

Real-Time User Support System

By

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Abstract

The Real-Time User Support System is a menu-based, technical support application designed to improve the efficiency of the technical support request / administration process. This application allows end users to create technical support requests and manage the requests in real-time, empowering the end user to direct his or her own technical support requests. This menu application is designed to run on a multi-user LAN or WAN. The application menu is divided into two core interfaces, the client interface and the administrative interface. The client interface allows end users to create, edit, and delete technical support requests. The administrative interface allows IT administrators to have full administration over support requests. The administration interface also includes a complete inventory control system, user management system, and a suite of informational reports. An online chat feature is also available for all users to handle minor technical support issues.

Real-Time User Support System

1. Statement of the Problem

The Real-Time User Support System has been created to more efficiently handle the technical support process for end users in a network environment. After working in the IT field for the last 5 years, I noticed the need for a technical support application that is easy and empowering to the end user, yet powerful enough to allow technical support administrators to effectively manage the daily demands for technical support from an IT department. The technical support processes that I have observed while working in the IT field are mostly unorganized and inefficient, building a barrier between support requesting clients and the support technicians.

2. Description of the Solution

The Real-Time User Support System (RUSS) is a multipurpose, customizable menu-based technical support application that allows end users and IT support personnel to interact in real time to efficiently manage technical support requests in most company settings. RUSS is intended to be used on a multi-user LAN or WAN.

The foundation of RUSS involves two main interfaces to handle the core technical support request/ completion utility of the application; a stout client interface designed to empower end users on a network to create & revisit support requests, and a powerful administrative interface designed to allow IT support personnel to effectively manage the support requests. RUSS offers numerous other supportive features like a complete inventory management system, an online chat system for live user support, a user

management system, and powerful reporting tools for accountability & support tracking.

RUSS provides end users a tool to initiate software or hardware support requests, as well as an instantaneous view of who is working on their requests, the status of their requests, and an estimated time of completion. Users also have the ability to engage in a chat session with a support technician (if available) to try to resolve a problem at the moment before initiating a support request.

2.1 User Profile

There are two levels of intended users for RUSS; End Users, which include any user on a network, not associated with IT support & administration, and IT Technicians and Administrators which includes hardware & software technicians, as well as network administrators.

2.1.1 End Users:

The end user group encompasses any network user not associated with an IT department. End Users include users of any hardware or software at any seniority level in any department besides IT. The End User group will be using the main client interface of the RUSS application. End Users are the primary users of RUSS. This application is intended to empower the end user in the technical support process. The End Users' level of IT literacy can range from extreme novice to expert. The client interface is designed to accommodate all types of end users no matter how well-versed the end user is in IT.

2.1.2 IT Technicians and Administrators

The administrators group includes any IT support technicians or administrators in an IT department. This group will use the main administrative interface of RUSS. These

users have the functionality to administer end user support requests, as well as the ability to manipulate application configuration, manage inventory control, control user management, & use reporting tools. IT technicians and administrators are well-versed in IT support & administration, allowing for a more complex administrative interface.

2.2 Design Protocols

RUSS is a menu-based application designed for easy navigation that can be easily used by all potential users. RUSS is written in Microsoft Visual FoxPro 8.0, and uses Microsoft Visual FoxPro 8.0 Database. Graphics the Real-Time User Support System will be created using Adobe Photo Elements 2.0. The main executable file will create a login screen where users are authenticated to the application. Upon successful authentication, a specific user profile object is created for that specific user. The profile object contains information like user info, request ticket information, and security level information. The Real-Time User Support System menu layout can be seen in Figure 1 on the next page.

