



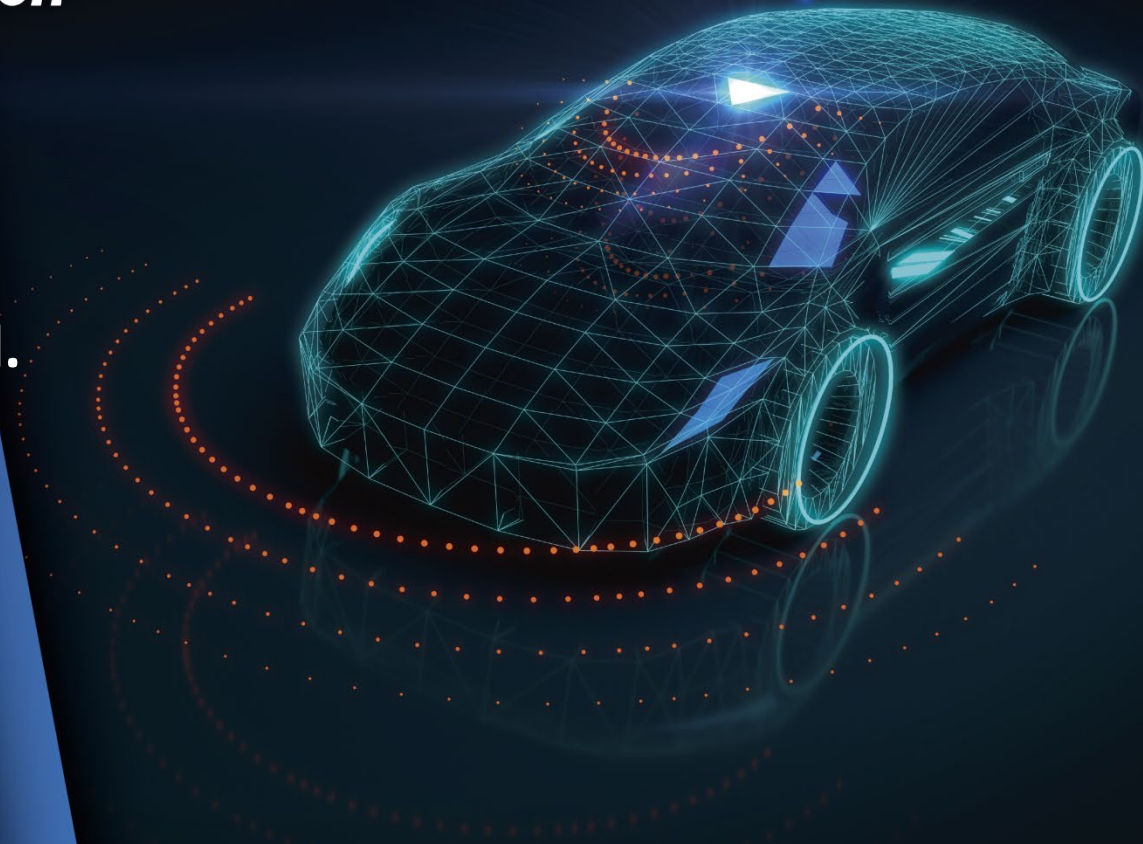
SiliconMotion



Flash Memory Summit

Future SSDs in Automotive Field.

