

Klas and Dell Technologies: Autonomous Vehicle R&D Data Logging Solutions

Overview

To evolve beyond Advanced Driver Assistance Systems (ADAS) to fully Autonomous Vehicles (AV) safely, R&D developers need to validate their algorithms and systems against real-world scenarios. R&D data logging solutions are critical to capturing the required data to validate and accredit ADAS systems for the evolving evidence-based and data-driven regulations*.

In partnership with Klas, Dell Technologies is pleased to include the TRX D8 data logging and cloud ingestion solution as part of the Dell Autonomous Drive Ecosystem - an end-to-end solution for autonomous vehicle development. The in-vehicle node from Klas comes integrated with automotive interfaces and swappable storage of up to 240TB, allowing for ease of installation and a faster turnaround of R&D vehicles.

The data logging solution is completed with an in-garage data ingest receptacle built around the Dell PowerEdge R7525 Rack Server, allowing for seamless transfer of data to either Dell EMC PowerScale storage or to a local Storage Area Networks (SAN) with secure backup to private/public clouds.

This highly scalable solution offers AV developers the unlimited capacity to capture and store data for the continuous development of ADAS - future-proofing AV development amidst evolving regulations.

Challenge

To capture real-world AV data scenarios, automotive R&D developers often build validation platforms made up of disparate systems. Such resulting "home-grown" validation platforms are typically cumbersome to build and can be resource-intensive when it comes to management, ultimately limiting the number of deployed test vehicles and captured data sets.

Furthermore, many validation platforms are placed in enclosed spaces such as the vehicle's trunk. The result is that devices need to withstand the hardship of being on the road and can operate in extreme temperature ranges.

To maximize the number of hours that the test vehicles are on the road, AV R&D developers need ruggedized in-vehicle storage. The storage capacity needs to be hundreds of terabytes in size to reliably capture the data generated by LiDAR, Radar, Cameras (High and Low-resolution images), and GPS. Furthermore, for the continuous development of ADAS, AV developers need to transfer data reliably and quickly to Software in the Loop (SiL) or Hardware in the Loop (HiL) simulation environments.

To remain compliant with evolving regulations, AV developers need to securely store data for at least the lifetime of the development of a vehicle. To manage data storage costs, AV developers need a seamless way in which to move archived data no longer used in SiL/HiL environments to more cost effective storage such as the cloud.

Klas Benefits

- True end-to-end R&D AV data logging solution - with vehicle logger and garage ingest station
- Longer drive times - up to 240 TeraBytes of In-vehicle logging
- Time saving - integrated compute to preprocess R&D data
- Compact - compute, storage and networking as a single device
- Eliminates unnecessary hardware - integrated CAN
- Easy to deploy - powered from vehicle 12VDC battery
- Faster vehicle turnarounds - swappable storage cassettes
- Highly secure - encryption of swappable storage cassettes
- Multi-vehicle ingest support - collate data from 8 x AVs per server
- Faster access to data for SiL/HiL environments - Dell R7525 support for Generation 4 RAID

Dell Technologies Benefits

- Automotive thought leader providing Automotive-specific products and solutions including the Dell Autonomous Drive Ecosystem.
- Proven ADAS storage solutions with approximately 70% of leading Tier-1 ADAS suppliers using Dell EMC PowerScale storage today.
- High performance CPU and GPU-compute solutions for AI/ML/DL.
- World-wide support and services tailored to meet needs ranging from start-ups to global enterprises.

Solution

In partnership with Klas, Dell Technologies includes the TRX D8 data logging and ingestion solution as part of the Dell Autonomous Drive Ecosystem - an end-to-end solution for autonomous vehicle development that meets the demands for unlimited AV R&D data capture and storage. Furthermore, TRX D8 reduces the number of devices required as part of the AV R&D validation platform.

The TRX D8 solution includes:

- Ruggedized compact data logger: integrated compute, automotive connectivity, and storage device
 - » Swappable storage cassette with SAS/SATA support (up to 240TB of storage)
 - » Native support of automotive 12VDC power supply
- TRX D8 ingest station: Dell PowerEdge R7525 Rack Server and ingest receptacle
 - » Supports concurrent data ingestion of up to 8 cassettes per server
 - » High performance - supports generation 4 RAID controller cards and 100Gbps NICs

