

IN BRIEF

- **Goal:** To be able to complete real-time inventory control utilizing a barcode solution in the greenhouse, and reserving inventory for shipping with no delays in operation.
- **Solution:** Creating a Pocket PC application that is linked to MAS 200® dynamically and supporting MAS 200 modifications to Sales Order and Inventory Management.
- **Results:** After the modifications were implemented the result was a success. My Greenhouse Company was operating with the “just-in-time” concept, where the inventory was always ready for shipping as soon as it was reserved.

About the Company

My Greenhouse Company (not the actual name of the company) is a 750,000 square foot wholesale greenhouse. They grow a complete line of top quality perennials, hostas, and daylilies in a variety of sizes for mass-market retailers, independent garden centers, and landscape contractors. My Greenhouse Company currently produces over 700 different varieties and deliver more than 3.5 million perennials annually. They ship products to over 300 stores from March until the end of September.

Situation

The president of My Greenhouse Company, described the situation as a very time consuming manual process. He said the inventory controller walked through the entire greenhouse and wrote down all the available plants on paper, detailing their locations, sizes, available quantity, and shipping priorities.

Then the controller would come back to the office and determine every single rack that will ship out that entire week based on the written notes. It came to a point where they had to stop two days before shipping again, which affected their business with their customers. My Greenhouse Company president summed up the situation by saying, “We need to eliminate the manual process, and more importantly, we need to be able to ship nonstop.”

HighTower and My Greenhouse Company had many design meetings prior to defining and designing the modifications. The most time consuming process for My Greenhouse Company inventory controllers was obviously reserving and figuring out the greenhouse availability for shipping. The plants were shipped on multiple level racks, so the height of a plant was important in order to determine which shelf of the rack it needed to be placed. Also, at any given time some plants were in bloom more than the others, and those plants needed to be shipped out before the non-blooming plants. As a result, the prioritization of the

plant locations was very important. In addition, My Greenhouse Company wanted to ship a mix variety of plants to each store for better looking racks.

In order to streamline the greenhouse walk process, the obvious solution was to use barcodes and wireless scanners. My Greenhouse Company needed to have live communication between the wireless scanners and MAS 200® for nonstop shipping.

Challenges

In this project HighTower had more challenges than an average project. The project was very complicated by itself, and there was no method of communication between the wireless scanners and MAS 200. However, HighTower had the necessary expertise in-house for finding or developing a solution that My Greenhouse Company required. The first task assigned to the HighTower Development department was to create the communication between wireless scanners and MAS 200. The Development department designed a server side application that worked on top of the ProvideX Web Server to receive and send XML documents conforming to XML-RPC standards. HighTower also created a Visual Basic .NET client that could send and receive XML documents conforming to the XML-RPC standards.

Solution

After having many meetings and discussing different options for the wireless scanners, HighTower and My Greenhouse Company decided to use wireless Pocket PCs in the greenhouse. This decision would require a custom application for the Pocket PCs, and placing multiple access points in several locations inside the greenhouse. After some research, HighTower and My Greenhouse Company purchased waterproof barcode labels to use inside the greenhouse. After determining the six different locations in the greenhouse for the access points, HighTower started writing the custom application.

HighTower decided using Visual Basic .NET 2003 for the custom Pocket PC application, knowing that .NET framework already had all the smart device libraries incorporated. HighTower also chose Symbol PPT 8846 Windows Mobile 2003 devices because symbol had the SDK's available for .NET framework. For the Access Points, the modification team decided to use Symbol AP 4121, which is a top quality access point for outdoor use with high speed roaming, multiple level of security, while being easy to configure and manage.

HighTower created a custom "Greenhouse Entry" program for the Pocket PC. This application was a complete client/server application. The data and the business logic were stored on the server side, and only the user interface functions were written to the client application. This design made the application size to be very small, and also made it easier to make business logic changes on the server without making any changes to the client application on the device.

The application was very easy to use. By scanning the label at the location, the application would automatically pull the item information from MAS 200 and display it on the screen. The user at this point had what MAS 200 had as the quantity for that location on the screen, and was able to do an inventory adjustment and update it through the Pocket PC if necessary. Otherwise he/she would enter a reserved quantity, change the default height if necessary, assign a priority, and save the entry. Since the data was stored on the server and all the Pocket PCs were accessing the same data files, if someone scanned a location that was previously scanned by another employee, the previously entered information would display on the screen. HighTower also added reporting functionality to the application for the user to figure how many more plants they need to scan to fulfill all the open orders.

HighTower also created a program in MAS 200 called “Greenhouse Availability Maintenance,” which had the same functionality that the Pocket PC application had but it was available in MAS 200.

HighTower created another program called “Rack Code Maintenance” where the user defined the racks with their number of levels and the height of each level.

The line detail of each sales order had only kit items and each kit item had a rack code assigned to it. As a result, My Greenhouse Company could calculate how many racks were needed for that item.

Shipping was scheduled based on the size of a truck and the delivery route. For that reason, HighTower created a program called “Transportation Maintenance.” This program enabled the user to assign orders to a truck and create a route. Once the route was entered by clicking the “Update Orders” button, an update routine assigned inventory to all the orders within that transportation as component items by choosing those items from the greenhouse availability file, based on a complex formula, and generated all the racks required.

HighTower also created several other programs to streamline the picking, packing, and shipping processes.

Results

After the modifications were completed and installed, they were implemented. After several test runs and several adjustments, the system was ready for live use. The greenhouse walk, which took two days to complete, was now a “just-in-time” process for My Greenhouse Company. As soon as an item was scanned and reserved in the greenhouse, it was available to be shipped.

Since the assignment of inventory to sales orders was based on a complex formula, there was no need to create templates or pre-define the racks. This process enabled My Greenhouse Company to do several small walks throughout the week and just reserve the plants that were really ready to go – as opposed to

doing one walk and predicting some plants would be ready as the week progressed.

Key to the success was creating the wireless environment in the greenhouse and linking it dynamically into MAS 200. Today, My Greenhouse Company operates with no delays in their operation. They made a big investment with the modifications and the hardware, but the return on investment was probably less than three months for them. Just the overtime alone that they needed to pay with their old process, justified this investment for them.