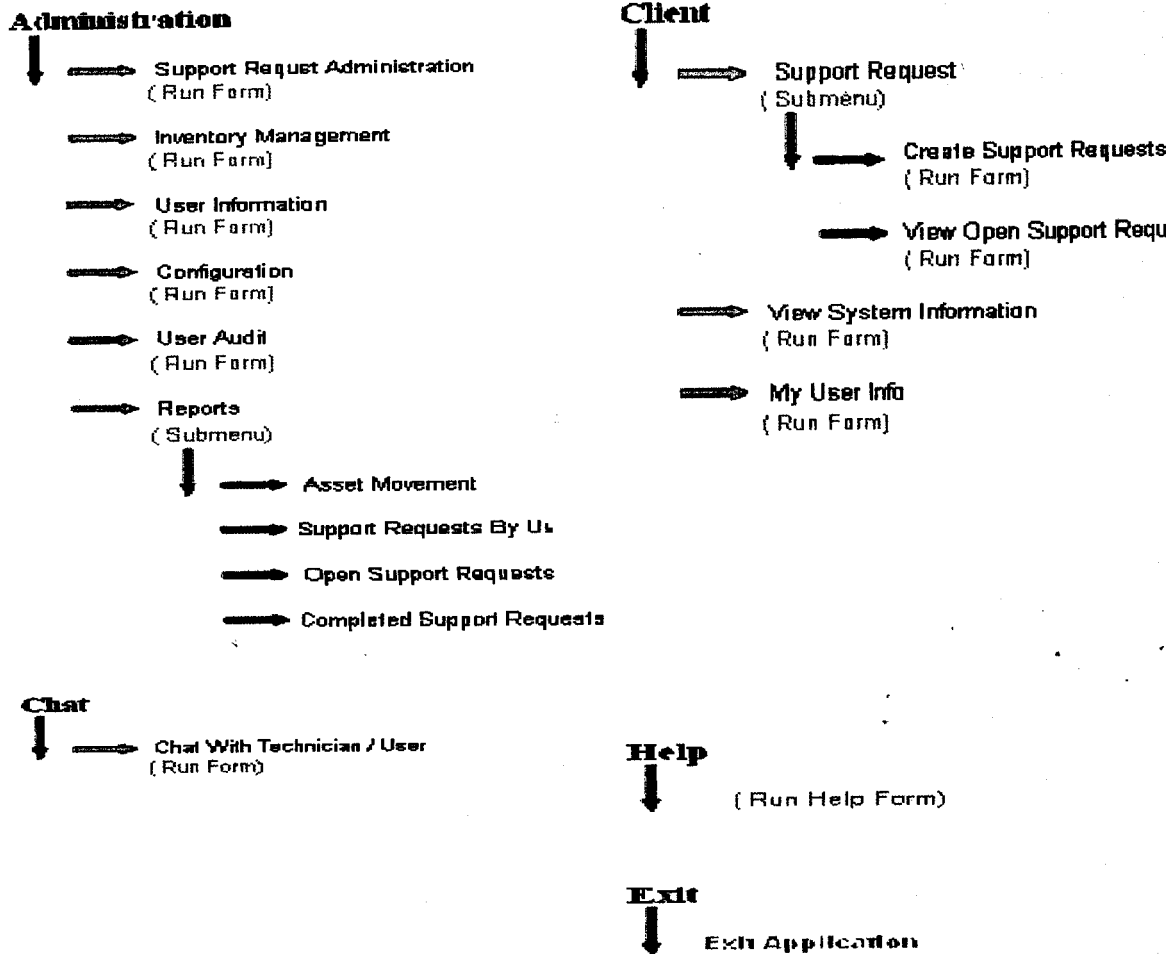


Figure 1 – RUSS menu layout

Upon successful authentication, the Real-Time User Support System menu will become available to the user. The menu functionality depends on the security level of each individual user. The main RUSS menu will have several features for both the client and the administrative users. The menu will follow standard Windows conventions to make users feel more at home in a Windows environment. The main menu screen can be seen in Figure1 on the next page.



Welcome Andrew Ballew
Logged In 05/30/05 02:22:47 PM

NUM

Figure 2 - Main menu screen

3. Objectives of the Project

The goal of the RUSS application is to provide all of the tools and functionality to both end users and technical support administrators to efficiently handle the technical support demands on an IT department. RUSS will provide an effective tool for timely request / completion of most technical support requests. The individual goals of this application are outline below.

3.1 - Outline of Project Objectives

- Easily Navigated Menu System
- Robust Relational Back-End Database
- Easily navigated Client Interface providing the following functionality:
 - Ability to create technical support requests
 - Ability to view/update open support requests

- Ability to view/update current support request in progress in real time
- Ability to view system information
- Ability to engage in online chat with technical support personnel to quickly solve minor support issues.
- Ability to view help on the RUSS application
- Easily navigated Administration Interface providing the following functionality:
 - Full administration of user technical support requests
 - Complete inventory management system
 - Ability to manage RUSS user information
 - Ability to engage in real time chat with end user.
 - Ability to use Reporting tools to gather the following useful data:
 - Inventory Asset Movement
 - Support Requests By User
 - Support Requests By Asset
 - Support Requests By Status
 - Completed Support Requests
 - User Audit Trail

4. Design and Development

The following section describes the design and development aspects of the Real-Time User Support System including the budget for the application, the timeline for application completion, and the necessary hardware and software used to create the Real-Time User Support System application.

4.1 Budget

One of the best qualities of the RUSS application is that it does not require

anything super-fancy to run the application. The RUSS database files can reside on any network share of choice, or a single network server dedicated to host the database. Any network machine capable of efficiently running Windows XP can run the RUSS menu. The total cost of implementing the RUSS application will depend on the total number of network users at a specific location, and the number of nodes needing the Windows XP OS. Additional licensing for Visual FoxPro would be necessary in most cases where 5 or more users would be using the application. A Volume Licensing Agreement would be necessary in this case to purchase a higher volume of user licenses to accommodate a larger user base. The costs of implementing the Real-Time User Support System are shown in Figure 1.

Software	
Software Item	Price
Microsoft Visual Foxpro 8.0	
1 - 5 Users	
Upgrade Version	\$349.00
Full Version	\$649.00
6 or More Users	
Requires Volumen Licensing Agreement	
Microsoft Windows XP Professional	
Upgrade Cost	\$199.00
Full Version	\$299.00
** Upgrade version is only compatible with Windows 98, 98 Second Edition and NT 4.0 operating systems. All other operating systems will require a full version of Windows XP Professional	
Windows Server 2003	
Standard Edition Plus 10 CAL's	\$1,199.00
Hardware	
Basic Desktop System	
Dell Dimension 3000	\$598.00
Basic Network Server	
Dell PowerEdge 1800	\$999.00

Figure 3 - Budget

The total cost of implementing the RUSS application can vary significantly depending on the number of client users and the current status of the client systems, as well as the existence of a network file server. The RUSS application can run from any Peer share on a network, however it is recommended that the database files are located on a true network file server running Server 2003.

4.2 Timeline

A stringent timeline has been followed for successful completion of the RUSS application. The following sections outline the timeline followed to complete the application, as well as a break-down of specific tasks accomplished during Senior Design II & Senior Design III.

4.2.1 Senior Design II Accomplishments

The majority of the Senior Design II tasks included developing the skeleton of the application menu, client interface, administrative interface, and database design. Once the application skeleton was in place, I began to add functionality to the application as well as basic testing and cosmetic improvements. Specific SDII tasks are outlined below.

- Created initial database design, created data tables
- Created menu layout
- Created app login screen and functionality
- Created classes to be used by administrative and client side interfaces
- Created basic client interface forms
- Created basic administrative interface forms
- Created basic executable application to allow user login
- Added functionality to demonstrate the application's basic features

4.2.2 Senior Design III Accomplishments

The Senior Design III tasks mainly involved finalizing and testing the functionality of the entire application, as well as performing final cosmetic changes to the

interface, fine-tuning functionality, and re-working problem areas discovered while developing the initial prototype in Senior Design II. The once the entire application was fully functional, I began scenario testing to identify any logical errors and possible ideas for enhancements. Specific SDIII tasks are outlined below:

- Completed all client interface forms
- Completed all administrative interface forms
- Completed functionality for all interfaces.
- Fine-tuned database design, setup referential integrity, persistent relationships and table indexing for reporting & queries
- Completed scenario testing to identify logic errors
- Completed all cosmetic changes

4.3 Software

Microsoft Visual FoxPro 8.0 has been used to design the Real-Time User Support System. The entire application interface as well as the database has been created using FoxPro. All of the graphics for the application were created and editing using Adobe Photo Elements 2.0.

