DELL EMC STORAGE FOR ADAS AND AUTONOMOUS DRIVING

Accelerating ADAS development

Competition in the era of autonomy

The automotive industry is in a highly competitive, transitional period where success is not about winning, it’s about survival. Once an industry of pure hardware and adrenaline, automotive design is increasingly dependent upon, and differentiated by software. This is especially true for Advanced Driver-Assistance System (ADAS) development, which is introducing disruptive requirements on engineering IT Infrastructure – particularly storage, where even entry-level capacities are measured in petabytes.

The Society of Automotive Engineers (SAE International®) has defined different levels of automation and most modern cars today have features that are at level 2-3. Today’s SAE level 3 ADAS projects have already outstripped legacy storage solutions, and with level 4 and 5 projects around the corner, the need for game-changing storage solutions that are optimized specifically for high performance, high concurrency with massive scalability is evident.

The value of data

Advanced Driver Assistance System / Autonomous Driving (ADAS/AD) development relies on massive amounts of real-world training data, consisting of sensor data gathered over the course of millions of miles of test driving and thousands of concurrent simulations. For example, just one front-looking radar sensor can generate 2800Mbits of data per second. For SAE level 3 automation, up to 200,000 km of sensor data is commonly required. That’s over 3300 hours of data when captured at 60km/hr. That’s 4.2PB for just one sensor! Cars today already have greater than 10 sensors on average. In the future, when cars evolve to SAE level 5, fully autonomous operation, you can expect more sensors – and an estimated 1000x more data per sensor.

Ideally architected for ADAS development and certification, Dell EMC Isilon® scale-out NAS provides the scalability, performance, parallelism and easy management tools to help OEMs and Tier-1 suppliers accelerate their ADAS projects. Isilon supports simultaneous ingest from thousands of concurrent streams from around the globe, provides simultaneous access for HIL/SiL testing and Deep Learning / AI, and includes archive options to meet regulatory re-simulation SLAs.
ISILON KEY BENEFITS FOR ADAS

Scalability
- Up to 10s of PB per volume
- Single namespace
- Best ROI with 85% disk efficiency

Performance at Scale
Performance increases with capacity
- Designed for concurrency
- Ready for Machine-learning
- Multiple price-performance tiers

Automated Tiering
Restart archived simulation environment in minutes
- Seamless, policy-based tiering
- Tier to Cloud with CloudPools®
- Precisely match performance requirements to $/GB

Ease of Management
Single point of management
- Eliminate islands of storage
- Consolidate workloads including ADAS, CAD/CAE/PLM, Analytics, IoT/IoV/ConnectedCar

Predictability
Eliminate unexpected downtime
- Just-in-time capacity expansion
- Buy for today; expand tomorrow
- Non-disruptive OS upgrades
- Hardware upgrades without migration

Maximum performance at maximum scale
As autonomous vehicle development advances toward SAE level 5, your storage investment today must be architected to handle ever increasing demands in performance – even as cluster capacity grows. With traditional scale-up storage architectures, cluster performance degrades as capacity is added. With Isilon’s scale-out architecture expanding a cluster’s capacity also increases its aggregate as well as peak performance, making Isilon an ideal choice for the ADAS workloads of today and tomorrow.

A deep learning storage platform
From object localization, semantic segmentation, road and lane marking annotation and metadata attribution, Artificial Intelligence is becoming more and more critical to remaining competitive as progress continues towards SAE level 5 autonomy. Dell EMC Isilon provides the performance, parallelism, scalability and management required to support increasingly complex AI workflows. Dell EMC makes adopting AI simple with the ADAS Development Pod with Isilon. This solution can be attached to existing Isilon environments, making it easy to use the data for AI workflows, without the need to move or replicate data.

Affordable archive for data that’s minutes away
A key challenge of ADAS development is contractual and regulatory commitments surrounding test data retention. Keeping tens, and soon, hundreds of petabytes of data in high performance storage is certainly a requirement during the simulation and validation phase. This data must be retained for multiple decades, and with service contracts commonly mandating restoration and re-simulation times measured in days, tape archive is simply not an option. Archive in public cloud is great for data that never moves but will be expensive once access and egress fees are considered. Isilon offers multiple tier options and tools like SmartPools® and CloudPools®, policy-driven automated tiering solutions allowing you to move data to the optimal price/performance tier across Isilon and cloud, depending on the stage of your project.

