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VtoCloud Analytics System for Connected Autonomous Vehicles

Lance Keen
CEO – Influx Technology

CAM Seminar Hall Sponsor

ZENZIC
SELF-DRIVING REVOLUTION

Smart Data!

Influx VtoCloud

Big data to smart data

Smart data logging for connected autonomous vehicles.

Presenters : (Influx) Lance Keen
(LRW) Craig Fraser

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About us...

Influx Technology is a UK company located in Millbrook, Bedfordshire. We specialise in vehicle data logging tools for development engineering. We are global with a engineering development office located in Bulgaria and a sales and support office in Beijing China and Bangalore India.

Vehicle Data Loggers

Since 2005 Influx Technology has been in the forefront of supplying automotive vehicle data loggers to several OEM's.

Instrumentation

In 2015 we introduced our first instrumentation device the K-Box. We have since expanded our instrumentation range to include the K-TC range.

Solutions

At Influx we have developed several innovative solutions. 'Replay' is one such idea allowing repeat of data on the HIL.

The Data Problem…

We are living in the age of too much data…
Every millisecond today's vehicles are using sensors and data algorithms to make crucial decisions for vehicle occupants. However, the rapid rise in our ability to generate data for these algorithms is not matched by our ability to collect, analyse, understand and manage this data.

Missed opportunities

Key information is hidden in vast data lakes making it difficult to understand the data.

Costs

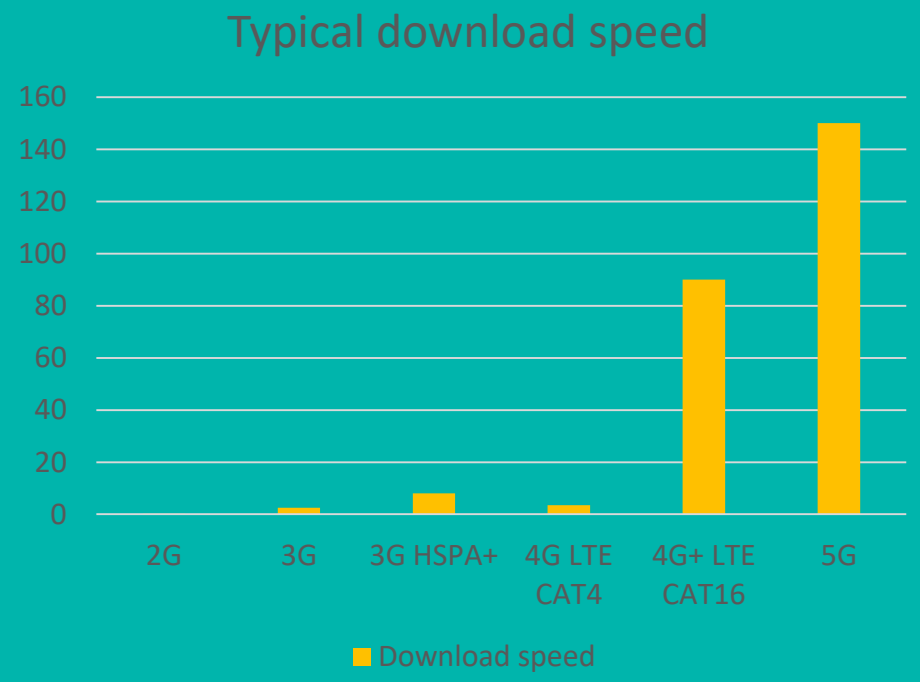
The cost of storing, processing and managing big data can be unaffordable.

Time

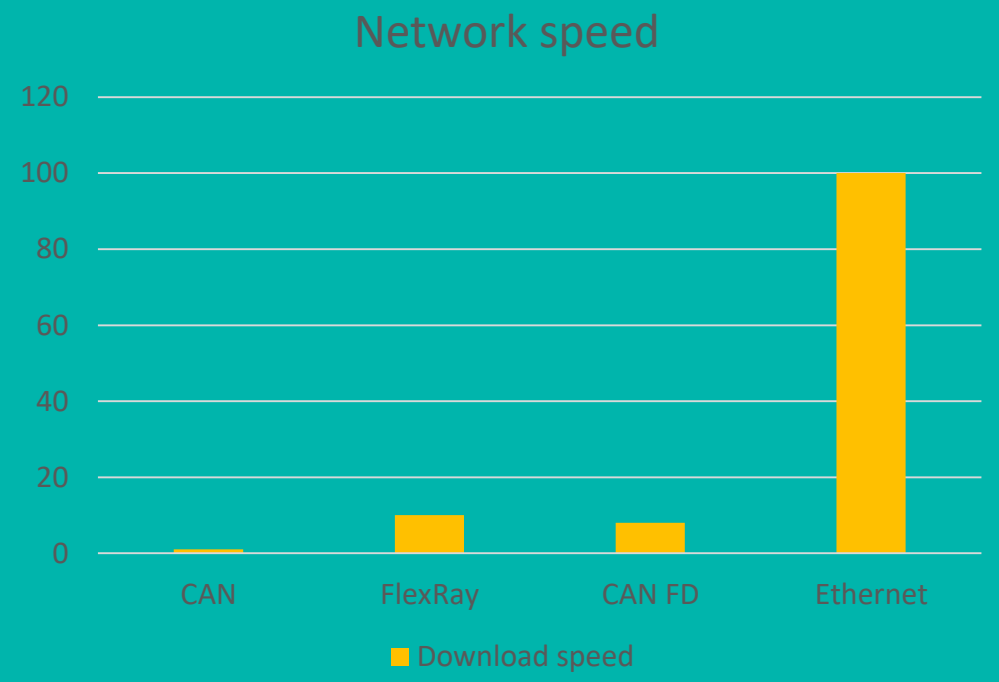
The time taken to post process large data lakes delays urgent action.

The Bandwidth Problem…

Recent growth in the amount of vehicle network data generated is out pacing the increase in mobile communication speeds.
Mainly due to the demands of EV and autonomous vehicles.



Graph showing the typical increase in mobile communication download speeds achieved.



Graph showing the increase in vehicle network data.

