STAND-ALONE SYSTEM FOR E-SHOP ADMINISTRATION BY THE HELP OF WEB SERVICES

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ABSTRACT

The main objective of this contribution was design of an application for control of expedition orders and administration of products for an arbitrary e-shop which has had implemented all necessary web services. The application communicates bi-directionally with the e-shop via these web services. A part of the work was also design of web services for an e-shop of one unnamed company. The application code was created in C# language for the Microsoft .NET framework 2.0 and higher. The Microsoft .NET framework and C# language was chosen so that the application could run on various operating systems. The application can be used on Linux or Mac platforms with the Mono framework by Novell. The web services in the e-shop application were implemented using PHP language.
Keywords: system for e-shop administration, web services, Microsoft .NET framework 2.0

1. INTRODUCTION

The retail, as well as wholesale shopping via Internet gains increasing popularity in recent years. The graduating shopping boom is accompanied not only with the accelerating number of sales transactions, but also with the sold goods volume. It results in rising demands on logistics and product management of all Internet companies. To manage all those challenges, mighty and groovy Internet companies are exploiting various types of information systems. However, such solution represents indispensable investments in the information system purchase and its interconnection with the e-shop. That is something what small and incipient companies can not afford. That is why they are mainly using administration interface for e-shop and orders management. Such a cheaper alternative could provide wide functionality and also a quality and well-arranged user interface, but only for a small scale product range and not many orders. The larger product scale and numerous orders are very inconvenient for that arrangement.

2. INTERNET E-SHOPS

The Internet shop (also called e-shop) makes for products or services offer, orders reception, payment mediation, and a provision of supplementary information on products and/or services by a particular seller.

2.1. The electronic trade systems

The electronic trade system is generally a web oriented application that makes it possible to realize trading in the Internet environment. It can have both B2B (business-to-business) and B2B (business-to-business) variant. These applications consist of two inseparable complexes, as a rule. One of them is a presentation layer which provides product browsing, sorting, searching, and ordering. The second layer is the administration interface for the Internet shop filling with products, their descriptions, prices, and with other essential information. This part serves very often for orders attendance and for customer notification on orders processing state.

3. APPLIED TECHNOLOGIES

3.1. Selection of applied technologies
The following aspects were considered at technology selection for the e-shop administration system development:
- effortless interconnection with arbitrary electronic commerce system,
- platform independence,
- multi-user session,
- the middle scale e-shop applicability.

3.2. Web services
WWW (World Wide Web) is more and more used for communication among applications of various types. The program interface for such kind of communication is called the web service. In common use, that notion is related to the SOAP (Simple Object Access Protocol) protocol application in XML (Extensible Markup Language) format as an envelope and their interface description in the WSDL (Web Services Description Language) format.

3.2.1. SOAP
SOAP creates the basic layer of communication among network services and it provides the environment for an advanced communication of remote applications. The SOAP message is a formal specification of XML information file.

3.3. Microsoft .NET Framework
.NET Framework is a quite new compact basis for the application development related to different operation systems. The particular .NET Framework version has been always adherent to the issue of Visual Studio developer environment, namely up to the version 3.0. .NET basis does not claim any programming language.

3.3.1. Mono Project
Mono is the software basis susceptible for simple way of multi-platform applications development. It is an open source implementation of Microsoft .NET Framework based on the ECMA standard for C# and CLR. Mono removes barriers at the creation of more powerful applications for Linux platform whereas there is still possible to use Visual Studio for Microsoft Windows oriented applications.

3.3.2. Visual Studio
Visual Studio is a software tool facilitating the programmer work and specialized on the.NET Framework platform. It includes the code editor for the .NET languages family cooperating with IntelliSense. IntelliSense is a supporting tool for program code adding. Visual Studio includes also a large set of supporting tools for higher transparency and work acceleration. For instance, one of them is Object Browser for object browsing and design. Because of its sophistication, Visual Studio has been chosen for the development of administrative application for e-shop management.

3.4. SQL Server 2005
Microsoft SQL Server stems from Sybase SQL Server. Its primary query languages are T-SQL and ANSI SQL. It comprises attractive news - the native support for XML data management as a supplement to relation data. For that purpose, one XML data type is defined. XML can be interconnected with XSD (XML Schema Definition) scheme, and inherently stored data can be verified toward the particular XSD scheme.

4. PRACTICAL SOLUTION

4.1. Web Service
At the very beginning of project realisation, there was necessary to design and create the web service that would serve for communication with the administration program later on. That is why there were

established basic requirements on functionality, and on the I/Os of administration program. The basic functions of web service have been design according to those basic requirements.

4.1.1. The Web Service Implementation

For the whole project to realise and verify, there was necessary to find out a ready to use system solution for electronic trading, and implement the web service in such system. The e-shop system bizZone by Akineta solutions company was the convenient solution. That e-shop is implemented in PHP language, and it is calculated for Apache web server with MySQL database server. The web service server uses the NuSOAP v 0.7.2 library, and that is why the web service is also implemented in PHP language using means and libraries of that system for electronic trading. That fact does not mean any problem with web service implementation or with its linking to the administration system developed with .NET Framework.

