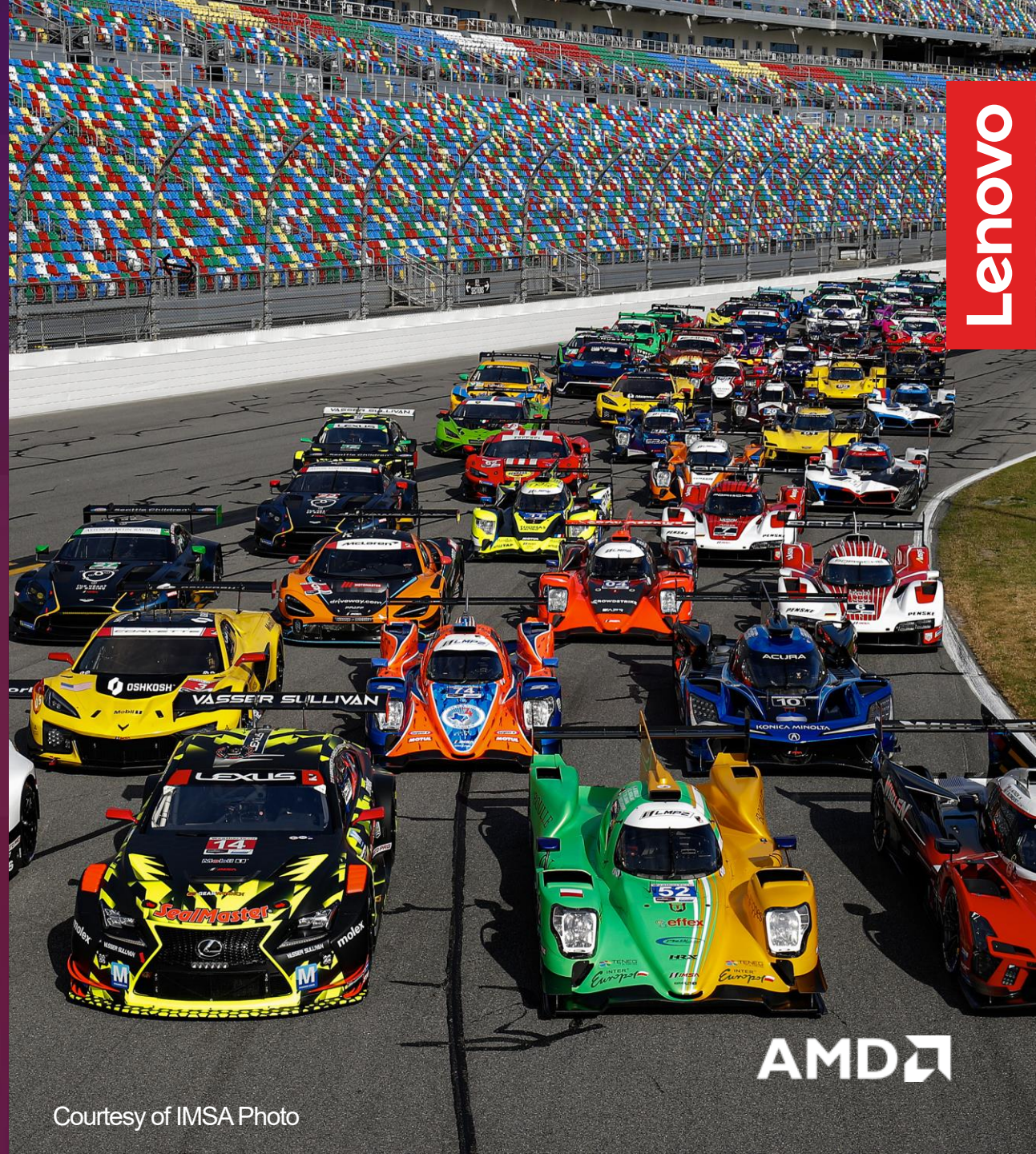
Automotive | United States

# Delivering next-level motor racing experiences

## IMSA

IMSA combines live video feeds with timing, scoring, and telemetry data from vehicles in real time, enabling faster insights into racetrack performance—all running on Lenovo ThinkSystem and ThinkEdge servers, powered by AMD EPYC™ processors, housed in a trackside mobile data center.




