

SSG Innovations LLC

SSG Innovations Uses OpenNETCF.org's Smart Device Framework and the .NET Compact Framework to bring efficiency to the railroad industry

CASE STUDY

SSG Innovations wanted to simplify and streamline the processes involved in managing and maintaining freight railroad car and locomotive maintenance facilities. To do so, they created Express Yard™, which uses a wireless mobile application written using the .NET Compact Framework and OpenNETCF.org's Smart Device Framework for data capture. Express Yard™ enables rail employees to enter data as tasks are completed, utilizing streamlined and intuitive screens designed for quick and accurate data entry. In combination with the logical flow of the interface, we have considerably reduced the possibility of data entry errors and omissions. Once the data is entered into the system, it can be reused for different reports without the need to reenter data.

Express Yard™ currently provides significant improvements for customers in the areas of yard management, car cleaning and car repair. With the positive reception achieved so far, additional features are being added to also cover inventory management, locomotive maintenance, commodity loading and RFID tag reading.

Situation

Automated billing systems are nothing new in most industries, including railroad maintenance, but after market analysis, SSG Innovations identified several areas that required improvement.

A large number of companies produce bills through a computerized system. Unfortunately, the bills are often printed and mailed to the end customer, as well as being filed locally and manually reconciled against receipts. This can create an excessive amount of work for the accounting department and increase the time between work completion and actual payment.

Even though the billing systems were often computerized, the data was almost always collected in the rail yard on paper forms. The data from these forms was later entered by hand into the system, and usually by someone other than the person who performed the work.

Not only did this “double data entry” require extra time to process, it also greatly increased the chance of errors.

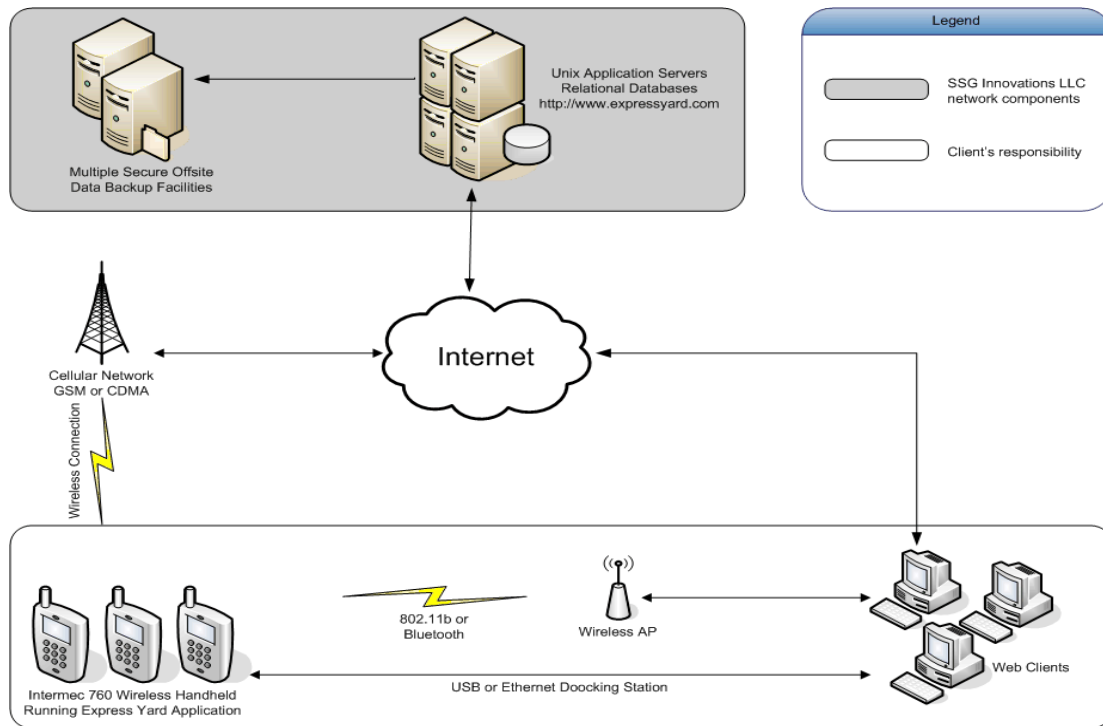
Often these errors were not caught until a customer was billed and challenged an invoice. Not only could this be damaging to customer relations, it also caused extra work for accounting to both rectify the balance sheet and process the charge-back.