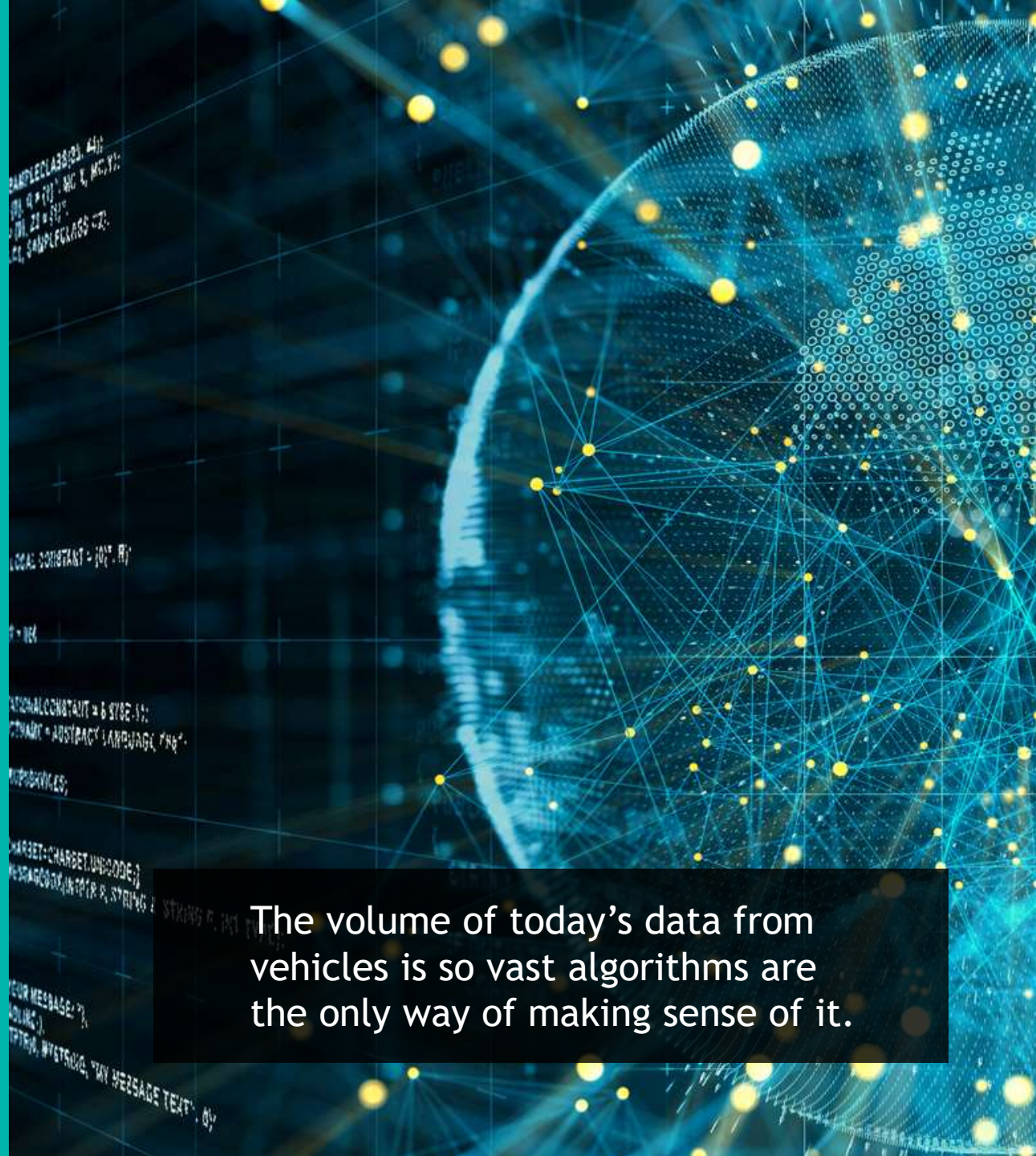
The VtoCloud Solution

VtoCloud turns big data to smart data.

Smart vehicle data loggers process data instantly and locate the actionable points – the ‘smart data’.

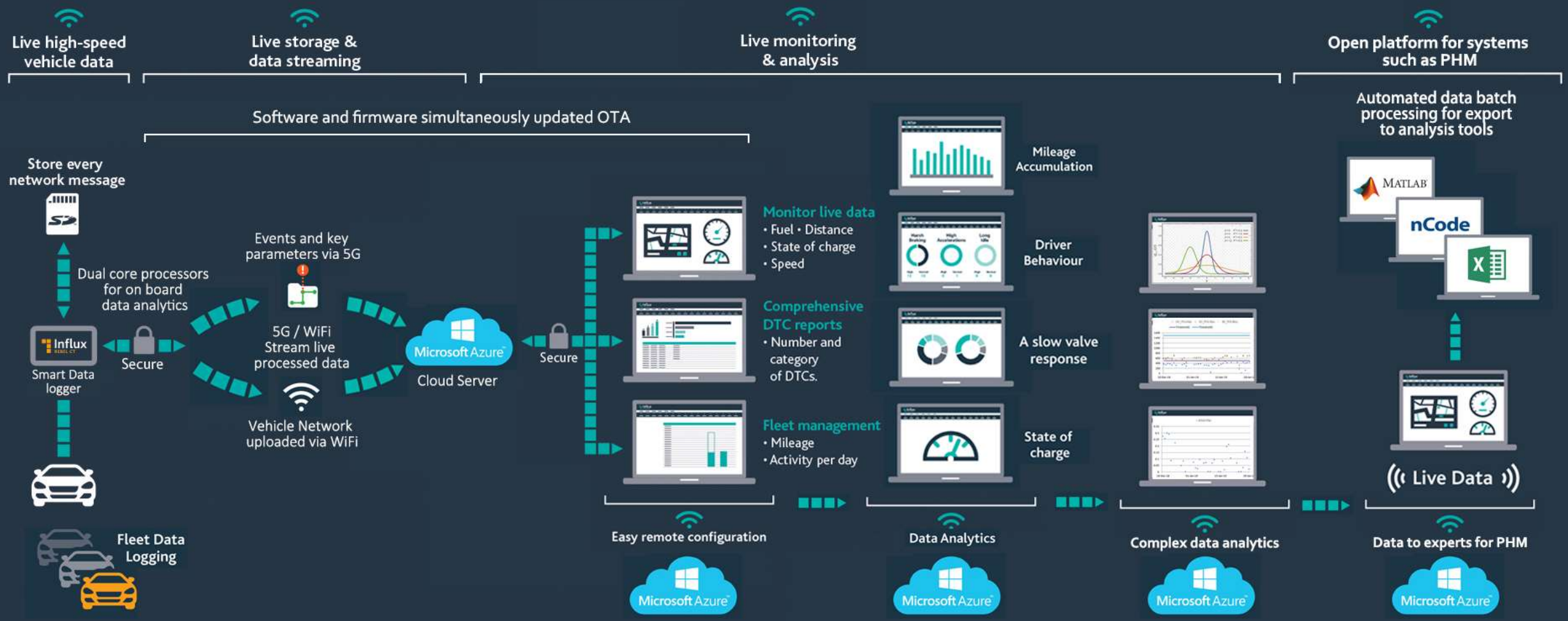
VtoCloud will push the smart data to the cloud for instant reports and alerts whilst simultaneously storing the raw data directly onto the internal memory storage.

