Advanced Fuel Dispenser Brings In-Store Conveniences to Driver’s Seat

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Dan Harrell, Senior Director, Marketing and Product Management, Dresser Wayne

With a company history that stretches back to 1891, Dresser Wayne is a true pioneer in the retail fueling industry. When a high-volume national retailer approached Dresser Wayne about building the industry’s most reliable fuel dispenser, the company’s product designers were ready to meet the challenge. Embedded operating system requirements included real-time operation and reliable TCP/IP networking and XML support for seamless integration with legacy in-store POS systems and site management software.

After considering many embedded solutions, including Linux, the company chose Microsoft® Windows® CE version 5.0 and worked with Microsoft Windows Embedded Partner BSQUARE. The technology platform developed by Dresser Wayne not only guarantees uninterrupted fuel sales 24/7 and allows retailers to diagnose and troubleshoot problems before they occur, but it also allows consumers to watch full-motion color videos, make purchases, print coupons, and much more.
Situation

Retailers are increasingly turning to gasoline sales as a way to bring customers into stores. But as a new breed of high-volume retailers—such as wholesale clubs, convenience stores, and supermarkets—enter the petroleum arena, they have new requirements. Unlike standalone gas stations, these retailers risk losing more than just fuel sales when a pump goes down—they risk losing profitable ancillary sales.

That’s why a major U.S. retailer approached Dresser Wayne, a forerunner in fuel dispenser technology, about developing a system that was more reliable than available solutions. The problem with traditional fuel dispensers is that they are typically connected to a single controller inside the store. If the controller in the store goes down, all the pumps in the forecourt go offline. Dresser Wayne’s customer wanted a self-contained solution that would operate no matter what happened to the central point-of-sale (POS) system.

At the same time, Dresser Wayne recognized they had an opportunity to build a fuel dispenser platform that gives petroleum retailers the ability to deliver marketing messages and other value-add information to customers as they pump gas into their vehicles.

Technical requirements of the embedded operating system included support for color display screens, soft key and touch-screen interfaces, support for legacy protocols requiring hard real-time interaction, 24/7/365 uptime, support for TCP/IP networking, full-motion and full-screen multimedia content and tools, and complete remote management.

Solution

Dresser Wayne was encouraged by its point-of-sale hardware vendor to consider open source operating systems such as Embedded Linux. But according to Dan Harrell, Senior Director of Marketing and Product Management for Dresser Wayne, there were three reasons why Dresser Wayne chose Microsoft® Windows® CE version 5.0 instead.

“First, we would have had to spend lots of money to encapsulate tools and technologies, such as a web browser and media player, which are already included with Windows,” says Harrell. “Second, using Windows CE fit into our long-term strategy to use the Microsoft .NET Compact Framework to develop application components that run across all of our platforms, from servers to PCs to outdoor kiosks. Third, my group is already trained on Microsoft tools and programming methodologies, so it would have been a dramatic move to take up Linux development.”

He concludes: “We estimate that choosing Embedded Linux over Windows CE 5.0 would have added hundreds of thousands of dollars in costs and delayed development by months.”

Choosing Windows CE had additional benefits beyond cost and time to market. “The need for a hard real-time embedded operating system with exceptional TCP/IP networking and XML support capabilities made the combination of Windows CE and the .NET Framework the best choice for the new dispenser,” says Harrell. “In addition, Windows CE and .NET were able to provide a system resilient enough to keep the dispensers up and running dependably, at the same time offering an enormous number of tools for integrating current applications and developing new ones.”

Windows Embedded Partner BSQUARE was instrumental in the development process, providing not only runtime and tool licenses, but also delivering Windows CE 5.0 training.

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validating Dresser Wayne’s technology roadmap, and consulting on various development issues.

“BSQUARE is an important partner,” says Harrell. “They assist us in understanding the implications of licensing agreements. They help us look into the future of Windows Embedded technology so we can plot out a roadmap for the platform. And their training allows our development team to become more productive and self-sufficient.”

Within six months, Dresser Wayne took the product from paper proposal to market release using off-the-shelf hardware. Custom hardware development added another two months, but the overall deadline for the high-volume retailer was met successfully.

“Meeting product delivery schedules is not only important to our development team, it’s also critical to our customers’ success,” states Harrell. “We’ve released several generations of this product over the last two years, and every development has been on time. In that time, total sales to the initial customer and others have exceeded 3000 units.”

