

Development of a Real-time Customer Service System

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Abstract

Good customer service is essential for business to grow. One of the major challenges facing most companies has been how to keep their customers satisfied and properly serviced. The existing customer service systems have limitations such as poor customer service and relations. Hence, a real-time customer service system is proposed. The system was developed by using incremental model development process. The front end was designed using Macromedia DreamWeaver 8.0, Macromedia Flash and Java server page. The business logic and the work flow was developed using Java Servlet and Apache Tomcat Server. MySql 5.0 was used as the back end.

Keywords: Customer service, e-commerce, customer support, help desk

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1. INTRODUCTION

Electronic commerce has gradually but steadily begun to replace the traditional commerce. It is transacting of facilitating business on the Internet (Khurana, 2011). Companies have also begun to appreciate and embrace the benefits derived by interacting with its customers via electronic means – specifically via the Internet. While some companies have found it a very convenient and cost effective way of interacting with the public, others have found it to be a method to announce their presence to their competitors and to their prospective customers. With the wide and ready acceptance of this form of interaction by both parties, it has become expedient for the development of powerful applications that meets the needs of these parties.

One of the major challenges being faced by most companies has been how to keep their customers satisfied and properly serviced. Over time, as a company begins to grow, its customer base is expected to expand also. How does a company keep track of information regarding its customer base, facilitate the proper documentation of company-to-customer interactions, as well as offer fast and personalized real-time interdependent customer support alternatives to service all possible needs of its customers?

Most customers have stopped patronizing certain companies on the basis of poor customer service and relations. It is usually very important to get the customer satisfied, before and after business has been transacted. Proper

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service delivery support should be included as one of the main priorities of the company. By service delivery support, one refers to ensuring the continued and sustainable use of a product by the support unit of the company long after being sold. Hence, there is the need to develop a real time customer service support system.

The organization of this paper is as follows: Section 1 gives a general introduction about the paper. Section 2 describes existing customer service systems. Section 3 discusses the proposed system while section 4 concludes the paper.

2. EXISTING CUSTOMER SERVICE SYSTEMS

Customer Service is the provision of service to customers before, during and after a purchase. According to Turban (2002), it is a series of activities designed to enhance the level of customer satisfaction – that is, the feeling that a product or service has met the customer expectation. Customer Service has always been interwoven with any form of business. Usually, before a transaction can occur, there must be some form of interaction between the customer and the seller. Over the years, customer personnel have been given the sole responsibility of interfacing with the outside world on behalf of its company. This method of interaction has evolved over the years. Spiller and Lohse (1998), in their study of 137 Internet online businesses, show that there is still a long way to go in meeting customer expectations. Less than 9% of the sites have a Frequently Asked Questions (FAQ) section and 78% of them do not offer incentives to attract and retain customers. The existing systems can be divided into two broad categories. These are discussed briefly in the following sections.

2.1 Traditional Customer Service Support

This usually refers to all forms of contact before the advent of more sophisticated forms of communication, like the Internet. They are generally called help desks. These are:

Face to Face customer contact

The customer occasionally comes to meet a representative of the company for enquiries. However, this wastes time since physical contact between both parties has to occur before solutions can be proffered.

Telephone Contact

The company encourages the customers to call in order to make enquiries about information or complaints about products purchased. Extra communications skill is required from the customer service personnel. Also, the customer may go through several people before the ideal person who can help him is eventually reached.

Paper Contact

Contact is established via mailing magazines, brochures and catalogues to customers who subscribe. However, mailing via post is not real-time, and therefore it takes some time before contact is established between the customer and the company.

2.2 Electronic/Online Service Support

This is the most current means of communication between a company and its customers via the company's website. Some of the support options being used by some Nigerian companies on their websites are: Frequently Asked Questions (FAQs), Electronic Mail, and Electronic bulletin boards or notices.

