

**DEVELOPING A PROTOTYPE E-COMMERCE APPLICATION WITH CREDIT
CARD VALIDATION AND SECURE TRANSACTION**

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ABSTRACT

Shopping today has been a problem for many people since more people nowadays have less time to shop. Therefore many are actually switching to e-commerce applications. Anyhow, the problem with e-commerce application is that many of them are not secure. This application is designed to enhance the e-commerce applications with additional security items. The security enhancement made was integrating an encryption module that secures the data that are stored in the databases. The application also includes an online credit card validation module that validates credit cards against the Luhn Algorithm and predefined credit card prefixes. The application will accept three types of credit cards which are Mastercard, Visa and American Express. The application is developed on the .NET platform using ASP.NET and Visual Basic .NET scripting. Therefore, the application could run on all kinds of platform. The application requires a Microsoft Server based operating system and Microsoft SQL Server in order for it to run. The application has been tested and runs successfully both on a server and on a workstation with server settings. In short, this system is the solution to the problems of current e-commerce technology.

ABSTRAK

Membeli-belah kini kian menjadi masalah bagi orang ramai kerana ramai di antara kita yang terlalu sibuk. Satu alternatif bagi masalah ini adalah melalui e-dagang (e-commerce). Namun demikian, masalah yang sering dikaitkan dengan aplikasi e-dagang adalah transaksi maklumat yang tidak selamat. Aplikasi ini akan mengatasi masalah tersebut dengan menambahkan modul pengekodan (encryption) bagi mengkodkan semua maklumat sulit sebelum disimpan di dalam pengkalan data. Dalam sistem ini juga terkandung modul bagi pengesahan kad kredit menggunakan algoritma Luhn dan prefiks kad kredit yang telah ditetapkan. Aplikasi ini menerima tiga jenis kad kredit iaitu kad Mastecard, Visa dan juga American Express. Aplikasi ini telah dibina di atas platform .NET menggunakan ASP.NET dan skrip Visual Basic .NET bagi membolehkan aplikasi ini digunakan di pelbagai platform yang berbeza. Aplikasi ini memerlukan sistem pengoperasian Windows Server dan juga Microsoft SQL Server. Segala bentuk ujian telah dijalankan dan sistem ini terbukti dapat berjalan lancar samada di dalam server ataupun komputer biasa. Secara ringkas, sistem ini dapat mengatasi masalah-masalah yang dihadapi oleh aplikasi-aplikasi e-dagang pada masa kini.

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LIST OF TERMINOLOGIES

- B2B (Business to Business) - The exchange of goods and services between business.
- B2C (Business to Consumer) - The exchange of goods and services with the end consumer being the target market.
- Chargeback - Where a transaction is debited against a merchant account in cases of refunds and fraud. Chargebacks usually attract a fee that is debited against the merchant.
- Certificate Authority - A third party company that issues digital certificates that confirms a company or individuals' identification. A digital certificate is a crucial part of secure ecommerce
- Cobranding - Where two companies identify a partnership between them through one company displaying their logos, color schemes etc on another companies application.
- Cookies - Small text files stored on your computer when visiting a site that record preference for that particular site's usage. Cookies are also common in shopping cart applications in order to remember visitors as they move throughout product pages.

- CRM - Customer Relationship Management. The entire process of a pre-sales, sales and service relationship with a customer. Many software applications are now available that permit you to record this relationship from the time the clients asks their first question. Good CRM software is much more efficient than fragmented records as it can save time in tracking communications and transactions with a particular person.

- EDI - Electronic Data Interchange. This is the business to business (b2b) flow of information between companies or within a company itself. The 90's saw the concept of information equaling power. Whatever creates power also generates money and therefore creates new enterprises to supply this information.

- Encryption - Process of transforming data into a type that prevents casual observers from deciphering.

- Etailing - These are mainly "virtual" storefronts which act as a catalogue of products of merchants and usually include a "shopping cart" system to enable consumers to purchase online with the use of credit cards.

- Firewall - Software/hardware used to prevent unauthorized access from a computer system or network of computer systems.

- Gateway

 - Computer that allows communications between networks one network with another. Used in ecommerce to act as an interface between a merchant and a bank; i.e, a Payment Gateway.

- Infomediary

 - An infomediary is an online resources that collates data from a variety of sources and acts as a middleman between those distributing the information and people who want the information.

- Luhn algorithm

 - The LUHN algorith is used for credit card number generation and validation.

- eCheck

 - An E-Check is a form of payment that deducts funds directly from your own standard checking account. eCheck services are usually managed by third party companies that interface with a number of different banks. An echeck provides a more fraud resistant option in terms of ecommerce transactions.

