

The On-Line Help Desk Tracking System

By

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Submitted to
the Faculty of the Information Engineering Technology Program
in Partial Fulfillment of the Requirements for
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in Information Engineering Technology

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Date

Acknowledgements

In Loving memory of my father Zaharias Sakellariou, 8-23-2005.

Table of Contents

Section	Page
Acknowledgements	i
Table of Contents	ii
List of Figures	iv
Abstract	vi
1. Statement of the Problem	1
2. Description of the Solution	2
2.1 User Profiles	3
2.1.1 Clients	3
2.1.2 Administrators	3
2.2 Design Protocols	4
2.2.1 Programming	4
2.2.2 Database	4
3. Deliverables	5
3.1 OHDT system Deliverables	5
3.2 Client Deliverables	5
3.3 Administrator Deliverables	5
4. Design and Development	6
4.1 Timeline	6
4.1.1 Senior Design I Spring 2005	6
4.1.2 Senior Design II Fall 2005	7
4.1.3 Senior Design III Winter 2006	7
4.2 Budget	7
5. Proof of Design	9
5.1. OHDT Functions and Features	9
5.1.1 Database Storage	9
5.1.1.1 Client Table	9
5.1.1.2 Administrator Table	9
5.1.1.3 Help Desk Request Table	9
5.1.2 The Unique Case Number	10
5.1.3 OHDT System E-mail Functions	11
5.1.3.1 OHDT System Open E-mail	11
5.1.3.2 OHDT System Closed E-mail	12
5.1.4 Prioritizing Help Desk Request	12
5.2 Client Sections	14
5.2.1 Login Page	14
5.2.2 Create a Help Desk Request Page	15

5.2.3 Confirmation Page	17
5.3 Administrator Sections	19
5.3.1 Login Page	19
5.3.2 Main Page	20
5.3.3 Adding a Client	21
5.3.4 Adding an Administrator	22
5.3.5 Editing a Client Profile	24
5.3.6 Editing an Administrator Profile	25
5.3.7 Create a Help Desk Request	26
5.3.8 View and Modify Help Desk Request	28
5.3.9 Assigning an Administrator to a Help Desk Request	31
5.3.10 Assigning a Specific Status to a Help Desk Request	32
5.3.11 Searching for a Specific Help Desk Request	33
6. Testing Procedures	35
7. Conclusions and Recommendations	36
7.1 Conclusions	36
7.2 Recommendations	36
References	38

List of Figures

Figure Number	Page
Figure 1. Budget	8
Figure 2. OHDT System Open E-mail	11
Figure 3. OHDT System Closed E-mail	12
Figure 4. Selecting a Priority	13
Figure 5. Login Page	15
Figure 6. Client Creating a Help Desk Request	17
Figure 7. Confirmation Page	18
Figure 8. Confirmation E-mail	19
Figure 9. Login Page	20
Figure 10. Add Client Page	21
Figure 11. Edit Client Profile Page	22
Figure 12. Add Administrator Page	23
Figure 13. Edit Administrator Profile Page	24
Figure 14. Edit Client Profile	25
Figure 15. Edit an Administrator Profile	26
Figure 16. Administrator Creating a Help Desk Request	28
Figure 17. Help Desk Data Grid	29
Figure 18. Updating a Help Desk Request	30
Figure 19. Selecting a Specific Administrator	31
Figure 20. Selecting a Status	33

Figure 21. Searching for a Help Desk Request	34
Figure 22. Displayed Search Result	34

Abstract

The *On-Line Help Desk Tracking System* (OHDT system) has been designed to improve a company's ability to provide high quality service and support for their users. The OHDT system is a web application that is designed for two types of users, clients and administrators. Clients login to the OHDT system and submit the required information about themselves and the issue they are experiencing. Once the information has been submitted the client will be assigned a unique case number for their help desk request. Administrators will have full access to all the functionality of the OHDT system. Administrators will be able to: 1) Create, view, or modify help desk request; 2) add or modify client or administrator accounts; 3) search for specific client or administrator accounts; 4) reassign help desk request to other administrators; 5) assign a specific status to a help desk request; 6) search for a specific help desk request.