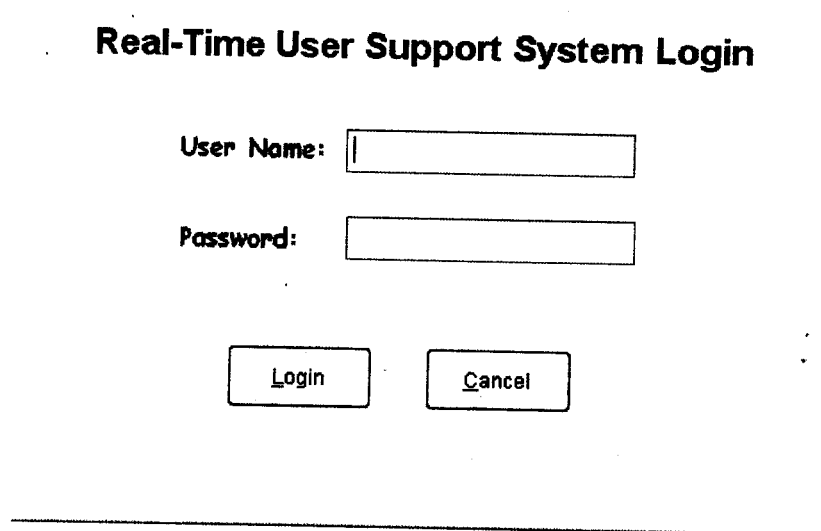
5. Proof of Design

The next section explains in detail how each of the application objectives were fulfilled by describing the aspects of each deliverable as well as showing sample screenshots from the Real-Time User Support System application.

5.1 Real-Time User Support System Login

All users must authenticate to use the Real-Time User Support System. This is necessary for a few reasons. First, all established users have a security level associated

with their user id. The security level is evaluated at user login to establish rights to the Real-Time User Support System menu for the current session. Secondly, a user profile object is created at login time to hold credentials such as user id and security level throughout the current session. The Real-Time User Support System login screen is shown in figure 4.



The image shows a login screen titled "Real-Time User Support System Login". It features two input fields: "User Name:" and "Password:". Below these fields are two buttons: "Login" and "Cancel". The "Login" button has a small underline under the 'i' in "Login". The "Cancel" button has a small underline under the 'a' in "Cancel".

Figure 4 – RUSS login screen

5.2 Client Interface Menu Options

The following section details the client-side deliverables and functionality included in the Real-Time User Support System application.

5.2.1 Ability to Create Technical Support Requests

This feature is one of the key components for the Real-Time User Support System. The "Create Support Request" screen is available under the client bar on the RUSS menu and can be seen in Figure 5 on the next page.

Client Support Request Form

Real-Time User Support System Support Request Form

CategoryType

I Need Software Support

I Need Hardware Support

Please Choose From The Hardware Below

Internal Hardware: Graphics Card

External Hardware:

Please Choose Desired Completion Date Below

Jun 2005							Jul 2005						
Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat
			1	2	3	4	5	6	7	8	9	10	11
12	13	14	15	16	17	18	19	20	21	22	23	24	25
26	27	28	29	30									

Please Choose A Support Type

I am requesting technical support for this hardware

I am requesting this hardware device now

Enter Any Additional Comments Below:

I think

Please complete ASAP!

Submit Request

Figure 5 – Client support request screen

This screen allows the client user to initiate a technical support request. The user can choose from either hardware or software support. From there, the user selects the appropriate software or hardware item, a desired date of completion, as well as the support type. The support type defines if the user is requesting technical support or simply requesting new hardware or software. Finally, the user can enter additional comments to summarize the purpose of the request.

5.2.2 Ability to View Open Requests

The next deliverable for the client interface called for the users to be able to view open technical support requests. The Support Request Viewer screen shown in Figure 6 on the next page allows users to view all support requests for any status, including open.

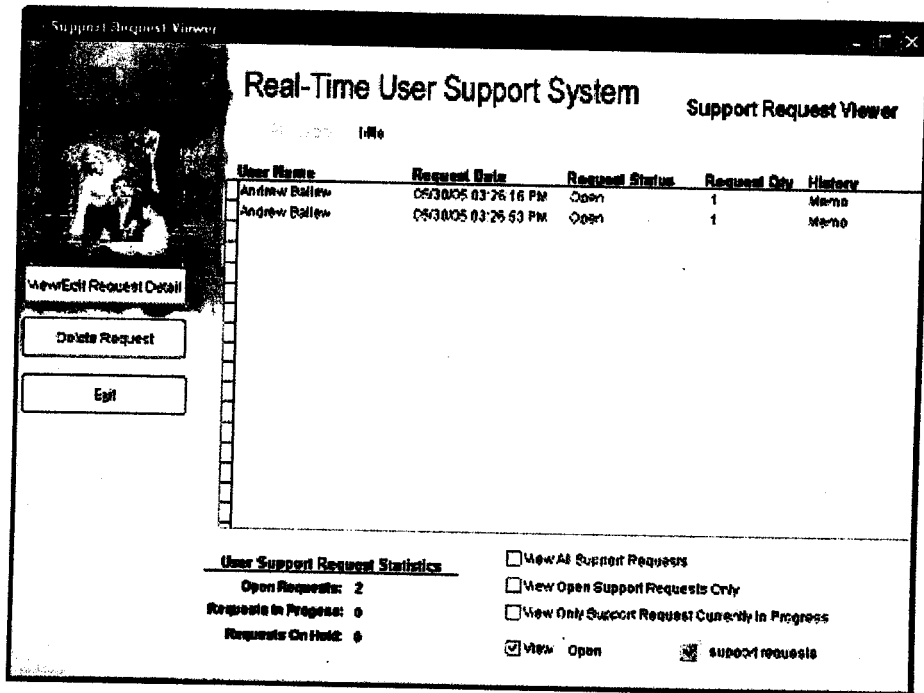


Figure 6 – Support request viewer screen

The Support Request viewer screen provides functionality to view all support requests by the following status codes:

- **Open**
- **In progress**
- **On hold**
- **Deleted by Requestor**
- **Deleted by Administrator**

The screen also shows basic support request statistics including quantities for open requests, requests on hold, and requests currently in progress. Users can delete a support request from this screen as long as the request is currently open and not in any other state. This screen is also used to select a particular support request to view or edit the support request detail.

