CATALYST FOR ACCELERATING RECRUITMENT PROCESS

by

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A REPORT

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MASTER OF SCIENCE

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Approved by;

Major Professor

Dr. Mitchell Neilsen

Abstract

Hiring process in an organization is very crucial which consumes cost along with a lot of time. I developed a catalyst which will accelerate the recruiting process which assures optimum time and cost utilization. Keeping track of all the applicants throughout the recruiting process is cumbersome. This catalyst for accelerating recruitment process is an interactive web application which helps multinational corporations and organizations to keep track of the recruiting steps for different position, reasons for creating a new position, history of all the potential applicants and the employer's feedback along with email communication to all the people involved.

Major emphasis of the web application ensures that none of the applicants in recruiting process are terminated unconditionally due to manual errors or miscommunication. Initially a position is created specifying the requirements and duties by a line manager or a branch manager. Initial applications are shortlisted by the recruiter and interviews are scheduled with panelists. This web application does not involve in the decision making, rather it provides a framework and sequence to follow and to tag an offer to a potential candidate.

The web application follows 3- tier architecture and Asp.net is used is used to develop the web application. Asp.net web forms, HTML, CSS, and JavaScript are used to provide rich front end, Vb.net classes provide the business logic, and Microsoft SQL server serves as the data layer. A part from the SMTP mail server is used to send mails to HR manager, line manager, panelists and candidates.

The overall system is tested using unit testing, manual testing and performance testing techniques. Automated test cases are written and used to ensure correctness of the functions. Manual testing further ensures that the functionality of the application is appropriate. The system is subjected to different loads and the corresponding behavior is observed at different loads. The unit and manual testing reveal the functionality of each module in the system as expected for both valid and invalid inputs. Performance testing reveals that the website works fine even when the server is subjected to huge loads.

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ACKNOWLEDGEMENTS

I thank my professor **Dr. Mitchell L. Neilsen**, for his constant help and guidance. I would also like to thank my committee members, **Dr. Gurdip Singh** and D**r. Torben Amtoft** for supporting my work on this project.

1. Introduction

1.1 Motivation

To implement a recruiting system from end to end for an organization geographically placed at various locations. In the present scenario recruiting process is very crucial and also a continuous process in an organization. Decision making process itself is very difficult for the recruiting committee besides their actual duties and so an automated process will reduce flaws due to missing documents and miscommunication. Thanks to Web 2.0 and technology for providing all the incentives and solve this issue successfully.

1.2 Objective

A Catalyst for online recruitment system can offer significant cost savings for employers and reduce time taken to fill vacancies, Using internet based approach along with traditional ideas helps candidates as well as organizations to choose right option. This application is developed using ASP.NET programming language using visual studio 2008 IDE. Development process is a great learning process and helps in solving a real time problem by analyzing various aspects.

1.3 Scope

Technology serves in various parts of the organization to grow systematically and improve benefits. Recruiting process is a crucial process and can be optimized and used to keep track of all the recruiting process throughout various locations in which an organization is placed geographically. This process can be integrated with Employee Tracking system that stores most of the information about an individual in further growth and placement of a potential Employee. For example the manager can go through the already stored feedback for promotions or transfers for candidates which helps in decision making.

1.4 Hardware Specifications

A processor above P IV is required to deploy the application with minimum of 500MB RAM. Based on the size of the organization memory requirements are altered. Minimum of 1GB is required to store the tables.

1.5 Software Specifications

Windows operating system 2000 server or above with IIS Web server is required to deploy, SQL Server 2005 or above is required and to maintain the application .net framework 2.0 is required. Application is developed in the visual studio 2008 Environment.

2. System Requirements Analysis

2.1 Requirements Gathering

The important and crucial part of the application development is the requirements gathering. The task is to make the recruiting process quite simple and quick. The recruiting procedures of various organizations have been observed to find few defects. An organization located at various locations needs to follow the same recruiting procedure as well as all the information is to be made available in the database. Thus web 2.0 can provide the necessary framework and object oriented design in solving the problem efficiently.

A feasible solution includes multiple factors for an organization and here I present that this application is feasible economically, technically and behaviorally.

2.2 System Feasibility

2.2.1 Economic Feasibility

This web application is economically feasible, since resource consumption is very little and more over only web browser is used to access the application internally in any organization. The necessity of the recruiting process makes this application more feasible.

2.2.2 Technical Feasibility

Microsoft windows server with .net framework 2.0 and IIS serves as the web server and SQL server serves as the database server. Any normal computer can be able to provide these facilities to deploy this application. More over this application is launched as web application to provide ease of use.

2.2.3 Behavioral Feasibility

Recruiting process is a continuous process in an organization and users of such applications are internal employees, most of the terminology and steps to follow are self explanatory.

Catalyst for accelerating recruitment is an application developed following the water fall model. Requirements gathering and analysis to build up the application is done step by step and confined to various fields based on the present requirements of an organization.

3. Technical Overview

Modern technology enables us to solve many problems in the present scenario, this application depends on ASP.NET components developed using visual studio 2008 and SQL server 2005.

3.1 ASP.NET

ASP.NET is a prime component of .NET framework these days while developing a web-application framework. It is built on the Common Language Runtime (CLR) which allows programmers to build dynamic web applications, web services and web sites and also allows them to write ASP.NET code using any .NET languages like VB.NET and C#.NET.

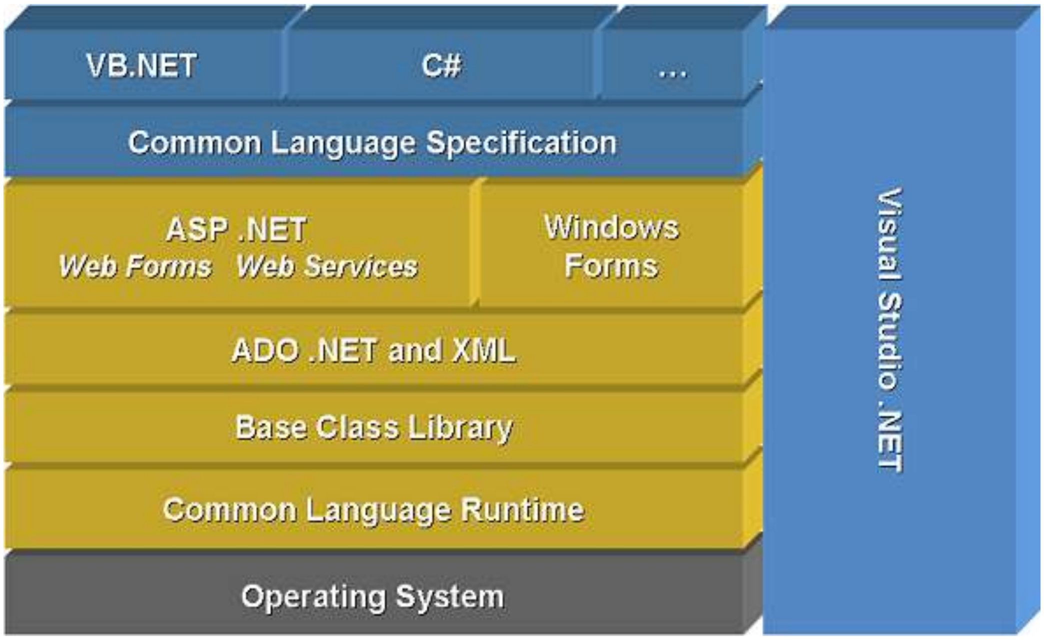


Figure 9: ASP.NET Architecture [11]

“The ASP.NET compiler compiles all the application components including pages and controls into an assembly so that ASP.NET environment can be used to service requests from the users. It has several other features like debugging support, health monitoring and performance features, xml web services framework, an extensible designer and hosting environment and application life cycle management.”[5]

The figure 1 gives an overview of the ASP.NET architecture. The architecture of ASP.NET is based on the CLR which runs as virtual machine on operating system. This CLR is layered on top of the windows and COM+ services. On top of it are the .NET framework base classes which provide classes that can be called from any .NET language. These contain ADO.NET, XML, IO, security, threading etc., ADO.NET which is a set of classes provides data access support for the .NET framework based on ADO. On the top of .NET framework base classes are ASP.NET and windows forms. ASP.NET offers web forms and web services where as the windows forms are used by traditional client applications (windows applications). Common Language Specification (CLS) is on top of these two which makes sure that each language has common set of features. Layered on top of CLS are various .NET programming languages like VB, C++, C#, J#, Jscript etc.,.

3.2 Visual Studio 2008

"Visual studio is an Integrated Development Environment (IDE) developed by Microsoft and it helps to build various ASP.NET web applications. It also helps in building console as well as GUI applications that can be in native code combined with managed code for all platforms that can be supported by Windows, .NET framework etc. There are several other built-in tools which include a forms designer which can also be used to build GUI applications, web/ class/ database schema designers etc." [6]

3.3 MS SQL Server 2005

Microsoft SQL Server is a relational model database server produced by Microsoft. Its primary query languages are T-SQL and ANSI SQL. SQL Server 2005 included native support for managing XML data, in addition to relational data. This enables to represent data in the form of relational schema and further normalize accordingly. SQL language helps in writing required queries and stored procedures to obtain data dynamically. MS SQL support with .net framework is commendable and assures full support in integration of the application.

SQL server Management Studio is used to create the RDBMS schema and specify various constraints like referential constraints during creation of a schema. To test queries and assertions the user interface of management studio is very helpful throughout the process.

4. System Design

Requirements gathering followed by careful analysis leads to a systematic Design i.e. Object Oriented Design (OOD). Various entities have been identified and basic duties are represented using use case Diagrams.

4.1 Use-Case Diagram

A use case diagram depicts the application from an external observer perspective. Use case diagram identifies the agents of the system and the functions that these agents perform with the system. In this application different kinds of agents or actors are identified, a Branch Manager who is interested in creating resource request and view the relevant requests he needs to approve.

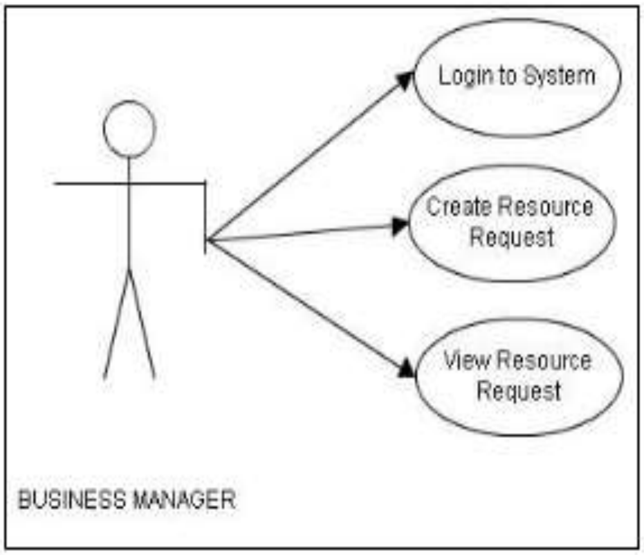


Figure 10: Use Case Diagram for Branch Manager

A Branch Manager or Line manager logs in to the system and creates the resource request i.e., actual opening in an organization specific to the department he belongs to and assigns all the required fields. He can also view resource status as well as other resource requests relevant to him.

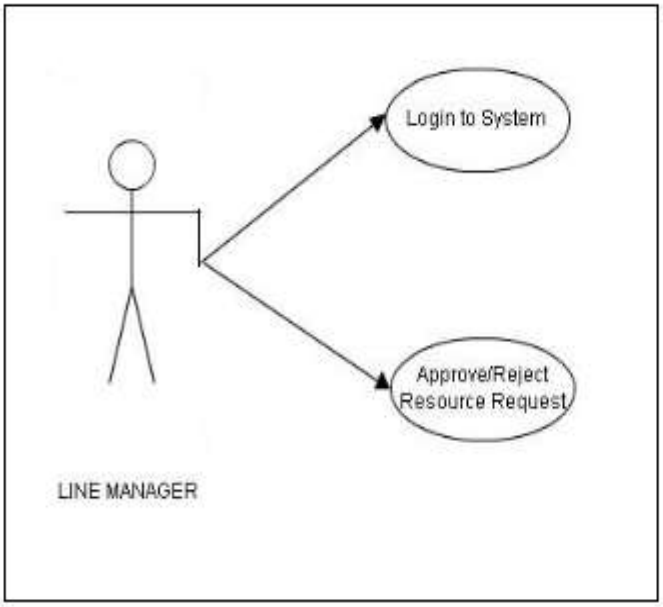


Figure 11: Use Case Diagram for Line Manager

A Line Manager is another agent responsible for approving an appropriate request and he even can reject a resource request and specify feed back or reason for rejection. Since this system is an internal application all the authorities need to login to the system. The Line Manager's approval takes the resource request to the next level based on the hierarchy.

Two more important agents Recruiter and Panelist play key roles in the system. Recruiter shortlists the required resumes and schedules interviews one after the other. The role of Panelist is to interview the potential candidates and submit the feedback which will be very crucial in decision making. The Recruiter’s use case is shown in figure 4 and Panelist’s use case is shown in figure 5.