Courtesy of IMSA Photo

1 Customer background

# Who is IMSA?

The International Motor Sports Association (IMSA) is the premier North American sports car racing sanctioning body, featuring participation by 18 global automotive manufacturers using racing to develop technologies for future street cars and mobility. Owned by NASCAR, its flagship series is the WeatherTech SportsCar Championship. This series features multi-class racing with advanced prototypes (GTP, LMP2) and production-based GT cars (GTD Pro, GTD). IMSA is renowned for its prestigious endurance races, including the Rolex 24 at Daytona, the Mobile 1 Twelve Hours of Sebring, and the Motul Petit Le Mans. It sanctions multiple other series, serving as the pinnacle of sports car competition in North America. For more information visit IMSA.com.

# 2 The challenge

Technology is changing the world of sport, helping to enhance everything from athlete performance to race day strategy to fan engagement. Motorsport is at the cutting edge of this trend, with high-performance computing technology now shaping every aspect of racing—from vehicle design to real-time track updates to drivers, race control officials, and fans.

“IMSA was founded in 1969 and has evolved into one of the major worldwide authorities for professional road racing,” says Mark Raffauf, Senior Director of Competition at IMSA. “Up until the early 1980s, we operated events solely with people stationed around the racetrack; there was no video or imagery.”

# 2 The challenge

Today, motorsports events have high-resolution cameras in all key locations on racetracks while hundreds of sensors in each race car stream data on vehicle and driver performance in real time. As a result, IMSA is inundated with information during each race—and never more so than during the Rolex 24 at Daytona, where 61 cars race for 24 hours, covering almost 3,000 miles each.

2 The challenge

# Combining telemetry and video data

“Until recently, we were at the mercy of broadcast TV cameras to capture what we needed,” says Mark Raffauf. “We had a long, tedious process to look at replays. It didn’t give us instantaneous understanding of an incident.”

Today, IMSA uses an integrated data analysis and video system from Catapult (formerly known as SBG Sports Software). “This system allows us to combine HD video with the timing, scoring and telemetry data that we gather off the cars and puts it in one timestamped package,” says David McSpadden, Senior Director of Systems Technology at IMSA. “On any given race weekend, we can have up to 72 distinct camera angles. This allows race control to have replays at their fingertips blended with the data.”

2 The challenge

# Supporting scrutineering

IMSA also relies on specialized motorsports solutions from Bosch, including a data-logging system that integrates with vehicle sensors, featuring AMD field-programmable gate arrays (FPGAs).

Brooke Bond, Motorsports Operations Lead at Bosch, comments: “We provide the scrutineering system that allows IMSA to ensure fair and consistent competition with reliable data, ensuring information is available in a timely manner from cars by processing the data on-site.”

“AMD FPGAs are an important part of our **digital core platform**. They do the heavy lifting in almost all our Bosch Motorsport electronics. From displays to engine and hybrid control units, FPGAs operate **time-critical logic** to enable operation in real time with shared functionality between components.”

Brooke Bond

Motorsports Operations Lead, Bosch

3 The solution

# Turbocharged backend

Underpinning IMSA's mission-critical Catapult and Bosch solutions is a high-performance infrastructure based on two Lenovo ThinkSystem SR645 V3 servers—each with 15 TB solid state drives, 128 GB of RAM, and powered by AMD EPYC™ 7313 16-core processors.

"On the backend, the software suite is constantly saving video files to disk at around 700 MB per second, as well as all the telemetry, timing, and scoring data from vehicles to a MongoDB database on our servers," says David McSpadden.