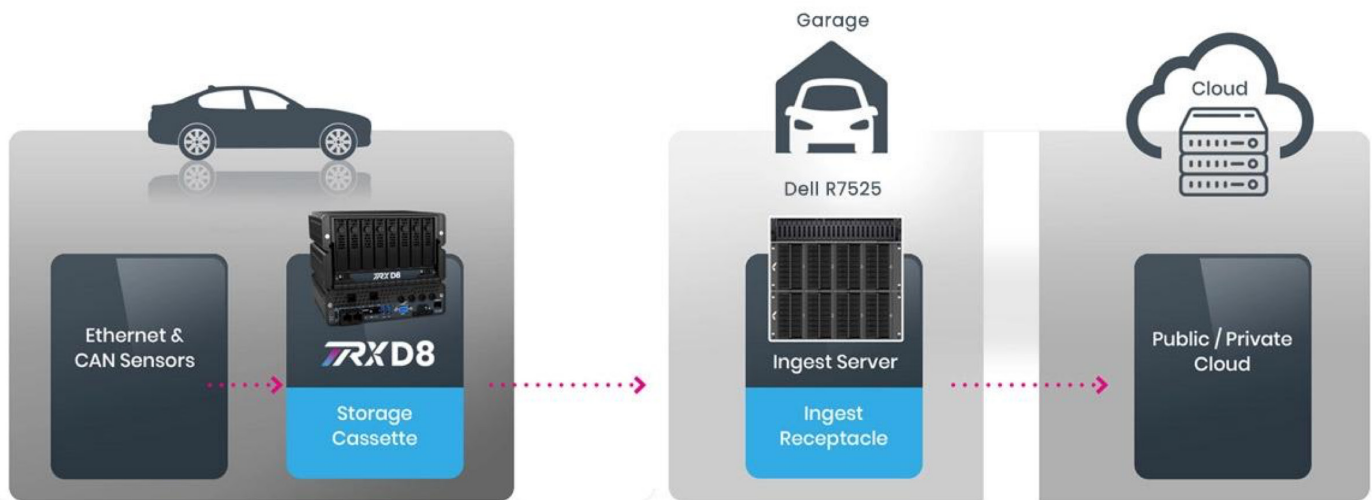


Fig. 1: TRX D8 end-to-end R&D data logging solution

For a highly reliable validation platform, AV developers choose the most appropriate hardware to provide the most competent and reliable solution. By choosing compact, lightweight ruggedized hardware from Klas, AV developers can reduce the number of devices that make up the validation platform.

A secondary benefit to reducing the number of devices in the validation platform is the reduction of potential failure points when collecting valuable R&D data e.g. vibrations causing cable disconnections, forced device shutdowns due to overheating, or storage failure due to shock.

Key TRX D8 advantages include:

- Maximizes drive times - up to 240TB of data storage per in-vehicle data logger
- Minimal installation effort - integrated CAN and Ethernet interfaces, 12VDC power ready
- Highly secure, highly rugged – encrypted disks in a ruggedized compact enclosure
- Data preprocessing – flexibility to run any 3rd party real-time application in-vehicle
- Rapid turnaround of vehicles – achieved with swappable quick release storage
- Mass data collection - simultaneously collect data from multiple vehicles
- Cloud ready – support high-speed ingest to local SAN with secure cloud access

Benefits

Secure - gain confidence and trust in AV R&D data collection and storage

Scalable - open architecture designed to meet the scale of Petabytes of R&D AV data

Lower TCO - eliminates the need for separate storage and compute devices per test vehicle

Future proofing ADAS development for evidence-based and data-driven regulations



Fig. 2: Ingest station and in-vehicle data logger, concurrently collate 8 cassettes of data per server

AV developers require highly reliable, scalable and secure R&D vehicle data logging solutions to meet the demands of the evolving ADAS regulations. The TRX D8 data logger from Klas is complemented by the KlasOS Keel operating system. Keel provides a holistic software platform to configure, manage and automate - compute, storage, and vehicle connectivity as a single device. Additionally, Keel has been validated in accordance with Common Criteria (often abbreviated as CC) standards, giving AV developers the confidence that the R&D data collected can be trusted throughout the data lifetime.

The TRX D8's integrated compute offers the flexibility to preprocess, and tag data live during test drives, assuring data can be easily identified in the future. Furthermore, the TRX D8 swappable storage cassettes can be encrypted, minimizing security risks or the potential for data tampering when transferring data outside the R&D vehicle.

The data center grade server, with generation 4 RAID, simplifies storage and retrieval of data for software in the loop (SiL) or Hardware in the loop (HiL) validation of ADAS. Furthermore, the scalable storage architecture means data from R&D test drives, SiL/HiL, and ADAS performance and validation results can be retained well into the future, aligned with evolving ADAS regulation.

The Dell R7525 supports the next generation of network interface cards, so AV developers can seamlessly connect with their cloud for ease of offloading archived R&D data. Ultimately, the TRX D8 from Klas future-proofs the ADAS R&D journey for many years to come.

About Dell Technologies

Dell Technologies helps automotive companies pursue new data-driven business opportunities in the software-defined era with future-proof infrastructure built on massively scalable, high performance storage systems, intelligent servers, access to your choice of public cloud services, a streaming data platform, and a well-vetted ecosystem of software partners. We can support both traditional workflows and data-intensive, emerging AI workflows. Dell Technologies solutions offer simplified data management and predictable performance all at the massive scale required for ADAS and AD development and testing. Learn more about [Dell Technologies storage solutions for Automotive](#).

About Klas

Klas is an engineering and design company with over 30 years of experience developing innovative communications solutions for the network edge. The company specializes in integrating enterprise networking capabilities from global IT leaders with purpose-built hardware and software platforms designed to meet market demands and the most stringent environmental requirements. Klas collaborates with strategic partners including Cisco, Dell, and Microsoft to support edge deployments in Government, Transportation, and Automotive industries. Learn more about [Klas Automotive Solutions](#).

Discover more about Dell Technologies solutions for the automotive industry



Learn more about Data Solutions for Automotive



Access the latest content and events for the automotive industry



Follow us on social media



Contact a Dell Technologies Expert for Sales or Support