Connecting vehicles to the cloud



The volume of today’s data from vehicles is so vast algorithms are the only way of making sense of it.

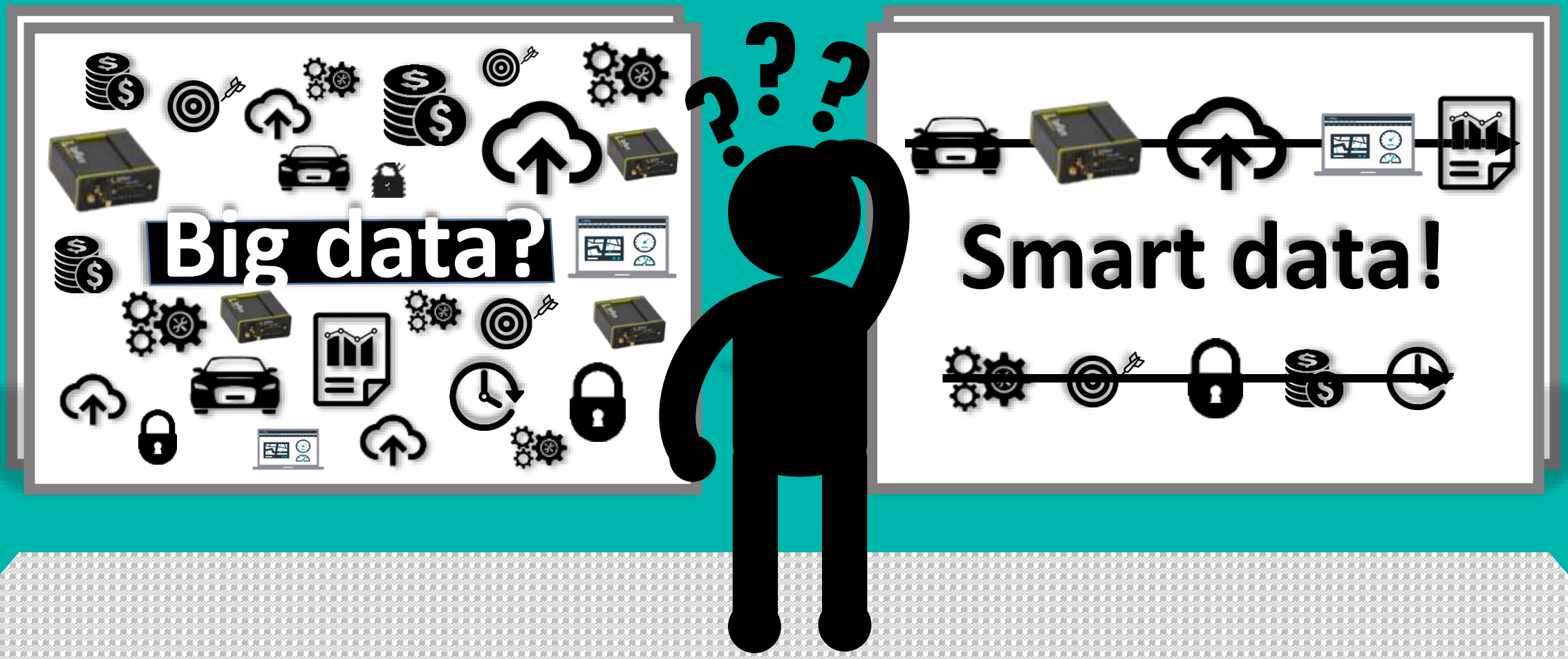
VtoCloud Solution



Influx VToCloud

Microsoft Azure

Big data vs Smart data



Illustrating the difference between Big data and Smart data

Task to capture the maximum temperature of vehicle components each day. Possible methods: The 'Big data' method or the 'Smart data' method

The ‘Big Data’ method

We sample the component temperature every millisecond (‘because we can’) and then push all of this data to the cloud for processing. Millions of points for each component. At the end of the day we can process this information in the cloud and determine the maximum temperature reached.

Acquire and Store Data

Data loggers sample each component every millisecond.

Store Results

Data is pushed to the cloud server.
….this is approx. 4 million points every hour.

Process the Data

Every day the data lake grows larger…

Reports

Every day the server required resources increase exponentially …

The ‘Smart data’ method

The component temperatures may be sampled in milliseconds and immediately filtered by the smart vehicle logger. The smart logger continuously checks for the maximum and at the end of the day result this is pushed to the cloud. Only the one sample point that really matters!

Acquire and Store Data

Smart vehicle logger’s acquire vast amounts of data and store this raw data locally.

Process Data

Smart vehicle loggers process the raw data instantly to find the actionable smart data.

Store Smart Data

For each component the point of interest is pushed to the cloud.