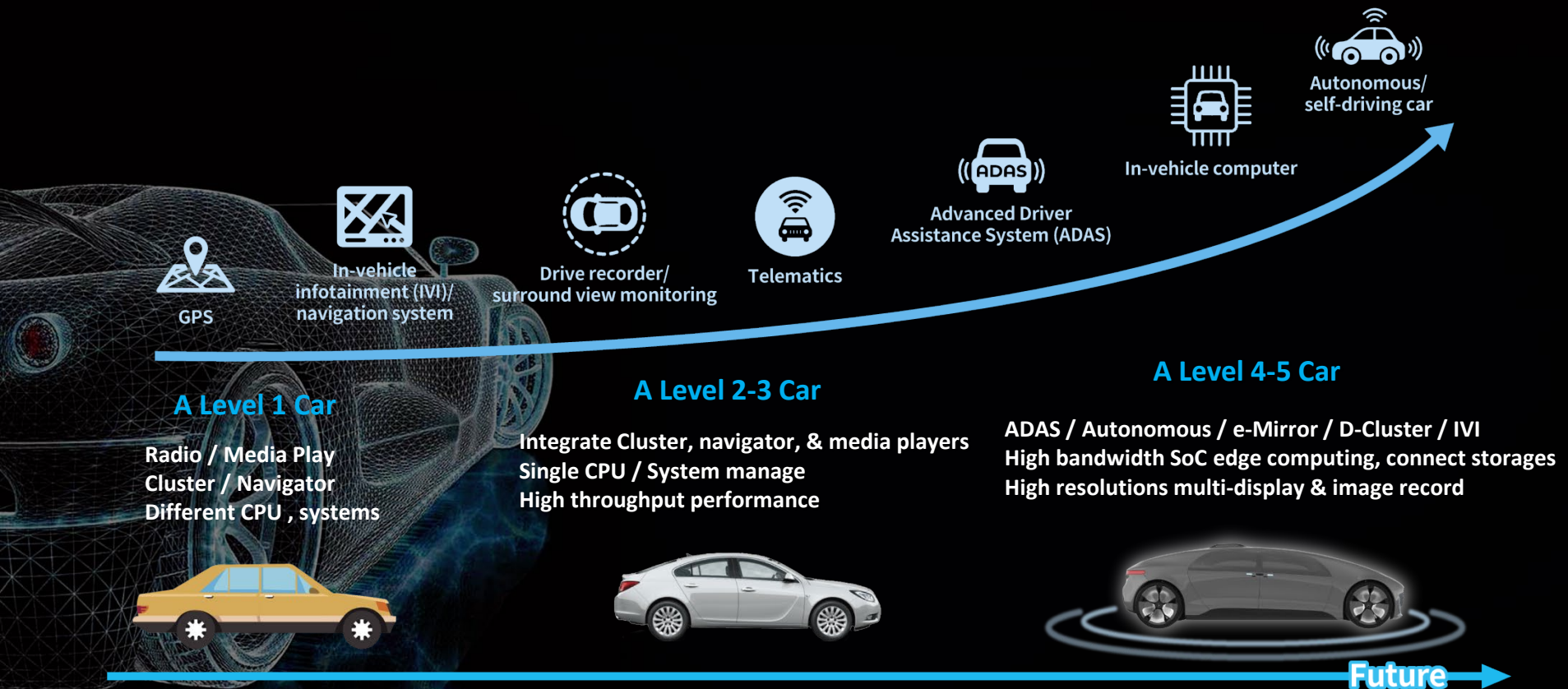
Steve Shih
Silicon Motion, Inc.