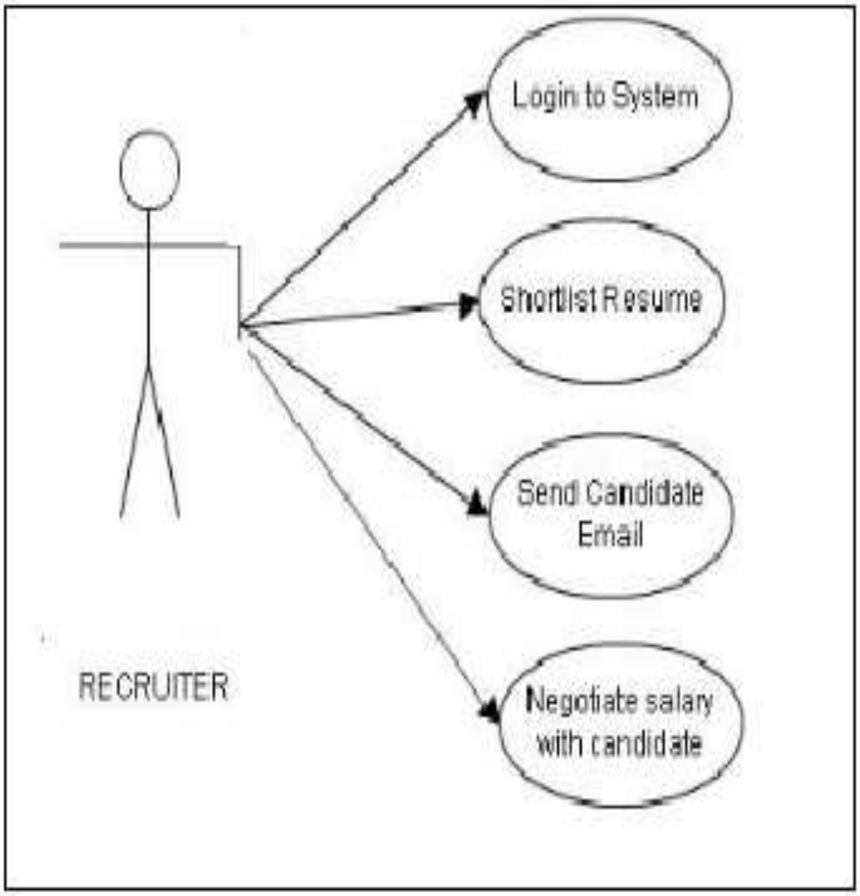


Figure 12: Use Case Diagram for Recruiter

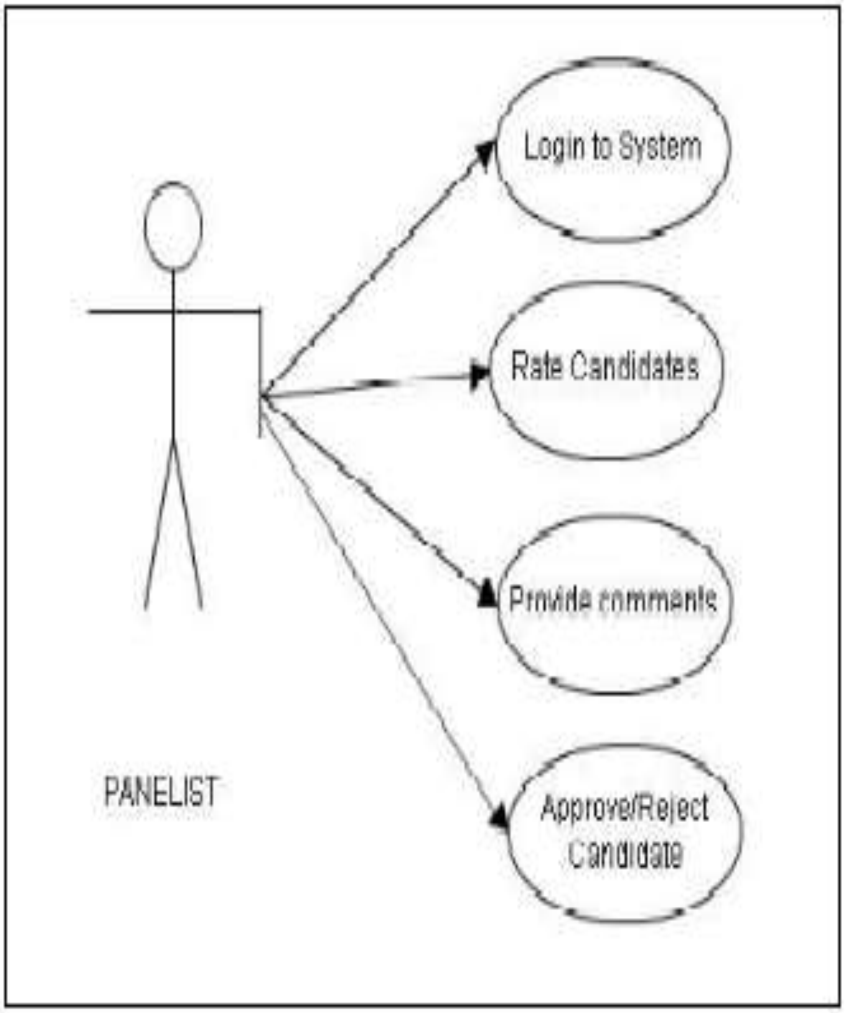


Figure 13: Use Case Diagram for Panelist

4.2 Class Diagram

In UML, class diagram is a static structure diagram which describes the structure of a system by showing the classes, attributes and their relationships. It is the main building block in object oriented modeling. The classes represent the structure or framework for the main objects and interactions in the application. The class diagram consists of classes represented in boxes which contain three parts. The name of the class is contained in the upper part, with the attributes of classes in the middle part and the bottom part contains the methods or operations that the classes undertake. With detailed modeling, the classes of the conceptual design are split into number of subclasses. The following figure shows the class diagram of the catalyst for accelerating recruitment.

Object oriented features and design patterns are useful at various levels to come up with a reliable design. In any organization Employee is the abstract class where default behavior can be specified. Various roles in the organization named line manager, branch manager; recruiter and panelist are derived from the base class employee. The attributes of each role in recruitment process is shown in the classes and important methods are listed in the figure 6.

An important element of this application is resource request which serves as the start point for this application. If a requirement arises in a department with responsibilities and duties a position is created and approved by various superiors and resumes are shortlisted. So resumes are also taken as a class and the potential resumes are shortlisted to keep track of the resumes. After this point various interactions should be take place between panelist and potential candidate (i.e., shortlisted resume). The recruiter is the one who schedules the interviews and updates the schedule. Panelist is responsible for obtaining the feedback and checks if a candidate is fit for the role.

The object oriented features like inheritance and encapsulation are used to make the task easy few classes and effective design. The selected resumes or shortlisted resumes are always preserved such that they can be viewed again based on the requirement and those candidates can be interviewed to fill in the position.

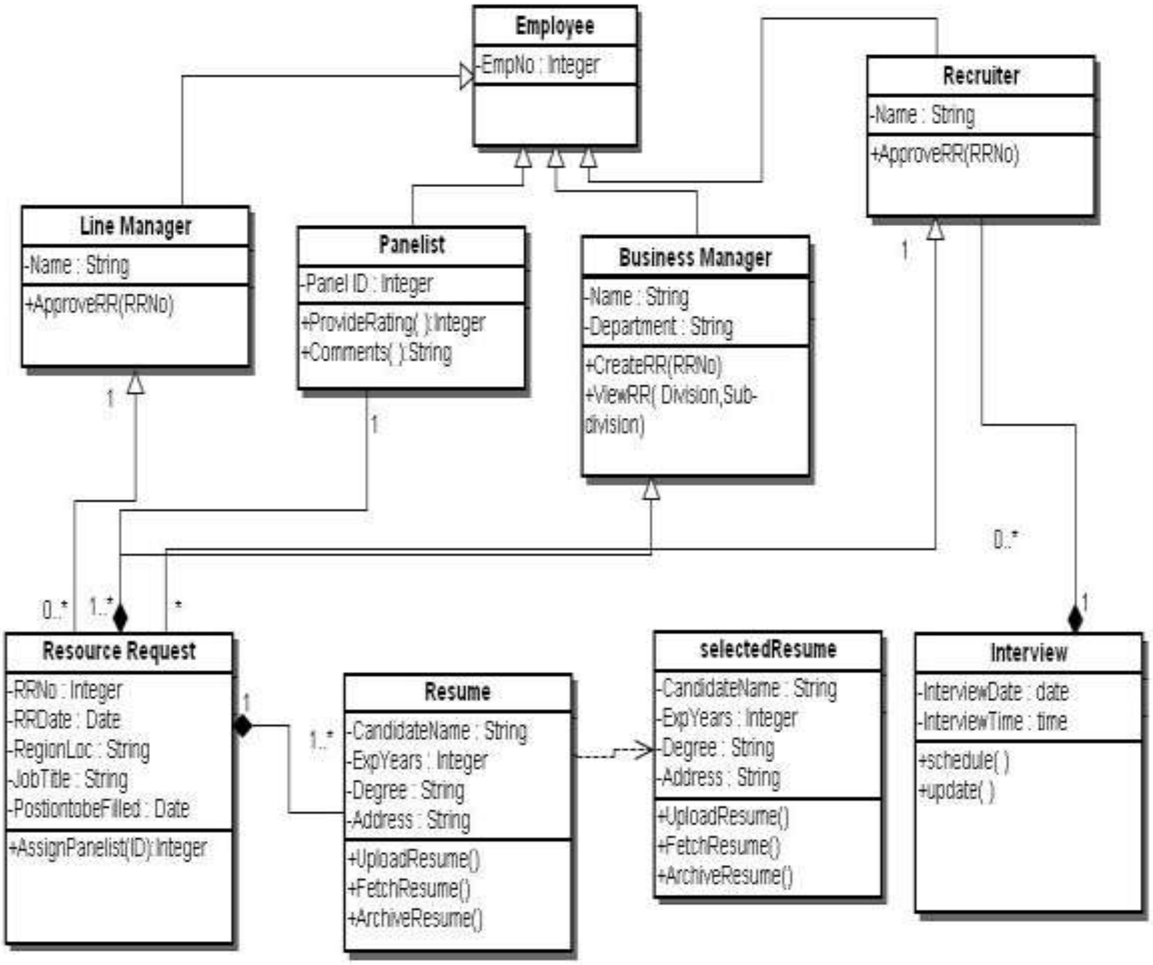


Figure 14: Class Diagram of catalyst for Accelerating Recruitment

4.3 Design Goals

The goals behind this design are listed as follows.

- Crucial design goal of this application is to build interactive front end to allow only reasonable states one after the other.
- Hierarchical design always optimizes the size of the code and keeps the code clean and simple.
- Implementing good search techniques for obtaining resumes and short listing the required resumes.
- Since this application is internal application functionality is given the highest importance in each part of the development.
- It also involves designing fast responsive web pages through the usage of session and view states thereby considerably reducing the post backs to the server and also calls to the database itself.
- Navigation is easy and more over only relevant people are notified on their dashboard, so it makes their tasks simple and appropriate.
- This application can be integrated to other applications which keep track of the employees in an organization.
- At any point in the future each employee history from the point of hiring is available in the database.
- Only active users are listed and assigned roles as per the requirement.

4.4 System Architecture

This application has followed the three tier architecture, the presentation layer serves as a rich interface, the business logic layer provides the functionality and the data access layer provides the stored procedures and drivers to access database.

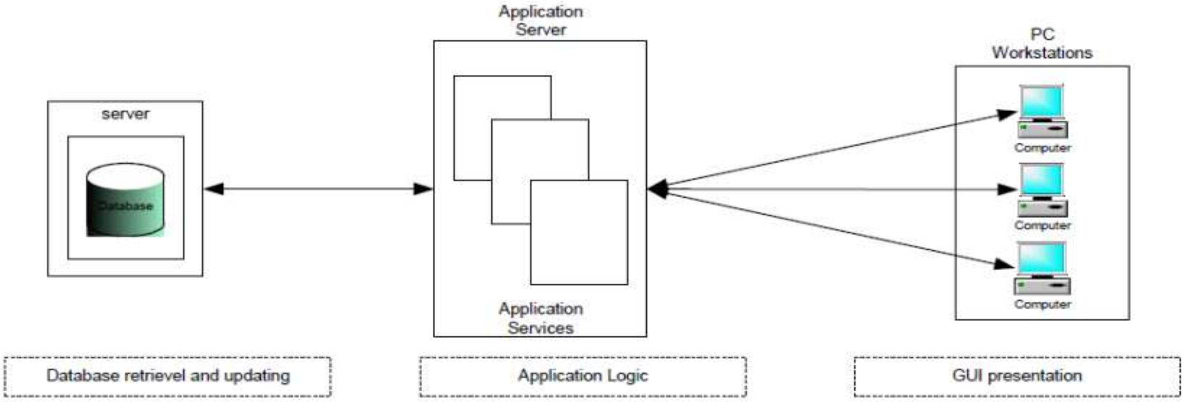


Figure 15: Three-Tier System Architecture

4.4.1 Presentation Layer

Presentation layer is the graphical user interface that helps various users of the application to complete their tasks and navigate according to the requirement. Administrator group is the super user group who can access all the parts of the application and modify the content once updated by any of the employees in the organization. This role can be assigned to only CEO category in the organization. Employee roles are assigned during the resource creation like panelist and recruiter. The recruiter can access data based on the resource id and can short list the candidates and there after based on the availability of the panelist the interviews are scheduled.

The controls are asp.net controls and html to make the application light weight on the client side. The Dashboard represents the tasks and highlights all the relevant information. An Employee after submitting his credentials given an option to choose a role like an employee can be branch manager or a line manager or a panelist etc. After selecting his role during the login, alert boxes will prompt the employees to complete their immediate tasks.

4.4.2 Business Logic Layer

The functionality of the application is implemented using VB classes. The verification validation from the beginning of the application is taken care by this business logic layer. The assigned functions can only be taken place in the recruiting process. Class files as well as web services along with external DLLs have been used to implement this layer.

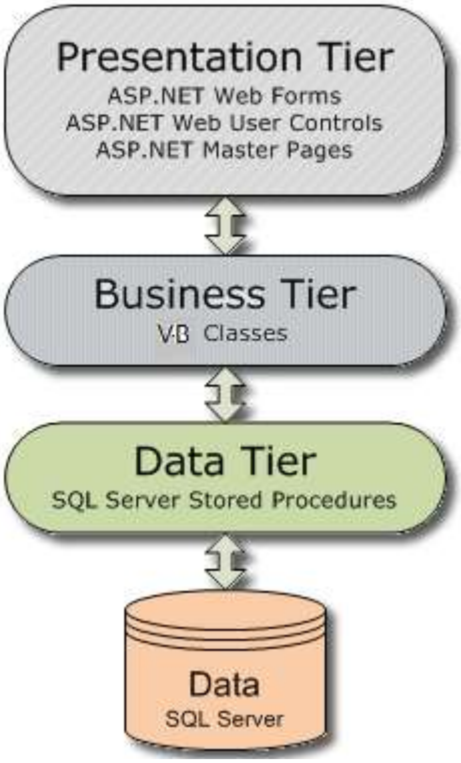


Figure 16: Three-Tier Architecture [13]

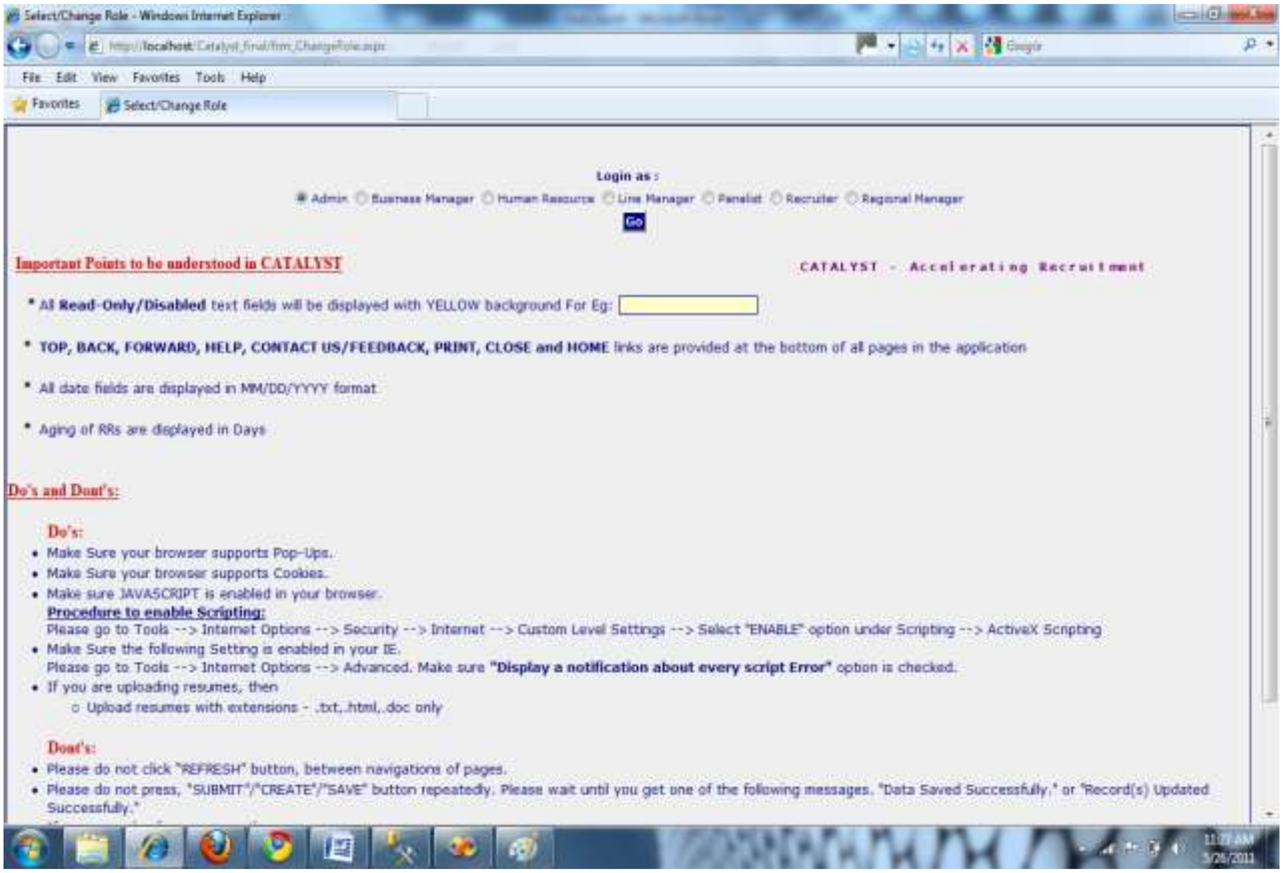
4.4.3 Data Access Layer

This is the layer which handles the database requests from the Business Logic Layer and responds back with the results to the BLL which then displays them using the presentation layer on the GUI for the user. MS Sql server 2005 is the database that has been used in this layer for this application. Usage of stored procedures and triggers has made access to this layer easy without much coding at the business layer.