## Hardware

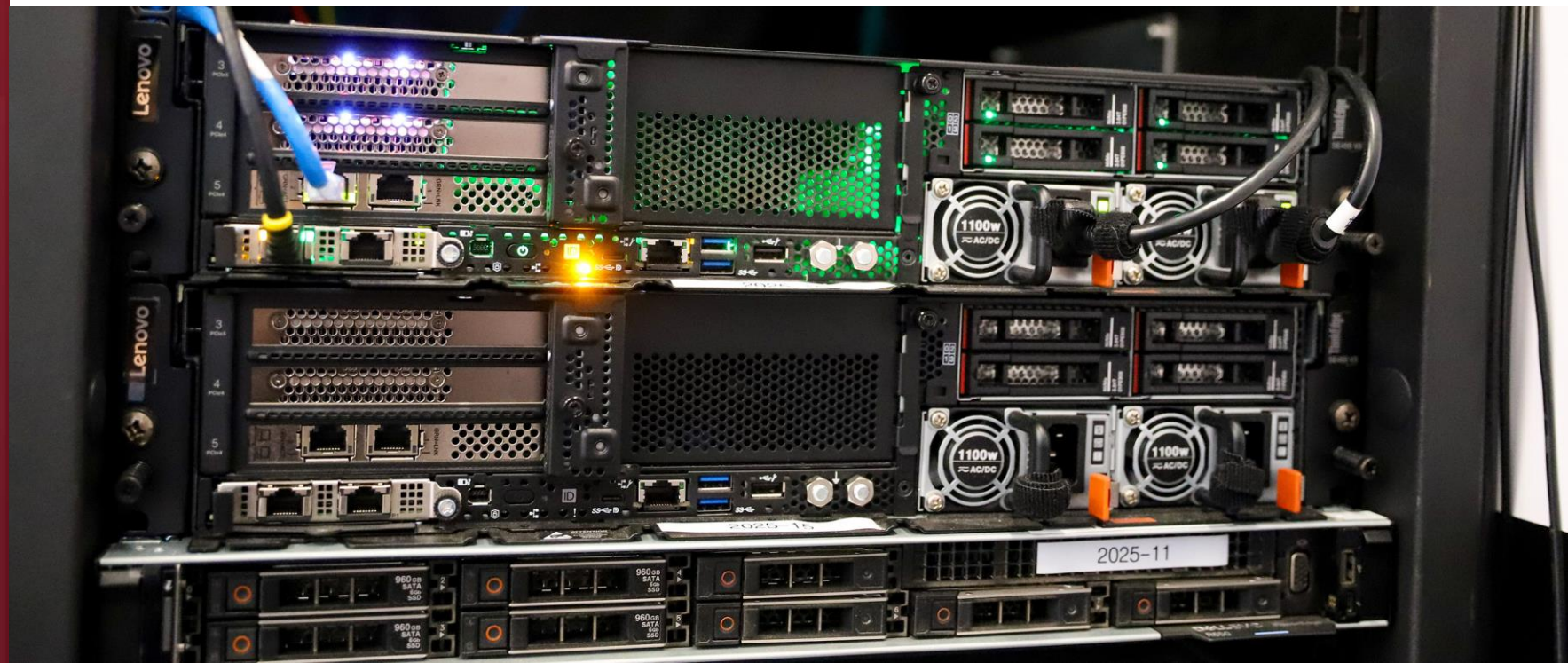
Lenovo ThinkSystem SR645 V3 servers powered by AMD EPYC™ 7313 processors
Lenovo ThinkEdge SE455 V3 servers powered by AMD EPYC™ 8004 processors
Lenovo ThinkPad Z16 laptops powered by AMD Ryzen™ CPUs and AMD Radeon™ graphics cards