The On-Line Help Desk Tracking System

1. Statement of the Problem

For a company to get ahead in the business market, a company must find ways to make money and also save money. These techniques determine whether a company will be successful. A company must find ways to reduce costs, reduce downtime, and increase service internally in the company. Once a company has a strong grasp on these factors, that company has a better chance of coming up strong against its competitors (5).

IT (Information Technology) administrators are under increasing pressure everyday to reduce cost, reduce downtime, and increase service. These pressures can be very difficult and frustrating for an IT administrator that is flooded with phone calls for assistance. This is also frustrating for the client that is on the other side trying to get the needed assistance, but is only getting elevator music. When this occurs cost is increasing as the client is delayed in doing his or her work. The client can't complete his or her task because the client is experiencing down time. And in the end, the quality of the service to the client has decreased. All of this downtime can be very costly for the company.

When a client encounters a technical issue, they usually contact an IT administrator. Valuable time can be wasted on the phone while the client is trying to contact the administrator. This can be likewise for a busy administrator that is tied up with answering phone calls. The administrator may not keep track of clients or the needed request that the client needs. This can be confusing for both an administrator and a client when they are communicating about a technical issue.

2. Description of the Solution

Administrators work extremely hard to provide the best support for their clients. Administration within an organization must be quick, responsive, and organized. Clients and administrators should have a sense of security that each issue is correctly logged and administered, instead of being lost in paper work or verbally “handed” around the office.

The On-Line Help Desk Tracking System (OHDT system) is a complete help desk system for internal support in a company. Combining an HTML and ASP user interface with a Microsoft Access Database, the OHDT system gives a company’s users 24-hour access to administrator(s) from any computer with an Internet/Intranet connection.

Clients will have a standard way of creating their own help desk request within an organization. This will provide the client with confidence that each issue has been logged and dealt with. E-mail confirmations will remind a client once a help desk request has been created and resolved. Clients will receive the needed attention and support when it comes to technical issues within a company.

Administrators will be able to monitor and administrate help desk request in an organized manner from any location. Administrators will have access to current client help desk request and archived request. Help desk request can be prioritized, making sure that issues are dealt with in a timely order.

2.1 User Profiles

There are two categories of users. The two levels include client and administrator.

2.1.1 Clients

The client will be the primary user of the On-Line Help Desk Tracking System. Clients will log onto the system to enter information about themselves and information about the issue he or she is experiencing. The system has been designed for easy navigation and use for all computer users, from beginner to experienced. Clients must authenticate with a valid user ID and password to connect to the system. Once connected, the client will be able to create help desk request that is submitted and stored into the database. Clients only have enough permissions to access the system and create and submit help desk request. Clients will not have access to log onto the database.

2.1.2 Administrators

Administrators are the second level users of the On-Line Help Desk Tracking System. Administrators are responsible for administering the system and communicating with clients over the help desk request. All of the administrators are considered experienced computer users.

Administrators will have full access to all of the On-Line Help Desk Tracking System functions. These features are:

- Creating/Modifying Client Accounts
- Creating/Modifying Administrator Accounts
- Creating help desk requests
- Viewing all help desk requests

- Changing the status of help desk requests (opening, holding, ordering, and closing)
- Searching for specific help desk requests

Administrators will be responsible for processing client request and issues and responding back to each client in a timely fashion that is deemed appropriate by the institution.

2.2 Design Protocols

The next section will explain what programs were used to create the OHDT system.

2.2.1 Programming

The programming will be dynamic but user friendly. The OHDT system user interface will be created using ASP.NET Pages, written in HTML with embedded VB.NET script. Using ASP.NET Pages provides the system with usability and scalability (4).

- Active Server Pages (ASP) are browser independent. The Internet/Intranet browser only sees pure HTML pages. No extra programs or extensions are required.
- ASP hides the VB.NET code from users.
- ASP gives the option to link to many different types of databases.
- ASP provides an efficient way to View, Search, and Modify a database.

2.2.2 Database

The database will be created using Microsoft Access 2003. Microsoft Access was the top candidate over other database programs. The main reason is the low cost

compared to other databases (11). The database will be a simple database that will store all information for the OHDT system. The database will be accessed via the Internet/Intranet allowing users to add request and for administrators to exercise their full privileges over the system.