5. Implementation

The Database design plays a key role in the application development, the stored procedures and triggers are the important concepts that help this application to be possible. Here initially the screen shots of admin roles are displayed and after that a Resource Request is created and approved by the managers to conduct the interviews.

5.1 User Interface Design and Implementation


Select/Change Role - Windows Internet Explorer
File Edit View Favorites Tools Help
Favorites
Select/Change Role

Login as :

● Admin ○ Business Manager ○ Human Resource ○ Line Manager ○ Panelist ○ Recruiter ○ Regional Manager

Go

Important Points to be understood in CATALYST

CATALYST - Accelerating Recruitment

- All **Read-Only/Disabled** text fields will be displayed with YELLOW background For Eg:
- **TOP, BACK, FORWARD, HELP, CONTACT US/FEEDBACK, PRINT, CLOSE and HOME** links are provided at the bottom of all pages in the application
- All date fields are displayed in MM/DD/YYYY format
- Aging of RRs are displayed in Days

Do's and Dont's:

Do's:

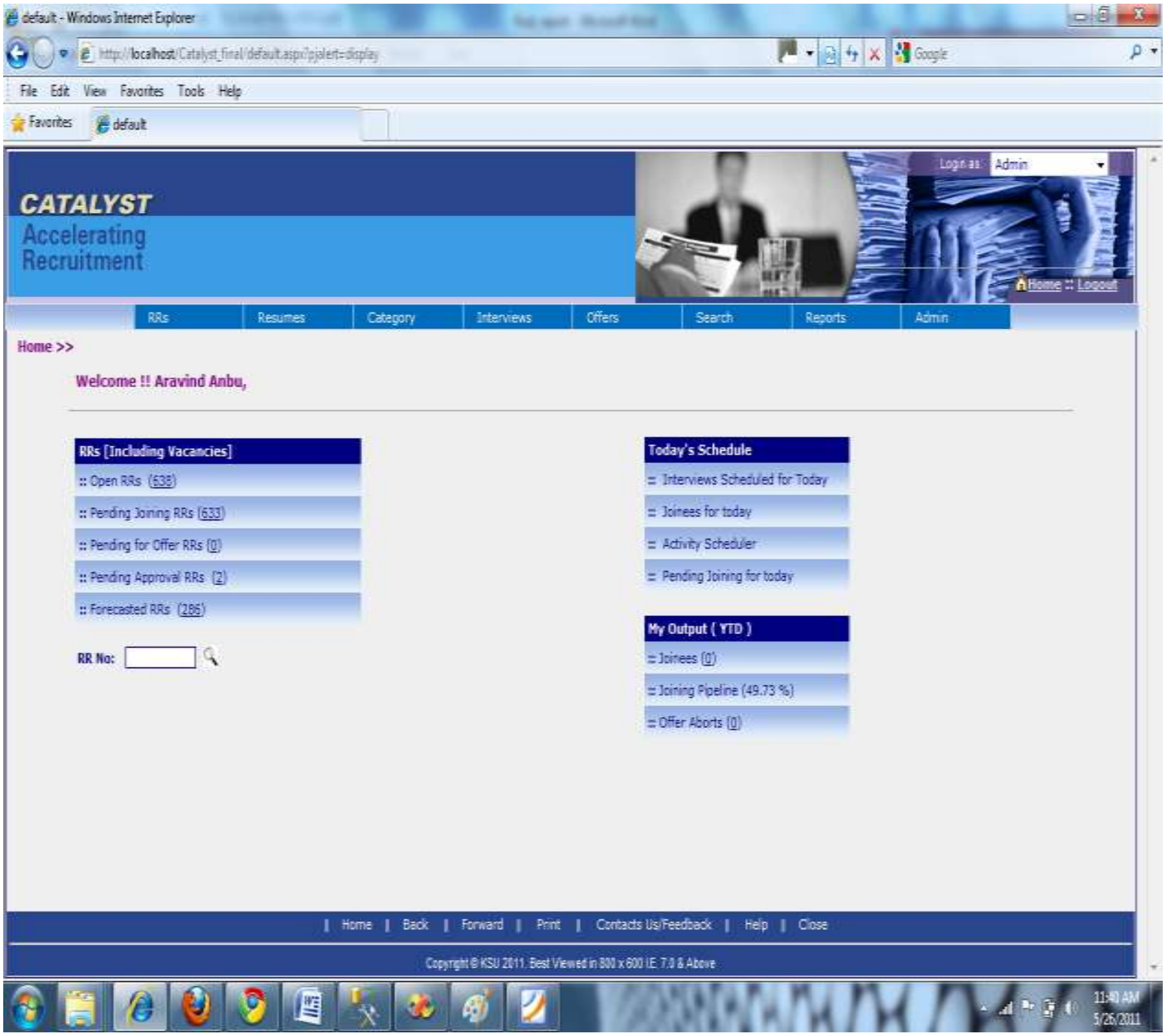
- Make Sure your browser supports Pop-Ups.
- Make Sure your browser supports Cookies.
- Make sure JAVASCRIPT is enabled in your browser.
  Procedure to enable Scripting:
  Please go to Tools --> Internet Options --> Security --> Internet --> Custom Level Settings --> Select "ENABLE" option under Scripting --> ActiveX Scripting
- Make Sure the following Setting is enabled in your IE.
  Please go to Tools --> Internet Options --> Advanced. Make sure **"Display a notification about every script Error"** option is checked.
- If you are uploading resumes, then
  - Upload resumes with extensions - .txt,.html,.doc only

Dont's:

- Please do not click "REFRESH" button, between navigations of pages.
- Please do not press, "SUBMIT"/"CREATE"/"SAVE" button repeatedly. Please wait until you get one of the following messages. "Data Saved Successfully." or "Record(s) Updated Successfully."

Figure 17: Screenshot of choosing a role while logging in

An employee logs in with his credentials based on the already existing mappings and he will be given various options to login. He can choose his role during this session. Once he is logged in he can escalate to the higher role but get the capabilities of the subsequent roles. The Menu located next to header is another key point in this application. All the elements are loaded at the run time and all the mappings are done appropriately.


default - Windows Internet Explorer
http://localhost/Catalyst_final/default.aspx?pjalert=display
Google
File Edit View Favorites Tools Help
Favorites
default
Login as Admin
CATALYST
Accelerating Recruitment
Home :: Logout
RRs
Resumes
Category
Interviews
Offers
Search
Reports
Admin
| Home | Back | Forward | Print | Contacts Us/Feedback | Help | Close
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11:40 AM
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Home >>

Welcome !! Aravind Anbu,

RRs [Including Vacancies]

:: Open RRs (638)

:: Pending Joining RRs (633)

:: Pending for Offer RRs (0)

:: Pending Approval RRs (2)

:: Forecasted RRs (286)

RR No:

Today's Schedule

:: Interviews Scheduled for Today

:: Joinees for today

:: Activity Scheduler

:: Pending Joining for today

My Output (YTD)

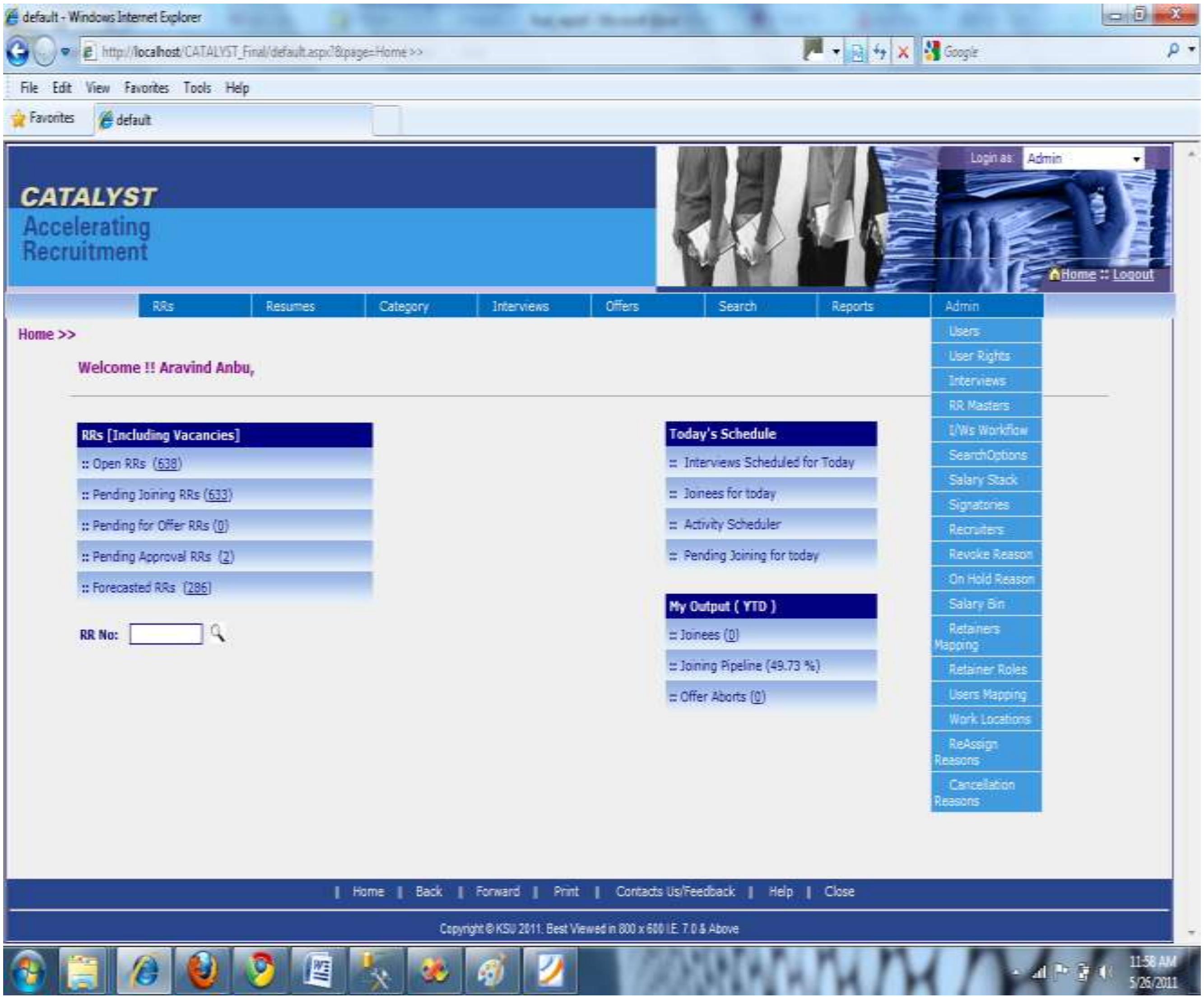
:: Joinees (0)

:: Joining Pipeline (49.73 %)

:: Offer Aborts (0)

Figure 18: Dashboard for the Administrator

For an administrator all the links show up and most of the mappings and the entire work flow of the application can be modified from this screen. The highlights of the application and links are provided. The navigation bar at the top always shows us where we are and the path from where we arrived at this point.



Home >>

Welcome !! Aravind Anbu,

RRs [Including Vacancies]

:: Open RRs (638)

:: Pending Joining RRs (633)

:: Pending for Offer RRs (0)

:: Pending Approval RRs (2)

:: Forecasted RRs (286)

RR No:

Today's Schedule

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:: Joinees for today

:: Activity Scheduler

:: Pending Joining for today

My Output (YTD)

:: Joinees (0)

:: Joining Pipeline (49.73 %)

:: Offer Aborts (0)

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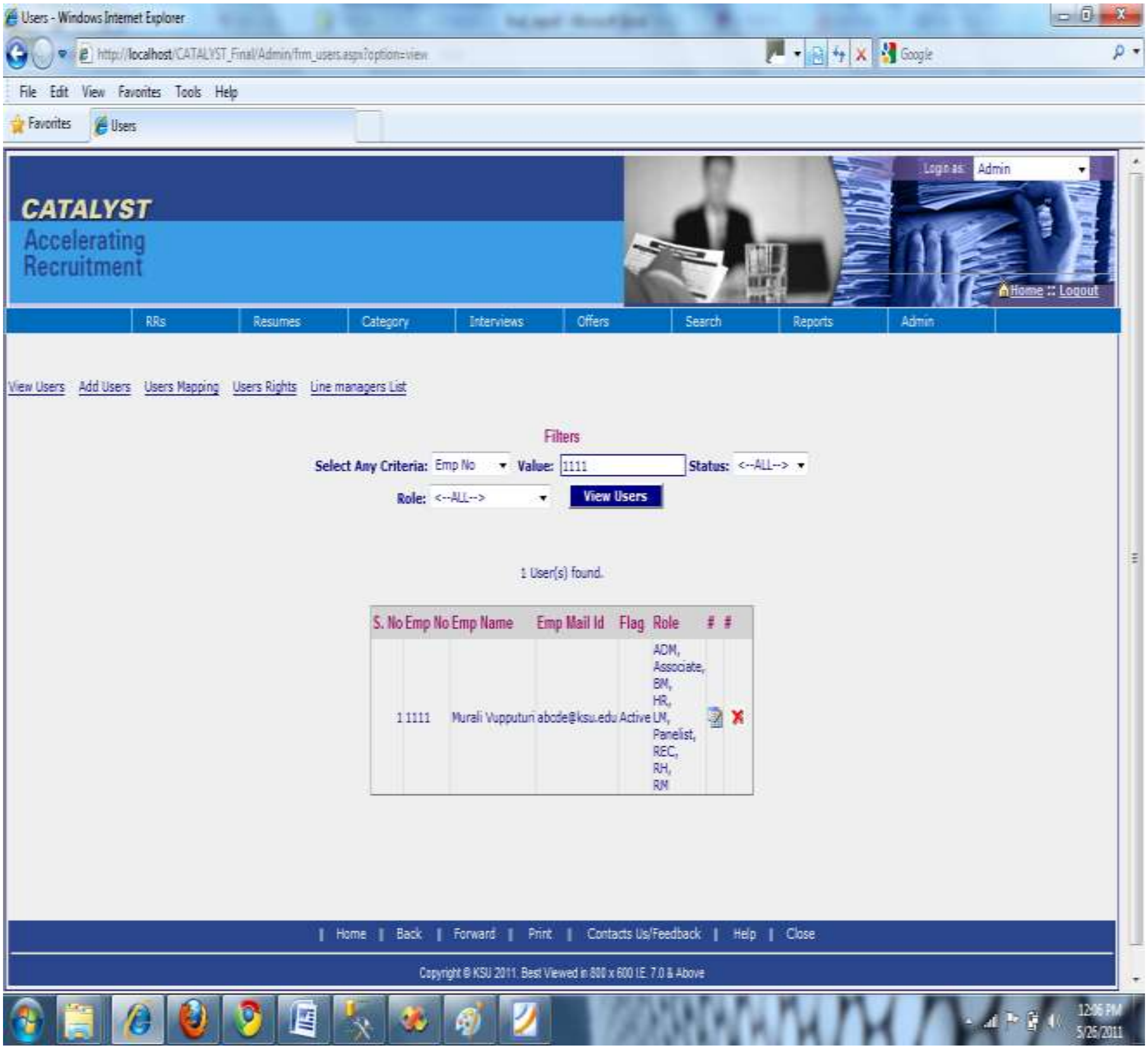
Figure 19: Admin Capabilities

Admin capabilities include most of the tasks and totally customize this application to any part of the organization. This application made me take care of the hierarchy of the employees in the organization and how a resource is created and how that can be approved by authorities.