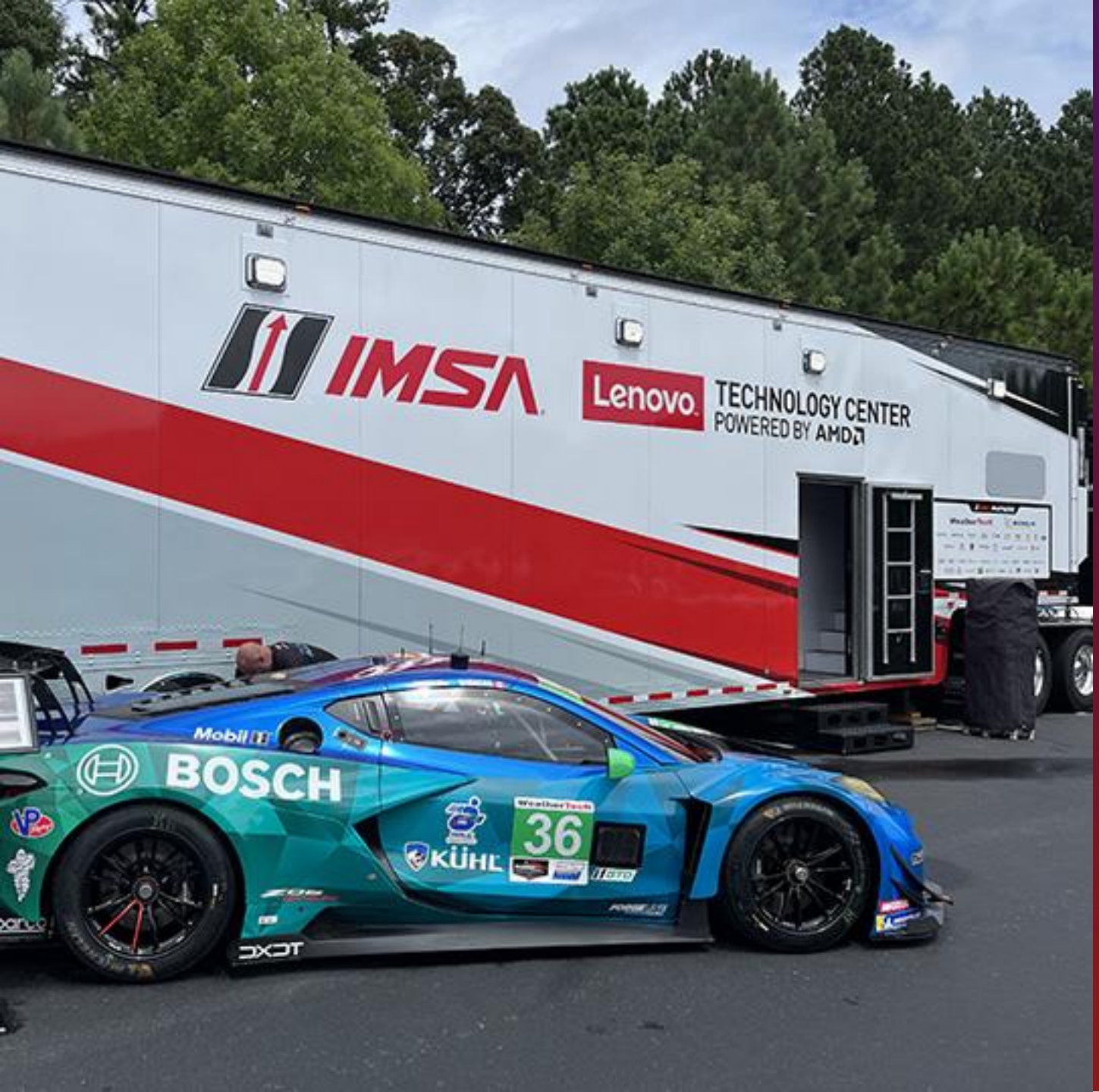
## Software

Bosch Motorsport
MongoDB
Catapult Sports
VMware

# 3 The solution

David McSpadden continues: “We have one production server and one backup server. On each of those, we have two VMware virtual machines powering half of the video channels each.”

