USING PREPAID CARDS IN E-BUSINESS
Libreaire, an e-Books Online Store

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Abstract: In this paper, we present an electronic business application and its related architecture. The developed system consists of a sample e-books sells website that involves shopping in a virtual store. The framework has been conceived as a prototype system which illustrates how Java technology especially Servlets can assist developers on building and deploying e-commerce applications. The problematic of E-payment is also discussed along with selection of the most adequate solution to the proposed architecture. The adopted model allows for business process logic to be handled at the server side, in a simple and secured way.

1 INTRODUCTION

In recent years, electronic commerce applications have gained considerable importance because of the tremendous growth of the Internet. The Web is rapidly becoming a major source of revenue for electronic merchants.

E-commerce means doing business online or selling and buying products and services through web storefronts (B2C model). The articles traded could be physical products or services. They can also be digital data directly downloadable from the website. E-business however, is not limited to buying and selling products online; it extends to both internal and external business relationships such as suppliers, payment…etc (B2B model). It combines the software solutions with strategy and tactics hence, performing a profitable role within a business.

Indeed, most online store systems consist of three layers of application logic. At the base is a Database Management System which task is data storage in a database. At the top is the client web browser used as an interface to the application. Between the two lies most of the application logic, usually developed with a web server-side scripting language that can interface with the DBMS, and can format HTML pages used for presentation in the client web browser.

Even though, application development is often driven with insufficient attention to security and ease-of-use concerns, causing confusion and frustration for novice and even experienced users. Therefore, a new way to allow users to shop online is required.

In this paper we take the position that the success of e-commerce is tightly related with the development of suitable payment model which guarantees facility and security. After analyzing Internet technologies, especially those based on platform independence, we demonstrate how the latest advances in Java servlets development should be employed in E-commerce systems.

2 PROBLEMATIC

The online payment problem, evident from the earliest days of internet, has not gone away. In fact, the potential of the web, as place to do business continues to be undermined by the lack of suitable payment systems: e-business pioneers tended to focus on products, markets and logistics and completely underestimated the challenge of executing downstream payment transactions.

Over the years, many e-payment schemes have been launched to try and fix the problem: Payment through the Internet Service Provider(s), Payment System Providers, and Prepaid Cards. It has been, however, shown that with the exception of credit cards (still the most popular approach), SMS-based mobile phone systems and prepaid cards are the only major new payment approaches integrated into online news offers, in the hope of reducing

customers' reluctance to make payments over the Internet.

A dominant form of such new e-money systems is that they are server-based, i.e. that funds are not stored locally on chip cards or computers, but kept at a central server (e.g. at the issuer). They promise their users greater convenience and lower set-up costs than the first generation of e-money.

3 ADOPTED SOLUTION: PREPAID CARDS

Prepaid cards provide a very good solution to the online payments problem. In some areas, such as mobile phones, where more of the prepaid cards infrastructure is in place, this mechanism is already providing a mass market platform. On the web, however, the use of prepaid cards remains very limited. Yet, and until a better solution comes along, the prepaid cards remain the best way to deliver much of the functionality demanded by business and consumers alike.

The principle consists of scratch cards with an identifying number that needs to be revealed. Before the cards are produced and delivered, the system creates unique digit number exactly the same amount as cards ordered. Before the cards go to the distributor, they are loaded in the system. However, they are not activated yet. It is only when the distributor, for example, passes a small number of them to a dealer that the cards are activated. This means that if the cards are stolen beforehand, they are worthless. This is one of the most important security factors in the concept.

When the user account is consumed, or insufficient for desired order, the consumer is verified to improve the fund in order to be liable for further payments in the supplier website.

After the consumer authenticates himself with security procedures, the number has to be entered into the issuer's website to increment the "user account" with the corresponding value. The entered serial number is encrypted per SSL and routed to the Web server of LibreAire system. Here, the input is checked by the application and routed to various databases. The payment is processed and debited there.

4 SYSTEM OVERVIEW

The Cerist E-Books online store is a web application running into a Tomcat Servlets container. It can be imported to any platform or system since Tomcat container is carried out by a Java Runtime allowing application portability.

Collected information storage and retrieving is managed by a MySql Data Base Manager System.

Behind the scene, the implemented solution was built as a combination of a set of components and technologies as explained in the following section.

4.1 Architecture

The following diagram shows in more details the modular architecture of LibreAire Electronic Books Store System. We have chosen to use the 3-tier client/server architecture (figure 1):
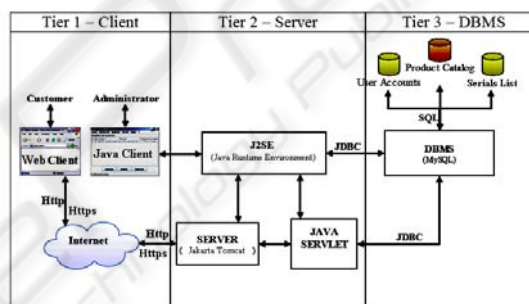

Figure 1: SALE global Architecture.

Tier 1 (client) consists of a standard Web Browser for customers navigation, and a local Java application used by an administrator to manage the system.

Tier 2 (server) is made of a Web Server in interaction with a, generally included, Servlets engine. These two entities are running onto a Java Runtime Environment.

Tier 3 (DBMS): The Database Management Server software comprises the third and final tier.