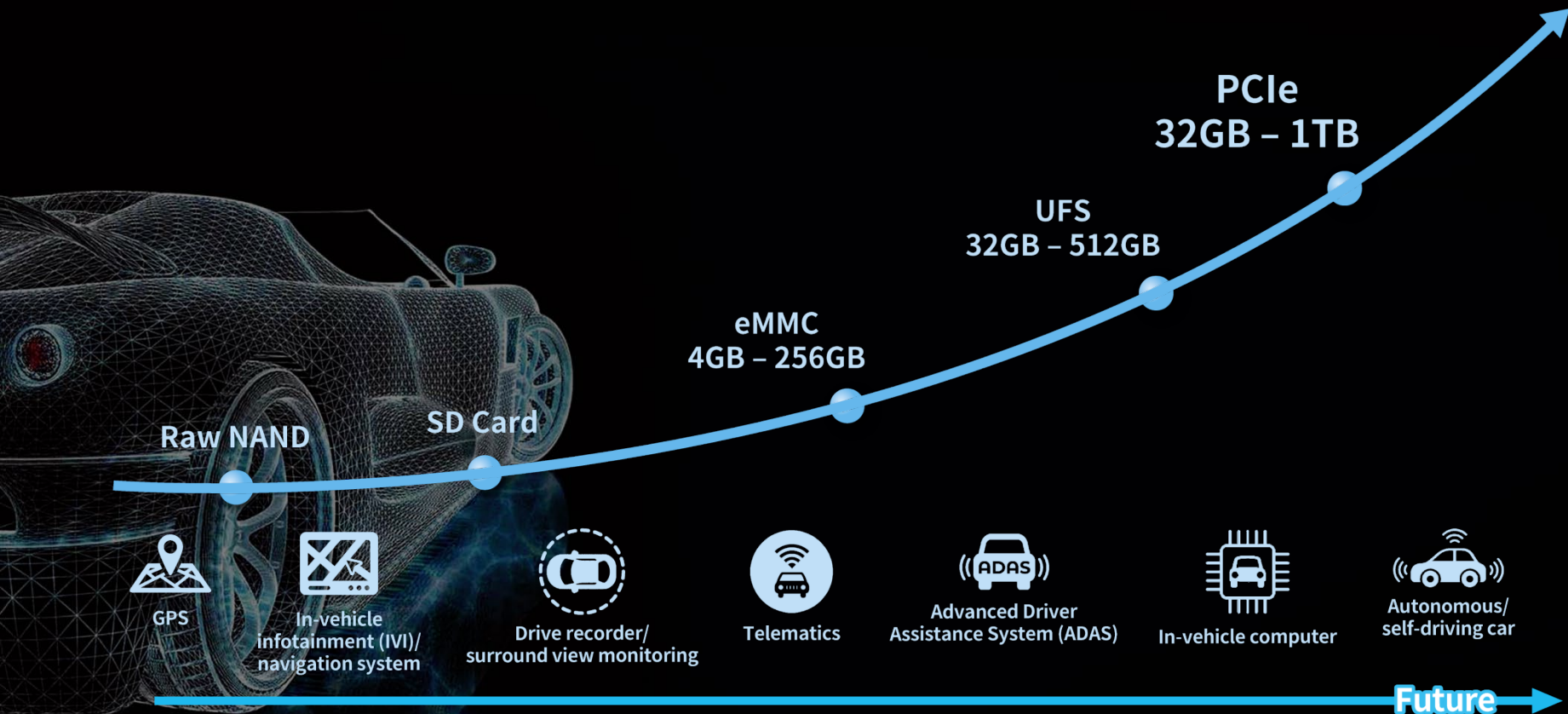
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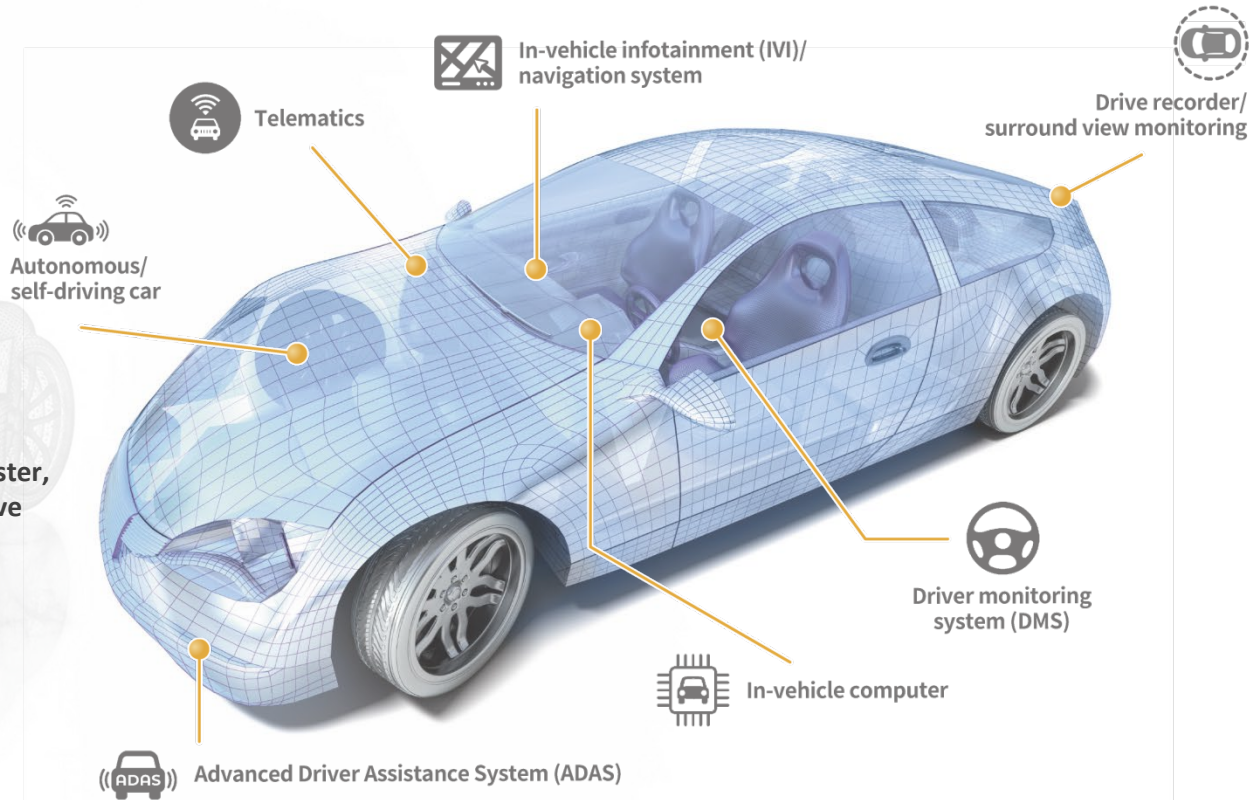
Automotive Trend