The final result of Wayne’s efforts is the Ovation® iX fuel dispenser, a multimedia enabled dispenser and outdoor kiosk. The heart of the Ovation iX dispenser is Dresser Wayne’s IX™ Technology Platform based on Windows CE 5.0. This scalable, open-architecture platform currently supports three product extensions designed to benefit consumers and retailers:

iSense™ self-diagnostics software empowers the retailer to diagnose and troubleshoot potential site equipment problems before they occur and allows for off-site, real time monitoring of tank levels and flow rates.

iDPOS™ in-dispenser point of sale feature helps to assure uninterrupted fuel and merchandise sales 24/7/365 by independently managing transactions and credit card sales at the dispenser, even if the in-store POS is off-line. IX Media allows consumers to watch full-motion, site-specific video commercials right on a dispenser-integrated 10.4” color display. Customers can even print customized coupons at the dispenser.

“The industry sees the Ovation iX fuel dispenser, featuring the IX Technology Platform, as a new avenue to further their ability to enhance loyalty applications, drive sales, improve customer experiences, and lower overall total cost of ownership through remote management,” says D.P. Rabalais, Director of North American Marketing for Dresser Wayne.

Benefits
Microsoft Windows CE 5.0 delivered several important benefits to Dresser Wayne, including robust support for TCP/IP and XML; access to products and technologies such as Internet Explorer, Windows Media® Player, and .NET Framework; and hard real-time performance to support both legacy and future protocols with device level precision.

Real-Time Performance
The hard real-time performance of Windows CE 5.0 ensures that the Ovation IX dispenser can interoperate with a central POS system, typically located inside a retail structure. Most POS systems use the legacy RS-45 communication protocol to poll fuel dispensers, and the systems expect a response within a specific time frame. Other security and remote management devices also need to poll the fuel dispensers, so setting priorities for response times is critical.

The enhanced real-time features of Windows CE provide sophisticated thread handling and the ability to set and manage thread priority levels. Dresser Wayne uses thread...
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For more information about BSQUARE, call (888) 820-4500 or visit the Web site: www.bsquare.com

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prioritization to ensure that a POS, with an interrupt response time (IRT) of 50 milliseconds (ms), has a lower priority than a security device with an IRT of 35 ms. “Thanks to the exceptional real-time capabilities of Windows CE, the iX technology platform can perform very demanding fuel dispenser activities while offering additional feature sets that help fuel retailers dramatically lower their ownership costs, reduce unexpected downtime, and increase productivity,” says Harrell.

The .NET Framework
A few years ago, Dresser Wayne made a strategic decision to adopt the Microsoft .NET Framework, an integral Windows component for building and running the next generation of software applications and Web services. The ability to run .NET applications on Windows CE 5.0 was an important benefit for Wayne.

“.NET gives us one of the most powerful tools we have ever had when it comes to developing ‘fit for purpose’ business logic code that can be used in a variety of applications,” says Harrell.

Code for totaling a transaction, for example, can be used across dispenser, POS, and kiosk applications. Additionally, many of Dresser Wayne’s business-level applications are already created using the .NET Framework, which gives the company the flexibility to reuse these components in both in-store and outdoor applications.

“The real beauty of the .NET Framework is that it saves us lots of time and cost because we can develop and test business logic code once, and then run it across a variety of applications and platforms,” says Harrell. “.NET gives us a foundation upon which we build applications that solve business problems.”

Multimedia Platform and Tools
For Dresser Wayne, creating a fuel dispenser that appealed to a consumer’s senses was almost as important as reliability. The Ovation iX dispenser and iX Media extension take full advantage of the many multimedia features and functions built into Windows CE 5.0. “By using the tools and technologies included with Windows CE, our developers were able to focus their time on device differentiation and innovation instead of licensing and integration,” says Harrell.

“We also believe that consumers appreciate using familiar interfaces like Microsoft Internet Explorer and Windows Media Player,” he adds.

Reliability
The issue of reliability was successfully solved by the Ovation iX dispenser and its iDPOS feature, which ensures continuous fuel sales 24/7/365.

“Our initial target client expected that under no circumstance would the dispenser ever go off-line,” says Harrell. “One of the reasons we chose Windows CE is because Microsoft offers access to source code. If I need to understand what’s going on under the hood, I can examine the source code. It gives me enormous power when I can tell my client that I have 100 percent control and accountability. Only Windows CE can give us what I call ‘access to reliability.’”

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