- Merchant account

 - A special account account where money from credit card sales is first routed to and held before transfer to your own business account. This process is usually fully automated in ecommerce transactions. Money may be transferred into your standard business account in real-time or during various points in a 24 hour period. A merchant account is a crucial part of ecommerce.

- MIDS - Merchant Identification Number. Unique merchant identification number that is used in conjunction with all transactions.
- Out of the box - Refers to an applications suitability to be rapidly integrated into an existing system
- P2P (Peer-to-Peer) - Process whereby computers can trade information between each other directly without the assistance of a third party network.
- Payment threshold - The minimum accumulated commission an affiliate must earn to trigger payment from an affiliate program.
- Privacy policy - A Web site's official statement on the type of information collected on a site, how the information will be used, how the person can access this data and the steps for having the data removed. A privacy statement will also usually include information regarding systems that are in place to protect the information of web site visitors.
- Privacy seal programs - Independent organizations that verify if an online companies' Privacy Statement is verifiable and accurate.
- Scalability - The ability and flexibility of an application to meet growth requirements of an organization

- Secure servers - Special servers that utilize encryption to prevent unauthorized users from intercepting and reading a message that passes through its system.
- Session cookie - Temporary cookie stored in a computers memory for remembering preferences during a web site visit that is flushed on leaving the site.
- Shareware - Software that is distributed at no cost that can be used for free for a specific period of time or under certain circumstances to allow evaluation.
- Shopping cart - Software that keeps track of items a visitor picks to buy from your site until they proceed to the "checkout".
- SLA - Service Level Agreement. Used in many merchant/institution and merchant/consumer transactions to define the boundaries of what the service is committed to deliver and under what circumstances.
- SSL (Secure Socket Layer) - A secure protocol that ensures the integrity of information that is transmitted via this means.
- SOHO - Stands for Small Office/Home Office and refers to a specific group of people who work from home or very small companies.
- Turnkey - Refers to an application that with very few adjustments is ready for use, such as a remotely hosted shopping cart service.

- Uptime

 - The amount of time a web site is available. The industry benchmark at this point in time for availability is 99.99%.

- User session

 - Each visit to a web site by one person. The session is usually "ended" when all pages have been closed or after a specific time of inactivity.

- Vortals

 - Vertical industry portals. Online resources that are gateways to specific industry related information.

- WYSIWYG

 - What You See Is What You Get. An application that displays how the resulting page will look as it is being developed by the user in which the screen displays what the end result will look like, while the document is being created or modified.

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CHAPTER 1

INTRODUCTION

Internet was a marvel once it was introduced to the world, but in our daily lives today, Internet has evolved to be one of the essential needs for us, mankind. In June 1998, Matrix Information and Directory Services, Australia (MIDS) reported that there were hundred and two million people accessing the Internet world-wide. This number had increased from the estimate of fifty seven million in January 1997, representing a close-to 100% increase in numbers of people accessing the Internet in just a year and a half.

The number of Internet users around the world surpassed 340 million in 2002, and will continue to grow strongly in the next five years. Much of that growth is coming from Asia, Latin America and parts of Europe.

In reference to the chart in figure 1.1, we could see that the use is growing by at least thirty million per year.

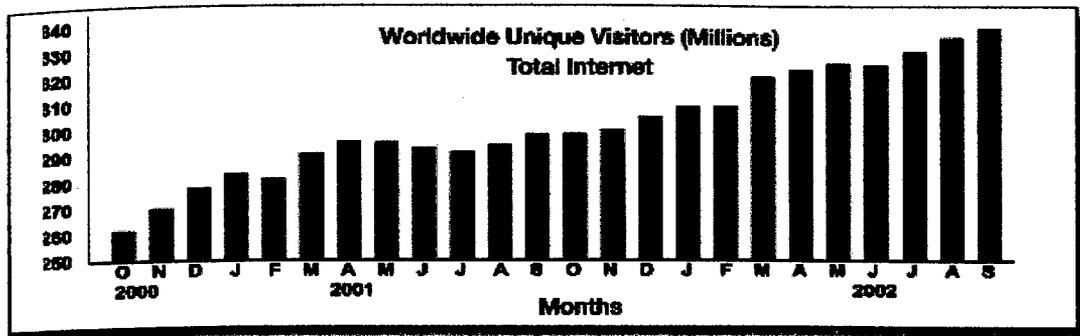


Figure 1.1 Worldwide Internet User Statistics (October 2000 – September 2002)
(Comshore; 2004)

“A major contribution to this statistics is the ever-growing e-commerce sites. E-commerce have grown from being virtually unknown to being one of the most popular forms of shopping where the shoppers need not even lift a finger to shop. Cisco Systems Inc. is today the world's largest Internet commerce site, selling more than \$32 million in products every day. As amazing as it seems, another e-commerce wizard, amazon.com has increased their sales from a mere \$ 500,000 in 1995 to \$ 4.3 billion in the year 2003 (Australian Bureau of Statistics, 2003).”