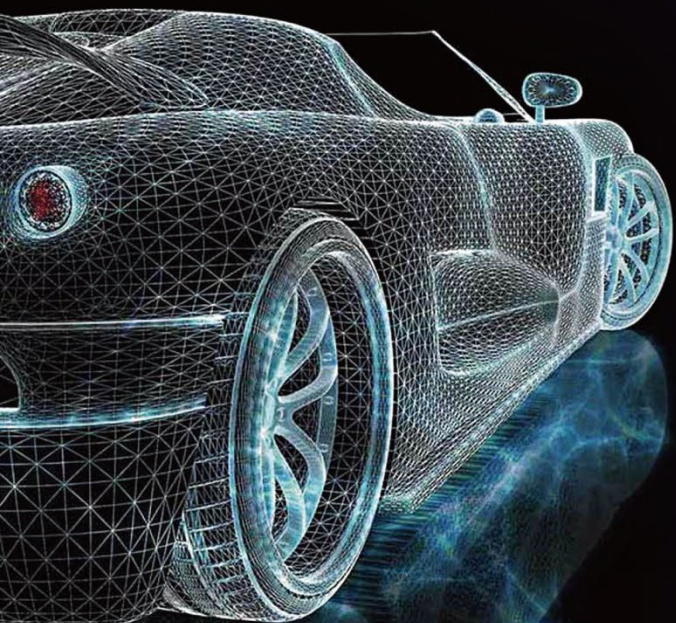


Automotive Storage Technology Transition



NAND Storage Products for Automotive Applications





5TB – 20+TB

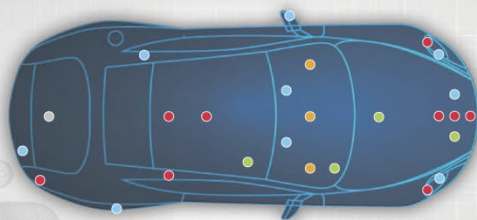
Average autonomous vehicle data
generated each day by 2025

A wireframe illustration of a sports car, shown from a front-three-quarter view. The car is rendered in a dark blue wireframe mesh, with glowing blue highlights on the wheels and front end. It appears to be moving, as suggested by the motion blur and glowing trails behind the rear wheel.

How Can NAND Storage Solution Provider Join This Evolution?

Moving Toward Centralized Architecture

Conventional Architecture



In-Vehicle Computing

- Environmental monitoring
- Issues analysis
- Reaction in time
- NVMe SR-IOV for storage

Automotive Storage Needs

- Performance
- Data correction
- Reliability
- Wide temperature range

• ADAS/Autonomous

Level 3 autonomy, radar/image processing, collision avoidance, pre-crash, cruise control, lane departure, parking, black box recording, HD mapping

• Body Electronics

HVAC, lighting, doors, electric seats, windows, mirrors, cameras, seat belts, air bags

• Powertrain

Main motor control, transmission, engine control, generator/e-water pump, battery management

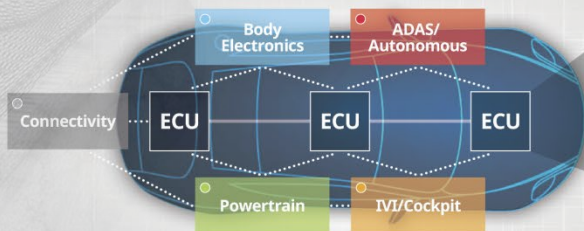
• IVI/Cockpit

Audio visual, maps, traffic, toll payment, Google Automotive Services, rear-seat entertainment system, voice recognition, gesture control, cluster and HUD

