Web based SCM Solution

Overview:

Our client is in the field of e-business and wanted to develop a web based B2B and B2C Supply Chain and Content Management platform that is suitable for driving online shopping sites and the back-end business processes. The overall goal was to be able to support the management of the supply chain. We had served this client 15 years back when they had approached us for a small application development work. The client was very pleased with the result then and came back this time around with work entailing a larger application i.e. a legacy system built on Progress and PHP. They wanted it to be re-built using .Net 3.5 and My SQL/ MS SQL Server, and work on multiple databases. In addition to that, the application was required to be multilingual.

Evaluating the need, Mindfire's team proposed to the client a business flow. The final system that was built based on this business workflow turned out to be quite a robust and effective one. It played a critical role in the growth of the client's business. With time, the code base was migrated from .Net 3.5 to .Net 4.8 and finally to .Net Core and .Net 6. Our work has helped us establish a strong partnership with the client, who considers us as their reliable technical partner.

Client Details:

Name: Confidential | **Industry:** Retail | **Location:** Belgium

Technologies:

- Frontend: HTML5, Java Script, jQuery, Bootstrap, CSS, AJAX
- Backend: C#.Net, WCF, Rest API
- Database: MySQL
- Server: Linux, Window
- Code Repository: Bitbucket
- API Documentation: Swagger
- Logging Tool: Log4net

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Project Description:

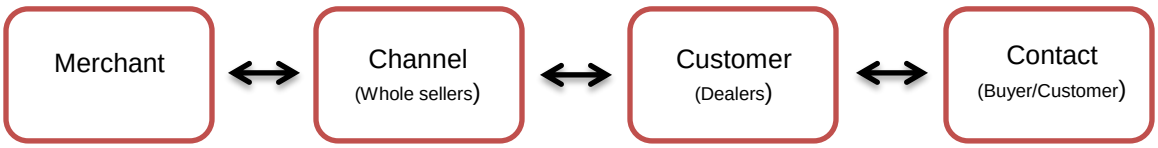
The client's primary objective behind wanting to develop this application was to create a web based B2B2C platform that supports the management of complete supply chain activities, including but to limited to : cash register, e-commerce, e-invoicing, warehouse management, CMS and CRM. They had an existing legacy system built on Progress and PHP which had to be rebuilt using .Net 3.5 and My SQL/ MS SQL Server. The customer also wanted that the application is multilingual, and supports multiple databases.

Mindfire's technical team took up the work and started analyzing the scenarios and the necessary steps that had to be taken in order to fulfill the objective of the client. After a few brainstorming sessions, the team proposed the client a business workflow that would act as a basis to develop the system so as to make it efficient to manage. The process included a walk through the legacy application and a detailed analysis of the database. The client had a technical background and wanted us to first perform an in-depth analysis, and the offer the required insights and clarifications on the suggestions we have. Obliging, our team undertook the required steps and proposed the new solution. The client found the same quite impressive and offered their approval.

Solution:

Looking at the objective of the client and the complexities of the project, Mindfire's team performed an in-depth analysis of the system and came up with a basic business workflow on which the solution had to be based.

The workflow is as follows: Merchant <–> Channel (Wholesalers) <–> Customer (Dealer) <–> Contact (buyer/customer)



- Each merchant can have multiple Channels
- Each Channel can have multiple Customers
- Each Customer can carry one or more Contacts in it.

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The system comprises of 2 parts. The First part deals with the product, customer, order, stock management and reporting section. This is used for managing the back end supply chain system used by merchants, dealers and warehouse staff.

The second part is the frontend public website. It has product catalogue drawn from dynamic pages out of the CMS system. When an order is placed via the product catalogue, it generates a supply chain record for the backend system. The order processing chain from warehouse to dealers and then to customer is processed through the supply chain cycle of the system. The complete website uses components of ASP.Net and Ajax Toolkit that provide rich UI and performance.

An ePOS section was developed later for Shop Kassa users. The ePOS uses the browser's local storage - IndexedDB. It is used by Kassa users in the physical shop to create orders. At the start of the system it fetches product details, default customer details and stores them in IndexedDB to make the system function in offline mode in case of an internet failure.

The system carries all the generic business rules and database tables in a package, that can serve most business needs with little merchant specific customization.