Solution

SSG Innovations saw an opportunity to introduce a distributed solution that consisted of two parts: a central database and server running data logic and business rules along with a field application for data collection and validation. They call their solution Express Yard™.

Express Yard™'s central server provides a centralized, secure repository for all collected data and enables quick, customizable, online reports and billing.

Express Yard™'s field application runs on either a PC via a Web interface, or using a mobile, ruggedized, wireless Windows Mobile handheld device running an application written using the .NET Compact Framework.



**Note: Client may choose to use any combination of the connections shown above for handheld device. An 802.11b wireless connection is not necessary but is recommended.*

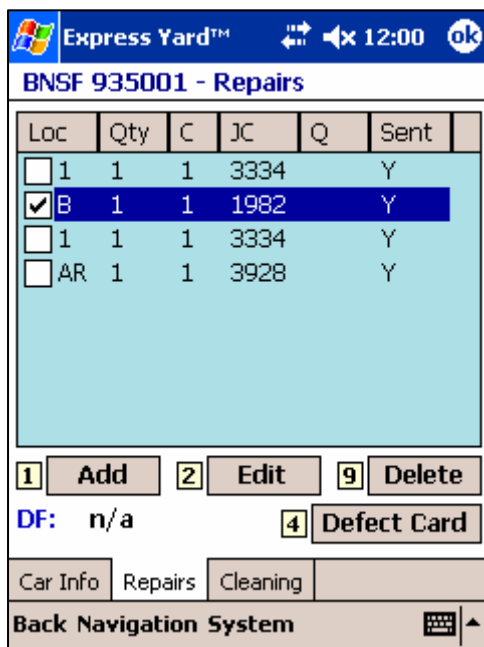
Figure 1 - SSG Innovations' Express Yard™

"When we started developing using the Compact Framework (CF), it didn't take long for us to realize that some features we needed were either going to take a significant amount of time to develop or simply weren't going to be feasible in our timeline," says Robert Wojciechowski, Partner and Lead Software Architect at SSG Innovations. "The CF provides enormous gains in developer productivity and stability compared to unmanaged code, but compared to the full desktop .NET Framework there is just a lot that isn't there, yet."

After a few weeks of development, SSG Innovations discovered OpenNETCF.org's Smart Device Framework. The Smart Device Framework (SDF) is a comprehensive set of free shared source libraries written specifically for .NET Compact Framework developers. The SDF was designed to provide certain features that exist in the full .NET Framework but were omitted in the Compact Framework, as well as providing other classes and functions tailored to the mobile application environment.

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"Finding libraries of pre-built, and more importantly, tested code afforded us the opportunity to integrate these into our application with little development time, which paid off in spades," says Wojciechowski.



Benefits

By coupling Microsoft's .NET Compact Framework and OpenNETCF.org's Smart Device Framework, SSG Innovations was able to produce an initial implementation of Express Yard™'s mobile device interface and get it into commercial use in just seven weeks.

Again Wojciechowski: "We now have an in-house multi-form caching framework similar to that which is in the article section on OpenNETCF.org but customized to our application. The code and strategy outlined allowed us

A keyboard acceleration framework provides simple, intuitive navigation of rich functionality.

to quickly implement Web browser type navigation (back, history), support for modal forms, programmed paths through forms, a framework for drawing titles on all forms/tab pages and much more.