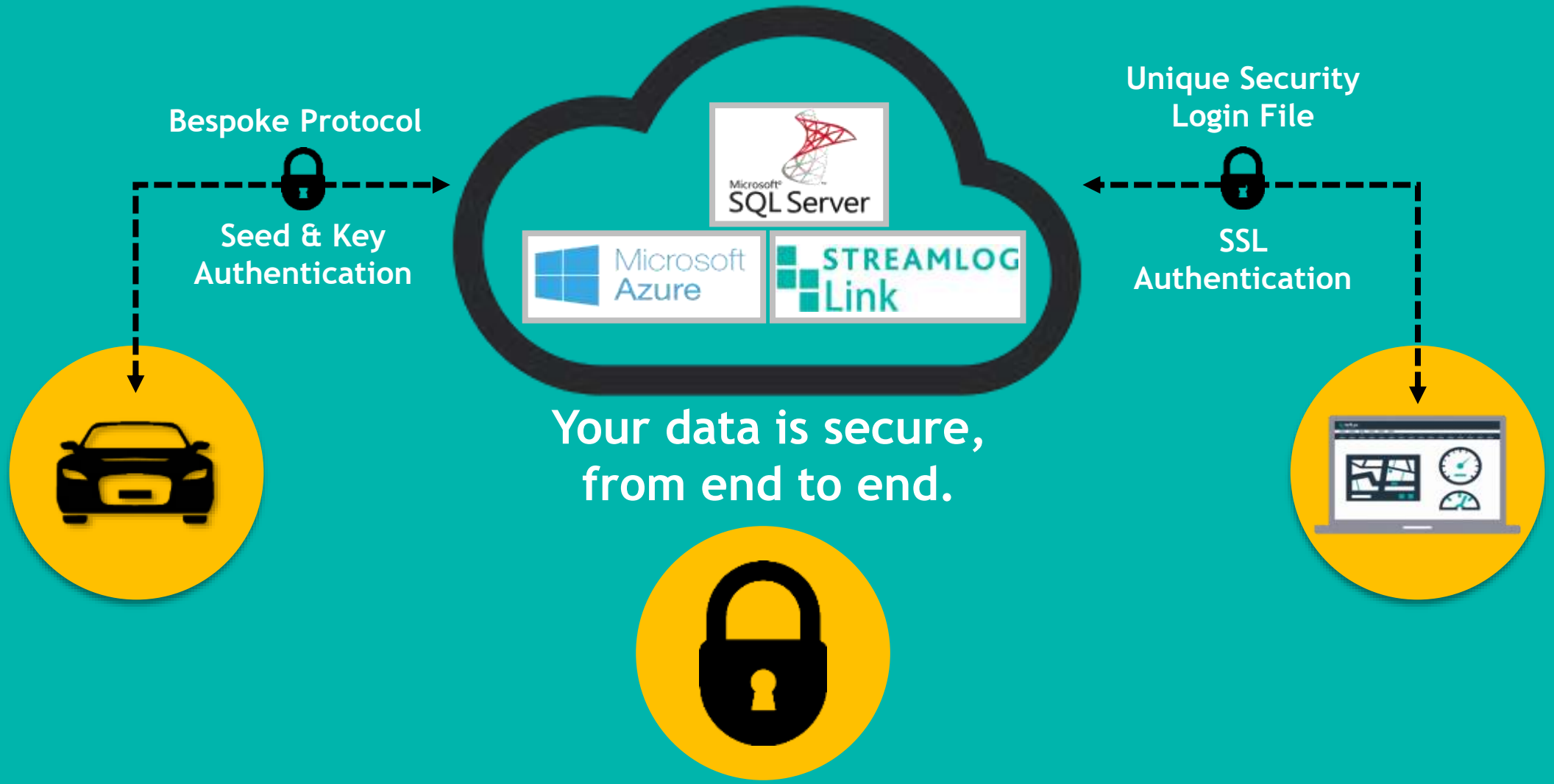
Process Smart Data

VtoCloud enables user designed plug in apps to make use of the smart data.

Reports and alerts

V2Cloud produces reports and alerts in real time.
Smart data makes it faster, easier and more cost effective.

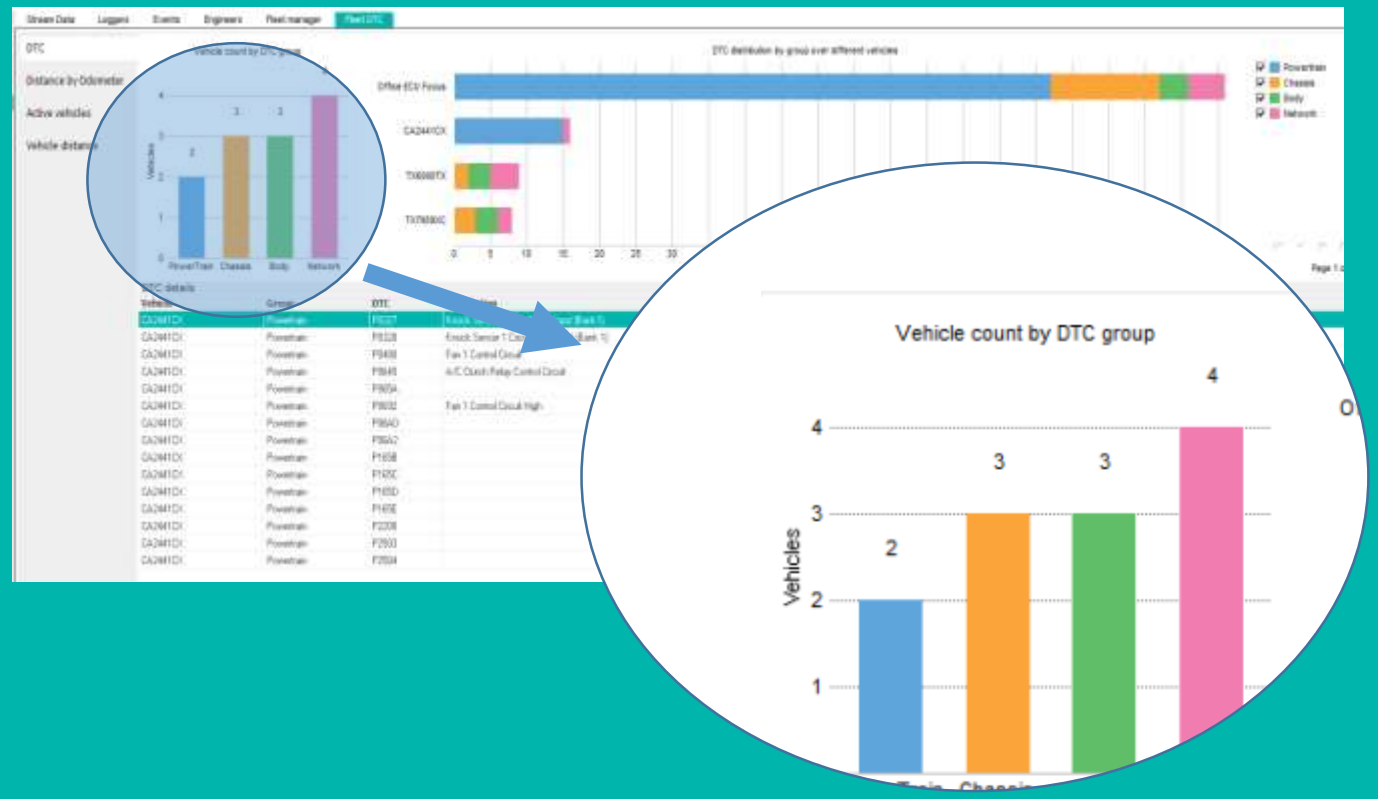
Data Security...