Users - Windows Internet Explorer
http://localhost/CATALYST_Final/Admin/frm_users.aspx?option=view
File Edit View Favorites Tools Help
Favorites
Users
Login as: Admin
CATALYST
Accelerating Recruitment
Home :: Logout
RRs
Resumes
Category
Interviews
Offers
Search
Reports
Admin
View Users
Add Users
Users Mapping
Users Rights
Line managers List
View Users
| Home | Back | Forward | Print | Contacts Us/Feedback | Help | Close
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12:06 PM
5/26/2011

Filters

Select Any Criteria: Emp No Value: 1111 Status: <--ALL-->

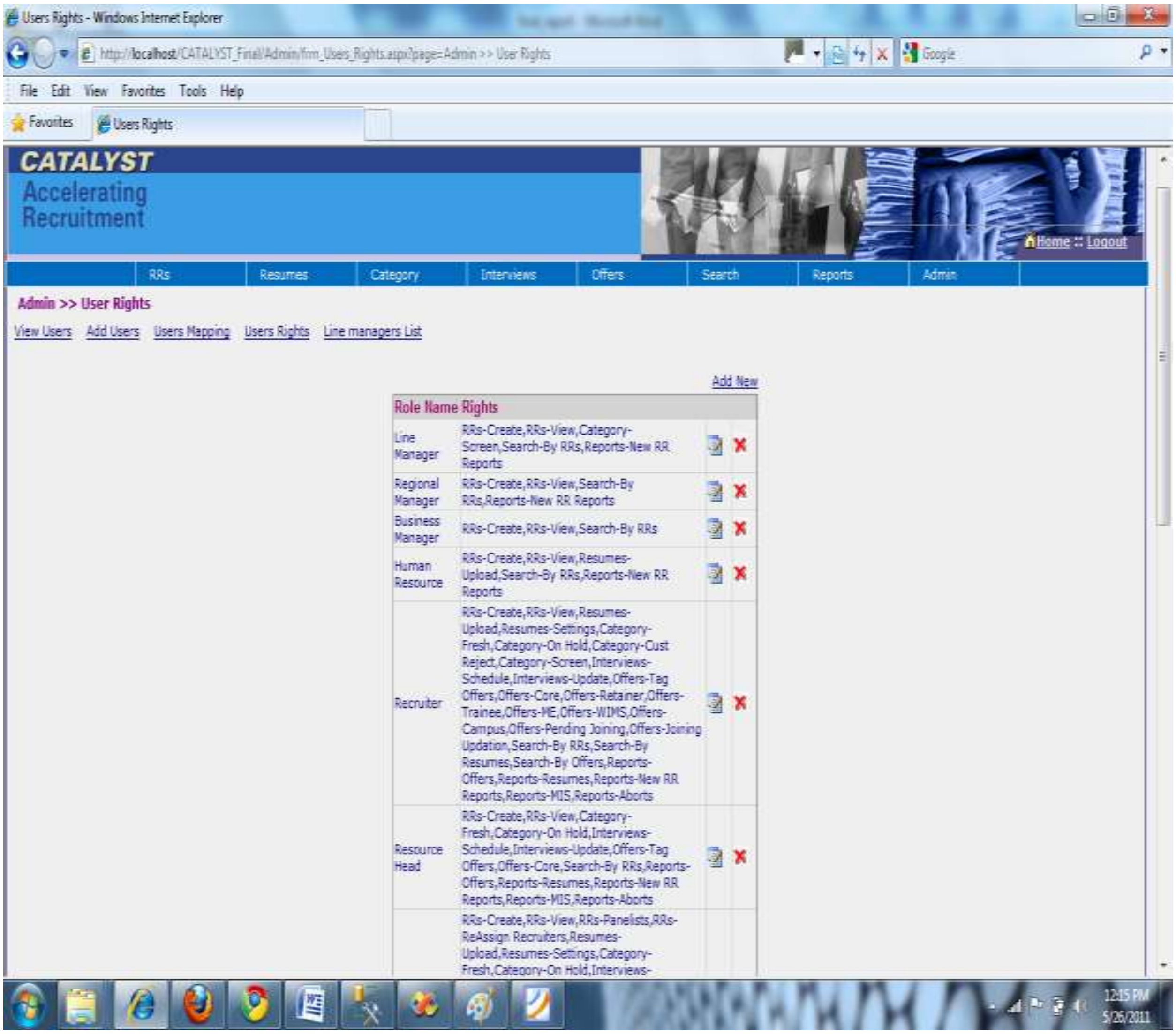
Role: <--ALL-->

1 User(s) found.

S. No	Emp No	Emp Name	Emp Mail Id	Flag	Role	#	#
1	1111	Murali Vupputuri	abcde@ksu.edu	Active	ADM, Associate, BM, HR, LM, Panelist, REC, RH, RM	✎	✗

Figure 20: Employees and their capabilities are accessible by Admin

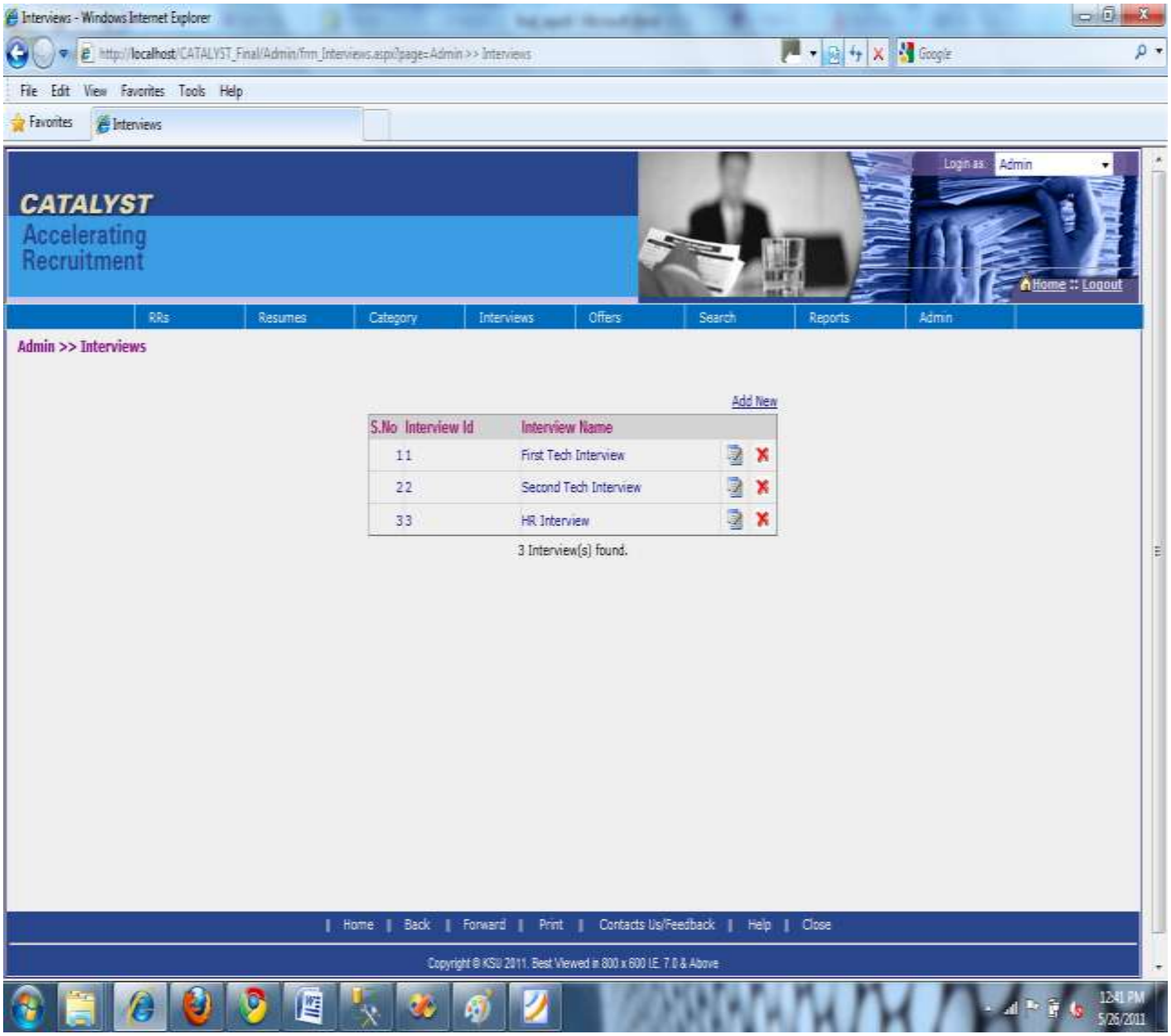
Admin can search any employee in the organization and his roles; he can edit his capabilities and even delete an employee if he leaves the organization.



Role Name	Rights		
Line Manager	RRs-Create,RRs-View,Category-Screen,Search-By RRs,Reports-New RR Reports	✎	✗
Regional Manager	RRs-Create,RRs-View,Search-By RRs,Reports-New RR Reports	✎	✗
Business Manager	RRs-Create,RRs-View,Search-By RRs	✎	✗
Human Resource	RRs-Create,RRs-View,Resumes-Upload,Search-By RRs,Reports-New RR Reports	✎	✗
Recruiter	RRs-Create,RRs-View,Resumes-Upload,Resumes-Settings,Category-Fresh,Category-On Hold,Category-Cust Reject,Category-Screen,Interviews-Schedule,Interviews-Update,Offers-Tag Offers,Offers-Core,Offers-Retainer,Offers-Trainee,Offers-ME,Offers-WIMS,Offers-Campus,Offers-Pending Joining,Offers-Joining Updation,Search-By RRs,Search-By Resumes,Search-By Offers,Reports-Offers,Reports-Resumes,Reports-New RR Reports,Reports-MIS,Reports-Aborts	✎	✗
Resource Head	RRs-Create,RRs-View,Category-Fresh,Category-On Hold,Interviews-Schedule,Interviews-Update,Offers-Tag Offers,Offers-Core,Search-By RRs,Reports-Offers,Reports-Resumes,Reports-New RR Reports,Reports-MIS,Reports-Aborts	✎	✗
	RRs-Create,RRs-View,RRs-Panelists,RRs-ReAssign Recruiters,Resumes-Upload,Resumes-Settings,Category-Fresh,Category-On Hold,Interviews-		

Figure 21: All the roles and their capabilities are listed (Edit and Delete)

Each role directly participates in the recruiting process and even if a new candidate is employed into a role the capabilities are listed as well. The capabilities of each role are mapped here these can be modified at any point in the future. For example if role is no more existing in an organization that can be removed as well.



Interviews - Windows Internet Explorer
http://localhost/CATALYST_Final/Admin/frm_Interviews.aspx?page=Admin >> Interviews
Google
File Edit View Favorites Tools Help
Favorites
Interviews
CATALYST
Accelerating Recruitment
Login as: Admin
Home :: Logout
RRs
Resumes
Category
Interviews
Offers
Search
Reports
Admin
| Home | Back | Forward | Print | Contacts Us/Feedback | Help | Close
12:41 PM
5/26/2011

Admin >> Interviews

Add New

S.No	Interview Id	Interview Name		
1	1	First Tech Interview	📝	✗
2	2	Second Tech Interview	📝	✗
3	3	HR Interview	📝	✗

3 Interview(s) found.

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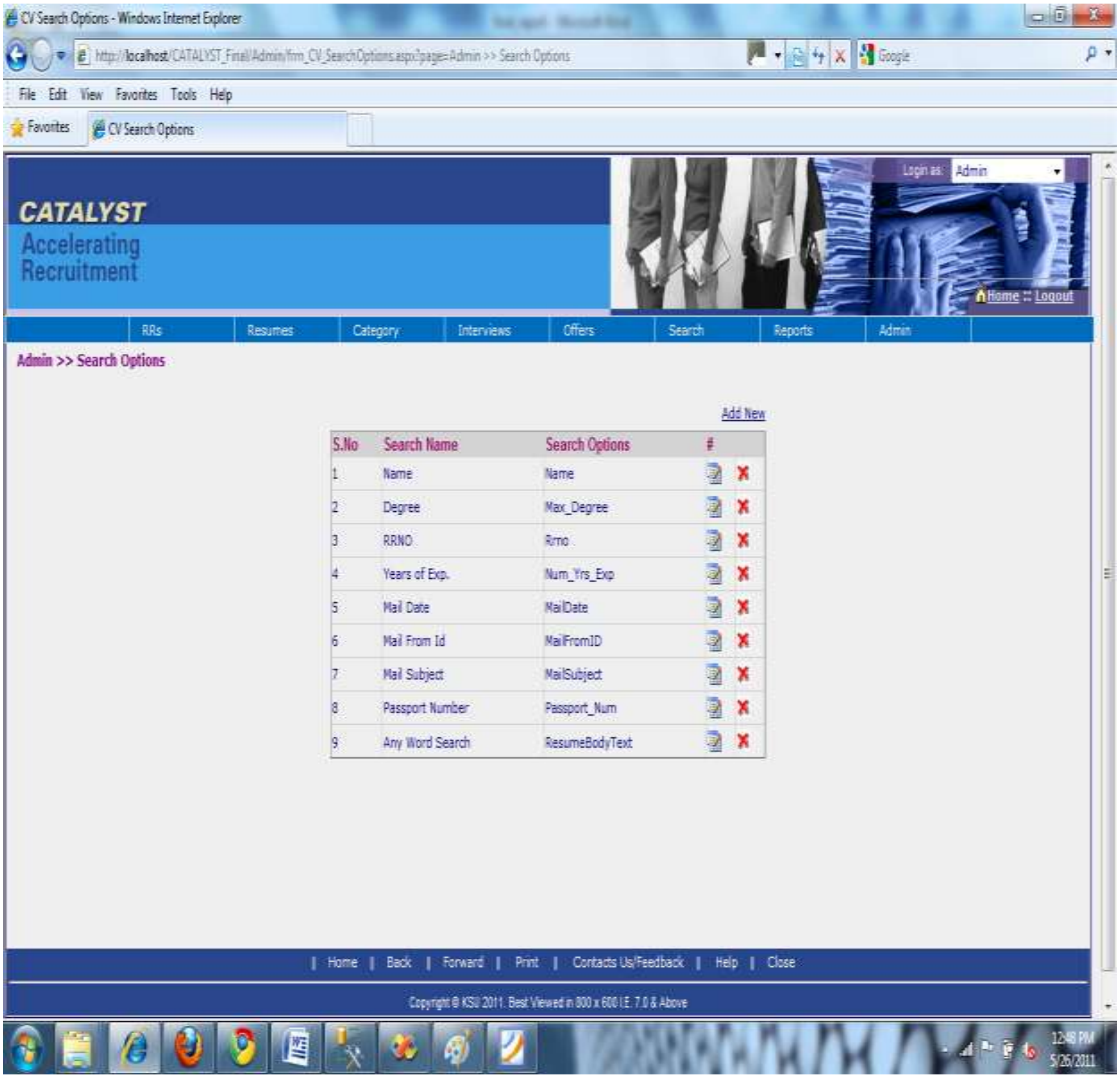
Figure 22: Number of rounds to be conducted

The recruiting procedure cannot be static, so number of rounds their names and option to add new round in hiring a candidate is necessary. This option is provided. More over based on the position one of the rounds can be skipped or any number of rounds can be skipped during the mapping.