3. Deliverables

In order to provide a well organized help desk system, certain items were considered necessary for the system. These necessary items made up the deliverables of the OHDT system.

3.1 OHDT system Deliverables

- A system that stores information in a database
- Assigning unique case numbers to each help desk request
- E-mailing a client when a help desk request is created with their credentials
- Communicating via e-mail with the client each time there is a change of status to a help desk request (Open and Closed Status)
- Prioritizing help desk request

3.2 Client Deliverables

Clients will be able to:

- Log into the OHDT system.
- Create help desk request.

3.3 Administrator Deliverables

Administrators will be able to:

- Log into the OHDT system.

- Add clients to the OHDT system.
- Add administrators to the OHDT system.
- Modify client user profiles.
- Modify administrator user profiles.
- Reset client and administrator passwords.
- Create a help desk request.
- View and modify help desk request.
- Assign a specific administrator to a help desk request.
- Assign a specific status to a help desk request, such as opening, holding, ordering, or closing a help desk request.
- Search for specific help desk request.

4. Design and Development

The following sections describe the project's timeline and overall budget.

4.1 Timeline

Below is a detailed time line of task completed in the Senior Design sequence.

4.1.1 Senior Design I Spring 2005

Weeks 1-5

- Gather information on Help Desk programs.
- Research and choose a database.
- Research and choose a programming language for user interface.

Weeks 6-10

- Create a basic layout for the database.
- Create a basic user interface.

- Present proposal to students and faculty.

4.1.2 Senior Design II Fall 2005

Weeks 1-5

- Continue to design user interface.
- Set up tables in the database.
- Test sample data in user interface.
- Work on Draft Design Freeze.

Weeks 6-10

- Finalize user interface.
- Finalize setup of database.
- Complete Final Draft of Design Freeze.
- Present working prototype.

4.1.3 Senior Design III Winter 2006

Weeks 1-5

- Modify user pages.
- Submit required documentation.
- Work on draft of final report/documentation.

Weeks 6-10

- Complete final draft of report/documentation.
- Present final Project.

4.2 Budget

The budget shows the cost of hardware, software, and miscellaneous items for the project (See Figure 1. page 8).

Hardware	
Item	Cost
Intel® Pentium® 4 Processor (2.80GHz, 533 FSB) (2)	\$280.00
256MB DDR SDRAM400MHz (2)	120.00
40GB3 Ultra ATA/100 7200RPM Hard Drive (2)	90.00
Dual Drives: 16x DVD-ROM Drive + 48x CD-RW Drive (2)	225.00
(15.0 in viewable) E153FP Analog Flat Panel Monitor (2)	200.00
Accellent 128MB Flash Dirve (2)	35.00
Total Hardware:	\$950.00
Software	
Microsoft Visual Studio .NET Professional 2003 (7)	\$700.00
Microsoft Access 2003 (7)	100.00
Total Software:	\$800.00
Miscellaneous	
Time Warner Wireless High-Speed Internet Connection	\$34.99
ScanDisk 256MB SD Memory (7)	65.00
Total Miscellaneous:	\$99.99
Grand Total:	\$1849.99

Figure 1. Budget

5. Proof of Design

The next section shows in detail how the deliverables of the project were fulfilled.

5.1. OHDT System Functions & Features

The following sections will describe OHDT system functions and features.

5.1.1 Database Storage

The Microsoft Access Database will be the core application that will be used with the OHDT system. The OHDT system will store all the generated information in the Access database. The database consists of three tables, UserInfo, Admin, and Members which will all be linked by the user ID.

5.1.1.1 Client Table

All information about the client will be stored in the client table named UserInfo. This table will store the clients' user ID, password, first, and last name. The unique identifier in the UserInfo table will be the user ID. No duplicate user IDs will be allowed in the UserInfo table.

5.1.1.2 Administrator Table

All information about the administrators will be stored in the administrator table named Admin. This table will store the administrators' user ID, passwords, first, and last names. The unique identifier in the Admin table is the user ID. No duplicate user IDs will be allowed in the Admin table.