5.2.3 Ability to View/Edit Requests Progress in Real Time

Another deliverable for the client interface called for the ability for end users to be able to view and edit support requests in real-time. The support request administration screen is the tool provided for users to take advantage of this functionality. The support request administration screen is a class designed to function differently depending on the security level of the current user. The support request administration screen can be seen in Figure 7 below.

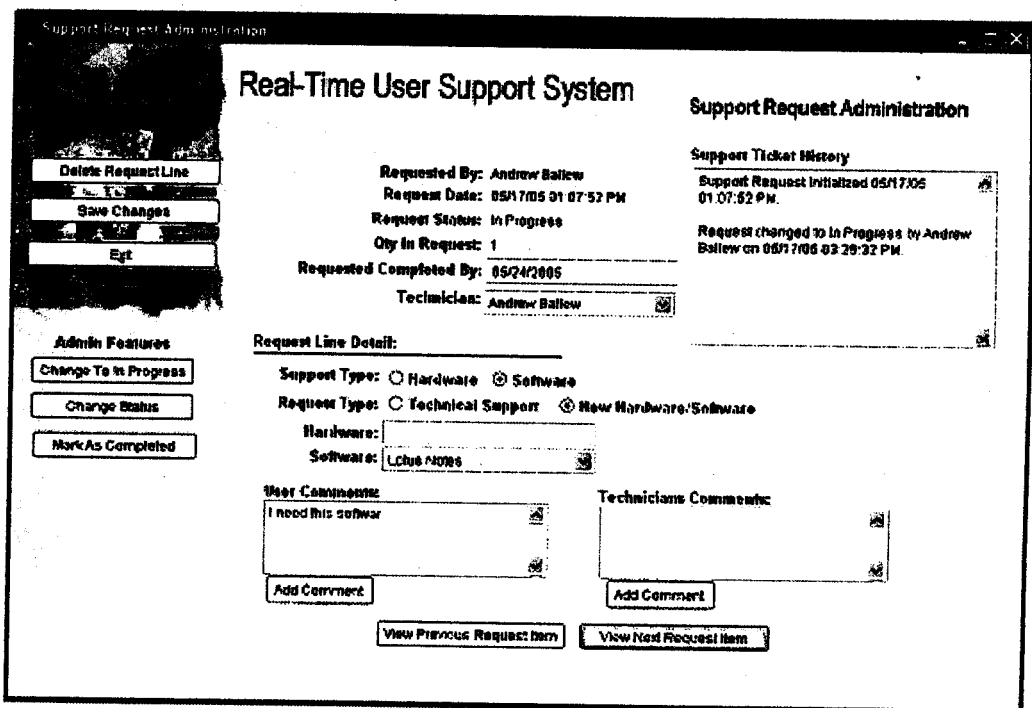


Figure 7 – Real-time request screen

When this class is instantiated, the class checks the goUserprofile class object created at user logon to verify the security level of the current user. The security level of the user enables or disables the administrative tools located on the left-hand side of the screen,

and enables specific types of editing for administrative and client users. This feature is useful so that administrators can have full editing control and regular end users can only edit support requests during open states.

5.2.4 Ability to View System Information

One of the deliverables stated is the need for users to be able to view their current system information. The System information class has been created to handle this task. The system information screen is a snapshot of the inventory information for a particular asset item belonging to the currently loggedin user. The system information screen can be helpful when support personnel request system specific information such as operating system version, processor type and speed, memory audits, and other hardware information. The system information screen can be seen in Figure 8 below.

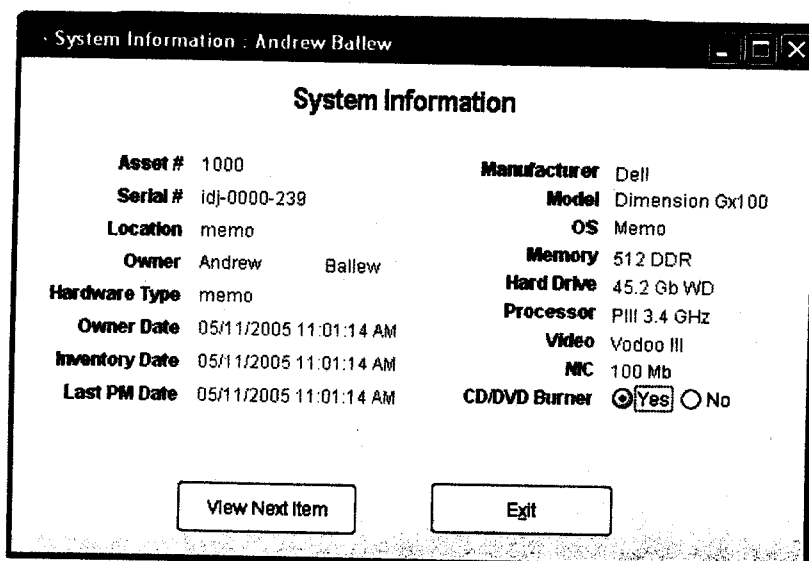


Figure 8 – System information screen

5.2.5 Ability to Use Online Chat Feature

The next deliverable for the client interface is the ability for users to engage in an online chat session with a technical support administrator to resolve minor technical support issues without a formal support request. The Chat It Up chat tool show in Figure 9 below allows users to chat with support administrators.

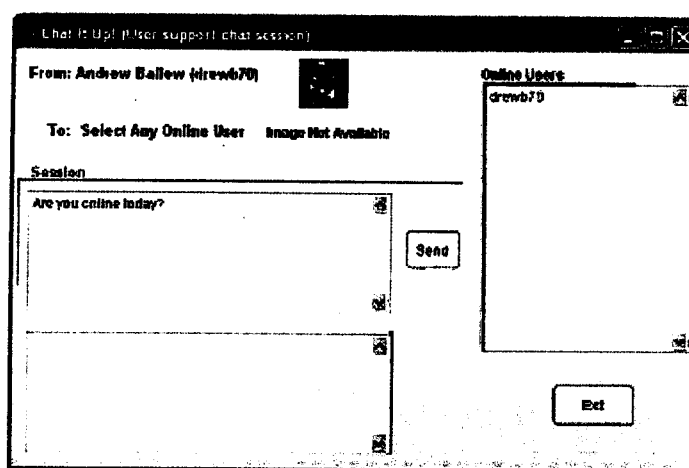


Figure 9 – Online chat screen

The Chat It Up chat window allows users to choose from a list of current online users. A picture of the selected user will appear if available, and the user can proceed to engage in chat with the selected support administrator. The online users list is refreshed every five seconds, resulting in user names being added or removed from the lists as other users open or exit the Chat It Up chat screen. If a user cannot be properly helped using this feature, they are directed to enter a formal support request using the client support request screen.

