DELL EMC ISILON, ECS AND B-PLUS

Engineering development and measurement solutions for ADAS/AD development

BENEFITS

b-plus:
- Specialist for in-vehicle data recording including hardware and software framework
- Data analysis tools for in-vehicle data analysis and computing
- Real-time metadata uploads to Cloud for fleet management and vehicle maintenance
- Sensor Data replay solutions for Hardware in the Loop testing

Dell Technologies:
- ADAS infrastructure expertise
- Single source for Compute, Network, Storage, Security, Management, SW Development.
- Own, lease, as-a-Service
- On-prem, Cloud, and/or Multi-cloud
- Ingest and store sensor data with scalability to 10s of petabytes in a single volume

Dell EMC Isilon & ECS:
- Grow quickly without sacrificing performance
- Simplify management and eliminate unnecessary islands of storage with seamless, policy-based automated tiering
- Rapidly re-simulate data to meet SLAs with affordable, near-line archives
- Accelerate AI adoption and utilize existing data stores without the need to move or replicate data
- Exabyte-scale sensor data management system
- Long-term data archiving

Managing the data highway to full autonomy

Advanced Driver Assistance Systems (ADAS) and Autonomous Driving (AD) vehicle technology development is driving rapid change in the automotive industry. As the industry shifts focus to meet customer demand for new innovations in safety and automation, a flood of new high-tech competitors has entered the race to be first to deliver a fully autonomous car. The best path toward winning this race is one that leverages the right partners who have the experience, technology and resources to get you to the finish line.

This race requires specialized solutions for data acquisition, management and of course, system design and validation, which relies heavily on captured sensor data for analytics and artificial intelligence (AI). Specialized ADAS-test hardware and software must be used for validation and must work seamlessly with the massive compute and storage infrastructure located in the data center. It is a well-known characteristic of ADAS/AD – it's all about sensor data management. Understanding and optimizing the flow of data at each stage of the ADAS data lifecycle is required to architect tools and infrastructure that are future-proofed to scale and adapt continuously – all while minimizing total cost of ownership (TCO).

ADAS/AD data acquisition, analysis and reuse at scale

A key component of virtually all ADAS/AD development programs is real-world sensor-data management. As designs evolve to SAE level 3 and beyond, and sensor resolutions grow higher, it is critical that the corresponding increase in verification complexity and total data captured is reflected in the project's tool and infrastructure choices. This includes initial data acquisition from test vehicles, data ingest and management within the data center, and sensor data analysis and reuse for design and verification, including AI, simulation, and physical hardware and system-level software validation. Sensor data lifecycle management is now a critical component that must be treated equally in importance to assure project success.

Dell Technologies and b-plus have partnered to offer ADAS development teams proven ADAS/AD in-car data acquisition, data analysis and data replay as part of a comprehensive ADAS infrastructure solution that includes high-performance computing, storage and data management, along with the services to deploy and use them.
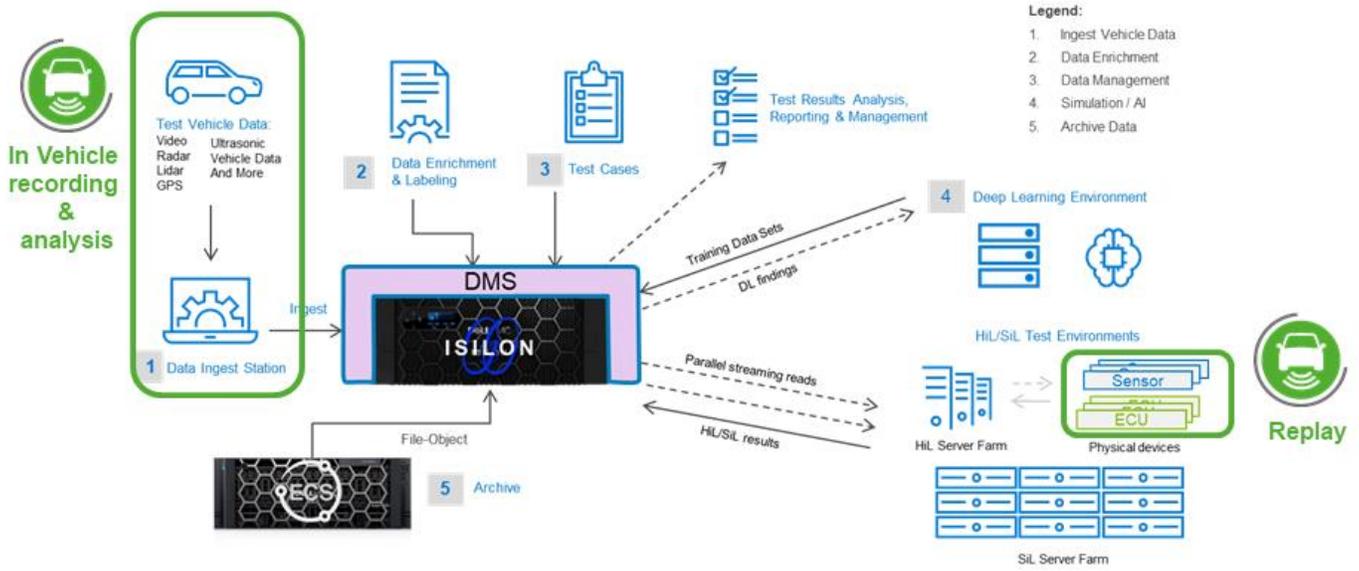
b-plus ADAS / AD Portfolio