4.2. E-shop Administration System

The application has been designed and programmed for .NET Framework with the use of Microsoft SQL Server 2005 Express Edition database server. The main accent was oriented on the possibility of future extension, and to simplify the effort of owners and employees engaged in the e-shop operation.

4.2.1. The Basic Requirements on System Functionality

The following basic requirements were set down:
- product export and import into e-shop,
- import and dispatching of orders,
- editing of basic product parameters,
- stock holding,
- stock export into e-shop,
- customer notification on orders processing state.

4.2.2. Software Requirements

The client layer has to answer following minimal requirement: operating system - Microsoft Windows 98 or later version, Linux or Mac OS X. There has to be installed .NET Framework 2.0 or later version, or Mono 2.4 or later. The minimal requirement on data layer (data server): operating system - Windows XP Service Pack 2 or later. There has to be There has to be installed .NET Framework 2.0 or later version installed.

4.3. Database

The administrating system uses its own structure for storing data. That structure is in no way related to the e-shop data structure.

4.3.1. Tables

The database includes following tables:
Company   – information on e-shop keeper (Fig. 1),
Customer   – information on customers,
CustomerType – codebook grouping the customers,
Order   – data on orders imported from e-shop,
OrderItems   – items of individual orders,
OrderStatus   – codebook designating particular order state,
Produkt   – list of all products with relevant information,
ProductPH   – saving of storage carryover,
Store   – stock cards file.

4.4. Application Linking To Web Service

Microsoft Visual Studio 2008 was applied for system development. We presume that most e-shops will have implemented at least the basic web service user authentication with user name and password to prevent misuse by competitors or by website data stealing robots.

4.5. Application Basic Classes Description

There are following basic classes in the system:

Product   – Class implementing the data elements and product methods,
Order   – Class implementing the order (Fig. 2),
OrderItem   – Class representing particular order items,
Customer   – Class representing any customer in the system.

Column Name	Data Type	Allow Nulls
Id	decimal(18, 0)	☐
Name	nvarchar(50)	☐
Street	nvarchar(50)	☐
PSC	nvarchar(5)	☐
City	nvarchar(50)	☐
ICO	nvarchar(15)	☐
DIC	nvarchar(15)	☐
Tel	nvarchar(20)	☐
Email	nvarchar(50)	☐
Web	nvarchar(50)	☐
BankAccount	nvarchar(15)	☐
BankNum	nvarchar(4)	☐
ORStr	nvarchar(250)	☐
Storno	bit	☐

Order — Class

Fields:
- _Code : string
- _CustCity : string
- _CustCompany : string
- _CustDIC : string
- _CustEmail : string
- _CustFirstName : string
- _CustICO : string
- _CustomerId : decimal
- _CustPSC : string
- _CustSecName : string
- _CustStreet : string
- _CustTel : string
- _DeliverCity : string
- _DeliverCompany : string
- _DeliverFirsName : string
- _DeliverPSC : string

Order — Class

- Fields
- Properties
- Methods
  - DeleteOrder() : void
  - GetOrder() : void
  - ImportWebOrders() : void
  - InsertCustomerByWebOrder() : string
  - InsertOrder() : void
  - PostDocumentPrint() : void
  - PutOrderItem() : void
  - SaveOrder() : void
  - UpdateOrder() : void
- Events
  - SendMessage : SendMessageEventHa...
- Nested Types
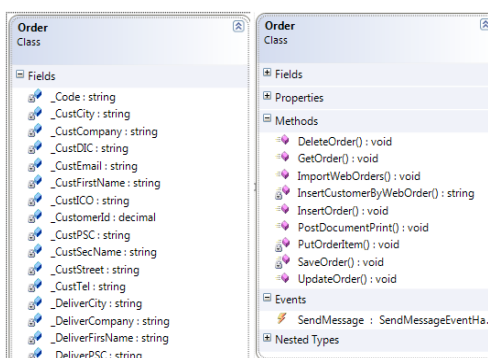
Figure 1. Company Table.   *Figure 2. Category Order.*

4.6. Information Distribution to Customers

The customer is informed every time the order status has changed. The current program version informs customers via email to the specified email address.

5. CONCLUSION

Our system and its way of communication with an e-shop should conform to common requirements of a middle size internet shop for orders processing and for customer notifying about the order status. Our system makes the order processing transparent and it brings the higher level of monitoring over the whole process. Furthermore, it ensures the customers´ overview about the status of their orders and also supports the product basic parameters editing, such as pricing or basic specifications. Our system improves the inventory and stock movement review. Thereby it is possible to simplify e-shop operating effort and spare time for more important activities like shop and products promotion what brings competitive advantage.

6. ACKNOWLEDGEMENTS

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