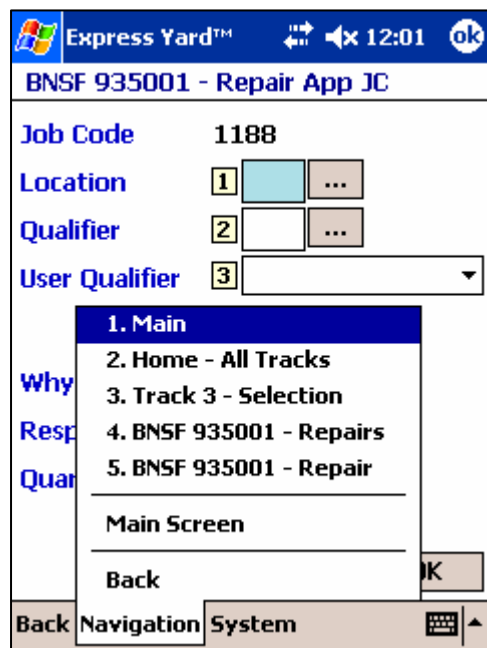
“...The workarounds became nearly non-existent....The application just works and the code makes sense...”

The Serial communication library saved us a couple weeks of writing, testing and debugging our own GPRS modem communication library, and by using several of the OpenNETCF.org controls we were able to compact and streamline the user interface. But what really paid off was the ApplicationEx class. Our users needed a simple-to-use but fairly sophisticated system for form navigation from the keyboard, and the .NET Compact Framework simply didn't provide any way to do it.

The ApplicationEx class let us implement a great keyboard acceleration framework based on message filters and allowed us achieve total control of the user interface. We probably cut the original code down by half once you consider all of the workarounds we had sprinkled throughout our code to try to get form navigation working under just the Compact Framework. Now that we've implemented the OpenNETCF.org code, the workarounds became nearly non-existent ; the application just works and the code makes sense.”

Microsoft's Windows Mobile platform, along with the .NET Compact Framework, create a solid foundation on which solution providers can quickly architect and deliver robust solutions for their customers. However, the Compact Framework is still in its infancy, and many of the features that developers have come to rely on are simply not present. OpenNETCF.org fills this need by providing quality shared-source libraries and a depth of knowledge unavailable anywhere else.

By incorporating OpenNETCF.org's Smart Device Framework, the Microsoft .NET Compact Framework, and their knowledge of the railway vertical market, SSG Innovations was able to implement a high-value solution that greatly reduced costs, as well as time



to market, while improving both productivity and quality for their customer.

The OpenNETCF.org Smart Device Framework is a free, shared source, set of classes and controls that enrich and extend the Microsoft .NET Compact Framework. By utilizing the Smart Device Framework, developers can provide more robust customer-driven solutions, experience reduced time to market, and provide a wider variety of features than can be accomplished with the Compact Framework alone.

For more information about the OpenNETCF.org Smart Device Framework go to:
<http://www.OpenNETCF.org/SmartDeviceFramework.asp>

The Microsoft® .NET Compact Framework, a subset of the .NET Framework, extends the benefits of developer productivity and Web services integration to resource-constrained devices, such as Pocket PC and other Windows CE-based systems. It provides a highly productive environment for development and integration with virtually any data source, ranging from local Microsoft SQL Server™ CE databases to enterprise back ends. The Compact Framework's unified, hierarchical class library enables software developers to rapidly construct rich user interfaces, access native operating system methods, and interoperate with assets on the device, such as the infrared data port and other hardware extensions.

For more information about the .NET Compact Framework go to:
<http://msdn.microsoft.com/vstudio/device/>

For More Information

For more information about the OpenNETCF.org products and services, go to:
<http://www.opennetcf.org>

For more information about SSG Innovations LLC and Express Yard™, go to:
<http://www.ssginnovations.com>
<http://www.expressyard.com>

For more information about Microsoft Windows Mobile products and services, go to:
<http://www.microsoft.com/windowsmobile/default.aspx>