• Connectivity

LTE 5G, Wi-Fi, Bluetooth connecting to CAN FD, LIN, FlexRay, Ethernet

Software-Defined and Centralized System



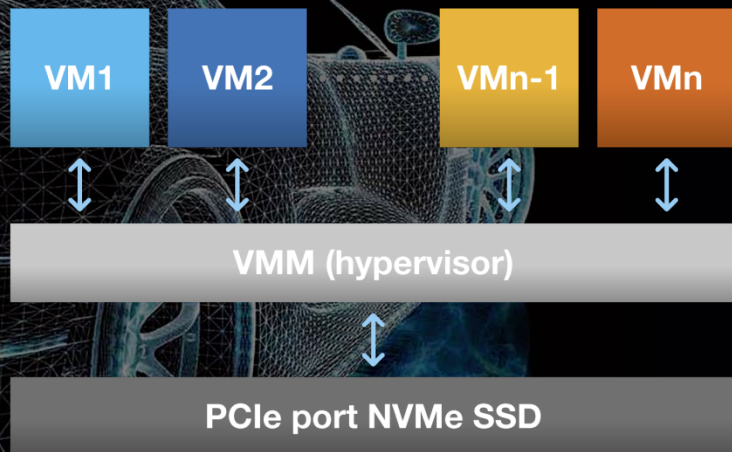
PCIe Port NVMe SSD



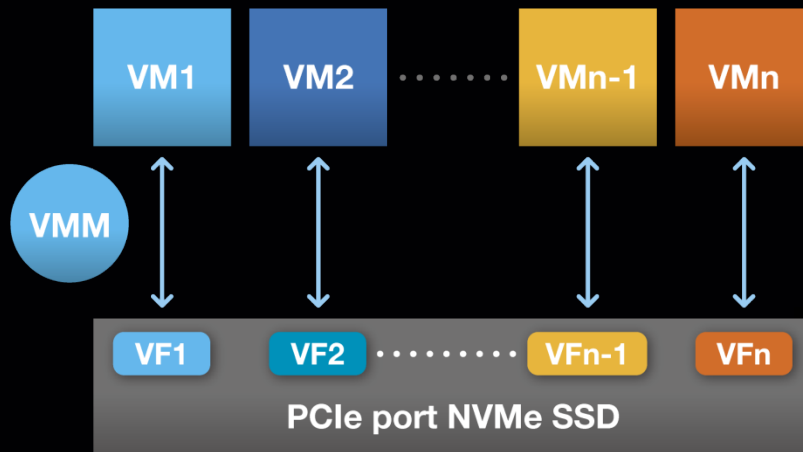
Built-in SR-IOV Capability for Automotive Storage

One storage directly support virtual I/Os to multiple VFs

Conventional Virtualized Computing Architecture



SR-IOV Architecture



A wireframe model of a classic car, possibly a Ferrari, shown from a front-three-quarter view. The model is composed of a dense grid of lines, giving it a transparent, skeletal appearance. It is positioned on the left side of the slide, with its reflection visible below. The car's design features include a prominent front grille, round headlights, and multi-spoke wheels.

Safety, Reliability, and Quality

Controllers for Automotive Quality

— Qualification —

AEC-Q100 Grade2 / Grade3

Grade 2: -40°C to +105°C

Grade 3: -40°C to +85°C



ASPICE certification

Follow ASPICE process to maintain product design SOP and documentation control



— Certification —

IATF16949 compliance



FMEA (Failure Mode and Effect Analysis)
Zero-defect quality management standard



Functional Safety and Cyber Security

Functional Safety: ISO26262 for ASIL A, ASIL B, ASIL C and ASIL D
Cyber Security: ISO21434 Compliance.

Automotive Storage in Action



Autonomous vehicles will continue to drive innovation in flash technology to meet speed, data & storage requirements > 5TB



Autonomous driving requires **reliable** protection of data and the integrity of devices



SR-IOV NVMe sharing can be a cost-effective way to implement centralized system in autonomous vehicles



Functional safety and **security** are key elements of autonomous driving applications

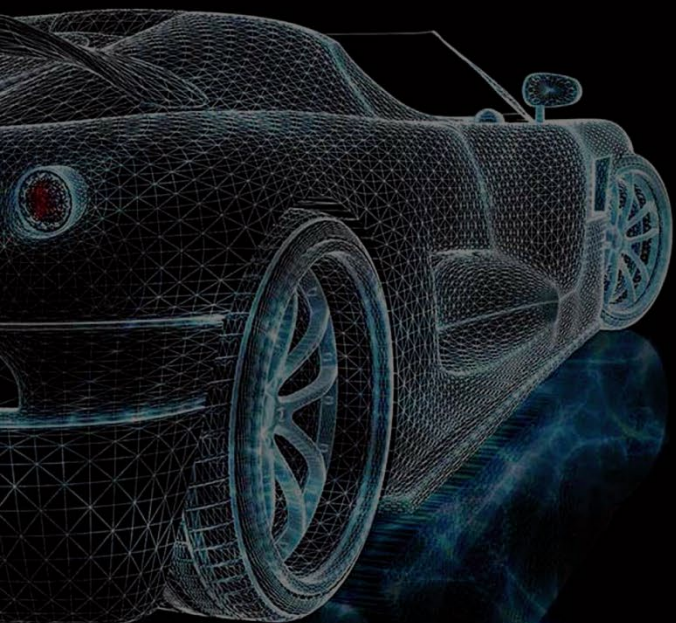


Silicon Motion's automotive storage solution provides various storage to support different application

Innovating Storage in Action!

Meet us at booth #311





Thank you!