5.2.6 Ability to View Help

The final deliverable for the client interface is the ability to view help for the Real-Time User Support System application. The help screen is a critical aspect for the entire application. A technical support application that does not supply and adequate help system is contradictory in itself. The Real-Time User Support System help screen provides users with a full list of keywords and help topics to answer all navigation or intended use questions. The help screen can be seen in figure 10 below.

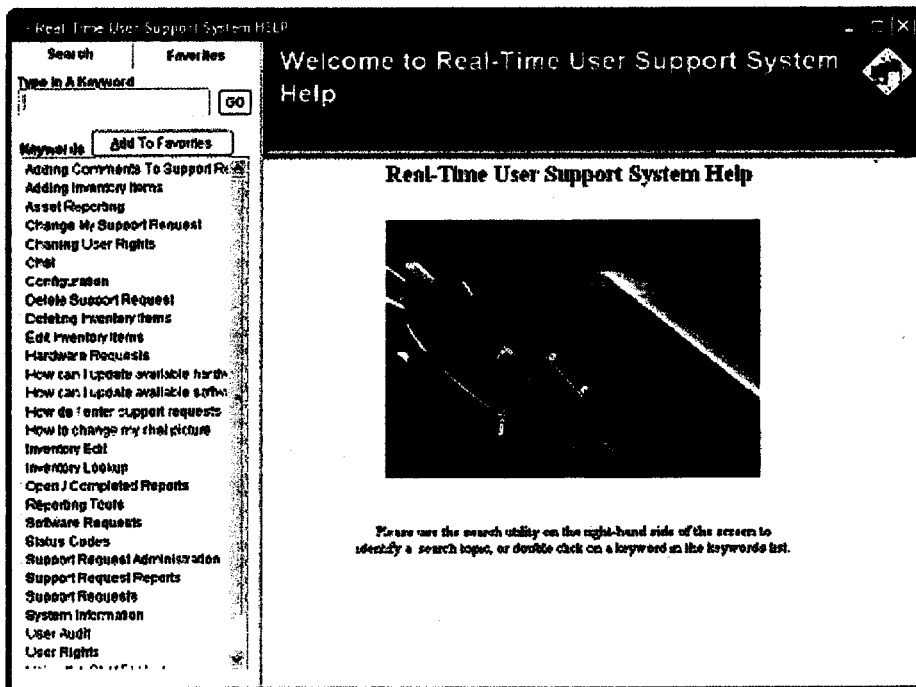


Figure 10 – Help screen

Once users open the help screen from the menu, they can search for help by entering a search topic or selecting a topic from the keywords list. The help document for the selected help keyword then appears for the user to view. The help documents are actually

stored as raw ascii characters in the help file located in the RUSS database, and are displayed using Microsoft's Rich Text ActiveX control. Users can add or remove any help topic to their own favorites list if desired. This feature allows users to build their own help viewer that can be reviewed at any time, allowing users to find answers to common questions more quickly.

5.3 Administrative Interface Menu Options

The following section details the administrative functionality included in the Real-Time User Support System application.

5.3.1 Support Request Administration Screen

The first deliverable defined for the administrative interface called for the ability to have full administration of user technical support requests. The Support Request administration class handles this functionality. For administrators, the screen provides more functionality than simply viewing and basic editing. Administrators have full control over support request status and full control over deletions & additions.

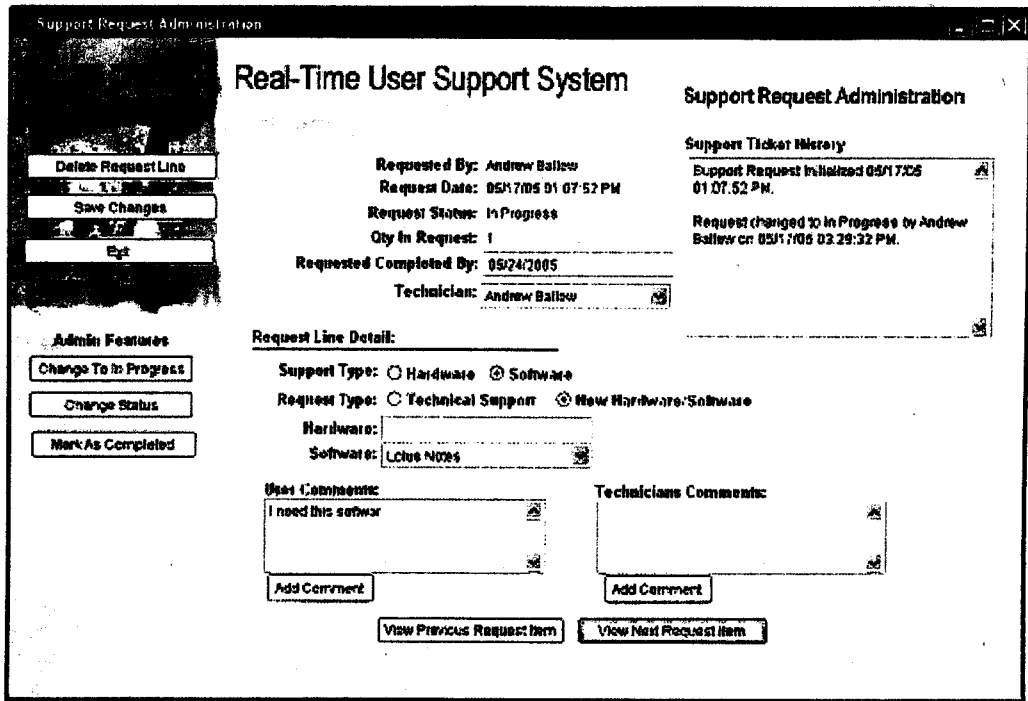


Figure 11 – Support request administration screen

From the Support Request Administration screen, administrators can change a support request status to In progress, assign a technician, change request line details, delete request lines, add or edit comments, and complete open user requests.