Some important database tables that give a clear picture of the business management chain are:

- Merchant: Business owner
- Channel: Business Network (Wholesaler)
- Customer: Dealers
- Contact: Individual buyer (person) of a Customer network
- Product: List of Products and its properties ranging from wine, magazines, car rental to anything
- Channel-Product: The Channel to Product Assignment for custom pricing of products per channel
- Customer-Product: The Customer to Product Assignment and custom pricing of product per customer
- Order: individual order placed by buyers
- Order-Details: details of the order entry
- Payment: store payment data for an order
- Invoice: individual invoices of related orders
- Invoice-detail: details of invoice
- Supplier: Suppliers

- Supplier-Product: The Supplier to Product management - which supplier supplies what product.
- Supplier-invoice: invoice of ordered related to a particular supplier
- Supplier-invoice-detail: details of supplier invoice
- Warehouse: Warehouse
- Warehouse-Product: The Warehouse to Product management - which warehouse stocks what product

There are approximate 100 tables in total defining the B2B and B2C system along with CRM. Some more tables are: Access level, Menu, Submenu, Pages, Channel Attributes, Country, City, Currency, Language, Product-Type, Product-Category, Product-Type-Cat-Assignment etc.

The systems admin site is a set of around 70 to 80 table maintenance pages that directly deal with single and multiple tables internally doing insert, update, and deletion of records on them. Everything is done through custom Object Relational Mapping (ORM) classes to meet the complex multi column joins.

The systems Super Admin, Merchant Admin, Channel Admin can browse into the table data for their business needs. All the page access is checked with access level security checks as per the contact privilege and scope.

Total abstraction of database layers from the business and UI layer helped to achieve multiple database situations. Now, it supports both MySQL and MSSQL Server and can be extended to run on top of other databases.

To support multiple languages,

- For fixed texts, resource files (.resx) are used. The site is capable of handling Dutch, Spanish apart from English now and can be easily extended to deal with more languages.
- Changing site UI culture automatically changes the date and time, currency formats etc. to make it convenient for users.
- The dynamic site content is also made multilingual making every text pattern customizable and database driven.

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Achievements

The highlight of the project was to build an application that could support multiple languages and run on multiple databases. Mindfire's team did well to meet these challenges and build a stable system for the client. Within 3 months of the start of this project the core was developed and 5-6 sites were ported. Currently this system holds around 15 sites and is still growing.

Customer Benefits

Ajaxfied UI helped the client to get a faster and more robust application. Database refactoring and redesigning of new indexes resulted in faster database processing. Bootstrap helped the client to access the application from multiple-sized devices. All these things collectively helped the client achieve higher degrees of efficiency, accuracy and satisfaction. .

Screenshots:

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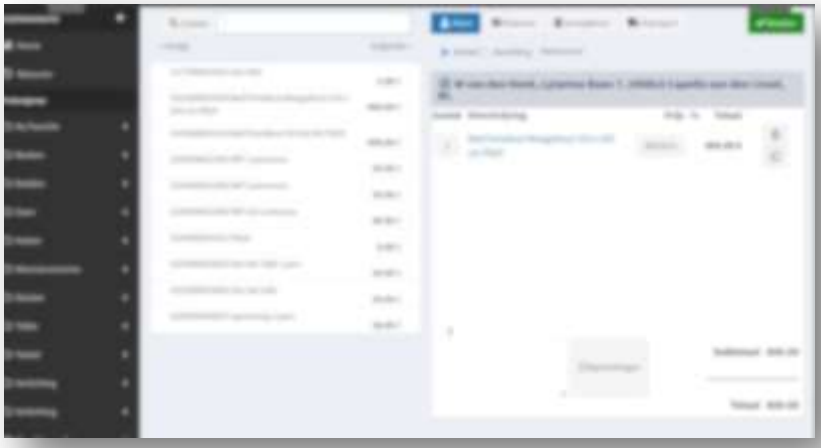

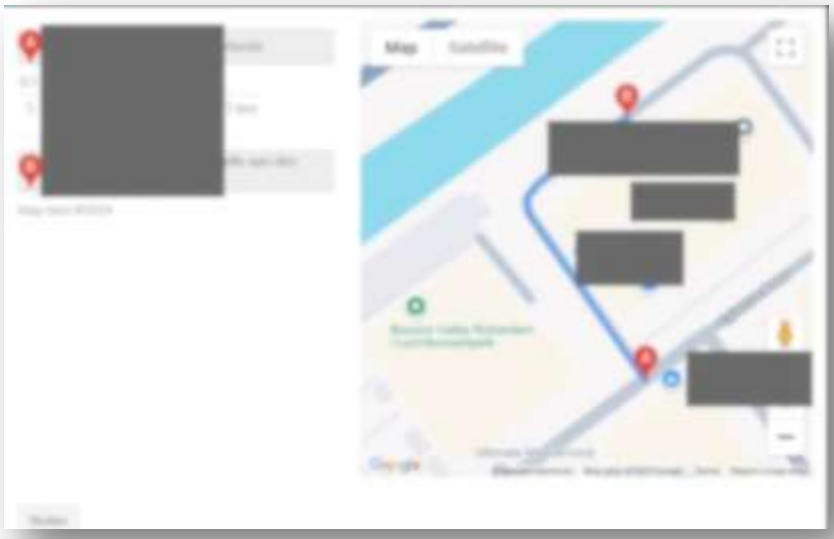

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