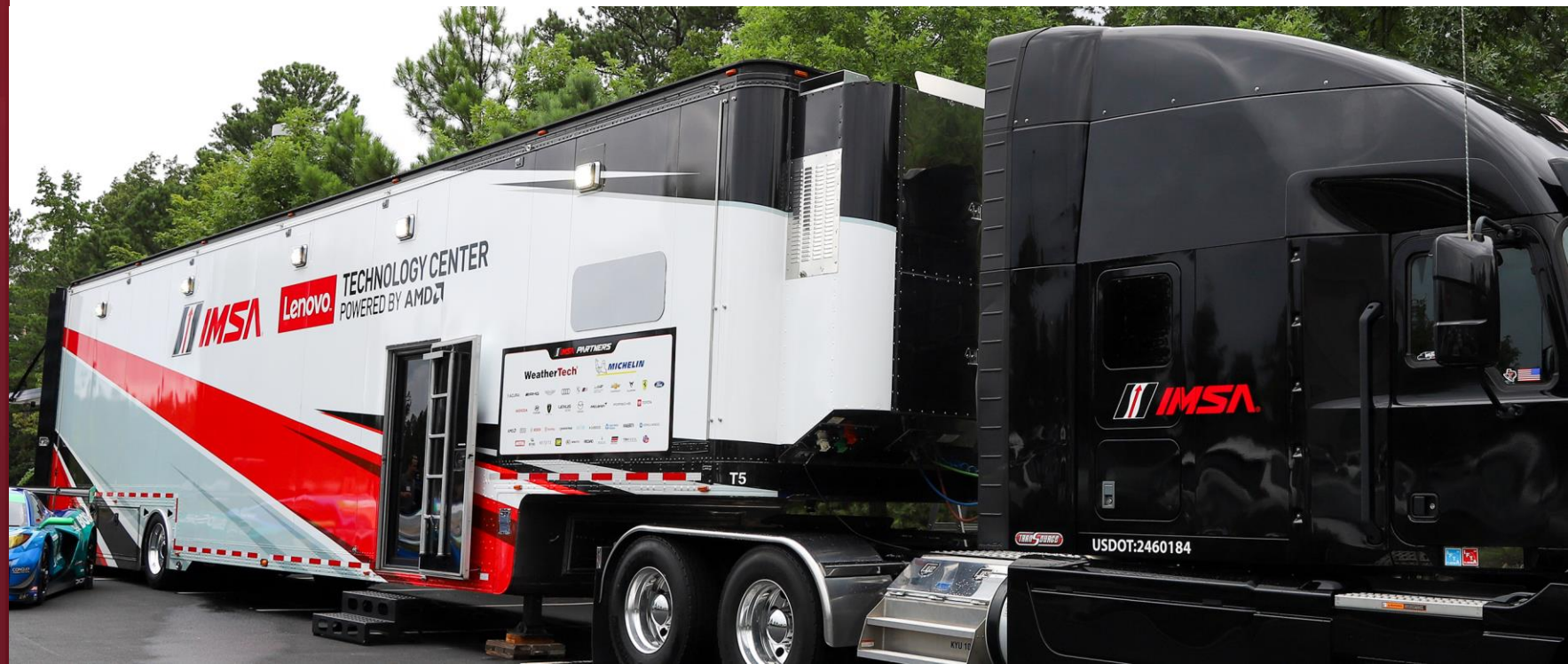





For rapid trackside data processing and analysis, IMSA installed the Lenovo ThinkSystem SR645 V3 servers in its mobile data center, which is housed in an 18-wheeler truck. This powerhouse on wheels is also equipped with two Lenovo ThinkEdge SE455 V3 edge servers, powered by AMD EPYC™ 8004 processors, enabling real-time data processing during races.

# Real-time analytics at the edge

The Lenovo ThinkEdge SE455 V3 is a rugged, compact-sized edge solution capable of handling temperatures from 0-55°C while delivering high performance for demanding race analytics right at the racetrack.



