PREMIER combines real-time material usage tracking and a dynamic workflow interface into one powerful solution.

SPECIFICATIONS

Technologies

Software
- ASP .NET 2.0
- Microsoft SQL Server 2005
- Windows 2000 or XP Professional
- Internet Explorer™
- psiScrΨpt

Networks
- Ethernet
- 802.11 Wireless Access

Hardware
- Computers
- SQL Database Server
- IIS Web Server
- Wireless Handheld Terminals
- Wireless Access Points

Objectives

Technical Goals
- Material Tracking
- **Electronic Instructions**
- **Mobility**

Production Benefits
- Mobile data collection
- Dynamic workflow instructions
- Easily modified processes
- Improved data accuracy

PREMIER System Integrators, Inc. is committed to delivering the finest quality material tracking solutions to our customers. We would like to discuss the advantages of our approach and recommend integration solutions for your production strategy.

Background

A large automotive manufacturer needed an electronic solution for tracking material usage in their paint mix room. They also needed the ability to provide electronic instructions to their operators, while allowing a supervisor to modify those instructions easily. They came to PREMIER to implement a solution utilizing the latest wireless handheld technology, mobile and server-based database storage, and web-based configuration and reporting.

The Challenges

1. The existing material usage and tracking was managed on paper, and then manually entered into a database for the Environmental department, resulting in poor efficiency and inaccuracy.

2. Procedures for handling hazardous materials were kept on printed sheets. Due to changes in materials, workflows, and the physical layout of the mix room, the procedures needed to be constantly updated; costing time and money.

3. The mix room is a Class 1 Div 1 Hazardous area, meaning that any electronic equipment used in this area must be intrinsically safe. This immediately limited the options for using a PC or HMI for data entry.

The Solution

This system required two main applications: a web application for basic system configuration and for maintaining the dynamic workflows, and a handheld application to execute the workflows and synchronize data to the master database.

PREMIER chose Internet Information Server using ASP.NET 2.0 for the user interface, and Microsoft SQL Server 2005 for the backend database; leveraging Reporting Services for specific reports. A C# .NET application was written for the handhelds using the .NET 2.0 Compact Framework, and SQL Server Compact Edition was used to mirror data from the host database for use in areas where wireless access was not available. The system architecture is shown below.

A simple but powerful programming language, psiScrΨpt, was developed to drive the dynamic, interactive handheld application. The psiScrΨpt instruction set includes basic math, string, and database operations for calculations between workflow steps, along with several interactive operations such as Instruction, Decision, User Input, and Selection. Using the Workflow Builder portion of the web application, a supervisor can add, remove, or edit any workflow process without the need to touch the handhelds themselves. The process steps are stored in the host database, along with any parameters that need to be displayed or collected from the operator. Whenever the handheld has a wireless connection, it automatically synchronizes process data with the host database; completely transparent to the operator.

With the new system in place, operators use the handhelds for any process related to handling material in the mix room. They simply log into any handheld using their 4-digit pin, then select a process from the list. The workflow guides them through the entire process, prompting them for information at each appropriate step. After the process is done, it is automatically synchronized with the host database. Users can immediately view the material tracking data and usage reports.

Web Server (IIS)
Database (SQL Server 2005)
Ethernet
Wireless Access Point
Wireless Handhelds
Client PCs