1.1 Problem Statement

The current scenario where consumers are often too busy to find time to shop is a usual spectacle and a relevant approach to solve this problem is to shop from home. In this case, there are two main choices, shopping through the telephone, or through the internet (e-commerce).

Telephone shopping is effective, however will require a high amount of time and budget in order for it to be constructed. This includes the excessive advertisement cost and the telephone operator cost, not to mention the amount of time the consumers will have to spend in front of their television sets just to wait for the advertisement to appear for a mere thirty minutes.

So hereby, the appropriate and most effective solution that is possible would be e-commerce. With e-commerce, the consumers only have to choose the product

that interests them, key in their credit card numbers and wait for the products to be delivered to their doorstep. An easy and inspired solution to all of mankind shopping problems.

But e-commerce has its own disadvantages. Nowadays we hear about the credit card frauds that is violating all ethical codes. It is a great danger to shop online both for the shoppers and for the merchant. The merchant may be cheated using false credit cards and the shoppers are at risk of eaves dropping and losing their credit card information to attackers.

So, this shows that e-commerce is effective but not secure. That is why a more secure e-commerce application needs to be developed.

1.2 Objective

The reason why e-commerce is such an inspiration is put together as the objectives for this project, which are:

- a) To develop a prototype online system that sells handphones through e-commerce
- b) To provide a built-in credit card validation system
- c) To secure all credit card transaction information using encryption

1.3 Scope

In order to achieve the objectives, a few scopes have been outlined. The scopes are as listed below:

- a) The system is just a prototype and will not deliver the handphones to the buyer.
- b) The application will consist of a few randomly chosen handphones and will not feature all handphones.
- c) The application is a standalone application that will not be integrated with any banks.
- d) The application will not consider the current stock available as it is not developed specifically for anyone.
- e) The types of credit card that would be accepted by the system are Mastercard, Visa and American Express.
- f) The validation of these credit cards will purely rely on algorithms and does not ensure that there have enough funds in the account.
- g) The sensitive resources like password and credit card number will be encrypted and stored in the database.
- h) The system will either run on a workstation that is configured to run as a server and supports SQL or a server that supports SQL.

CHAPTER 2

LITERATURE REVIEW

There has been a never-ending debate over the e-commerce, but only recently have all the critics silenced up, as the ever-growing e-commerce society has been proven to achieve what every home shoppers need; Confidence, availability, reliability and trustworthiness. E-commerce has gone through an evolvement as much as any technology could evolve in a short period of time.

“Now that e-commerce has evolved to such a degree, the diverse and highly distributed infrastructure can be intimidating. By keeping in mind, however, the objective is to satisfy users in every aspect of their relationship and transactions, it’s possible to identify and deal with myriad details that otherwise bedevil IT departments. Listing critical success factors shows that performance or availability alone is no longer sole objectives of IT departments. In fact, it’s the synergy gained for the business (Edgar Pfanner, June 2001).”

2.1 E-Commerce Definition

A possible definition for electronic commerce or e-commerce would be any kind of business exchange between two parties electronically rather than physically. However, that definition does not reveal the true passion of e-commerce. A better definition for e-commerce will be saying that it is a way changing needs and new technologies come together to revolutionize the way in which business is conducted.

Electronic commerce is a reality, and is not just for big, multibillion-dollar corporations. Solutions exist today that enable companies of all sizes to do business over the web securely, affordably, and efficiently. Boundaries in business are being abolished through the implementation of e-commerce. More companies are taking advantage in going global through e-commerce and many companies have already succeeded in doing so.

2.1.1 How e-Commerce Works

Electronic Commerce is one of the most important aspects of the internet to emerge. It allows people to exchange goods and services immediately, with no barriers of time or distance. Any time of the day or night, you can go online and buy almost anything you want.

“The road to creating a successful online store can be a difficult and confusing one if you are unaware of the concepts, procedures and terminology behind eCommerce. The best strategy to entering this market smoothly is to find out what you need to do before you start (TamaraGraphics, 2003).”

A customer browses through an e-commerce site looking for something to buy and adds the items to an online shopping cart assigned to them. The customer is then asked for their credit card information and shipment address. After the credit card has been approved and the payment is made, the product will be delivered to the customer. This is how generally an e-commerce application would work.

There are many different payment systems that an e-commerce merchant could adopt but the most popular is the credit card transaction. Although many consumers have deemed the online transactions to be unsafe, many new technologies are being developed to create a safer environment for online shoppers.