Microsoft Server Product Portfolio
Customer Solution Case Study

Firm's Solution Accelerates Access to Huge Data Stores for Formula One Race Teams

Customer: McLaren Electronic Systems
Website: www.mclarenelectronics.com
Customer Size: 135 employees
Country or Region: Great Britain
Industry: Manufacturing—High tech and electronics manufacturing
Partner: EMC
Partner Website: www.emc.com

Customer Profile
McLaren Electronics Systems is part of the McLaren Group, a private group of companies that includes McLaren Racing. Based near London, it develops, manufactures, and deploys control and data systems for professional motor sports teams, high-performance automotive manufacturers, and other industries.

Software and Services
- Microsoft Server Product Portfolio
  - Microsoft SQL Server 2008 R2 Enterprise
  - Microsoft SQL Server 2008 R2 Parallel Data Warehouse
- Technologies
  - Microsoft SQL Server 2008 R2 Analysis Services

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"The SQL Server 2008 R2 Parallel Data Warehouse technology allows for new kinds of historical and specific analyses of huge data sets in real time and at affordable prices."

Peter van Manen, Managing Director, McLaren Electronic Systems

McLaren Electronic Systems created SQL Race, a solution built on Microsoft SQL Server 2008 R2 database technology that helps to manage data generated by Formula One auto racing activities. With the release of Microsoft SQL Server 2008 R2 Parallel Data Warehouse, McLaren saw a chance to boost the capabilities of SQL Race and become one of the first companies to explore using massively parallel processing data analysis capabilities to analyze huge data sets in real time.

Business Needs

McLaren Electronic Systems is a leading name in the fast-paced world of Formula One auto racing. Together with its technical partner Microsoft, McLaren Electronics is the official supplier of engine control units (ECUs) and associated data systems to all of the teams competing in the Fédération Internationale de L'Automobile Formula One World Championship annually between March and November.

The ECU is a standardized engine control unit that manages the engine, transmission, and other components of Formula One race cars, which routinely race at speeds of up to 200 miles per hour. It is also the prime data logger for the cars, acquiring measurements from more than 100 sensors on the engine and chassis.

Partnering with Microsoft, McLaren decided early on to incorporate Microsoft SQL Server 2008 R2 Enterprise data management software as part of the overall ECU solution. The resulting McLaren product, called SQL Race, makes it possible to capture, store, and access large volumes of data at high speeds. Performance data collected from ECU devices is sent at speeds of up to 4

megabits per second. SQL Race was first deployed in 2010 and is becoming a highly valued tool on the Formula One racing circuit. But the McLaren team knew it was just the first step in an extended development process.

"There continued to be challenges with the sheer volume of data generated," says Peter van Manen, Managing Director of McLaren Electronic Systems. "During a race season, teams collect literally hundreds of billions of measurements. We looked for ways to help race teams quickly find the information they needed in massive data sets."

Solution

McLaren became one of the first companies to see the possibilities in the Microsoft SQL Server 2008 R2 Parallel Data Warehouse. The solution combines SQL Server database technology, low-cost hardware appliances, and a hub-and-spoke design to deliver a massively parallel processing (MPP) architecture capable of providing extremely fast, highly scalable systems for managing up to hundreds of terabytes of data.

McLaren engaged with EMC, a Microsoft Gold Certified Partner, to develop a Parallel Data Warehouse solution that would work in tandem with SQL Race. The EMC work included developing analytics that could take advantage of how the MPP architecture handled read-intensive workloads against very large data sets so race teams could quickly access and analyze information from billions of rows of historical data. For example, during one test session, EMC loaded 1.5 terabytes of session data into the Parallel Data Warehouse solution at speeds of more than 100 megabits per second. This allowed all of the data to be available for analysis in less than seven minutes. Data was then scaled up to 12 terabytes to simulate 90 complete race and test sessions, allowing cross-session analysis against almost 400 billion rows of data.

It took EMC less than one month to complete its Parallel Data Warehouse solution using business intelligence tools based on SQL Server 2008 R2 software, including Microsoft SQL Server 2008 R2 Analysis Services. EMC consultants developed extract-transform-load scripts to load data onto the new system, created and populated tables, designed the indexing, wrote queries, and created sample reports.

Benefits

By using the Microsoft SQL Server 2008 R2 Parallel Data Warehouse, McLaren and EMC created a flexible solution that rapidly collects and distributes massive amounts of data in real time under harsh operating conditions. The technology provides an innovative, flexible development environment that can help McLaren keep pace with the fast-moving needs of the racing circuit. Designers, engineers, and mechanics now can quickly search through very large data sets to find patterns so race crews are able to make split-second decisions about the condition of their cars.

Rapid Data Delivery

The technology behind the Parallel Data Warehouse solution and SQL Race provides a level of extremely fast data access that used to be limited to simple file systems. "That's not a trivial task," says van Manen. "The Parallel Data Warehouse architecture allows us in mere seconds to get answers to queries such as 'Where has this happened before?' and 'How does this relate to similar events?' This capability can be used for identifying, searching for, and matching patterns to learn more about cause and effect. The SQL Server 2008 R2 Parallel Data Warehouse technology allows for new kinds of historical and specific analyses of huge data sets in real time and at affordable prices."

Fast Queries Against Massive Data Sets

A Formula One car generates hundreds of millions of data points per hour, and hundreds of hundreds of billions of measurements build up over the course of a season. "With the Microsoft technology, our SQL Race solution can handle this massive accumulation of data," says van Manen. "During one test, EMC consultants took a pattern of value from one data set to search for similar patterns in another set. Working with 400 billion rows of data, they achieved query times of about 13 seconds. This is a huge performance benefit for teams that have to analyze information and make decisions in real-time racing conditions."

Innovative, Flexible Development

The widely available development tools used to build SQL Race and the Parallel Data Warehouse solution help organizations like McLaren make easy modifications as needed. "The racing circuit is perhaps the most relentless development environment in the world, with new cars arriving and evolving throughout the year," van Manen says. "Microsoft provides an ideal software development platform for such an intense, mission-critical, and high-profile environment. With the Microsoft tools, we can make refinements very quickly. They accelerate our ability to get updates and innovations to market faster so we can keep pace with the demands of the Formula One world."

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