Top five reasons to choose Dell EMC PowerScale and dSPACE for ADAS/AD

OEMs and Tier-1s developing Advanced Driver Assistance Systems/Autonomous Driving (ADAS/AD) face a multitude of complex challenges. This includes selecting the right partner for consulting services (test vehicle drivers, AI data scientists, hardware architects, design and validation engineers), test equipment (data loggers, ingest stations, simulators, hardware-in-the-loop test rigs), and the IT infrastructure to support them (compute and GPU servers, storage, networking, virtualization and administration). Dell Technologies and dSPACE have the experience and technology that enable you to make tomorrow's automobiles possible today. Here are the critical reasons why Dell and dSPACE are the ideal choice for your ADAS/AD needs.

1 | High-end vehicle data logging

Reliable 360-degree field detection, required for safe autonomous driving, is performed with a variety of environmental sensors, such as a camera, radar and lidar. Every second, these sensors generate vast volumes of data, which must be stored accurately during a test drive. dSPACE AUTERA is the ideal system for recording and processing large volumes of data from various sensors, automotive buses and networks during test drives. All interfaces are time-correlated and record accurate timestamps directly at the data-input location so that recorded data can be replayed with correct timing. High-performance computing as well as high network bandwidth are critical given the number of high-resolution sensors that are recorded simultaneously. dSPACE AUTERA is capable of continuously streaming up to 50 gigabits per second to compact, ruggedized, hot-swappable solid-state disks (SSDs). For even higher bandwidth demands, multiple AUTERA systems can be combined.

2 | The right infrastructure for ADAS/AD from edge-to-core-to-cloud

SAE-level 3 projects already require hundreds of petabytes of storage, and that requirement is constantly growing. As the industry approaches SAE-level 5, projects will be measured in exabytes. Staying ahead of this exponential data growth is one of the key challenges for any ADAS/AD project. Planning for this data growth must be fully accounted for at the beginning of the project, addressing project needs, how best to maximize value, and incorporating best practices and learnings from the success and failures of others. Over 40 leading OEMs and Tier-1 automotive suppliers worldwide already rely on Dell EMC Isilon scale-out NAS storage, now part of the PowerScale storage portfolio, to safeguard their valuable sensor data. Dell Technologies and dSPACE bring their industry experience together to provide proven ADAS solutions built with industry-leading hardware, software and expertise. These solutions make it easy to overcome these challenges and empower IT teams, data scientists and engineers to spend less time worrying about data and more time on strategic value-add projects.

3 | Comprehensive open- and closed-loop testing solutions

In order to test ADAS/AD sensor electronic control units (ECUs), data recorded during test drives needs to be replayed in the laboratory. It must be ensured that the heterogeneous data streams are reproduced time-coherently. In an open-loop (data replay) test setup, dSPACE RTMaps, in conjunction with dSPACE SCALEXIO, ensures realistic real-time stimulation of the

device under test via a time-correlated and jitter-free ingestion of video and vehicle bus data. In addition to real-time open-loop simulation, real-time closed-loop simulation is used to generate an entirely virtual world, and typically requires a high-performance computing (HPC) server farm to validate perception and data fusion. Here also dSPACE SCALEXIO is the optimal system of choice. dSPACE SCALEXIO provides high-performance processor technology for the most demanding real-time requirements. Featuring precise and fast input/output (I/O) capabilities, comprehensive bus and network interfaces, and rest-bus simulation capabilities for CAN, LIN, FlexRay and automotive Ethernet. Equipped with the Environment Sensor Interface Unit, SCALEXIO perfectly combines classical hardware-in-the-loop (HiL) testing with ADAS/AD sensor data generation and replay, quickly and synchronously.

4 | ADAS/AD storage scalability with no performance compromises

ADAS/AD development demands carefully architected and managed data storage that can continuously stream thousands of concurrent jobs with high performance. Such streaming will only grow throughout the project, as must the total capacity, making storage architecture that much more critical to project success. Test-vehicle data must be ingested and enriched constantly; artificial intelligence (AI), machine learning (ML) and deep learning (DL) jobs will demand streaming at very high bandwidth; model-in-the-loop (MiL) and software-in-the-loop (SiL) jobs will run into the thousands; and HiL jobs must stream with very low latency. All must perform flawlessly. Designed from the ground up for massive concurrency, PowerScale can scale from terabytes to tens of petabytes with no disruptions nor downtime - and is easy to manage as well. PowerScale is also certified by Nvidia for AI/ML/DL workloads.

5 | Demystifying exabyte-scale data and metadata management

With so many moving parts and simultaneous activities across the workflow, tracking and managing sensor data and metadata is a continuous, ongoing requirement that gets more difficult as the amount of sensor data grows. Data must be easily discoverable and searchable in real time to build dynamic scenarios. Sometimes different processes in the workflow will require simultaneous access to the same data. Making it simple to coordinate this process across neural network training and MiL/SiL/HiL testing is vital, especially if infrastructure spans on-premises and cloud-based environments. PowerScale provides multiple options to help manage data. DataIQ offers dataset-management and storage-monitoring software that's used to identify, classify and move data between heterogeneous storage systems and the cloud. It also works as a sensor data and metadata manager. PowerScale can also utilize our data management system (DMS). Developed specifically for our ADAS customers, DMS begins tracking sensor data and metadata as it is ingested into central storage. Metadata tags are placed into a high-performance database enabling ADAS development tools to search for specific scenarios amongst the sensor data. The evaluation of AI/ML/DL algorithms as well as HiL/SiL/MiL testing can be queued automatically. These metadata tags are customizable for each project for full flexibility. DMS even load-balances sensor data across multiple PowerScale storage clusters to assure consistent and reliable high performance throughout the lifecycle of your project. PowerScale, combined with DMS, simplifies managing petabytes to exabytes of ADAS sensor data – eliminating unnecessary project risk.
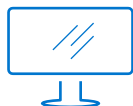
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