5.3.2 Inventory Management System

The next deliverable for the administrative interface states the requirement for a complete inventory system. The Inventory Lookup screen shown in Figure 12 and the Inventory Maintenance screen shown in Figure 13 on the next page handle all of the inventory lookup, add, and edit functionality in the Real-Time User Support System.

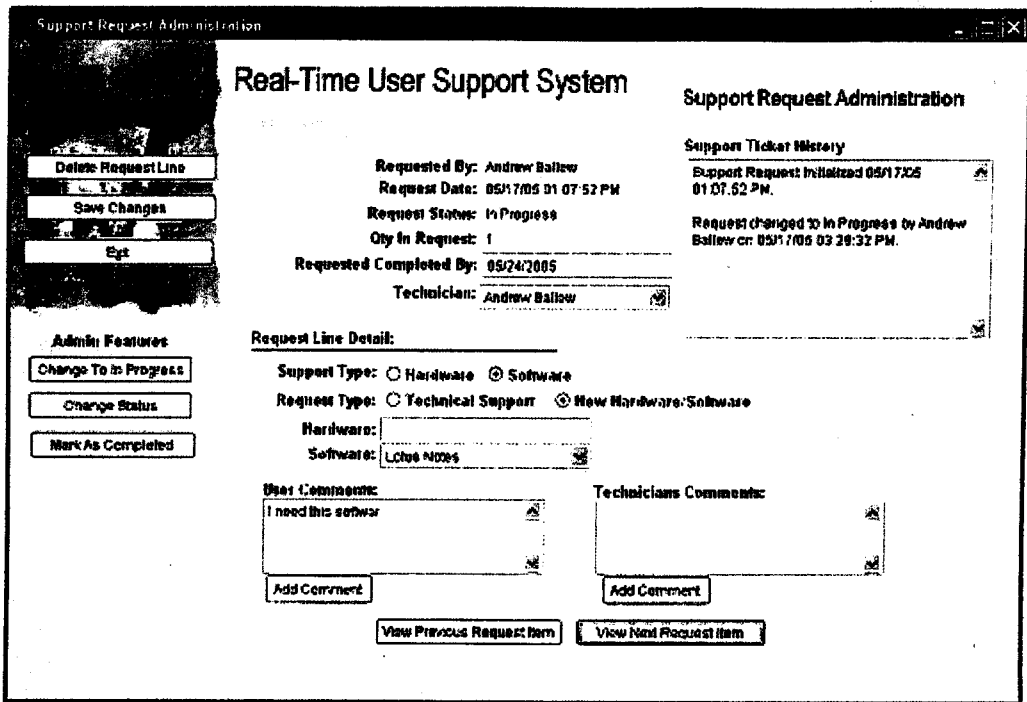


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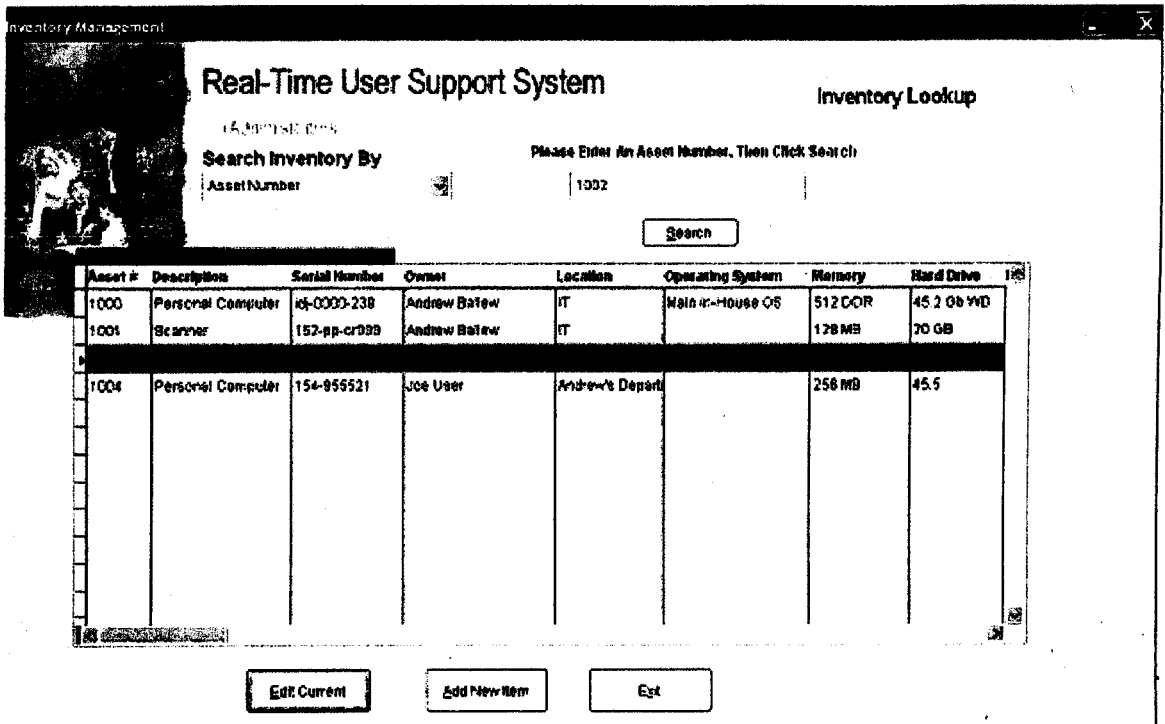


Figure 12 – Inventory lookup screen

When administrators access the inventory management bar on the menu, the Inventory Lookup screen appears. The Inventory Lookup screen shows a complete view of the current computer and equipment inventory. Administrators can search the inventory by serial number, asset number, location, or owner. If a match for the selected search criteria is found, the inventory item is highlighted in green.