Instant Reports...

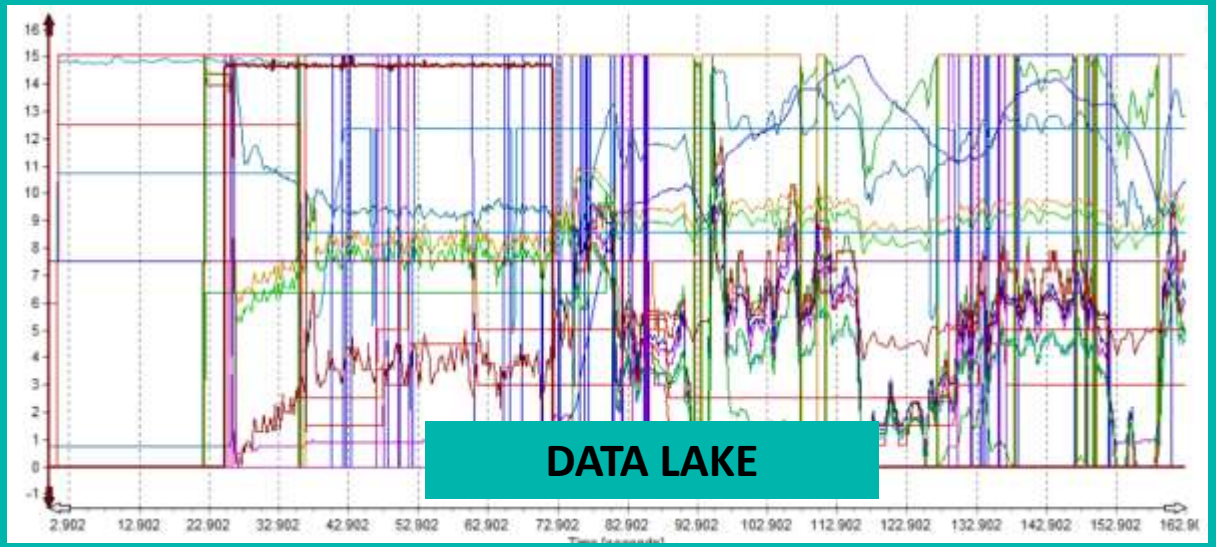
Smart data is efficient data therefore helping to create instant results from data acquired from fleet of vehicles.

This means it is possible to understand fleet data and detect any abnormal data and immediately put actions in place.

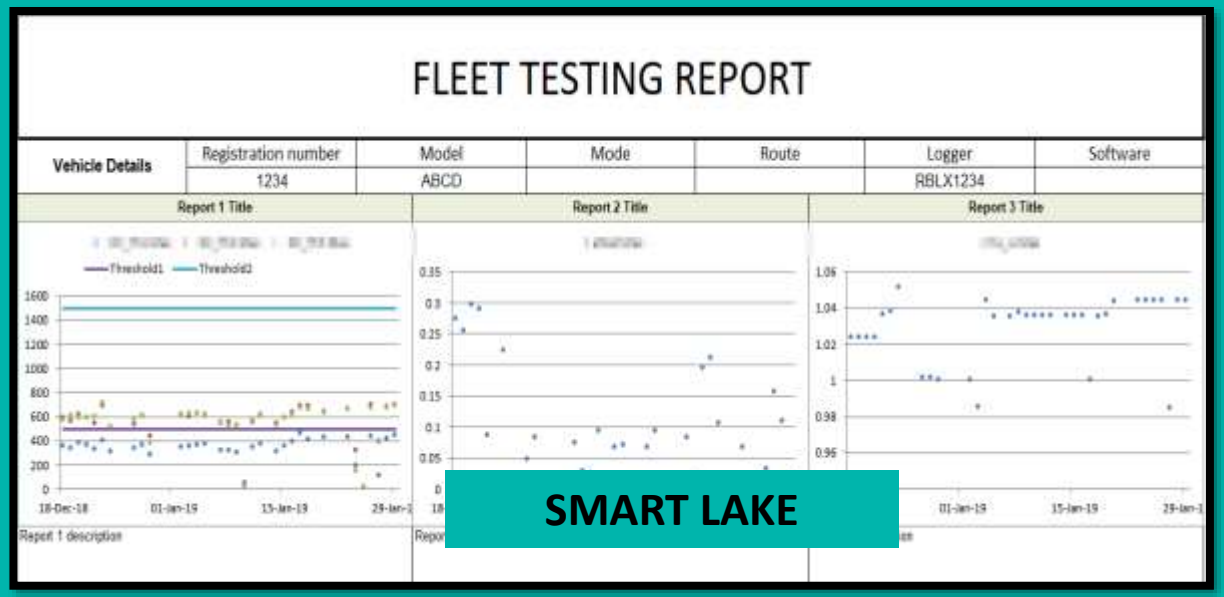


Instant Reports...