2.3 Limitations of Traditional Customer Service and Electronic Support Systems

At its best, e-support offers a customer an efficient 24-hour-a-day service. It also offers an enterprise a cost-effective means of improving customer relations. Another advantage that Electronic support has over the Traditional customer support is that issues of queuing at enquiry desks to get attended to by the customer relations unit is avoided, since access to the website is open to a large number of people at once. However, electronic support systems do not give customers the privilege of choosing from several interdependent options that will get them the fastest results. Lastly, most of the support systems on websites do not take into consideration the customer's opinion or reaction about the service he is receiving.

3. PROPOSED CUSTOMER SERVICE SYSTEM

The proposed Customer service architecture is as shown in Figure 1. The system was developed by using incremental model. The front end was designed using Macromedia DreamWeaver 8.0, Macromedia Flash, and Java Server Page. The business logic and the work flow was developed using Java Servlet and Apache Tomcat Server. MySQL 5.0 was used as the back end.

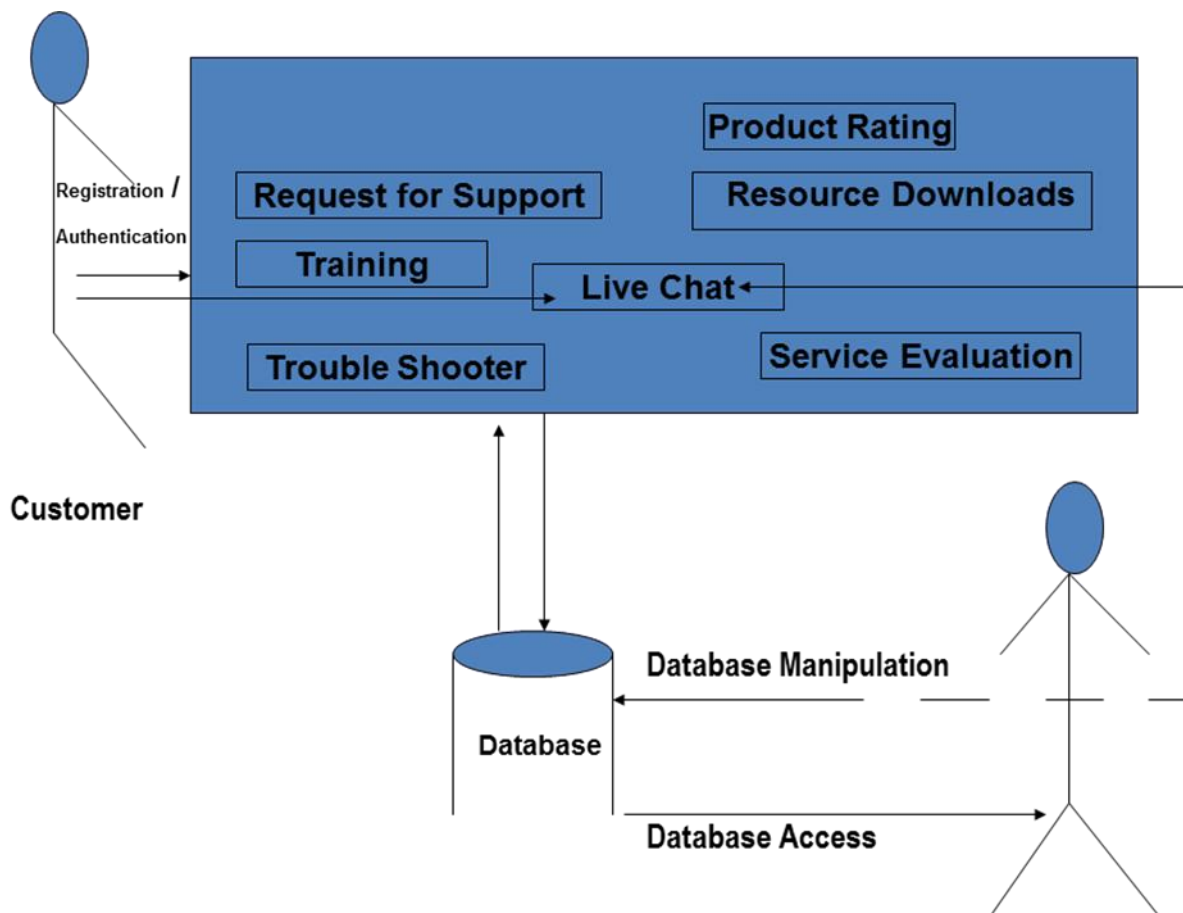


Figure 1. Proposed System Architecture

3.1 System Design

The system design is considered under three sections namely: the front end, the business logic and the back end. These are as discussed in the following sections.