Administrators can also quickly sort the inventory view by clicking on the headers of the inventory grid. This will re-index the inventory view based off the desired category. From this screen, administrators can add inventory items or edit specific inventory items.

The inventory maintenance screen provides administrators with the functionality to add additional inventory items, delete inventory items, or to edit inventory items.

Since each inventory item must have a unique asset id number, the asset # text box validates all entries to verify that no duplicate asset numbers are assigned.

Default Admin Form

Real-Time User Support System

Inventory Maintenance

(Administrators) Owner

Asset #

Serial # 488995895

Location Accounting

Hardware Type Personal Computer

Owner Date 05/11/2005 11:

Inventory Date 05/11/2005 11:

Last PM Date 05/11/2005 11:

Manufacturer HP

Model Pavilion

OS Microsoft Millenium Edition

Memory 256 MB

Hard Drive 15 GB

Processor 2.4 GHz

Video

NIC

CD/DVD Burner

Exit

Figure 13 – Inventory maintenance screen

5.3.3 User Management

The ability to manage Real-Time User Support System users is the next deliverable stated for the administration interface. Since it is necessary to become a user in order to login to the Real-Time User Support System application, the User Administration screen has been created to provide functionality to add and maintain user information for the entire application. The User Administration screen controls the entire user profile and can be seen on the next page in Figure 14.

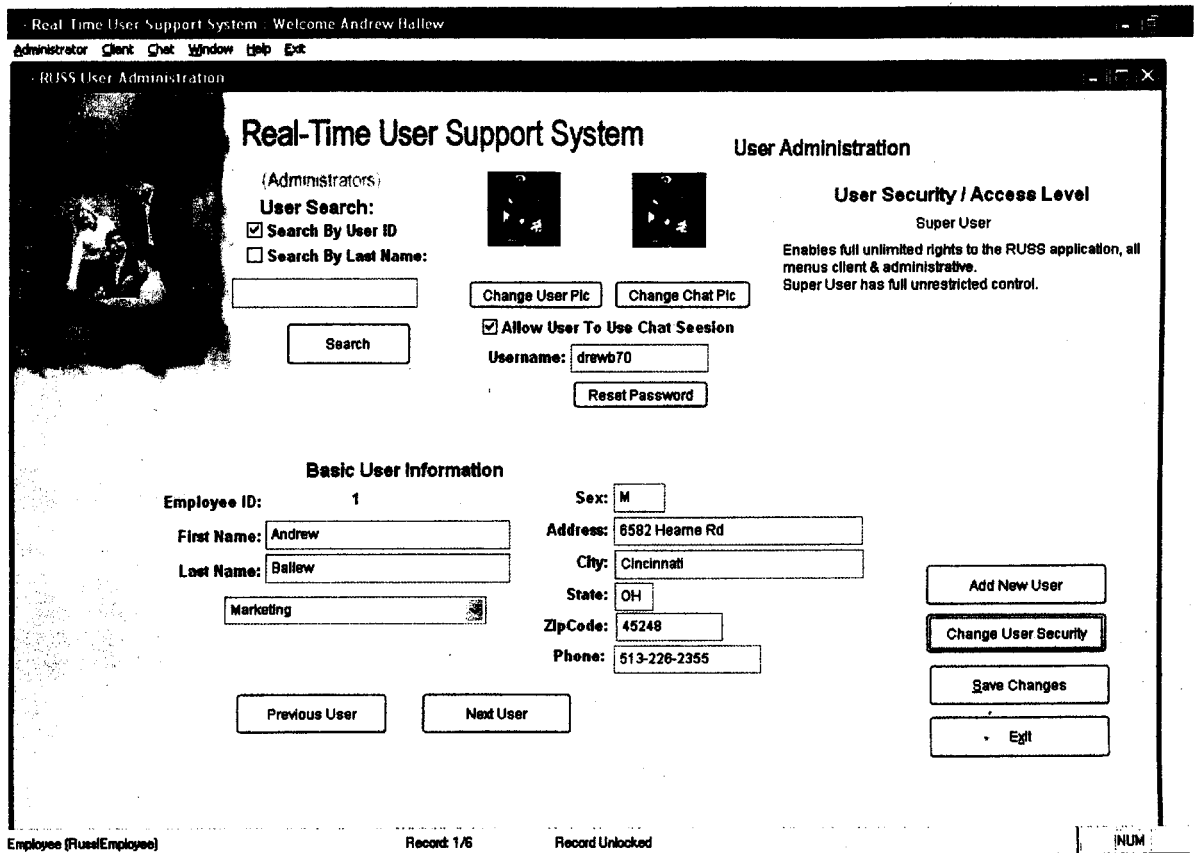


Figure 14 – User administration screen

From the User administration screen, administrators have access to the following functionality:

- **Add or delete users**
- **Edit current user information**
- **Add or remove the ability to use chat features**
- **Change user image**
- **Change user chat image**
- **Change usernames and passwords**
- **Change user security levels**

- **Search for users by name or user id**

The user rights maintenance screen is accessed from the user administration screen and is shown in Figure 15 below.

Default Admin Form

Real-Time User Support System

User Rights Maintenance

(Administrators)

Search For User

Search By User ID

Search By Last Name:

Search

Change User Security Level

Exit

User Name
Andrew
Ballew

Choose Security Level
4

Security Level Description Super User
Enables full unlimited rights to the RUSS application, all menus client & administrative.
Super User has full unrestricted control.

Save Changes

Figure 15 – User rights maintenance

From this screen, administrators can change a user's security to one of four levels:

- **Basic User**
- **Basic Administrator**
- **User Maintenance Only**
- **Super User**

Each security level allows specific access to functionality and features in the Real-Time User Support System. A description of each security level is displayed for each item in

the security level combo box.

5.3.4 Online Chat

The next requirement stated for the administrative interface is the ability for administrators to engage in an online chat session with other users logged in to the application. The chat screen is the same screen shown previously in Figure 9.

Administrators have the same functionality as regular end users with the Chat It Up online chat screen.

5.3.5 Reporting Tools

The final deliverable required for the administrative interface is the ability to use reporting tools to gather the following useful information:

- **Inventory asset movement**
- **Support requests by user**
- **Support requests by asset**
- **Open support requests**
- **Completed support requests**
- **User audit trail**

Each report can be accessed individually from the administrative side of the application menu. The main reporting tools screen can be seen in Figure 16 on the next page. This screen displays for each of the mentioned reports, and provides the means for report parameter input such as an asset number for asset tracking.