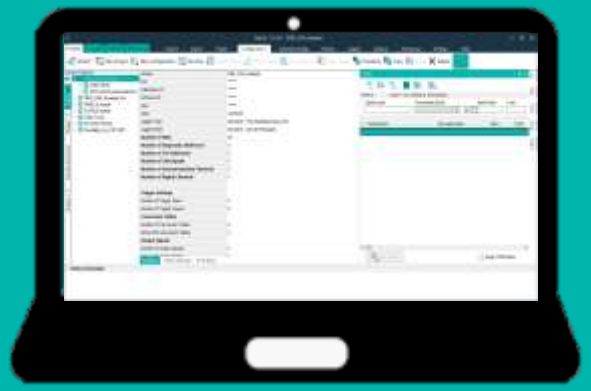
Example of the raw data lake.



Example of a VtoCloud configurable instant report.



Benefits...



Modular

VtoCloud makes it easy to start small and scale up to a larger system.

Configurable

VtoCloud is fully configurable to enable collection of smart data without complex scripting.

Instant Alerts

VtoCloud offers instant alerts – fast data.

Open platform

VtoCloud enables user designed plug in apps.

Efficiency

Smart data results in reduced processing time and costs.

VtoCloud Plug In Apps - PHM

VtoCloud is an open platform solution enabling 3rd party applications to configure the data logger to acquire the required smart data and then to use that data.

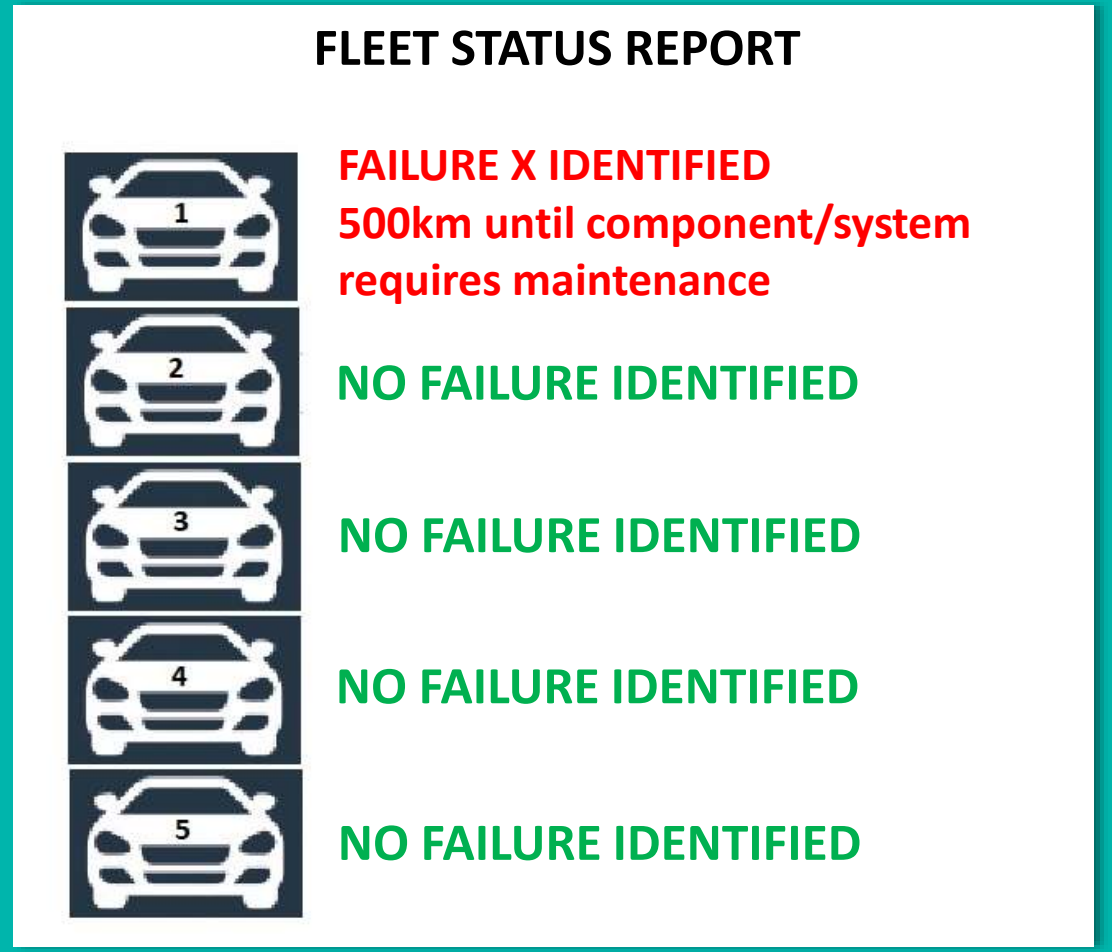
Prognostic and Health Management System - PHM

