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Web-based Warehouse Management System (WMS) is the way to go

Abstract

A Web page is a simple text file that contains Hyper Text Markup Language (HTML) code that describes how the text, images, forms, and other items will appear when a browser displays it on the screen. The code represents simple instructions that tell the Web browser how the page should look when it is displayed. The code tells the browser to do things like change the font size or color, or arrange items in a table. A Web browser interprets this code to decide how to format the information onto the screen. Web browsers are found on any number of Operating Systems (OS). Web pages are stored on a web server. This server can run any number of OS's. The server knows where the request for information comes from and can send the requested information back to the requestor. The Internet is what we're most familiar- where we can click on a link and go anywhere in the world. An Intranet is an internal website that serves the users of an internal Local Area Network (LAN).

Introduction

A web-based Warehouse Management System (WMS) is a viable system for smaller to medium sized warehouses. There are literally thousands of WMS software packages available today. They vary in size, scope, deployment, OS and cost to name a few. Very few systems if any are web-based. This article will discuss the typical features and components of a WMS and compare web-based technology to other client based methods for warehouse management systems. There are many OS's available for running a web server. Due to the writer's field of expertise, this article will only refer to a web server running in the Windows environment.

Choosing a System

There are some basic requirements that a team tasked with choosing a WMS needs to be sure the system can comply.

These are:

- Will it do what you want?
 - Will the system accomplish the goals you have set forth
- Is it easy to use and maintain?



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- Will the average user be able to do his job with minimal instruction and supervision
- Will the system require constant attention due to bug or crashes
- Is it flexible?
 - Can certain exceptions that occur in a good manufacturing process be handled efficiently
 - Can changes be easily made as your business changes
- Transaction traceability
 - Are there audit trails created for accountability
- Metrics
 - Are there sufficient reports and measuring tools to help realize your goals
- Low cost of ownership
 - Does this system require a full time babysitter to handle glitches and hardware issues
- Will it interface to your ERP system?
 - Is there a painless way to seamlessly get information to and from the WMS
- Does the WMS provider have good customer service?
 - What is their reputation in the industry
 - What support systems do they have in place

How it works

A web-based WMS is a system which allows the warehouse to fulfill customer orders and keep track of inventory. Customer order data is imported into a spreadsheet from another system. The data is then reviewed and more information is added. The spreadsheet is then exported

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into an Access database table. This populates an electronic pick list that the operator uses to fulfill orders. This system is comprised of three main components- Wireless infrastructure, a web server (PC), and mobile computers.

Wireless Infrastructure

The wireless infrastructure provides the wireless network connectivity that allows mobile computers to roam seamlessly in the coverage area as if connected by a network cable. It is connected to the rest of the plant network via a router. A wireless bridge is also installed that connects to the distant building and provides access to the plant network for wireless and wired devices. A 128 bit Wireless Encryption Protocol (WEP) or WPA-TKIP is used to prevent unauthorized access to the wireless infrastructure. Wireless devices must be properly configured in order to allow access. A logon is required to access the rest of the network.

Web Server (PC)

The web server is a PC that produces the web pages that make up the WMS. A program called Internet Information Server (IIS) resides on the PC that manages connections from devices with a web browser like Internet Explorer that try to access it. Web pages have the .asp extension. This means that they are Active Server Pages (ASP). They can contain various scripting languages such as Visual Basic Script (VB Script), Hyper Text Markup Language (HTML) and Javascript. A file named asp.dll works with IIS to process the ASP pages and produce the web page. Running an application on a web server means that any device with a web browser can access and view web pages. These scripts also manage connections to the Access database file that stores all the data in the system. Once connected, the scripts also handle the database activities such as Add, Delete, and Query records as well as math functions. The Web Server also has a back up script that runs separately from IIS that makes a copy of the database in case something happens to the original.

Mobile Computers

The mobile computers (scanners) used are Symbol Technologies model MC9000 series. The scanners run Windows Mobile operating system and are equipped with a touch screen, a radio to connect to the wireless infrastructure, and a long range laser bar code scanner. Windows Mobile comes with a version of Internet Explorer that allows the user to access the web server wirelessly and perform the necessary tasks. The touch screen allows navigation from one page to the other. The scanners use a program called Scan Wedge that puts the scanned bar code data into the current text field on the web pages that's on the screen. A clone program is also loaded onto the scanners to automatically reload the scanners settings in case of a cold boot or in case the main and back up batteries run down.

Typical Features of a web-based WMS system

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Customer order data can be imported into an electronic order pick list. This pick list, combined with an inventory table, will guide the order picker to the location of the product for order picking. The item is picked, inventory reduced, and the order picker goes to the next line item on the order. Many checks and balances exist to ensure correct product picking and data validation as well as order picker accountability.

Order Picking

Customer order data directs the order picker to the product location (using FIFO principles) where the item and location are scanned and order quantity entered. Upon data validation, the order picker is directed to the next line item on the order. Reports can be generated to gather information on picking efficiency, exceptions generated, and new inventory counts to name a few.

Receive to Warehouse

Whether from manufacturing or receiving, product is scanned into the warehouse and after data validation is added to the warehouse inventory and date stamped for stock rotation.

Shipping

Orders that have been picked go to a staging area. Upon loading on the truck and data validation, order will be removed from system and logged. Trailer number and operator loading the trailer are recorded.

Move Inventory

Inventory can be moved to another location to accommodate more frequently picked items or to organize inventory.

Utilities

This module provides the order picker with the ability to perform some common warehouse maintenance and location management functions. These include:

- View inventory
- Verify inventory
- Cycle counts
- Adjust inventory
- Partial pallets
- Combine pallets
- Load partially picked orders

Reports

Many reports exist that can be viewed from a web browser on a PC. These include:

- Inventory
- Inventory Summary
- Production/Transfer Log
- Picked Log

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- Picklist View
- Picked Log
- Shipped Log

- View Partial
- Exceptions

Comparison

Table 1 shows some key components of what a WMS consists of and compares a web-based to a non Web-based.

Table 1.

WMS Software Platform Comparisons

	Web-based	Non Web-based
Development Software	ASP.NET, ASP, HTML	Delphi,.NET
Programming Code	Open source	Proprietary
Mobile Unit (MU)Client	Web browser	Licensed Custom Client
Desktop Client	Web browser	Licensed Custom Client
MU Client Updates	None	Reload MU client
Licensing - Desktop/MU	Both come w/browser	Per MU and Desktop
Server Platform	Windows XP	Complex Server platform
Server Maintenance	Simple	Complex
Developer work force base	Large developer base	Smaller more skills required
Cost to Implement	\$	\$\$
Max Users	40	# of Licenses

Conclusion

Web-based WMS is a viable solution for small to medium sized warehouses. It offers a low maintenance, low cost of ownership solution for businesses that don't have the resources or complexity for a more expensive, more complex inventory system.



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