CV Search Options - Windows Internet Explorer
http://localhost/CATALYST_Final/Admin/frm_CV_SearchOptions.aspx?page=Admin >> Search Options
Google
File
Edit
View
Favorites
Tools
Help
Favorites
CV Search Options
CATALYST
Accelerating Recruitment
Login as:
Admin
Home :: Logout
RRs
Resumes
Category
Interviews
Offers
Search
Reports
Admin

Admin >> Search Options

S.No	Search Name	Search Options	#	
1	Name	Name		✗
2	Degree	Max_Degree		✗
3	RRNO	Rrno		✗
4	Years of Exp.	Num_Yrs_Exp		✗
5	Mail Date	MailDate		✗
6	Mail From Id	MailFromID		✗
7	Mail Subject	MailSubject		✗
8	Passport Number	Passport_Num		✗
9	Any Word Search	ResumeBodyText		✗

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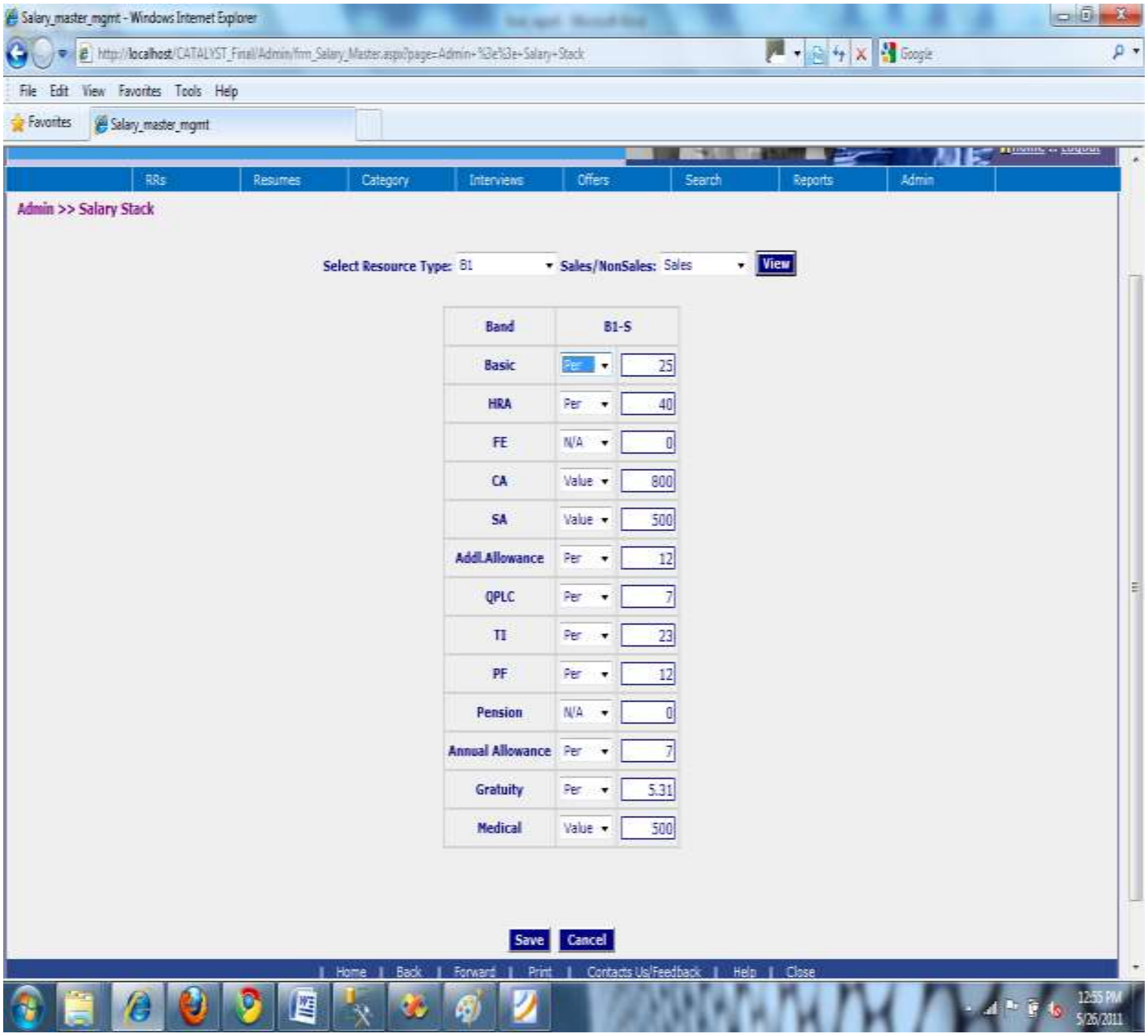
Figure 23: Search options to search resumes

Now-a-days along with the opportunities, number of applications are also numerous. Thus for any specific position resumes are searched using different key words and criteria. This option can be handy if included in the admin capabilities. Admin can edit the criteria or add a new one or delete existing criteria.



Salary_master_mgmt - Windows Internet Explorer
http://localhost/CATALYST_Final/Admin/frm_Salary_Master.aspx?page=Admin+%3e%3e+Salary+Stack
File Edit View Favorites Tools Help
Favorites
Salary_master_mgmt
RRs
Resumes
Category
Interviews
Offers
Search
Reports
Admin
View
Save
Cancel
Home
Back
Forward
Print
Contacts Us/Feedback
Help
Close
12:55 PM
5/26/2011

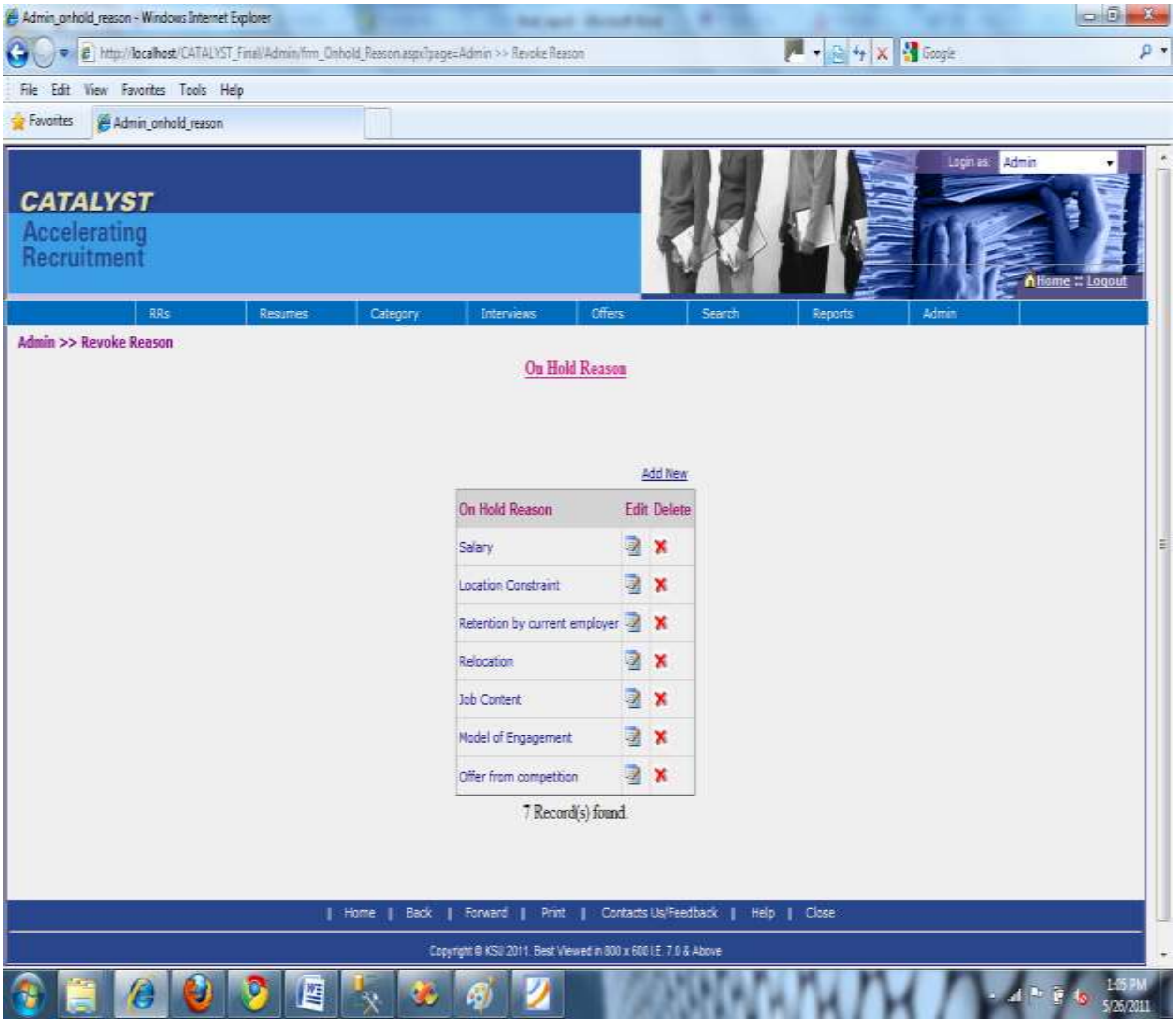
Admin >> Salary Stack

Select Resource Type: B1 Sales/NonSales: Sales

Band	B1-S	
Basic	Per	25
HRA	Per	40
FE	N/A	0
CA	Value	800
SA	Value	500
Addl.Allowance	Per	12
QPLC	Per	7
TI	Per	23
PF	Per	12
Pension	N/A	0
Annual Allowance	Per	7
Gratuity	Per	5.31
Medical	Value	500

Figure 24: Salary stack to generate offer letter

Once a candidate is selected the salary division can be used to generate the offer letter. Thus this part is also taken care based on the grade of the position. Each position has a grade such that they can start with the basic salary and the benefits division is shown here.


Admin_onhold_reason - Windows Internet Explorer
http://localhost/CATALYST_Final/Admin/frm_Onhold_Reason.aspx?page=Admin >> Revoke Reason
Google
File Edit View Favorites Tools Help
Favorites
Admin_onhold_reason
CATALYST
Accelerating Recruitment
Login as: Admin
Home :: Logout
RRs
Resumes
Category
Interviews
Offers
Search
Reports
Admin
Add New
| Home | Back | Forward | Print | Contacts Us/Feedback | Help | Close
Copyright © KSU 2011. Best Viewed in 800 x 600 I.E. 7.0 & Above
1:05 PM
5/26/2011

Admin >> Revoke Reason

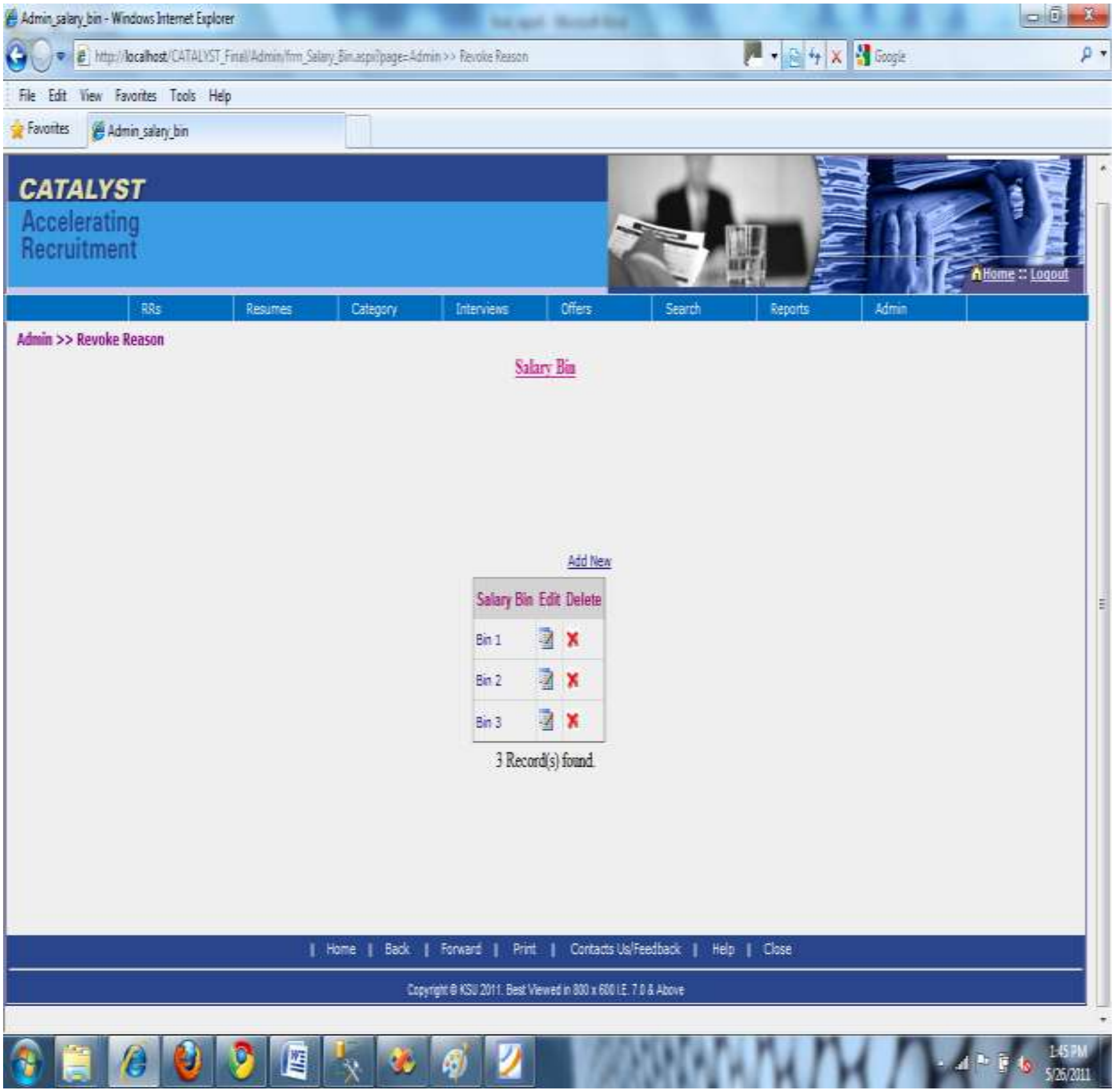
On Hold Reason

On Hold Reason	Edit	Delete
Salary	📝	✗
Location Constraint	📝	✗
Retention by current employer	📝	✗
Relocation	📝	✗
Job Content	📝	✗
Model of Engagement	📝	✗
Offer from competition	📝	✗

7 Record(s) found.

Figure 25: On hold reasons for a candidate

If an application is selected and doesn't turn into an offer the reasons are listed such that they can analyze and generate the reports if an organization needs to modify any of their attributes in hiring process. Along with these customized options, recruiters can enter other things also.