VtoCloud Plug In Apps - PHM

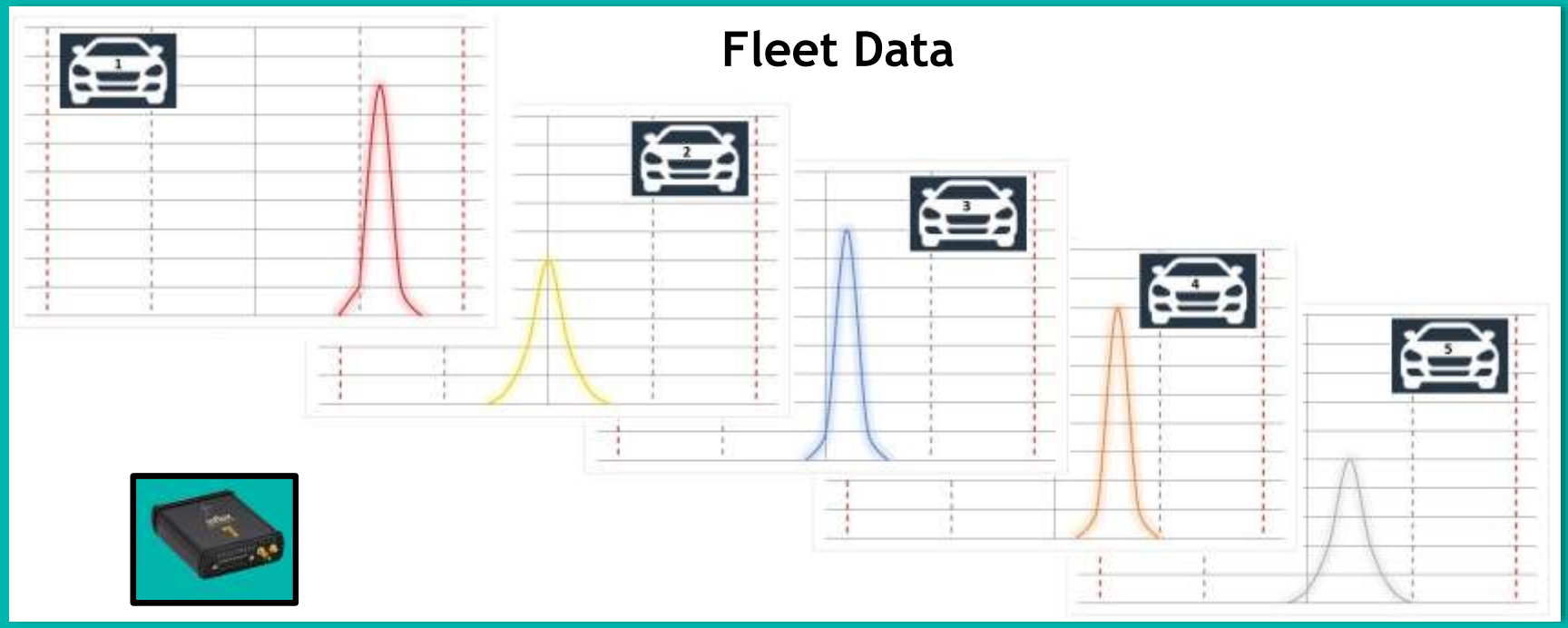
Prognostic and Health Management System - PHM

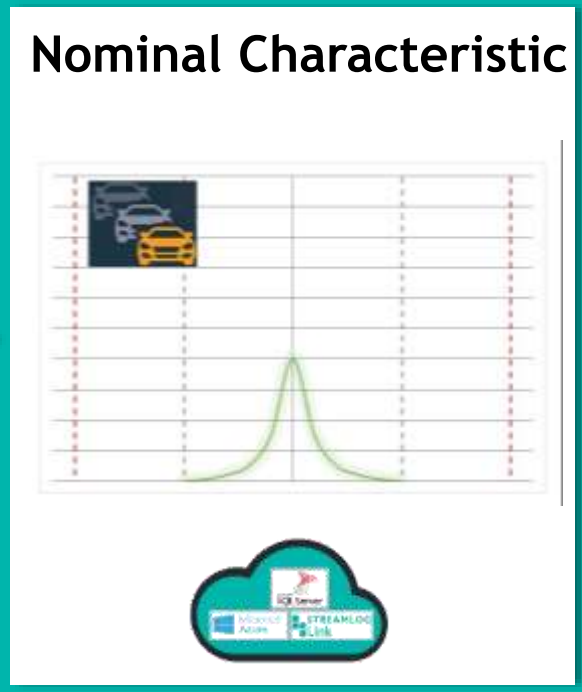
Data-driven prognostic system utilising machine learning techniques to predict the remaining useful life of vehicle systems

PHM is an effective tool to support maintenance and logistic operations



VtoCloud Plug In Apps - PHM



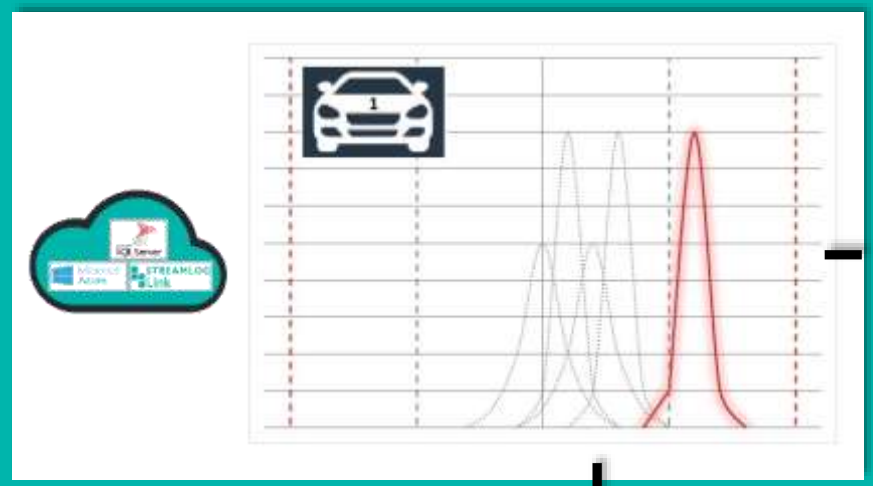


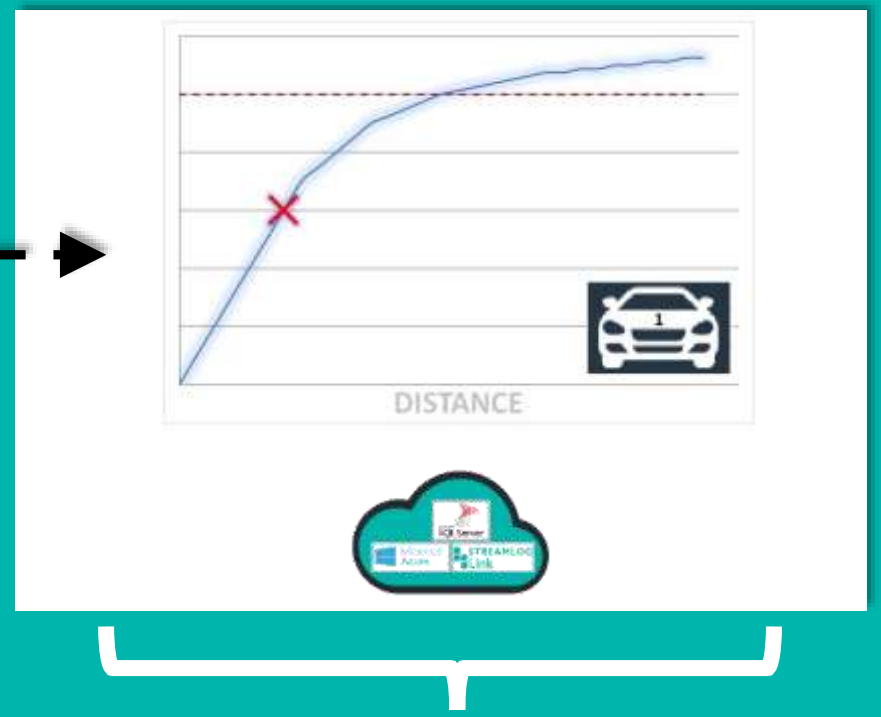
Initial data characterisation for pre-defined error signals performed using smart logger and compared to nominal characteristic