3.1.1 The Front End/Client Component

This presented the interface to interact with the application. This client component resides with the customer who is browsing through the company's webpage and it runs on a computer. The interface is user friendly since the customer will be interacting with familiar components such as: Checkboxes, Radio Buttons, Buttons and Password fields and Text fields. The functionalities of the system include:

- ✓ Registration of customers and assigning usernames and passwords.
- ✓ Customer Help Desk: This is a service that provides technical help and support for customers. It navigates the customers through the following service options:
 - *Product Rating* page: This allows the customer to rate a company's product.
 - *Feed Back* page: This includes an on-line questionnaire about product failures and speed of company's response to customer request for support services.
 - *Download* page: This interface presents the various hyperlinks that activates downloads of necessary resources for customers.

- *Technical Support Request* page: This allows the input of necessary information the customers might have to supply in order to request for the technical team to fix a problem.
- *Chat* page: This allows online interaction between a customer and a client for real-time assistance via instant messaging.
- *Self Help* page: This is a self help tool that a customer can use to fix a problem.

The tools used are Macromedia DreamWeaver 8 and Macromedia Flash. The web pages are saved as JavaServer page and compiled using Tomcat's Jasper, which automatically converts text-based document into a servlet and processes customer's request.

3.1.2 The Business Logic

The business logic considered the details and flow of the design of the Customer Service and Support Portal. Customer Registration was the first step to gaining access to other privileges available on the web portal. For every service available, a registered customer would need to key in his username and password created during registration in order to gain access to his account. However, an unregistered customer could be allowed to use a chat subsystem to communicate directly with the customer. This is similar to a prospective customer making enquiries with the hope of doing business with the company.

Chat Subsystem

Customer interactions with the Customer Relations personnel via instant messaging were achieved using Servlets. Different Servlets handle specific tasks such as: Session initiation, launching of customers into any Chat room specified, handling posting of information between the two parties and saving information about Chat sessions. The Chat server is implemented as a single class with a single instantiation because it has a large amount of associated state and a fair amount of code that would otherwise have to be repeated. Implementing the chat server as a servlet provides a simple way for one object to make it available via Hyper Text Transfer Protocol (HTTP) communication technique. By being an HTTP servlet, it has built-in HTTP support. HTTP chat clients post their messages to the server using the HTTP POST method. The servlet takes the new message from the Text Input component when the user hits **Enter** buttons, URL-encodes the message, and posts it to the servlet as a message parameter, as shown in Figure 2. A sample code of the Chat session listener is as shown below.

Chat Session Listener

```
package classes.chat;
import java.io.PrintStream;
import javax.servlet. ServletContext;
import javax.servlet.http.*;

public class SessionListener
    implements HttpSessionAttributeListener
{
    public void attributeRemoved (HttpSessionBindingEvent httpsessionbindingevent)
    {
        String s = httpsessionbindingevent.getName ( );
        HttpSession      httpsession      =
httpsessionbindingevent.getSession ( );
        if ("nickname".equalsIgnoreCase (s) )
        {
            String  s1      =
(String) httpsessionbindingevent.getValue ( );
            if (s1      != null
            {
                ServletContext  servletcontext =
httpsession.getServletContext ( );
                if (servletcontext != null)
                {
                    Object  obj      =
servletcontext.getAttribute ("chatroomlist");
                    if (obj      != null)
```

```

    {
        ChatRoomList chatroomlist =
        ChatRoom chatroom =
        if (chatroom != null)
        {
            Object obj1 =
            String s2;
            if (obj1 != null)
                s2 =
        }
        } else
        {
            system.out.println ("ServletContext is null");
        }
    }
}
public SessionListener ( )
{
}
}

