongst others, as well as AWS IoT services Device Shadow, Rules Engine and termination of MQTT streams using the IoT Gateway. Fuelscan on the other hand consists of a Station Data Aggregator hosting the AWS IoT remote client and connecting the various station data to the AWS IoT Gateway over MQTT. It also includes the PCM for



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monitoring pump data and a cellular communications module for physical and network connectivity to AWS.

Launching in 2017

With plans to deploy Fuelsuite in the second half of 2017, the end-to-end, next-generation solution will collect fuel pump transactions, tank and alarm data, as well as provide an interface to remotely set station price boards in manned and unmanned petrol stations across Australia.

Want to know more?

Hear from DiUS Principal Consultant, Zoran Angelovski and Head of Innovation at EMS, Russell Dupuy at 2pm on day 1 of AWS Summit Sydney about how we used the cloud and IoT to tackle the global petroleum industry problem of petrol station inefficiencies.



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