Model for nominal characteristic behavior trained with development and in-service data

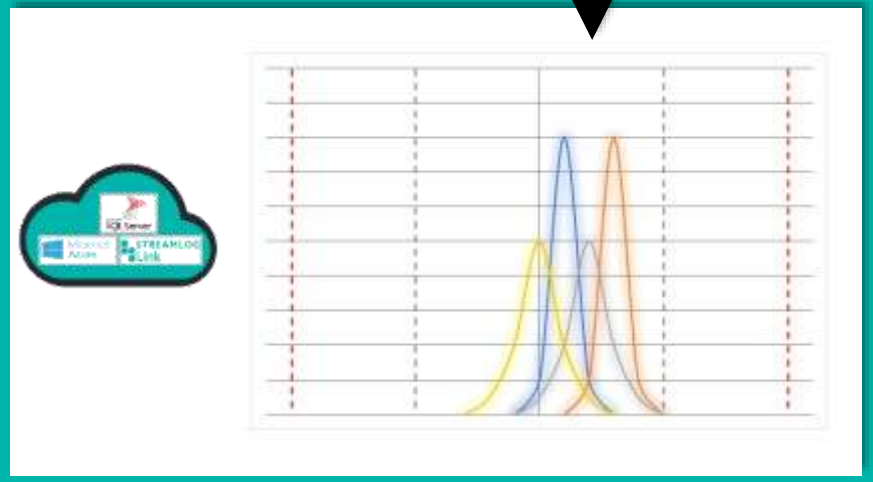
VtoCloud Plug In Apps - PHM

Outliers to nominal characteristic are identified and separated from nominal data





Healthy system data used to further train the nominal model



Failure mode is matched to existing data models then forecasting will predict duration until component replacement required

Data from new failure modes is used to create new models for forecasting deterioration rate in the future

Contact us

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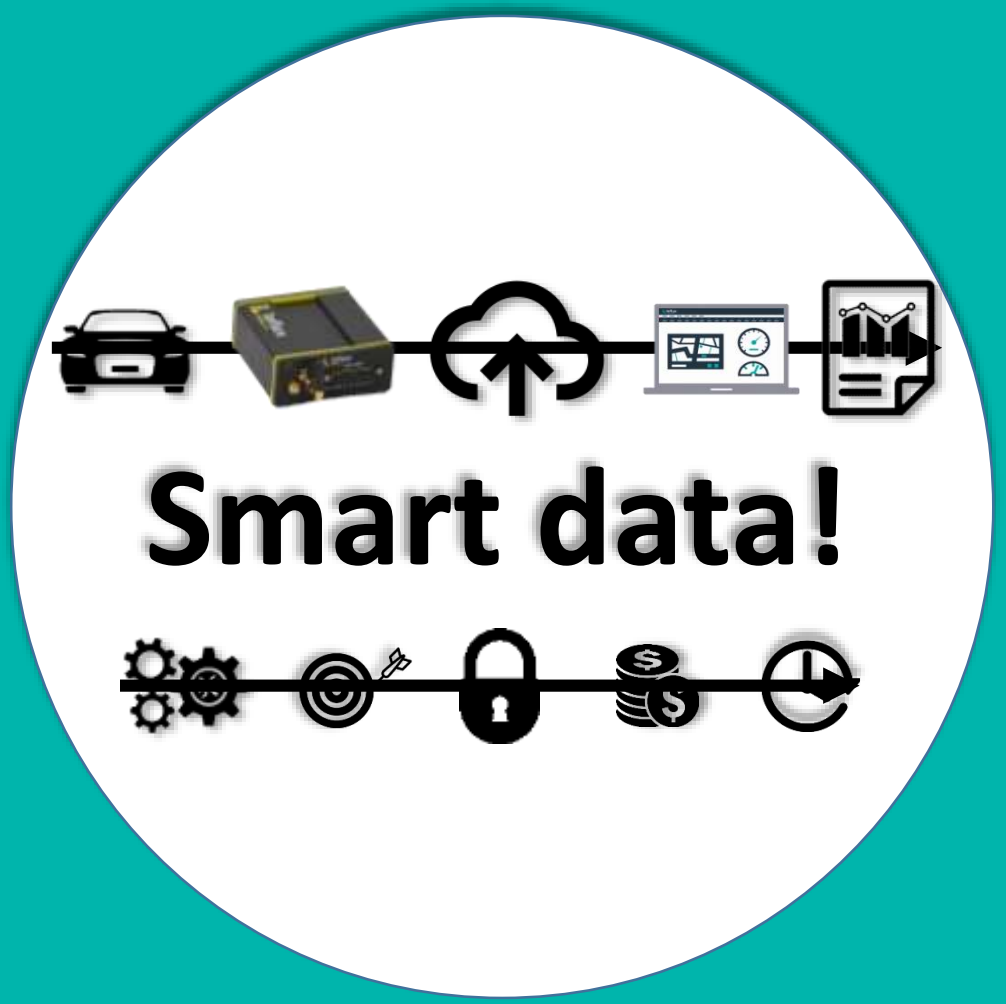

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