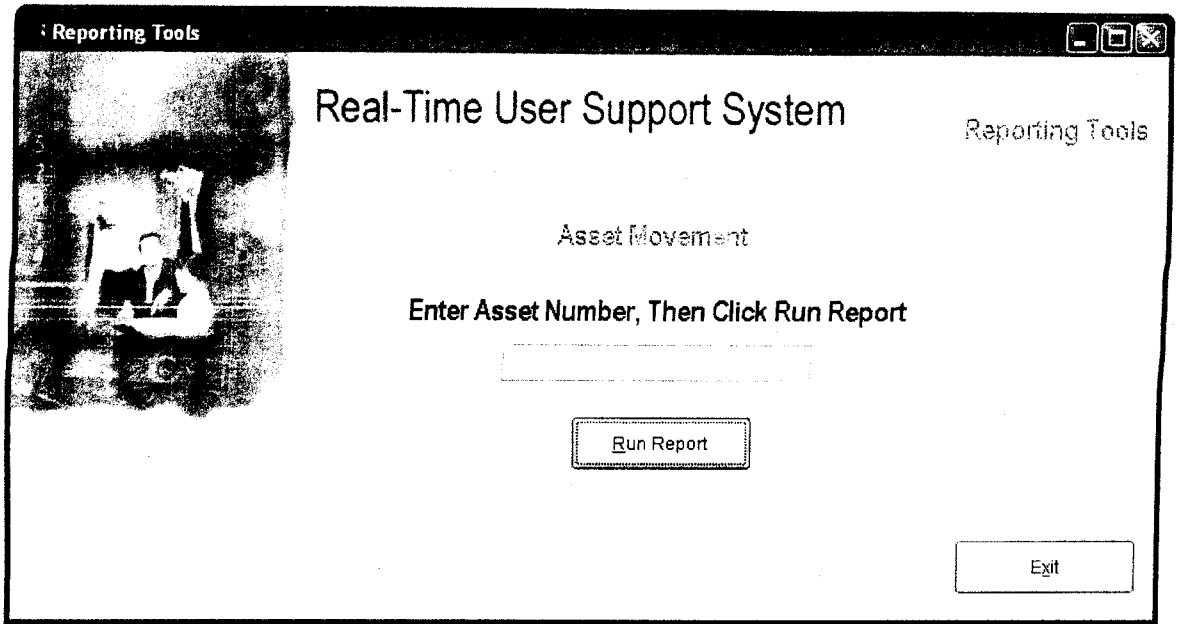


Figure 16 – Report Tools\

Once an administrator runs a report, the report data appears in preview mode on the screen. From the preview screen, the report can be printed or discarded. Figure 17 below page shows a sample Asset Movement report for a particular asset item.

Owner Name:	Location:	Comments:	Date:
	Repair		/ / : : AM
	Accounting		/ / : : AM
Andrew Hallow	IT		05/11/05 08:57:10 AM
	Repair		05/11/05 11:04:08 AM
Andrew Ballew	Engineering		05/11/05 06:32:49 PM
Andrew Hallow	Engineering		05/11/05 06:37:06 PM
Andrew Ballew	Marketing		05/11/05 06:33:33 PM
Andrew Ballew	HR		05/11/05 06:34:04 PM
Andrew Hallow	Repair		05/11/05 06:35:30 PM
Jon User	Repair		05/11/05 07:06:35 PM
Andrew Ballew	IT		05/11/05 07:06:55 PM

Figure 17 – Asset movement report

Figure 18 below shows a sample Support Request Detail report. All of the support request reports contain the same format, displaying information about the requesting user, the request detail, the request history, and any comments added by the user or administrator.

Real-Time User Support System				
Support Request Detail Report				
06/04/05 03:33:01 PM				
Ticket Num:	108	History:	Support Request Initialized 05/17/05 01:07:52 PM.	
Request Date:	05/17/05 01:07:52 PM		Request changed to In Progress by Andrew Ballew on 05/17/05 03:29:32 PM.	
Complete Date:	// : : AM		Support Request Deleted By Andrew Ballew 05/18/05 09:08:53 PM.	
Status:	Deleted By User			
User:	Andrew Ballew			
Assetnum	Request Type	Request Code	Software	Client Comment
1000	Technical Support	Software	Lotus Notes	<u>I need this softwar</u>

Figure 18– Support request detail report

6. Conclusions and recommendations

Although the Real-Time User Support System meets all of the design parameters set forth, I encountered many challenges that inspired new ideas to enhance this application. Some of the new ideas were able to be included as extra functionality in the application while many were left for future development. My recommendations for future development are delineated in the following section.

The first recommendation is to add email notification functionality to the

application. This would enhance the effectiveness of the application by further streamlining the technical support process for the end user. Instead of users having to login to the application and check on the status of recently submitted support requests, they would receive an email each time the status of the request changes. The email would include the updated request status along with the support request history. This feature would make the Real-Time User Support System even more helpful and convenient to the end user, further strengthening the overall goal of this application.

Another recommendation would be to enhance the help screen. I encountered a little problem with speed when loading the raw ascii data for the RTF help documents into the Windows Rich Text ActiveX control. My later research revealed that RTF documents are always smaller than regular text document formats *except* when incorporating JPG images. Since all of the help files contained assisting screen shots, this became a slight problem. I had to sacrifice the image quality to keep the help screen performance at an acceptable level. It would be desirable to segment the help document and the aiding screen shots into separate fields in a database table. Doing so would allow for higher quality help images and much faster performance.

The final recommendation would be to add the ability for users to add attachments to technical support requests. For example, if a user requested technical support for a software application for a specific error message, it would be helpful for the user to take a screen shot and attach it to the support request for a support technician to review. The use of this feature could even be expanded to a more useful tool for the entire application using file transfer. An administrator wanting to replace a corrupt file on a user's machine could attach a replacement file and a script to the user request. The user

could then execute a script to replace the corrupt file and fix the problem without ever physically coming into contact with a support technician.