

# aicas & NXP: “Intelligent VSS Data Management”



**COVESA**

Accelerating the future of connected vehicles

## aicas

aicas is a global software company specializing in embedded edge-to-cloud and Edge AI systems. aicas EdgeSuite streamlines the development, deployment, and operation of IoT and edge solutions—connecting devices to the cloud and enabling full software and data management across large fleets through a unified, open system.

## NXP Semiconductors

NXP® Semiconductors is the trusted partner for innovative solutions in the automotive, industrial & IoT, mobile, and communications infrastructure markets. NXP's "Brighter Together" approach combines leading-edge technology with pioneering people to develop system solutions that make the connected world better, safer, and more secure.

## COVESA Award-Winning

The aicas-NXP solution received the COVESA Showcase Award in September 2024 for its innovative application of Vehicle Signal Specification (VSS) technology, exemplary adoption of COVESA standards, and significant contributions to advancing the community—demonstrating how VSS can shape the future of connected vehicles.



**COVESA**

## COVESA VEHICLE SIGNAL SPECIFICATION (VSS) DATA MANAGEMENT SOLUTION

*“Our goal was to demonstrate how VSS can be used in real-world scenarios to simplify vehicle data management”*

**Dr. James J. Hunt**  
co-founder, CEO, and CTO aicas

## THE SITUATION



OEMs, rental companies, insurers, and fleet managers increasingly demand real-time vehicle performance data to improve maintenance, enhance safety, optimize fleet operations, costs and risks.

Missing a universal standard for vehicle signals results in inconsistent, proprietary definitions that vary by manufacturer. This creates challenges in data quality, normalization, and access to proprietary standards. Additionally, wireless bandwidth limits demand flexible, standardized data selection.

Needed is a vehicle data collection and management solution that converts heterogeneous vehicle CAN data into the standardized COVESA VSS format. This solution should allow users to selectively extract specific data from large volumes, transmit only the relevant information to the cloud, and support real-time data analysis and visualization.

aicas and NXP have joined forces to create a unified intelligent VSS Data Management solution. This collaboration enables a powerful implementation of VSS through aicas EdgeSuite, offering robust vehicle and fleet data management combined with advanced computing capabilities powered by NXP's automotive processors.

## About COVESA Signal Specification

Vehicle Signal Specification (VSS) created by COVESA introduces a domain taxonomy for vehicle signals. In short, this means that VSS introduces:

- A catalog of signals related to vehicles
- A syntax for defining and organizing vehicle signals in a structured manner

VSS serves as a standard in automotive applications to communicate information around the logical composition of the vehicle, which is semantically well defined. It focuses on vehicle signals, in the sense of classical attributes, sensors and actuators with the raw data communicated over vehicle buses.



## THE SOLUTION

The system that allows real-time vehicle data access and management comprises four main parts:



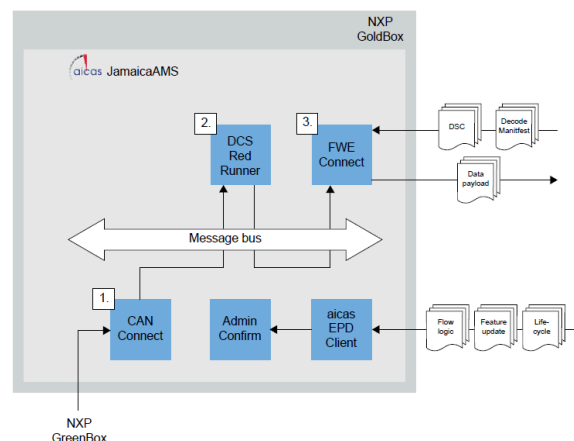
Image provided by NXP

- 1 aicas EDG (Data Collection)
- 2 NXP Greenbox 3
- 3 NXP Gold Box 3
- 4 aicas Dashboard EDG (Data Visualization)

Users can select vehicle dynamics, battery, and energy usage data via the intuitive (1) aicas Edge Data Gateway (EDG). The aicas Edge Agent identifies available signals and makes connected devices self-describing by reporting signal metadata to the cloud. Visualizations are provided through (4) dashboards in EDG. The environment allows dynamic remote reconfiguration for easy prototyping. A real vehicle system is illustrated by the (2) NXP GreenBox 3 (CAN data source) and the (3) NXP GoldBox 3 (CAN receiver and data processor), connected via a physical CAN bus.

## FLEXIBLE IN-VEHICLE SIGNAL FLOW AND TRANSFER

The software agent on the NXP S32G3 vehicle gateway runs as a set of services within aicas' JamaicaAMS runtime system, enabling remote updates and dynamic configuration at runtime.



Components of the data processing framework:

1. **Signal Collection** – Discovers and extracts raw CAN data, converts it to signal values, and normalizes it using a VSS-based structure.
2. **Signal Selection** – Executes the data campaign locally to configure which data is sent, how and, when.
3. **Signal Transfer** – encodes, batches, and sends the selected data to the cloud or data center.

## RESULTS

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### **Right Data. Right Place. Right Time.**

The solution unlocks valuable data from edge devices, enabling precise access, collection, and selection of relevant signals. Data can be visualized and analyzed to generate actionable insights that support operational success. Thanks to the integration of Vehicle Signal Specification (VSS), the solution delivers key benefits:

1

#### **SELECT WHAT DATA MATTERS**

Decide what data is collected and transmitted —delivered at the right moment and location. Fast and flexible.

2

#### **DRIVE BUSINESS EFFICIENCY**

Precise edge data enables flexible, fast, and efficient operations—optimizing business performance, reducing costs, powering Edge AI, and driving smarter decisions.

3

#### **ACROSS THE ECOSYSTEM**

Unified management of edge data across vehicle lines, models, sensors, and applications. Simplifies integration of Tier-1 software and ECUs and supports enhanced collaboration with off-vehicle systems such as charging infrastructure.

Data access means knowledge advantage. Manufacturers will know more about their products and can rely on facts for internal decisions and supervision. Marketers find out more about their customers and their product usage and can provide targeted services, offers, and open sales opportunities.

## LOOKING AHEAD

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Future iterations of the solution will integrate NXP's cutting-edge eIQ® Auto ML Software Development Environment for microcontrollers and processors. Leveraging structured and standardized VSS data, it will demonstrate how to train AI models more effectively and efficiently. By transmitting only the data relevant to specific use cases, the system minimizes noise, reduces bandwidth and cloud storage costs, and accelerates AI deployment across connected vehicles.



The Connected Vehicle Systems Alliance (COVESA) is an open, member-driven global technology alliance accelerating the full potential of connected vehicles. By developing common approaches and technologies, COVESA provides a collaborative platform that empowers automotive software stakeholders and world-class developers to address challenges and opportunities in connected mobility and navigate the digital transformation of the automotive industry. Learn more about COVESA or join our community at [www.covesa.global](http://www.covesa.global).