Admin_salary_bin - Windows Internet Explorer
http://localhost/CATALYST_Final/Admin/frm_Salary_Bin.aspx?page=Admin >> Revoke Reason
Google
File Edit View Favorites Tools Help
Favorites
Admin_salary_bin
CATALYST
Accelerating Recruitment
Home :: Logout
RRs
Resumes
Category
Interviews
Offers
Search
Reports
Admin
Home | Back | Forward | Print | Contacts Us/Feedback | Help | Close
1:45 PM
5/26/2011

Admin >> Revoke Reason

Salary Bin

Add New

Salary Bin	Edit	Delete
Bin 1	✎	✗
Bin 2	✎	✗
Bin 3	✎	✗

3 Record(s) found.

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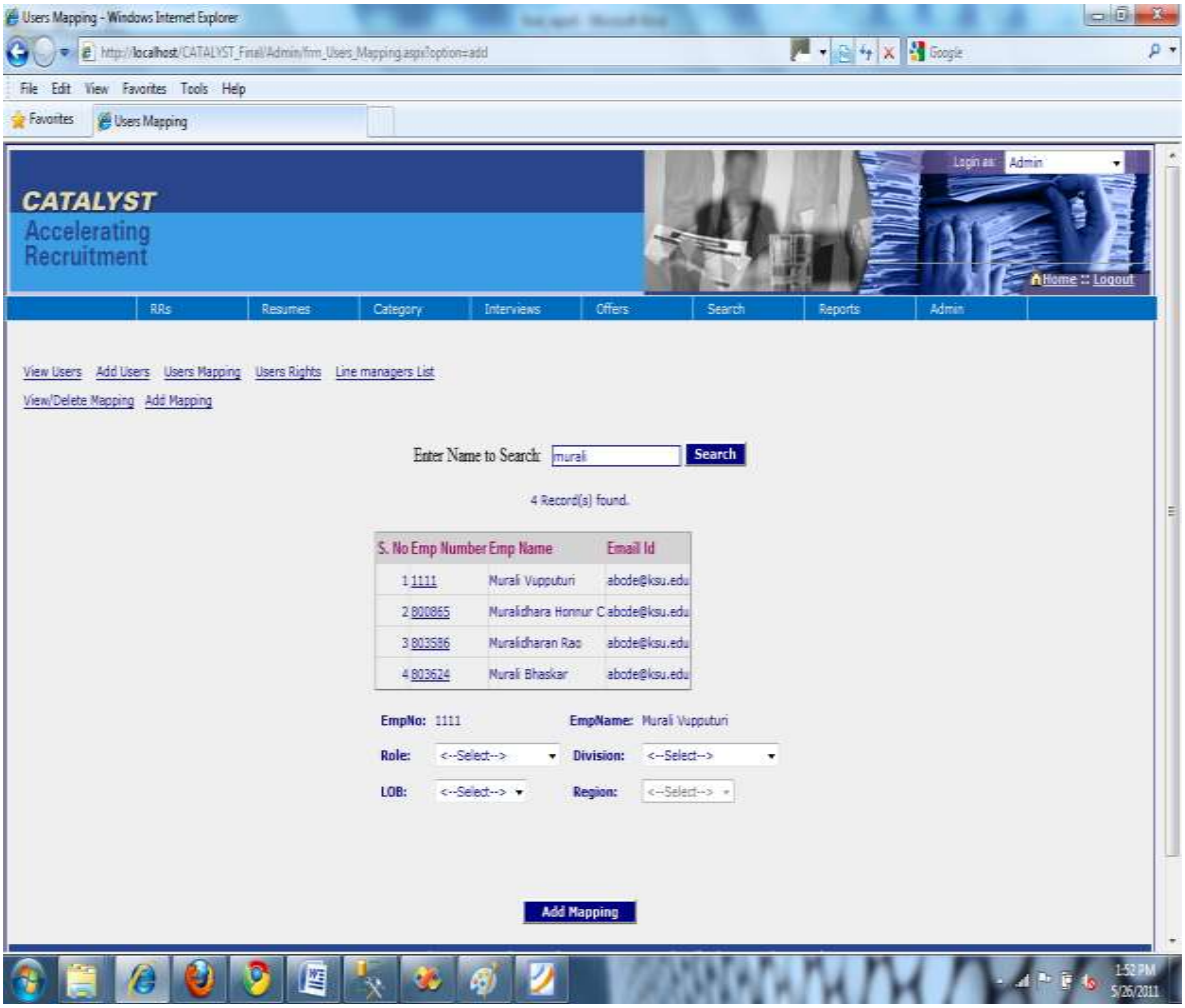
Figure 26: Different Salary Bins

Administrator can choose and create different salary bins such as choosing a bin based on the position and requirement. For example if negotiation takes place after the candidate is selected, then higher salary bin is selected and offer letter can be generated easily.



Enter Name to Search: murali

4 Record(s) found.

S. No	Emp Number	Emp Name	Email Id
1	1111	Murali Vupputuri	abode@ksu.edu
2	800865	Muralidhara Honnur C	abode@ksu.edu
3	803586	Muralidharan Rao	abode@ksu.edu
4	803624	Murali Bhaskar	abode@ksu.edu

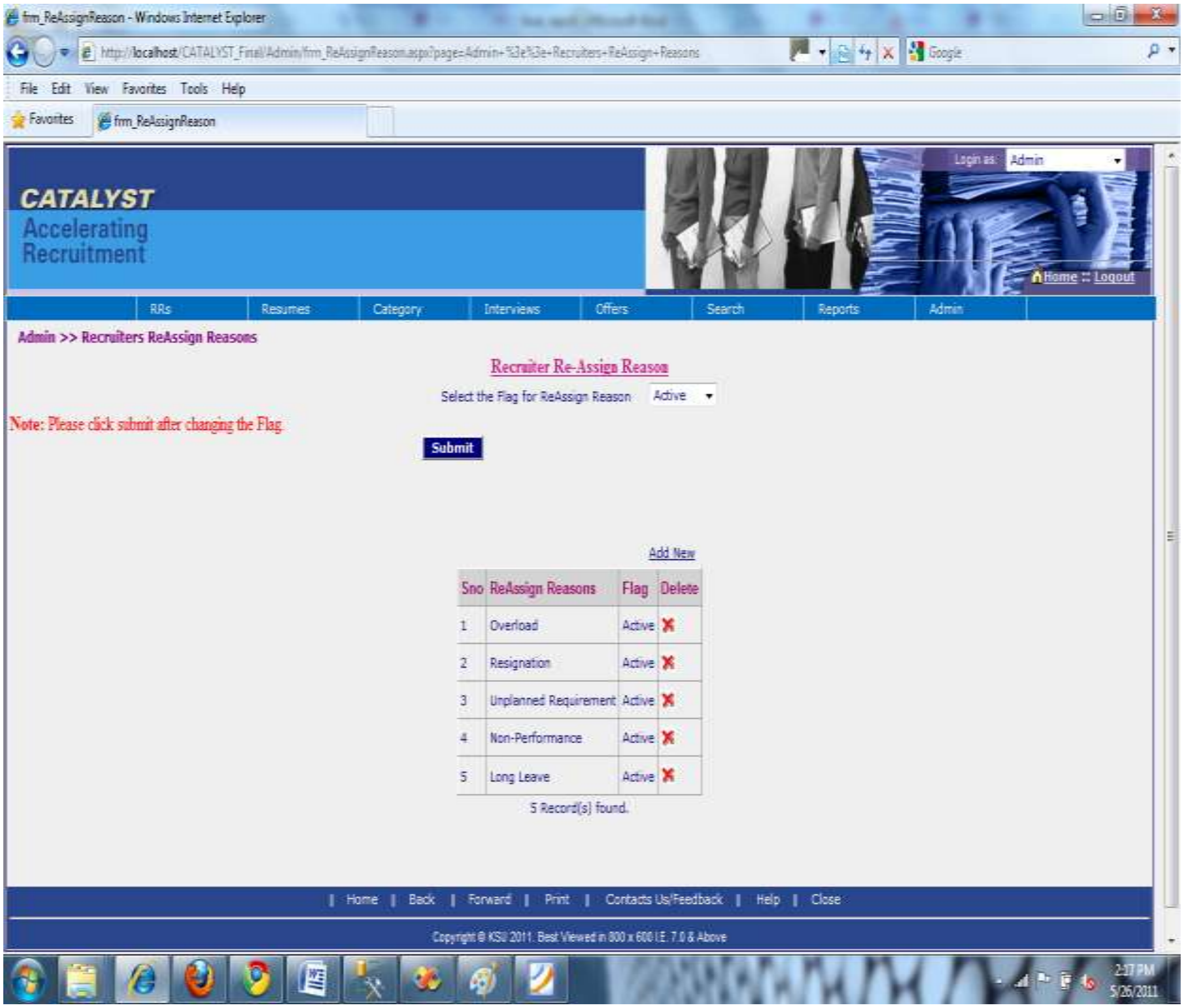
EmpNo: 1111 EmpName: Murali Vupputuri

Role: <--Select--> Division: <--Select-->

LOB: <--Select--> Region: <--Select-->

Figure 27: User Mappings

Users can be mapped and even managers need to be mapped such that whenever a resource request is raised then relevant managers are automatically sent an email and then they need to approve the Request Resource (RR). This mapping is very useful to maintain the hierarchy in the organization.


frm_ReAssignReason - Windows Internet Explorer
http://localhost/CATALYST_Final/Admin/frm_ReAssignReason.aspx?page=Admin+%3e%3e+Recruiters+ReAssign+Reasons
Google
File Edit View Favorites Tools Help
Favorites
frm_ReAssignReason
CATALYST
Accelerating Recruitment
Login as: Admin
Home :: Logout
RRs
Resumes
Category
Interviews
Offers
Search
Reports
Admin
Submit
Add New
Home | Back | Forward | Print | Contacts Us/Feedback | Help | Close
2:17 PM
5/26/2011

Admin >> Recruiters ReAssign Reasons

Recruiter Re-Assign Reason

Select the Flag for ReAssign Reason: Active

Note: Please click submit after changing the Flag

Sno	ReAssign Reasons	Flag	Delete
1	Overload	Active	✗
2	Resignation	Active	✗
3	Unplanned Requirement	Active	✗
4	Non-Performance	Active	✗
5	Long Leave	Active	✗

5 Record(s) found.

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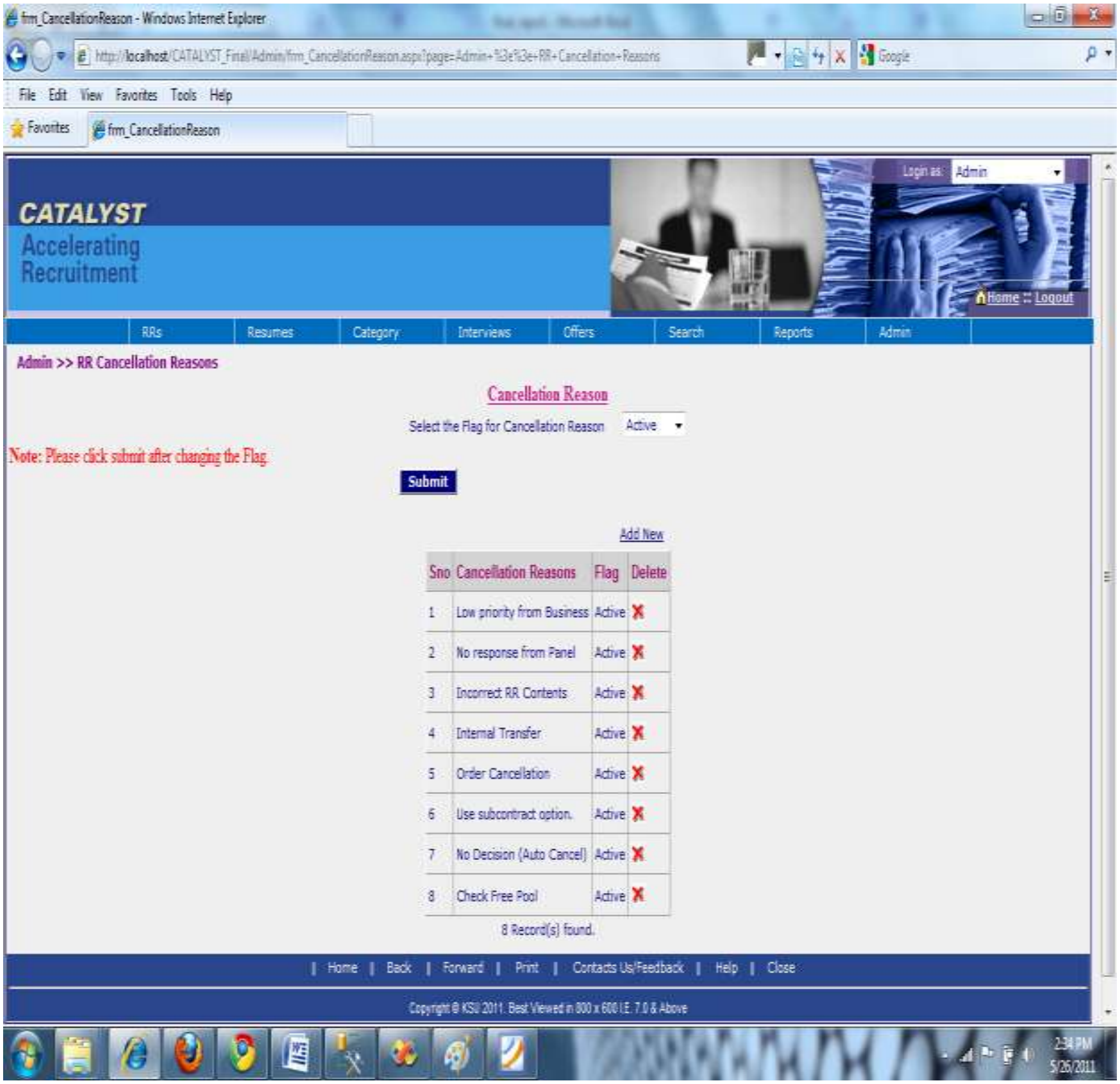
Figure 28: Recruiter Reassign

In this application if an employee fails to respond for a RR in 5 working days the request is escalated to the next level, but a recruiter should be active and do his duties for conducting interviews. In certain circumstances, the recruiters need to be reassigned in that scenario for that event is denoted here.


frm_CancellationReason - Windows Internet Explorer
http://localhost/CATALYST_Final/Admin/frm_CancellationReason.aspx?page=Admin+%3e%3e+RR+Cancellation+Reasons
Google
File Edit View Favorites Tools Help
Favorites
frm_CancellationReason
CATALYST
Accelerating Recruitment
Login as: Admin
Home :: Logout
RRs
Resumes
Category
Interviews
Offers
Search
Reports
Admin
Submit
Add New
| Home | Back | Forward | Print | Contacts Us/Feedback | Help | Close
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2:34 PM
5/26/2011