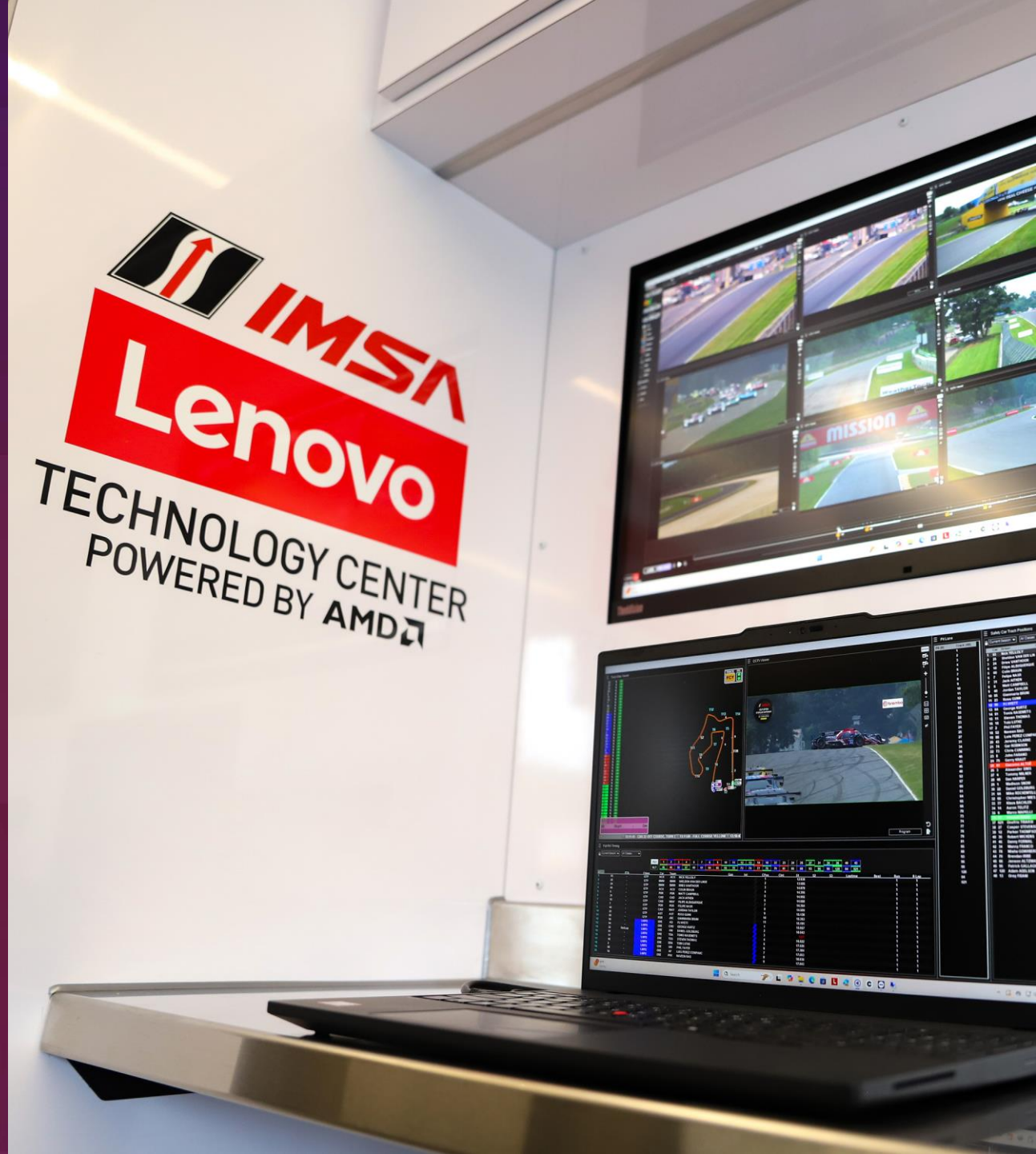
3 The solution

# Data center on wheels

The mobile data center serves as a central technology hub, capturing more than 10,000 individual data points per second.

The IMSA Lenovo Technology Center Powered by AMD connects a race series, its race operations, its timing and scoring, its teams and its broadcasters in one spot and travels to IMSA events across the U.S. It had a successful first season in the IMSA WeatherTech SportsCar Championship since debuting at Daytona International Speedway for the season-opening Rolex 24 At Daytona weekend in January 2025.

On the frontend for race officials, IMSA deployed Lenovo ThinkPad Z16 laptops powered by AMD Ryzen™ CPUs and AMD Radeon™ graphics cards in the mobile data center.