4.2 Example Use Case

The following series of screen shots represents the screens that user would transit in a complete shopping scenario.

4.2.1 Anonymous Mode: Navigation

User is shopping in anonymous mode, he can access the site home page, and he can also consult available articles, know their prices and get more details on

each of them. Moreover, this mode also allows him to select articles that interest him by adding them to a virtual shopping cart.

Unfortunately, user is not able to buy products. He has to login before.

4.2.2 Anonymous Mode: Registration

If user has never been registered as system's client, he must subscribe before any transaction procedure, by submitting a set of private information, especially a valid e-mail address. Doing that, he will receive his password by e-mail that he can access his account.

4.2.3 Connected Mode: Authentication

To complete any transaction, user have to login into the site, using his login (submitted during subscribe operation) and the corresponding received password. The server will compare this information to database client's accounts. If any error met, the user is given access to the site. This is the medium step between anonymous and connected modes.

It is important to notice that user can login/logout to his account without loosing the shopping cart content. This offers him more privacy since he can authenticate himself at any desired time of shopping process. Except for operations where client identity is required and then asked by the system.

4.2.4 Connected Mode: Passing Command

Buyer sees the shopping cart whenever he clicks the detailed cart icon. For each product in the cart (see figure 2), Buyer will see the product name, the quantity selected, the preview thumbnail and the price. He can also see the total order cost at the bottom.

In the cart screen, user can proceed to changes of any product to be purchased. He can then continue shopping, save current order for a later use, or proceed to order confirmation.

Detailed cart screen can be shown in anonymous mode. In this case, user is asked to login since he clicks on "Save Cart" link or "Pass Command" button.

After Buyers submit their order, a confirmation is generated and displayed. This confirmation shows the detail of order, and includes links to product to be downloaded.

Once transaction successfully processed, the buyer is given notice of which items and quantities have been downloaded and the charge that has been made to his credit.
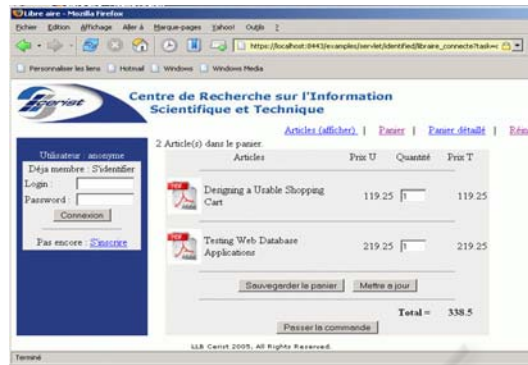

Figure 2: Detailed Cart Interface.

4.2.5 Connected Mode: Profile Update

At any time, in the shopping site, registered users may click the "My Account" icon to log in and view or change account details. In the profile details, Buyer sees a list of all their previous transaction. They can view, update, progress or cancel previously saved orders. They can also change their login password or E-mail address.

4.2.6 Connected Mode: Credit Charging

The main update that user can apply on his profile consists of credit charging, since the user credit is decreasing after every buying operation. Using the form shown by figure 3 buyer enters prepaid card serial, and clicks submit button. The server will check the submitted number validity referring to database serials list and increment user credit with corresponding value.
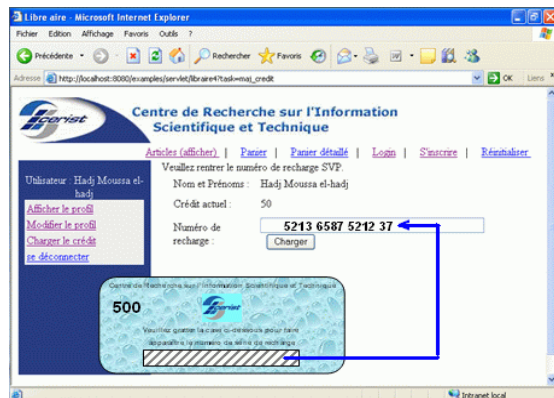

Figure 3: Credit charging mechanism.

Once all operations finished, user is asked to click logout link in order to close his shopping session.

5 DISCUSSION

The reported types of prepaid cards are submitted either to registration or licensing requirements. This mechanism has advantage to be flexible at various communication platforms; no special hardware or software is required, which guarantees a greater flexibility and extensibility to our solution.

This technique of using funds is simple, transferable and anonymous; the payer does not need to have or reveal a credit card, debit card or bank account number in order to pay; he has total control of available funds via electronic purses. Prepaid cards model is the preferred usage for anonymous payments and small amounts, including various value added services.

With deposited prepaid model, it takes time for a button click to make a financial transaction, instead of bank transactions.

6 CONCLUSIONS

The objective of this study is to develop a suitable platform prototype for E-business. We tended to demonstrate the effect of the Internet technologies on the development of Electronic Commerce. In this way, java technologies have been widely used to provide flexibility, scalability and integration with existing enterprise systems.

Because the Internet has evolved considerably over the past few years, LibreAire has been released to meet the needs of different browsers, heterogeneous platforms, security tools and operating systems.

We have also introduced a simple-use and powerful E-payment model that has already proved its efficiency in similar areas such as cellular telephony communications.

Future work and research will include developing an online stores automatic generator. Such a tool offers users a GU Interface to build and maintain a complete website shop, with no programming skills requirements. Respecting the proposed model, the generated system provides a more customized and targeted sales.

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