

Multiplatform System for Customer Flow Management

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Summary: At present there are public and private companies and institutions where the customer service is poor, people waste their time standing in long lines waiting for their requirements.

In companies or institutions that have automated care through a system of managing the flow of customers, there is a deficiency related to response times for support when the system fails, because the companies that develop systems flow management customers are mostly located abroad, causing economic losses for companies that implement these solutions.

Management System Client Flow is a technological solution according to the requirements and needs of companies that provide service to the public which are constantly designing strategies to provide better customer service at lower cost.

The system will manage long waiting lines, smoothly and quickly without complains related to system support.

KEYWORDS: Customer, Long waiting lines, management and smoothly.

1. Introduction

The very long answer in terms of software and hardware support on the part of foreign companies

supplying management systems of waiting lines has as a consequence the loss of time that result in economic losses for the companies using these types of systems.

Companies that do not have management software customer flow, are not in the ability to provide adequate care to the same customers, because excess time people expect to be answered involves discomfort and in some cases desertion by these people.

Goals

- **General**

Develop a multiplatform system for managing customer flow which improves the level of satisfaction by automating the process of attend and care.

- **Specific**

- Analyze the structure, classification and types of waiting lines.
- Determine the specific hardware and software requirements needed to develop the system.
- Define the important features and advantages of the J2EE platform application development.

- Implement a multiplatform system for managing customer flow.

• **Justification**

The development of a system of flow control customers allow local technology implemented to provide better service to customers who purchase such systems. It will allow saving both human and economic resources by maximizing the profitability of the users of this system.

The J2EE platform allows developing applications N layers architecture based on software components running on an application server.

The J2EE platform allows the developer to create a portable application between platforms and scalable, while integrating with previous technologies.

• **Scope**

The system will consist of four modules with clearly defined functions.

1. System Server Module.- The server system will be responsible for managing and addressing shifts. It will allow the management of priorities waiting, waiting times, service times, monitoring screen shifts waiting, monitoring screen connected to the system advisers will enable the generation of alarms based on waiting times and times of attention.

It will store the information in a SQL Server database from which the information required for the issuance of statistical reports will be obtained.

2. Keypad Module Virtual.- will be responsible for call shifts, display information connected to the system consultant, show the waiting time shift, show call time, implement the functionality to insert and transfer a turn, implement the functionality to connect and disconnect the system.
3. Emission Shift Module .- will be responsible for the printing and delivery of turn customer service according to the requirements.
4. Presentation Shif Module .- will be responsible for showing the turn and because of attention to which the user should be directed.

• **Limitations**

The server application will be developed to run on a single agency and client applications to communicate with the application server must be within the intranet of the agency and must have the TCP / IP protocol activated and enabled.

2. Materials and methods

2.1 Design

Before starting the development of the application must be installed and configured the following tools:

- NetBeans Integrated Development Environment 8.0 which must have the following components installed:
 - Framework Spring Web MVC 4.0.1
 - Framework JavaServer Faces 2.2
 - Framework RichFaces 4.2.0
 - Framework Hibernate 4.3.0

- Apache Tomcat Application Server 8.0.
- Java Development Kit 1.8 (JDK).
- Database Server SQL Express 2008.

2.2 Methodology

For system modeling Unified Modeling Language UML is chosen which has become a standard that has been adopted by many international organizations and companies to create schematics, diagrams and documentation software development.

The proposed architecture for the development of the application which is MVC pattern is a software architecture that separates data and business logic of the application user interface.

In the following figure we can observe selected for each layer of the MVC architecture technologies and their location within the web container.

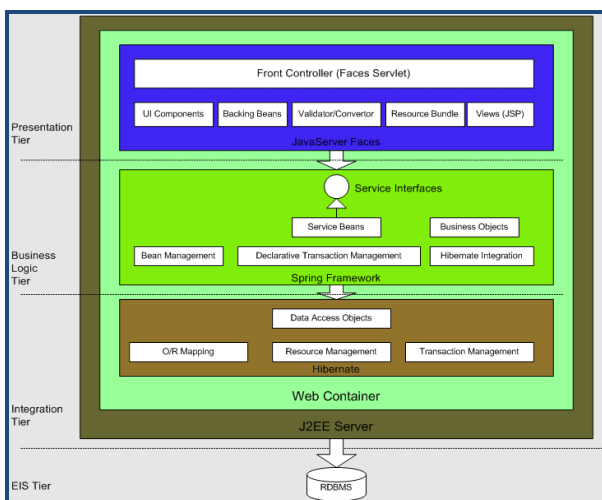


Figure 1: Architecture MVC

- There is the Apache Tomcat Application Server where the Portal is running Waiting lines Management QManagement.

- There is JSF to the presentation layer for being a model MVC standard technology which allows to develop user interfaces in a professional manner and according to the specifications required by the J2EE platform.
- The persistence layer of data will be done through the hibernate framework for being easy to deploy and highly portable.
- For business logic layer will have the spring framework which allows integration between application components.
- In SQL Server Express you have created the database name qmanagement which contains all necessary information storage tables.

3. Results

It has been found that in developing the application following the specifications of the J2EE architecture, an efficient, robust, portable and attractive and easy to use user application is obtained.