Isilon delivers the flexibility of keeping performance-critical data, such as a current ADAS sensor data, on a high-performance tier, and less critical data, such as previous ADAS projects, on low-cost, high-density archive tiers. Policies can even be set up to automatically migrate your archived ADAS data back to higher performance tiers should an urgent need to restore a simulation environment arise – such as from a recall. And since archived data can remain transparently within the same cluster and name-space, an ADAS simulation environment can become operational quickly and with little effort. Isilon offers the flexibility of matching storage needs with changing business needs. For data that isn’t subject to strict SLAs, Dell EMC ECS can be used to store data long-term in cost-effective object storage with support for geo-distributed archives.

Future-proof, modular architecture
With ADAS development, change is inevitable, and as vehicle operation approaches full autonomy, performance requirements become even less predictable. With this reality in mind, Isilon was architected to make taking advantage of future technology upgrades easy - separating its storage compute and storage capacity into individually upgradable components. By combining high-performance commodity drives and processors with the powerful Dell EMC Isilon OneFS® file system, upgrades come rapidly. No need to wait months – or years – for forklift upgrades common with proprietary technologies.
Driving predictability in an unpredictable world

Storage needs can be unpredictable in the automotive market – especially with ADAS – making storage forecasting and investments difficult. With Isilon’s scale-out architecture, you only need to buy for the storage you need today and expand as needed. A single Isilon cluster can start small, with as little as 96 terabytes, and be scaled easily to 58 petabytes (PB), with the system automatically provisioning capacity, monitoring system health, and rapidly self-healing any failure. Add a new sensor to a project. No problem – storage nodes can be added to a cluster in about 60 seconds with no downtime – making upgrades easy and predictable without adding complexity or impacting time-to-market. This enables engineering organizations to start with an infrastructure that fits their immediate needs without overbuying performance or capacity for future use. Isilon’s scale-out architecture and OneFS operating system eliminate I/O bottlenecks that are common with legacy storage solutions when highly concurrent automotive workloads are at play. This eliminates last minute performance surprises that arise when alternative solutions grow beyond their “sweet spot.”

Multi-protocol support for centralized storage

With Isilon, you can streamline your automotive and non-automotive storage infrastructure by consolidating large-scale file and unstructured data assets, eliminating islands of storage across the enterprise. Isilon scale-out NAS includes integrated support for a wide range of industry-standard protocols, including Internet Protocols IPv4, and IPv6, NFS, SMB, HTTP, FTP as well as a REST API for file access via HTTP for your cloud initiatives – including IoT/IoV/ConnectedCar. With native Hadoop Distributed File System (HDFS) support, Isilon even allows you to run analytics on your manufacturing data. You can even combine this data with your CAD/CAE design data on a single cluster and volume. With Isilon, you can simplify workflows, accelerate business analytics projects, support cloud infrastructure initiatives, and get more value from your enterprise applications and data, all from a single storage platform.

Small footprint for tight spaces

When facing the reality of ADAS storage requirements, the last thing you want to worry about is physical space requirements. Isilon’s modular architecture delivers maximum flexibility and capacity in a small form factor. A single chassis, 4-node Isilon archive chassis can be configured to accommodate up to 800 terabytes (TB) of storage today. Thanks to its modular architecture, as higher density drives become available and certified, higher density Isilon configurations can be supported – further assuring your investment in the Isilon architecture.
Ready for the enterprise

Isilon scale-out NAS is enterprise-ready – so you can rely on Isilon for safely storing your business-critical data. Isilon storage solutions provide the highest levels of reliability, availability, and serviceability in the industry:

- Fast and efficient data backup and recovery with scheduled snapshots
- Reliable disaster recovery protection with extremely fast data replication
- Push-button failover and failback simplicity
- File system auditing
- Data at Rest Encryption (DARE) with self-encrypting drives (SEDs)
- Write once, read many (WORM) data protection to help you meet regulatory requirements – including the stringent SEC 17a-4 rule.
- Role-based access control (RBAC) options and, if needed, isolated storage pools for specific essentials.

Manage development workflows – Not storage

Isilon scale-out NAS makes managing petabytes of file data a “part-time job.” Isilon consolidates divisions, projects, teams and entire automotive workflows into a unified storage solution that reduces costs and improves operational efficiency. Isilon is simple to manage, highly scalable, predictable, efficient, available, enterprise ready storage, and offers performance-capacity-density options, including all-flash, to suit your specific automotive project needs.

About Dell EMC storage

Dell EMC Isilon provides an enterprise-grade, scale-out NAS platform that scales from terabytes to more than 10s of PB of capacity in a single file system. Industry-leading data protection guards against hardware failures and intentional or unintentional data corruption. And Isilon stays simple to manage, regardless of how large your automotive environment grows – reducing costs and allowing you to manage design development – not storage.