Figure 1: Green b-plus AVETO building blocks portfolio within the DELL EMC Portfolio
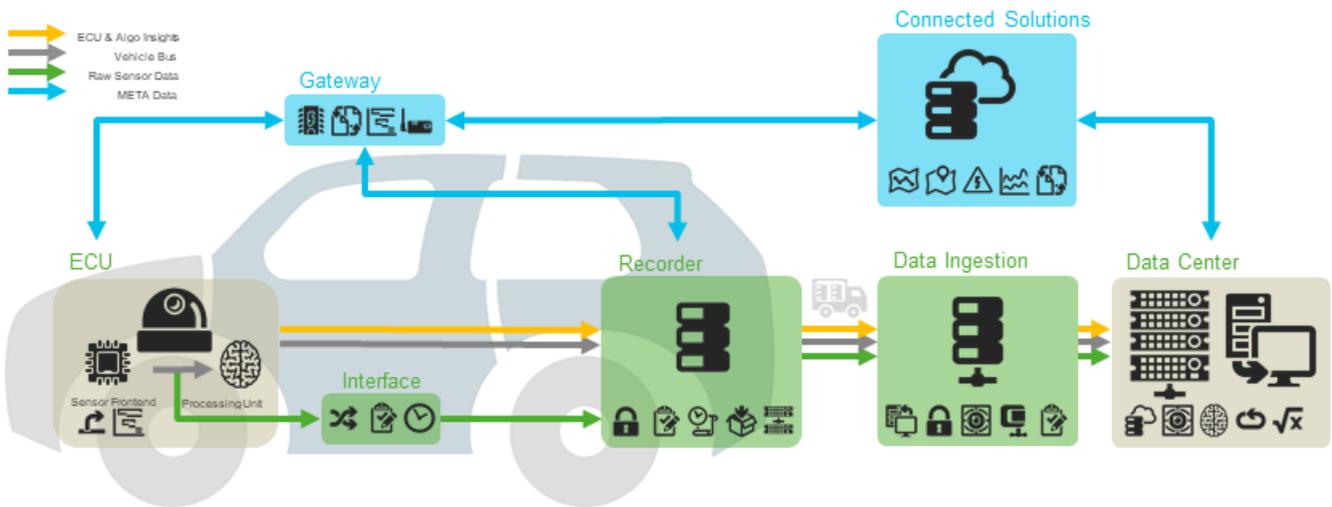

Figure 2: Portfolio of b-plus Solutions from Sensor to the Cloud

From the concept phase to series development, a wide variety of test procedures are performed for the use of future sensor systems in order to be able to react to real traffic risks. Sensor data must be recorded, analyzed and reused to verify that a new system is able to react properly and safely to any situations.

In-vehicle data recording

The AVETO recording solution is specifically tailored to sensors and control units of future driver assistance systems and autonomous systems. A unique advantage of this recording solution is the inclusion of both hardware and software from one source. AVETO is designed to be scalable and can be expanded to meet growing demands of current and future projects. The solution also includes data converters that allow the decoupling of data from sensor interfaces. This assures that your investment does not go obsolete as new sensor interfaces become available. Data integrity and time synchronization, in combination with a high-performance and easy-to-use web interface, make the recording package an optimally adaptable system for the validation of systems with the highest data volume. For a perfect connection to data center infrastructure, the workflow is summed up with a data ingest station integrated in DELL EMC solutions.