```

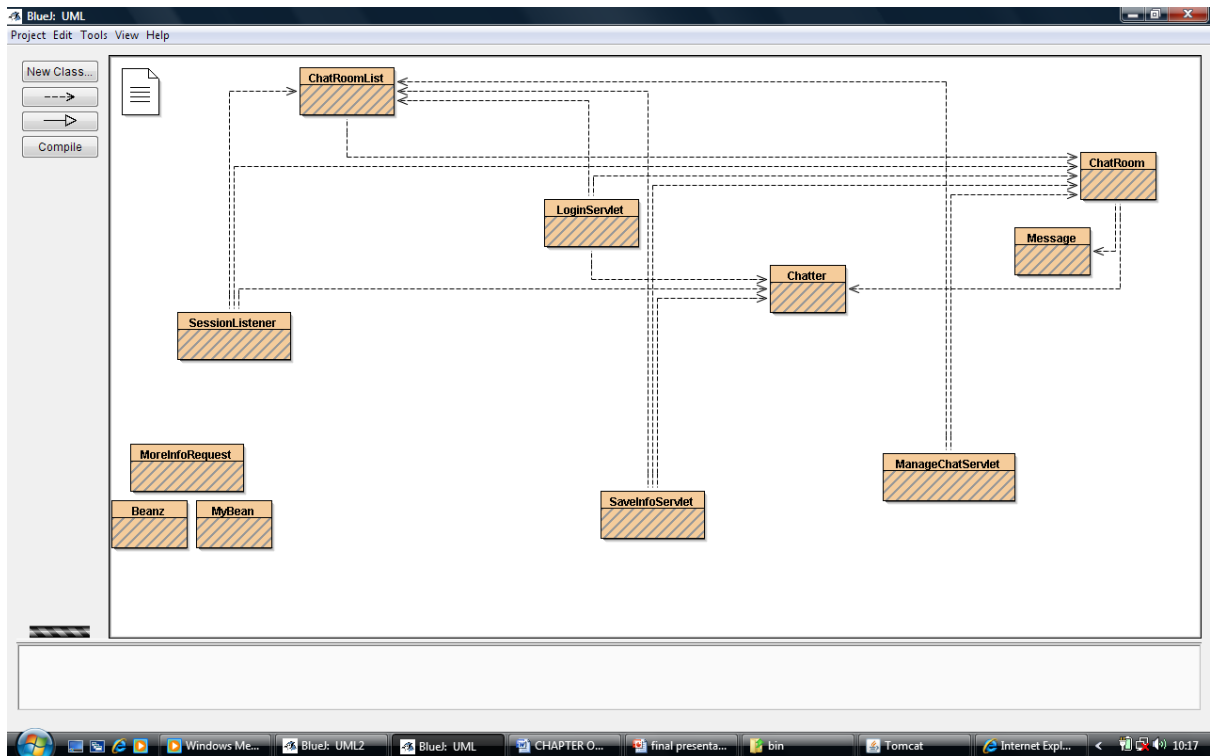


Figure 2UML Diagram for Chat Subsystem

Other Design Considerations are the Product Rating, Service Request and Customer Feed Back subsystems. These are processed by Servlets and the results presented based on the Customers' input. Customer Training is also provided online via video tutorials, while software 'demos' and other resources are made available by downloading them.

Online Self Help: This is designed as a dynamic FAQ, that produces solutions based on the 'symptoms' identified by the Customer while using the Company's product.

3.1.3 The Back End

In order to ensure data persistence, MySQL was used as to manage and store all the information handled by the application. The system had 4 tables that stored Customer Registration Information, User names and Passwords, Schedules and Appointments, Product Rating, and Customers' opinion about service. Data persistence is of utmost importance because these data are essential for the application and need to be called up at any time even after the application has been closed and reopened.