Admin >> RR Cancellation Reasons

Cancellation Reason

Select the Flag for Cancellation Reason: Active

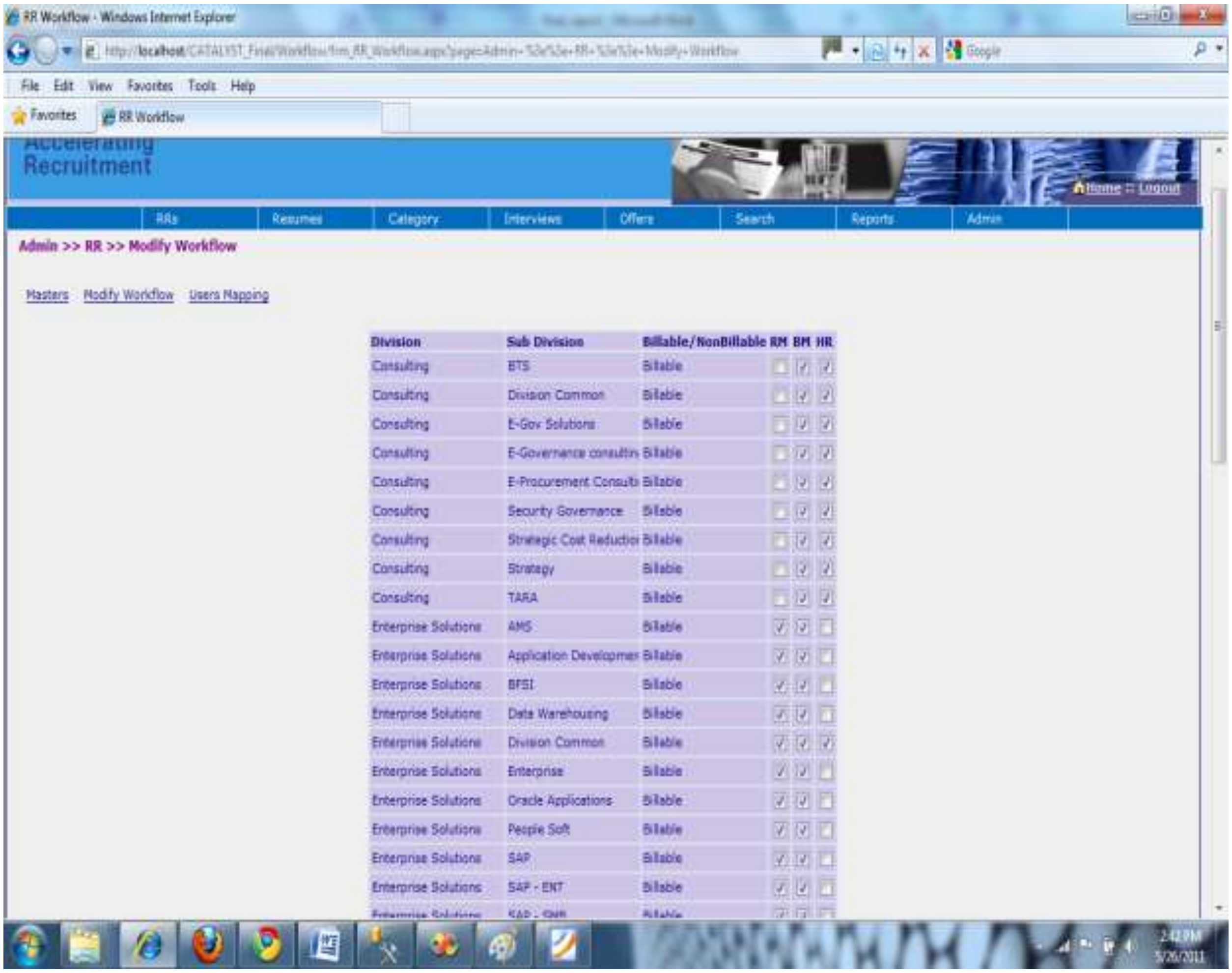
Note: Please click submit after changing the Flag

Sno	Cancellation Reasons	Flag	Delete
1	Low priority from Business	Active	✗
2	No response from Panel	Active	✗
3	Incorrect RR Contents	Active	✗
4	Internal Transfer	Active	✗
5	Order Cancellation	Active	✗
6	Use subcontract option.	Active	✗
7	No Decision (Auto Cancel)	Active	✗
8	Check Free Pool	Active	✗

8 Record(s) found.

Figure 29: Cancelling Reasons Customized Messages

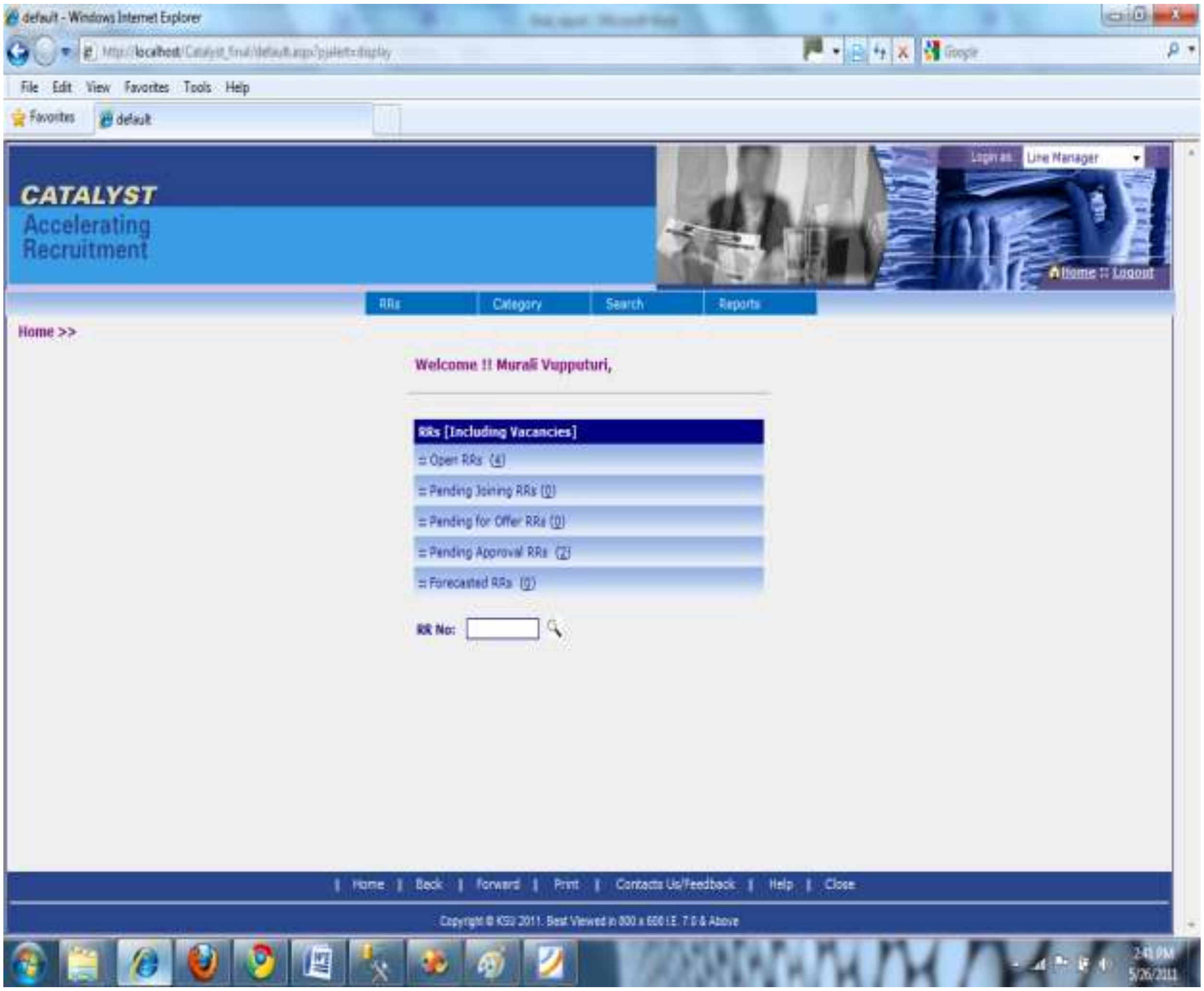
Resource request may not be approved all the time, these are the custom messages that are helpful to store and submit. Once again if a Resource Request is opened then the previous history can be obtained by referring to the previous messages. Here the messages can be more specific to keep track of all the rejected resource requests.



Division	Sub Division	Billable/NonBillable	RM	BM	HR
Consulting	BTS	Billable	☐	☑	☑
Consulting	Division Common	Billable	☐	☑	☑
Consulting	E-Gov Solutions	Billable	☐	☑	☑
Consulting	E-Governance consultin	Billable	☐	☑	☑
Consulting	E-Procurement Consulti	Billable	☐	☑	☑
Consulting	Security Governance	Billable	☐	☑	☑
Consulting	Strategic Cost Reductio	Billable	☐	☑	☑
Consulting	Strategy	Billable	☐	☑	☑
Consulting	TARA	Billable	☐	☑	☑
Enterprise Solutions	AMS	Billable	☑	☑	☐
Enterprise Solutions	Application Developmen	Billable	☑	☑	☐
Enterprise Solutions	BFSI	Billable	☑	☑	☐
Enterprise Solutions	Data Warehousing	Billable	☑	☑	☐
Enterprise Solutions	Division Common	Billable	☑	☑	☑
Enterprise Solutions	Enterprise	Billable	☑	☑	☐
Enterprise Solutions	Oracle Applications	Billable	☑	☑	☐
Enterprise Solutions	People Soft	Billable	☑	☑	☐
Enterprise Solutions	SAP	Billable	☑	☑	☐
Enterprise Solutions	SAP - ENT	Billable	☑	☑	☐

Figure 30: Workflow for a Resource Request Approval

For all the divisions and lines of business the hierarchy is not same, thus based on the departments and sub divisions and Lines of Business (LOB) the approval request emails are sent and the resource requests are approved. This takes place in certain branches and all the roles may not exist. Thus this workflow will be helpful to keep the process progressing and to confine to appropriate recruiting process.



default - Windows Internet Explorer
http://localhost/Catalyst_final/default.aspx?pjalert=display
File Edit View Favorites Tools Help
Favorites
default
CATALYST
Accelerating Recruitment
Login as: Line Manager
Home :: Logout
RRs
Category
Search
Reports
Home >>
| Home | Back | Forward | Print | Contacts Us/Feedback | Help | Close
2:41 PM
5/26/2011

Welcome !! Murali Vupputuri,

RRs [Including Vacancies]

:: Open RRs (4)

:: Pending Joining RRs (0)

:: Pending for Offer RRs (0)

:: Pending Approval RRs (2)

:: Forecasted RRs (0)

RR No:

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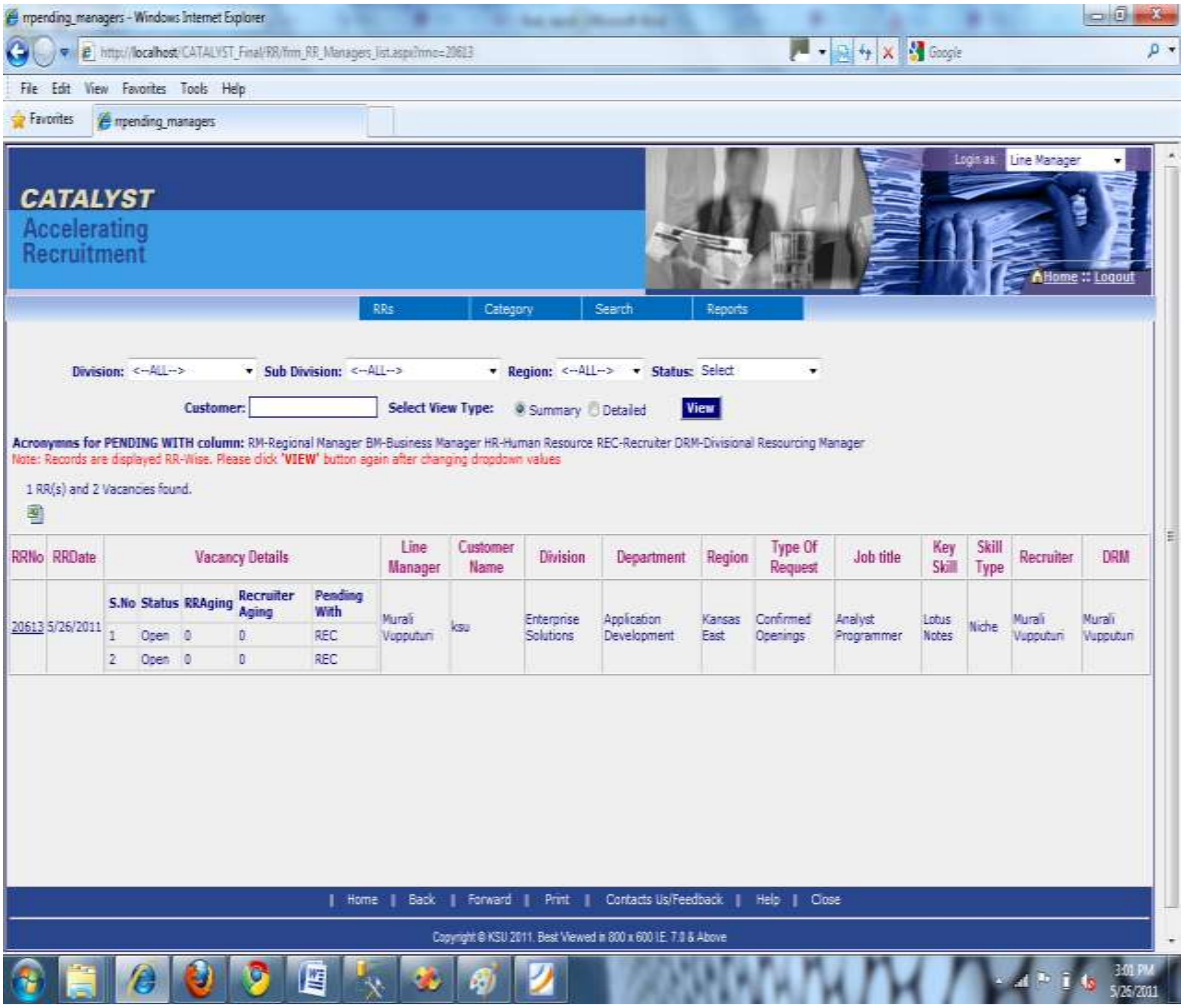
Figure 31: Dashboard for the Line Manager

The Menu is dynamic and only the relevant capabilities appear in the menu bar and the sub categories are also appropriate. If a Line Manager creates a RR, the Regional Manager and Branch manager need to approve the RR. In the above screen shot the Line manager creates a RR and waits for that RR to be approved.


rrpending_managers - Windows Internet Explorer
http://localhost/CATALYST_Final/RR/frm_RR_Managers_list.aspx?rrno=20613
File Edit View Favorites Tools Help
Favorites
rrpending_managers
CATALYST
Accelerating Recruitment
Login as: Line Manager
Home :: Logout
RRs
Category
Search
Reports
View
Home | Back | Forward | Print | Contacts Us/Feedback | Help | Close
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3:01 PM
5/26/2011

Division: <--ALL--> Sub Division: <--ALL--> Region: <--ALL--> Status: Select

Customer: Select View Type: ● Summary ○ Detailed

Acronymns for PENDING WITH column: RM-Regional Manager BM-Business Manager HR-Human Resource REC-Recruiter DRM-Divisional Resourcing Manager

Note: Records are displayed RR-Wise. Please click 'VIEW' button again after changing dropdown values

1 RR(s) and 2 Vacancies found.

RRNo	RRDate	Vacancy Details					Line Manager	Customer Name	Division	Department	Region	Type Of Request	Job title	Key Skill	Skill Type	Recruiter	DRM
		S.No	Status	RRAging	Recruiter Aging	Pending With											
20613	5/26/2011	1	Open	0	0	REC	Murali Vupputuri	ksu	Enterprise Solutions	Application Development	Kansas East	Confirmed Openings	Analyst Programmer	Lotus Notes	Niche	Murali Vupputuri	Murali Vupputuri
		2	Open	0	0	REC											

Figure 32: RR created and approved waiting with Recruiter at tag Resumes

After the approval, recruiter needs to short list the resumes and the interview process takes place. Once the round is finished the next interview is scheduled. Finally the offer is tagged.