The AVETO recording solution includes:

- MDLink measurement data converter for decoupling sensor data streams
- BRICK recording hardware
- AVETO recording software
- COPYLynx Cloud ingestion platform
- b-CON Cloud solution for test fleet management

Data analysis

The analysis of sensor data is critical for the development of ADAS/AD systems.It has many facets and is already being made online during test drive within the vehicle and offline in the lab with data from the data center solution. For in-vehicle analysis of measurement data streams, a powerfull framework has to be used to visualize multi-gigabit sensorics. AVETO visualization software is capable of realizing this task, live in the vehicle for first checks and later on in the lab. It is able to handle files exceding hundreds of gigabytes being recorded from multible sensors. It visualizes video, bus data and even 3D point clouds from sources such as LIDAR. As a flexible solution, custom visualizations are realized with an SDK. Having the same software in the vehicle and offline for analysis brings a seamless advantage during development.

During the pre-development and prototyping phase, analyzing the sensor data streams is very common. Therefore, immense power is needed – at the same time that hardware has to be rugged to run in a test vehicle environment. So server class performance and GPU power need to work in an on-board environment.

The AVETO.analyse solution includes:

- DATALynx ATX3 –HPC for computing in the vehicle
- AVETO visualization software for visualization and analysis of raw data streams

Data replay

To enable algorithm optimization as early as possible in the development and validation cycle, developers use hardware-in-the-loop (HiL) systems for radar, camera and fusion platforms. Some of these, such as monitor HiL systems, are no longer sufficient for today's replay of multi-gigabit sensors, since you aren't able to handle the ammount of camera data or miss some real world physical effects such as glare. Thus you want to replay your data on the target ECU or autonomous drive controller with the exact real world data you acquired. b-plus offers a HiL solution where test drive recordings can be directly injected into the ECU.

The AVETO.simulation solution includes:

- B-HiL – Sensor hardware in the Loop platform
- AVETO visualization software for visualization and analysis of raw data streams

Dell EMC and b-plus Benefits

Successfully developing advanced driver assistance systems, particularly at SAE levels 3 and above, requires solutions that can scale to meet exponentially growing sensor data requirements. This starts in-car and extends through to the data center, whether on-prem or in the cloud. Data acquisition solutions must not only scale on performance and capacity, but must also interface with centralized storage, which itself must be scalable. Storage must also be high-performance, to meet the variable and growing demands of ADAS/AD development. A simple mistake in architecting data center storage infrastructure, as well as in-car electronics, can impact project schedules, and even delay product launch. By partnering with Dell EMC and b-plus, you can be assured that our combined solutions are optimized to work together and to make your life easier.

About b-plus

b-plus is the specialist for the development and integration of electronic systems and components. Driver assistance systems (ADAS) in the automotive industry and the automation of mobile machines are among the core competencies of the medium-sized company. We rely on 20 years of industry experience and the expertise in safety-critical hardware and system development.
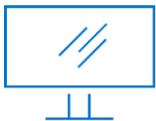
Our commitment: Complete and secure key technologies for automated driving and mobile automation today. For autonomous driving tomorrow. For more information, visit https://www.b-plus.com/en/home.html.

About Dell EMC Isilon & ECS

Dell EMC Isilon provides the leading Enterprise grade scale-out NAS platform that scales from terabytes to 10s of PBs of capacity in a single file system. Isilon's OneFS file system has unmatched storage efficiency with utilization capacity up to 80% and enterprise features such as data deduplication to save even more space to further lower overall total cost of ownership (TCO). Isilon has industry-leading data protection with the ability lose up to four nodes and still operate with no loss of data and Isilon stays simple to manage regardless of how your environment grows - allowing you to manage your business and not your storage.

ECS is an enterprise-ready object storage system from Dell EMC that delivers the flexibly to capture, store, protect and manage unstructured data at public cloud-like scale. Retain complete control of data, reduce security vulnerabilities, meet strict compliance requirements and more. At scale, ECS offers a 59.5% lower TCO compared to other public cloud providers—validated by ESG[1].

1 Palmer, T., & Sinclair, S. February 2019. Economic Benefit Analysis of On-Premises Object Storage versus Public Cloud. Milford, MA. Enterprise Stratey Group. https://www.dellemc.com/en-ca/collaterals/unauth/analyst-reports/products/storage/esg-ecnomic-value-audi-dell-emc-elastic-cloud-storage.pdf

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