The following figure shows the login screen in which validates the type of user interface according to the options enabled for each profile is shown.

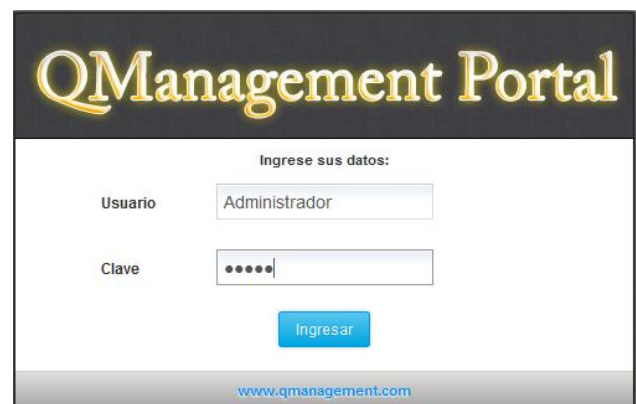


Figure 2: Logon customer management system.

By accessing the system administrator profile interface seen in the following figure shows.

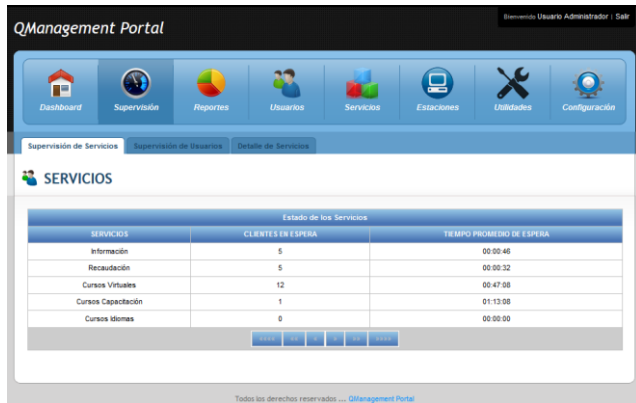


Figure 3: System Management Interface client management.

By default the option of monitoring which can monitor the status of the service is activated.

The management interface of the system allows all the functionality defined in the project scope to the system server module including:

- Monitoring Services.
- Monitoring Users.
- Monitoring Service positions.
- CRUD Services.
- Users CRUD.
- CRUD attention stations.
- General System Configuration.
- System Utilities.
- Issue Statistics Reports.

By accessing the profile system operator interface seen in the following figure shows.

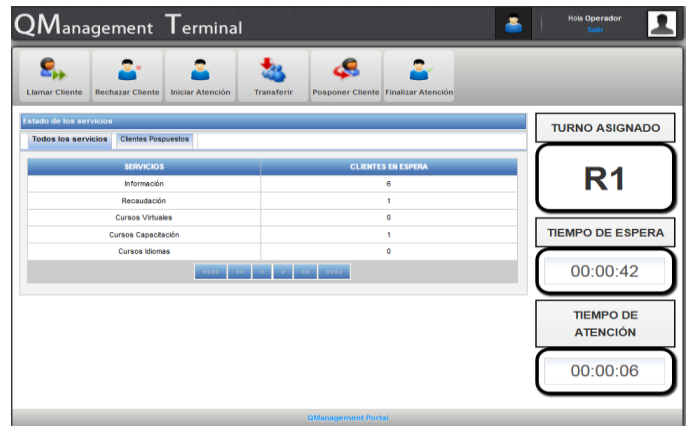


Figure 4: User Interface System Operator.

The operator interface system allows all the functionality defined in the project scope for the module position of attention such as:

- Call a turn.
- Reject a turn.
- Transferring a shift to another waiting line.
- Postpone an appointment for a specific time.
- Show name of the station operator attention.
- Change priority attention.
- Show the shift assigned to the position of attention.
- Display time out of turn before being named to the position of attention.
- Show the time shift attention.

The modules emission display turns and turns do not need to login to the system and connect directly via the following links.

Emission module shifts:

<http://localhost:8084/QManagement/imprimirticket.xhtml>

The interface is shown in the following figure.



Figure 5: User interface module emission shifts.

By choosing one of the services in implementing emission shifts the application displays a popup with the turn assigned to the customer.



Figure 6: POPUP showing assigned shift.

Presentation module shifts:

<http://localhost:8084/QManagement/display.xhtml>

The interface is shown in the following figure.

TURNO	MÓDULO
R2	2
I4	2
I3	2
I2	2
R1	2

Figure 7: Interface display module shifts.

The display module interface shift displays the last five turns the server waiting line assigned to care positions.

When a service position called a turn, the display application displays a popup with the shift and the module to which the customer must go for answers .



Figure 8: POPUP shows turn called.



4. Conclusions

- The development of this application will allow the company Q-Matic Ecuador have a multiplatform tool for managing waiting lines.
- The use of development tools and third-party frameworks, and subsequent integration was achieved through the MVC design pattern which clearly identifies the components that are used in every layer of the application.
- It was found that following the specifications of the J2EE platform is possible to obtain a robust, reliable, scalable and secure system.
- An intuitive user application, which can easily manage the customer management system was developed.
- When designing the application as specified by the RUP Software Development Process it opens the possibility of upgrades, improvements or create new modules of the system in the future.

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