5.2 Technical Discussions

Among the major aspects of the application searching resumes from the resume pool is very crucial, thus many ways to search is provided by the application to make all the employee tasks easier and faster. If the exact name or specific attribute is used to search the resume then the relevant resume can be popped up.

Number of employees in an organization is also an increasing factor and thus response time of the application is always taken into account, i.e., performance of the application over the internet is considered and whenever search needs to take place good techniques are used. Initially the application started with the motive of recruiting process but due to the roles involved this application actually covers most of the employee tracking system or most of the information related to employees and their roles involved in recruiting process.

One of the nice features of the application is that Admin has all the capabilities to add the employees change the mappings, create the new recruiting process. More over a super admin is created such that admin role can be deleted and modified and restricted to some extent. Super Admin permissions are almost similar to the admin.

Code Type	Number of Lines
Java Script	141
Automated VB	2012
Hand Written VB	5673
CSS	755
SQL Stored Procedures	640

In order to take care of various states of the application the conditions played a key role and the design pattern in Binder. In order to build the complex object different coding styles were incorporated. A total of 265 working hours spanning over 4 months have been spent on designing and developing this application and an approximate of additional 12 working hours have been spent on testing the application for its correct functionality after the application has been fully developed.

6. Testing

Testing ensures that the design and implementation confines to the technical requirements specified. Software testing also discloses bugs in the application. After rigorous testing, quality of the application is assured.

6.1 White Box Testing

Functional testing by validating the appropriate algorithms and data structures is done by white box testing. This testing ensures that

- All loops are exiting appropriately; i.e., loops in various parts are implemented appropriately.
- All conditional statements handle both the true and false statements.
- All the sections of the code are reachable by the control.
- All the function calls are possible.

Each and every module is tested manually and rigorously with various inputs to observe the behavior of each and every module in the code base.

6.2 Non Functional Testing

Non functional testing ensures that the application pops up the user friendly messages to the users of the application, if unintended and non permissible inputs are passed to the application. For example the email need to contain '@' and '.' otherwise it specifies that the input needs to be modified by the user. Certain fields in the application are restricted to alphanumeric values and if any special symbols are entered the messages are popped to minimize the mistakes in the data that is going to be stored in the database.

Validation testing also ensures that both the functional testing and non functional testing at various places in the application.

6.3 Unit Testing

The unit tool it used to do the unit testing, Unit testing is intended to test the each and every section of the code. Testing this application involved testing each and every module as and when it was finished to test and see if the required functionality has been achieved or not. At each and every stage I have tested these modules during their coding phase for its functionality until the modules have produced desired results.

- Test cases were written in a manner such that all the modules are tested.
- The login module is tested by giving invalid user employee numbers, and then messages were prompted for that input.
- While creating Resource Request (RR) the fields are filled with appropriate values.
- Zero is not permitted while creating number of vacancies in an organization.
- A panelist needs to be assigned to each RR before the creation of RR.
- While scheduling an interview the recruiter can schedule or choose time after the current time.
- Admin can map an employee to an existing role in his division.
- The salary bin can be tagged only after offer is tagged to a candidate.

The unit generates all the possible scenarios and the tests were passed. All the above tests can also be carried out by using the built-in functionality of generating unit test cases for ASP.NET application in Visual Studio 2008. All the test cases run under asp.net context pull the required information from web.config file of the application automatically as and when the test cases are run. Each and every module has been tested by generating test cases through this utility.

6.4 Performance Testing

A web application has to have the features of sustaining huge volume of requests and provide high throughputs at all the times and under all kinds of loads. To test this feature we need to perform stress and load testing for the application. In order to test this we need to simulate situations where in we have multiple users requesting pages on a website and have to check whether there is any performance degradation because of this.

To perform load testing I have used Apache JMeter which can be used to test performance both on static as well as dynamic resources. This simulates a heavy load on the server, network or object to test its strength or to analyze overall performance under different load types.

Major factors that I have chosen to test the stress and performance levels of this application are majorly the number of users accessing the system. I have tested the application for constant load as well as under peak load conditions to see how well it behaves. Testing environment for this application is a Windows 7 professional edition laptop with a 4GB RAM and 2.2 GHz of CPU speed.

I have tested my application on my laptop which acts as the local web server which has both the application and its database on the same server and hence these results do not include factors like bandwidth usage

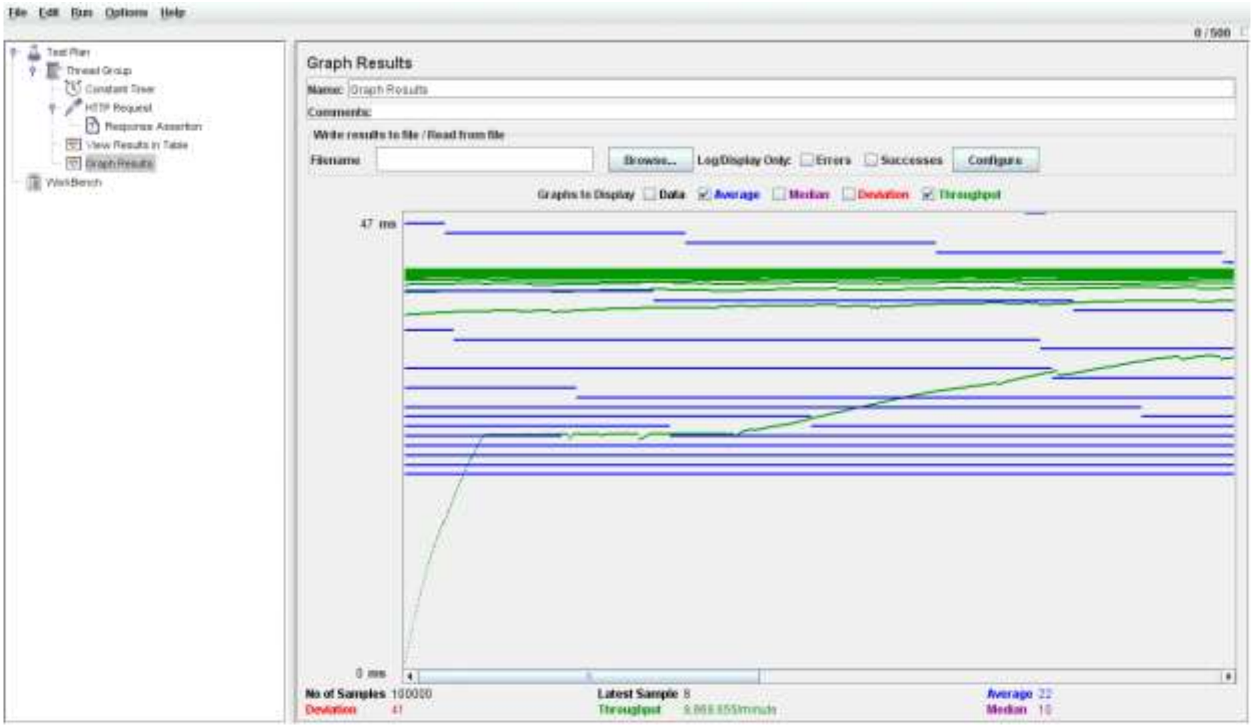
Users	Ramp-up Period	Loop Count	Average Response (ms)
50	5	500	876
100	5	500	902
250	5	500	995
500	5	500	1012
650	5	500	1222

These results are captured from the dashboard page for an Administrator.

In the catalyst for accelerating recruitment, few pages have light weight controls and few pages have very heavy controls, so I compared the throughput and generated graphs for understanding the maximum users that can access the application simultaneously.

Users	Dashboard page (ms)	Resumes Search page (ms)
250	26500	1028
500	114200	1267
1000	143500	8670

The results show that the throughput increased for the simple pages drastically but for the complex pages the throughput is low and after certain point the throughput raise is stopped.



Graph Results

Name: Graph Results

Comments:

Write results to file / Read from file

Filename

Log/Display Only: □ Errors □ Successes

Graphs to Display □ Data ☑ Average □ Median □ Deviation ☑ Throughput

No of Samples 100000

Deviation 41

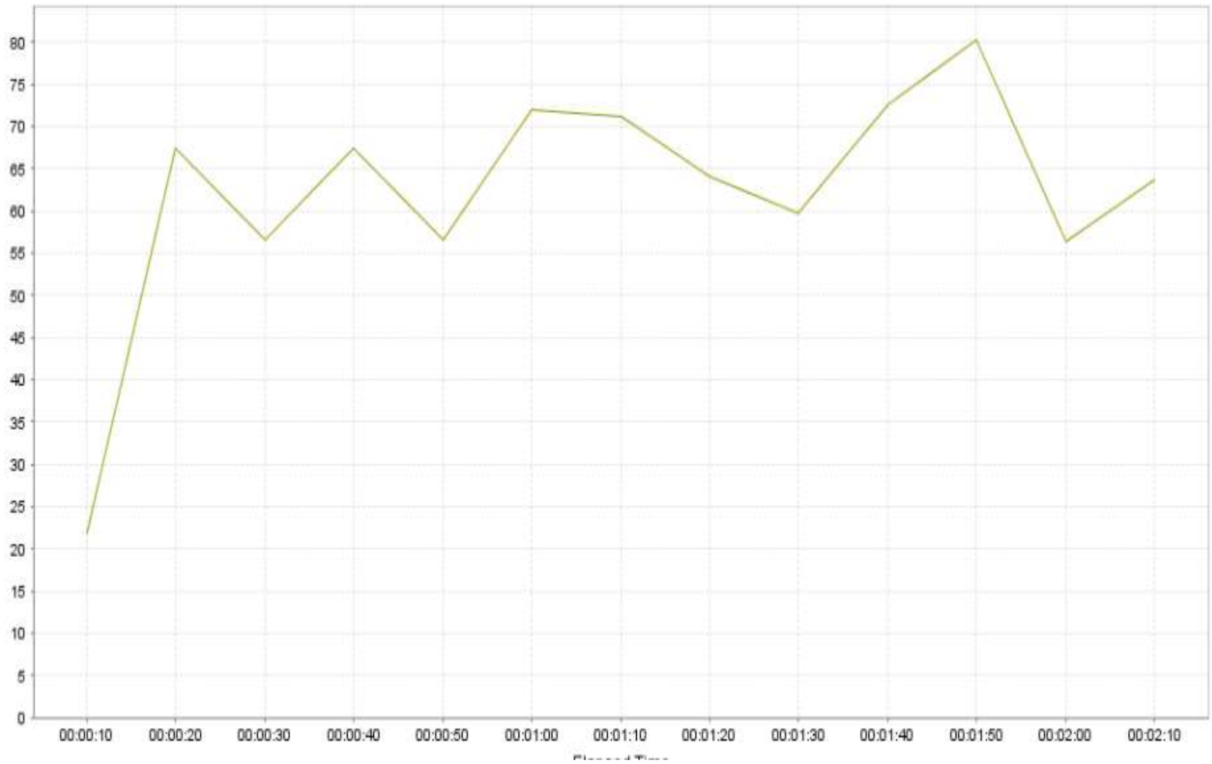
Latest Sample 8

Throughput 9,868.855/minute

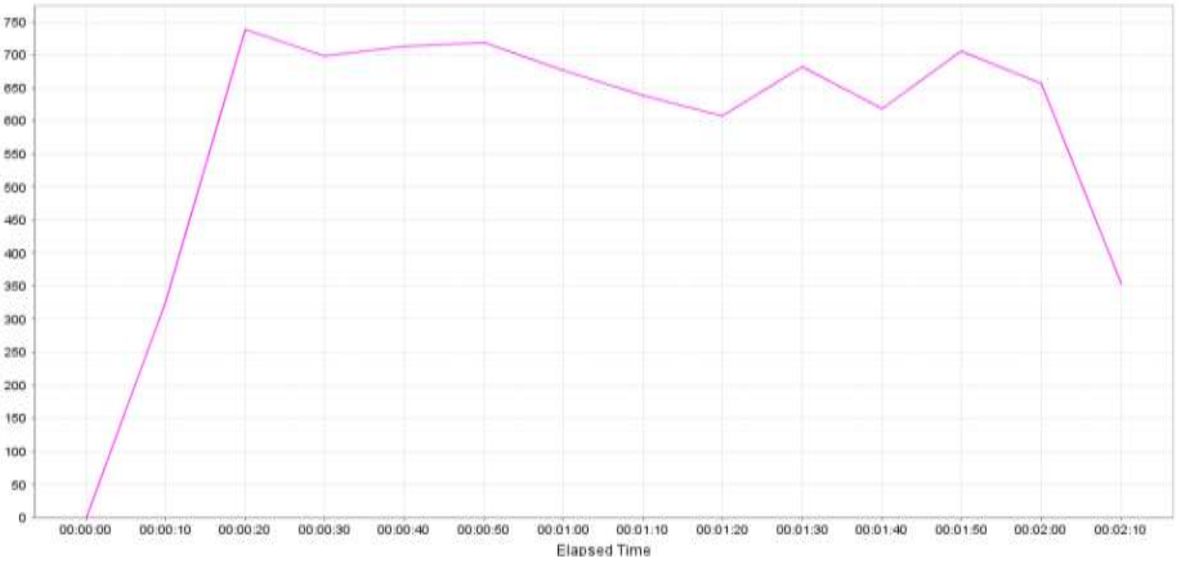
Average 22

Median 10

Figure 33: Jmeter screenshot for default page



Throughput for a simple page in the application, most of the controls are static.



Throughput for a complex page initially rises and after certain number of requests the throughput drops drastically.

7. Results and Challenges

The major challenge for this application is to design a solution effectively visualizing the problem from all possible instances. For now this application is designed in a manner such that it can be customized to any organization even if the branches of the organization are located at different places. This application can be incorporated and motivates many organizations to follow an automated system to manage internal resources and design such systems for crucial processes likes recruiting. This application's authentication can be provided only from the internal organization. This may not be possible in the current development environment but in the organization along with credentials the IP addresses can also be considered.

7.1 Challenges

In each and every phase of developing this application there are many challenges to achieve. Overall development process is a great learning process and here I present some challenges.

- Designing Entity relationship diagrams and considering all the aspects, normalizing the schema.
- Most of the content on the web pages are dynamic including menu items and sub items.
- Mapping the locations with the employees appropriately and maintaining hierarchy.
- Effective designing of web pages so that they are rendered properly in both IE and Mozilla Firefox.
- Using web services and learning the application development from the scratch.
- Keeping the logic simple and efficient and the testing results made few functions to take care of validations.
- Learning VB language and getting familiarity while developing asp.net web controls.

8. Conclusions

Catalyst for accelerating recruitment has been designed and deployed to serve small scale organizations which are geographically located at various places. In order to make the recruiting process smooth internet and current technologies are very helpful. In order to develop the recruiting process the hierarchy of the organization is analyzed and mapped to departments and then branches and further to regions. The roles in the organization like line manager, branch manager and other recruiter roles are keenly studied and after comprehending the entire problem, the solution is built with the permitted resources.

The SQL server and .net framework integration in the three tier architecture made this solution simple and achievable in short time.

8.1 Limitations

- Ajax framework can be included into this project such that asynchronous communication takes place without entire page load.
- This application needs to be customized based on the organization and requirement.
- Since business logic is given at most priority the presentation layer can be improved at various places.
- The hierarchy can be specific to the branch, in certain circumstances the entire system needs to be modified by admin and roles need to be restricted at that branch or even new roles need to be created.

8.2 Future work

- New features can be added to the present system.
- Drag and drop features can be included.
- More search options can be included.
- Further normalization may reduce redundant data in the database schema.
- Even candidates resumes can be parsed and automatic emails can be sent if profile requirements match certain openings.

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