3 The solution

# Powerful frontend

“We have a dozen Lenovo laptops, all with AMD CPUs and GPUs,” notes David McSpadden. “Our users will have a multiplex of dozens of camera angles up all at once, analyzing what’s happening in multiple different locations. One of the key early decisions that we made compared to some of the other racing series was to send multicast video everywhere over our network. This means five people can watch in race control, while someone else can watch in a completely different location.”

“We deal with really high-resolution data and upwards of 400 data channels per car. Many of our channels are being logged at one millisecond intervals, so we’re creating very large volumes of information. Our Lenovo laptops with AMD CPUs **deal with all this data flawlessly in real time during the race**. We also put together performance reports that are generated as soon as the checkered flag drops.”

Matthew Kurdock

Managing Director of Engineering, IMSA

3 The solution

# Rapid, reliable deployment

Working with Lenovo and AMD, IMSA successfully deployed the new infrastructure mid-season.

“We tested the system just once at Michelin Raceway Road Atlanta at the end of 2023 and moved to it the first race one event later at the beginning of 2024, which was a 24-hour competition at Daytona, the Rolex 24,” recalls Mark Raffauf. “Out of the box, our Lenovo and AMD technology has been great.”

# 4 The results

The Lenovo ThinkSystem SR645 V3 servers powered by AMD EPYC™ processors bring together telematic and video data into one package. By combining live video feeds with timing, scoring, and telemetry data from vehicles in real time, IMSA gets better insights into racetrack performance, faster.

“Just running the new system side by side with what we used to do at one event, we saw it was immediately superior,” says Mark Raffauf.

- Supports up to 72 video feeds delivering up to 700 MB/sec of data
- Supports up to 400 channels of telemetry data per car
- Enables race control to see dozens of different camera angles at once
- Delivers engaging race data feeds for fans

# 4 The results

Mark Raffauf continues: “It ran so well and just gets better because we are becoming more familiar with it. In race control alone, our officials can have five or six laptops watching different things at the same time, which is completely brand new for us. That capability allows safer, quicker, and more efficient decision-making in officiating the event because we can have people looking at the pitlane, the technical issues, or following a car around the racetrack that has been damaged to see if that damage is deteriorating. All these things can be done simultaneously, which never was the case before.”

4 The results

# Delivering fan engagement and safer racing

The new system is helping IMSA to enhance both race operations and the fan experience.

For example, IMSA can now anticipate the severity of conditions of an accident based on real-time data. “As soon as an incident with a car has occurred, we know what impact it has taken,” says Matthew Kurdock. “Before any of our safety and incident response personnel are on the ground, we know the extent of the accident.”

He adds: “We can also integrate the telemetry coming off the car into the broadcast. You can now see basic information on throttle, braking, engine, and vehicle speed, and how much energy remains in the tank of the car. This gives fans a better view of how the race strategy is going to play out. We’ve got this data not only integrated into the race broadcast, but we also have a web page where fans can see a variety of live telemetry from the cars as they’re racing.”

“This was a **huge step forward** for us. Our system is a lot more stable with a lot less maintenance than others using Catapult. **The list of cool stuff that we could now do is never ending.** There’s going to be more camera angles. We’re looking at doing some interesting things with telemetry and streaming to our fans. We’re really excited about the new opportunities available.”

David McSpadden

Senior Director of Systems Technology, IMSA

# Why Lenovo and AMD?

For IMSA, performance is the aim of the game—both on the racetrack and in the data center. Lenovo servers and laptops powered by AMD processors deliver exceptional performance and efficiency.

“The main thing about AMD EPYC™ CPUs is their efficiency,” confirms David McSpadden. “Our servers barely hit 60% utilization. Other organizations should follow what we’ve done. We’ve encouraged the software vendor to look at AMD EPYC CPUs as well.”

# How do you ingest, process, and analyze data from racecars in real time?

IMSA unlocks the performance for real-time motorsport telemetry and multiple video feeds using Lenovo servers powered by AMD EPYC™ processors.

**Explore Lenovo ThinkSystem Solutions**