3.2 System Implementation

The application was developed on a Microsoft's Windows XP operating system environment. After the coding process, each servlet is compiled with the *javac* command. These Servlets (which are java classes) are then mapped to various pages that are displayed in the course of running the application. This enables dynamic and flexible responses generated by the web server depending on the user's request. This web application is targeted at all personal computers. The server side application could be deployed on any web server, while providing the appropriate driver for the database-application connectivity. For this application to run on any system, the following requirements must be met.

Hardware Requirements: Minimum of 20GB Hard drive, Minimum of Pentium III, Minimum of 256MB RAM.

Software Requirements: Web Servers, Database Server, Java Runtime Environment

In order to deploy the application, the Servlets and JSPs were packaged. This was achieved by setting up a directory structure for packaging and creating a Web Archive (WAR) file for Servlets and JSPs. A WAR file is a web application archive that contains servlet classes, JSP files, HTML files, image directories, JAR files, XML configuration files, and other resources that a web application depends on. The WAR was deployed on the web container like Tomcat in order to make the web application available to the container's users. A WAR file is like a ZIP archive. One is able to deploy the web application into a web container by deploying the WAR. The interfaces of the system are as shown in Figures 3, 4, 5 and 6.



Figure 3: Home Page



Figure 4: Help Desk

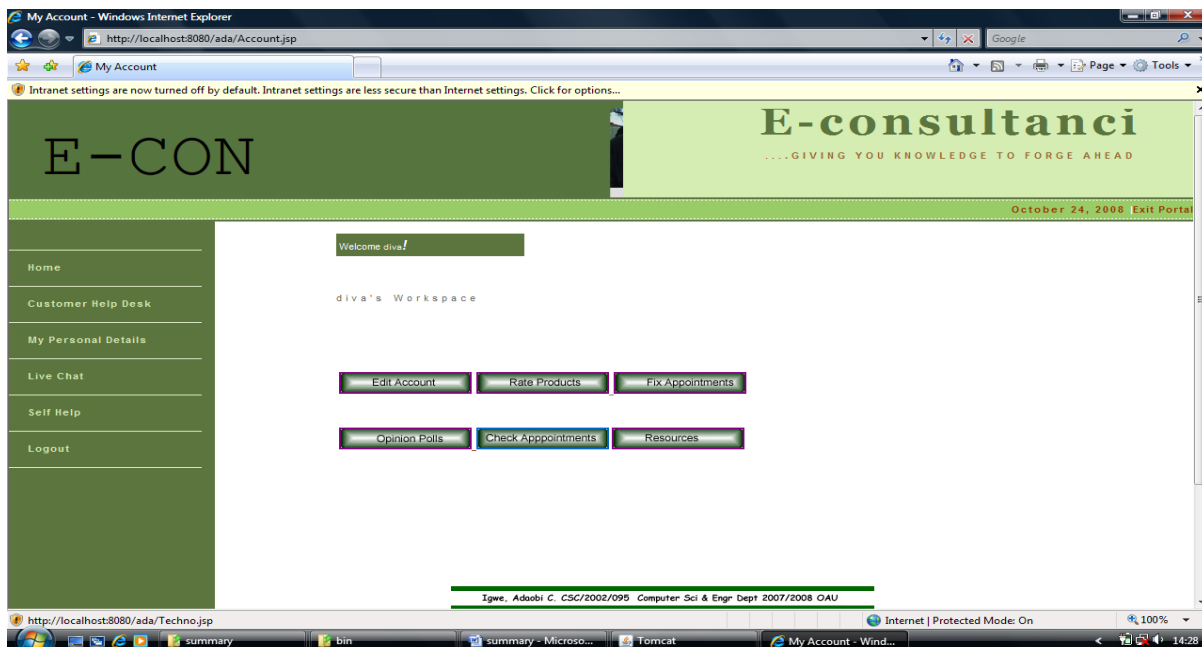


Figure 5: User Account Page

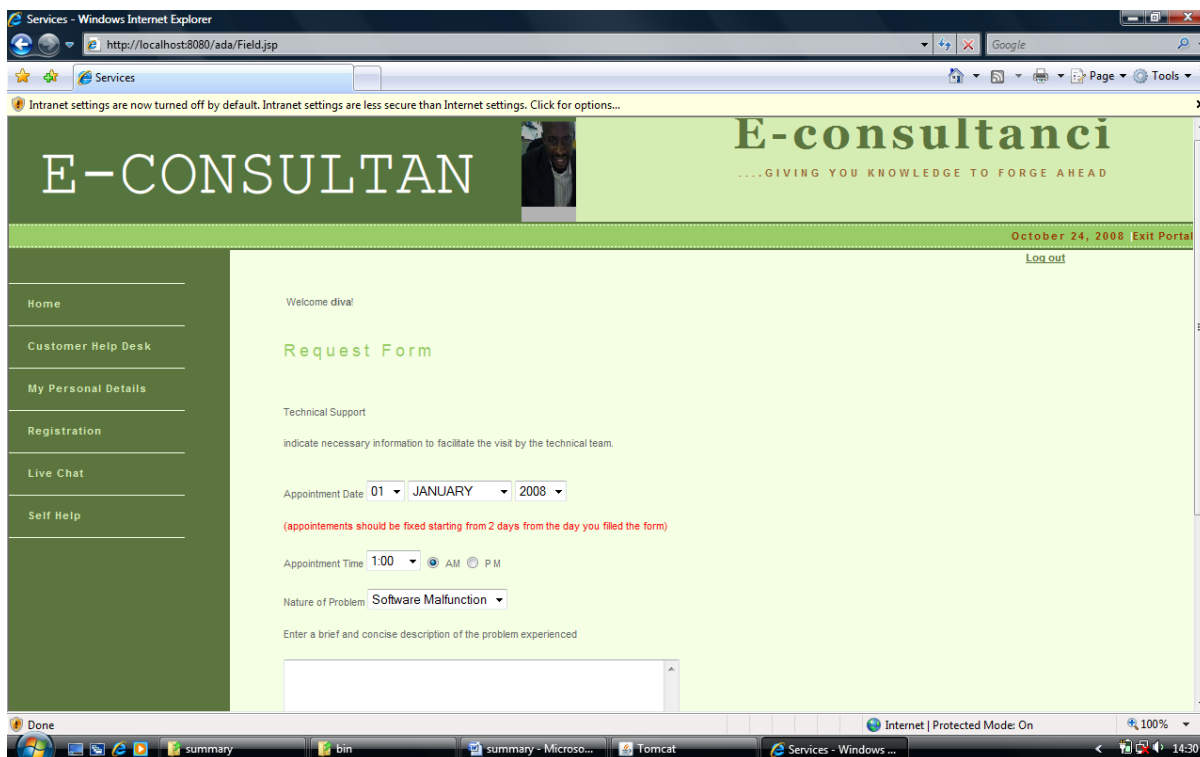


Figure 6: Appointment Scheduling Page

4. CONCLUSION

Customers over time have complained over the absence of proper customer service and support in most of the companies in Nigeria. This has been attributed to the mentality or background of the average Nigerian. However, other reasons stem from the fact that aside from the day-to-day deadlines that have to be met by the company in view of its sole goal: profit maximization, it becomes difficult to be able to prioritize or even take more seriously the opinions of the customers or their needs after they have purchased a product. The design and implementation of the project was successful. Users of the portal can benefit from it, if fully implemented and customized to meet the business needs peculiar to different companies.

The strength of this system lies in the availability of a wide range of interdependent options which the customer can choose from and that give him the best possible solution. The components of this system aside Customer Registration are: Online Requests for Technical Support, Product Rating and Customer Opinion poll, Online Help Desk, Product Training, Resource Download and a Self help troubleshooter.

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