

Quantum.

Mississippi State University Accelerates Data-Intensive Autonomous Vehicle Research with Edge Storage from Quantum

Summary

With access to sophisticated computer simulation technology and a 55-acre off-road proving ground, the Center for Advanced Vehicular Systems (CAVS) at Mississippi State University (MSU) is defining the future of autonomous vehicles. To collect the complex environment data generated by vehicles and used for simulations, CAVS relies on Quantum R-Series Edge Storage—purpose-built devices for capturing data in edge environments.

Introduction

MSU's CAVS is uniquely positioned to lead development of next-generation autonomous vehicles. Faculty and student engineers have access to MSU's powerful high-performance computing (HPC) resources, which are critical for modeling and simulating a broad variety of driving situations. At the same time, the CAVS team can capture real-world data and test vehicle systems using a newly

CASE STUDY



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Daniel Carruth

Associate Director for Advanced Vehicle Systems
Center for Advanced Vehicular Systems (CAVS),
Mississippi State University

FEATURED PRODUCTS



R-Series Edge Storage



SOLUTION OVERVIEW

- Quantum R-Series
Edge Storage

KEY BENEFITS

- Collecting autonomous vehicle sensor data while driving in challenging environments
- Transferring edge data to centralizing storage fast to accelerate simulation workflows
- Sharing data with multiple teams within and beyond the university

acquired 55-acre property—an area of diverse terrain dubbed ‘the Proving Ground.’ “I don’t think there’s anywhere else with our advanced computing capabilities...combined with the ability to quickly validate what’s happening,” says Clay Walden, executive director of CAVS.

The center’s work is valuable for any organization that needs to operate autonomous vehicles in complex environments where there are no streets signs, lane markers, or even roads. In these environments, weather events, fires, and military battles can dramatically alter the terrain from one day to the next. The autonomy systems and insights produced at CAVS will be vital for the military as well as for organizations in agriculture, energy, construction, forestry, and more.

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Daniel Carruth

Associate Director for Advanced Vehicle Systems, CAVS

Handling Mission-Critical Data

From the trails of the Proving Ground to the university’s HPC labs, the work of CAVS engineers revolves around data. Using sensors mounted on test vehicles, the organization collects a wide array of data about the outdoor terrain—including information about soil, topography, trees, and plants. That data is then used to create a digital twin of the environment, which is employed for running driving simulations.

These simulations help create the navigation software that guides autonomous vehicles. For navigation software to make good decisions in real-world situations, an autonomous driving system needs billions of miles of training. Since not all those miles can be logged by driving physical

test vehicles through the Proving Ground, MSU engineers must also conduct tens of thousands of simulated drives or tests using the Mississippi State University Autonomous Vehicle Simulator or MAVS system. Machine learning capabilities help ensure the software will be ready for any environment.

Creating a high-quality digital twin of the environment requires high-quality data from the field. The CAVS team needs onboard storage systems that can flawlessly collect field data and then enable engineers to transfer data seamlessly to the large-scale data center storage used for simulations.

Collecting High-Speed Sensor Data At The Edge With Quantum

The CAVS team selected Quantum R-Series Edge Storage for collecting test-vehicle data. R-Series systems are ruggedized, in-car devices designed for high-speed data capture in the field. “We needed storage that could reliably collect sensor data as vehicles traverse rough trails and other challenging terrain,” says Daniel Carruth, associate director for advanced vehicle systems. “Quantum R-Series Edge Storage is dependable even in the most demanding conditions.”

R-Series systems also accelerate the process of transferring the data collected in cars to the storage system used for conducting simulations. To begin moving data, technicians can simply remove a drive-filled magazine from the in-car storage device and slide it into a data center chassis—or use the R-Series system’s 10-GbE port. Automated capabilities then streamline the transfer of raw data to shared storage.

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Clay Walden
Executive Director, CAVS





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Envisioning The Road Ahead

Integrating the Quantum R-Series Edge Storage into a single, sharable storage platform enables CAVS engineers to make data readily available to multiple organizations. “Using the data collected in our test vehicles, we are building a comprehensive data set that will be valuable to several other teams at MSU and beyond,” says Walden. “We’re eager to see how this data will fuel breakthrough research and development in a wide variety of fields.”

ABOUT THE CENTER FOR ADVANCED VEHICULAR SYSTEMS

Mississippi State University’s Center for Advanced Vehicular Systems (CAVS) is one of the premier university automotive research centers in the world. A team of more than 300 students, staff, and faculty researchers work with government and industry partners to develop solutions that will enhance transportation safety, improve vehicle efficiency, and increase workforce productivity. The autonomous vehicle program capitalizes on top-rated high-performance computing (HPC) resources and a one-of-a-kind vehicle test site to conduct cutting-edge R&D for operating autonomous vehicles in complex environments.

Quantum

Quantum technology, software, and services provide the solutions that today’s organizations need to make video and other unstructured data smarter – so their data works for them and not the other way around. With over 40 years of innovation, Quantum’s end-to-end platform is uniquely equipped to orchestrate, protect, and enrich data across its lifecycle, providing enhanced intelligence and actionable insights. Leading organizations in cloud services, entertainment, government, research, education, transportation, and enterprise IT trust Quantum to bring their data to life, because data makes life better, safer, and smarter. Quantum is listed on Nasdaq (QMCO) and the Russell 2000® Index. For more information visit www.quantum.com.

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