5.1.1.3 Help Desk Request Table

All user help desk request will be stored in the Members' table. The Members' table will store the following records:

- User ID (Primary Key, duplicates allowed)

- Case Number (Primary Key, no duplicates allowed)
- First Name
- Last Name
- PC ID
- Phone Number
- E-mail
- Problem (Problem Description)
- Admininfo (Administrator Remarks)
- Sentdate (Time Stamp)
- Radvalue
- Location
- Status
- Admin (Administrator)
- Priority

In the Members' table, the unique identifiers will be the case number and the user ID. Since each help desk request will have a unique case number, there will be no duplications of a case number in the Members' table. But since users can submit more than one help desk request, the Members' table was created to store multiple user IDs.

5.1.2 The Unique Case Number

Once each help desk request is created, the OHDT system will assign the help desk request a unique case number. The unique case number will be used by clients or administrators to refer to a specific help desk request.

5.1.3 OHDT System E-mail Functions

Once a help desk request is created or closed, the OHDT system will submit an e-mail to the assigned client. The e-mail function was added to the OHDT system to help clients and administrators keep track of the help desk request that have been created or closed. The OHDT system e-mail will specify the case number and that the help desk request has been open or closed.

5.1.3.1 OHDT System Open E-mail

Once a client or administrator creates a new help desk request, the assigned client will receive an OHDT system e-mail. The OHDT system e-mail will specify the case number and that the help desk request has been opened (See Figure 2.).

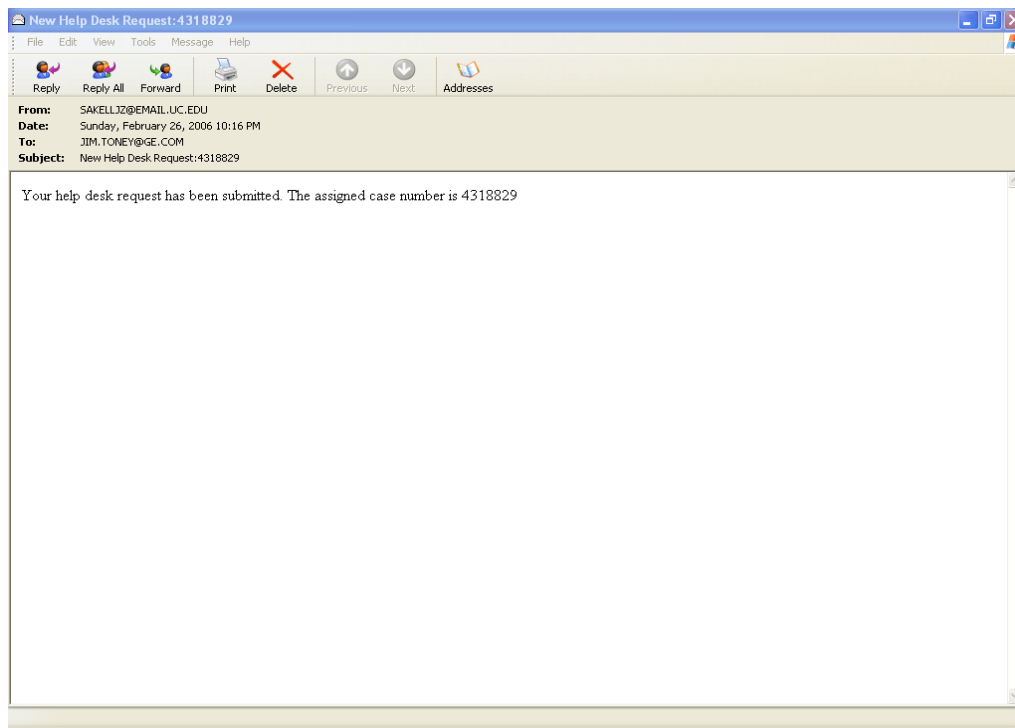


Figure 2. OHDT System Open E-mail

5.1.3.2 OHDT System Closed E-mail

Once an administrator assigns the closed status to a help desk request, the assigned client will receive an OHDT system e-mail. The OHDT system e-mail will specify the case number and that the help desk request has been closed (See Figure 3.).

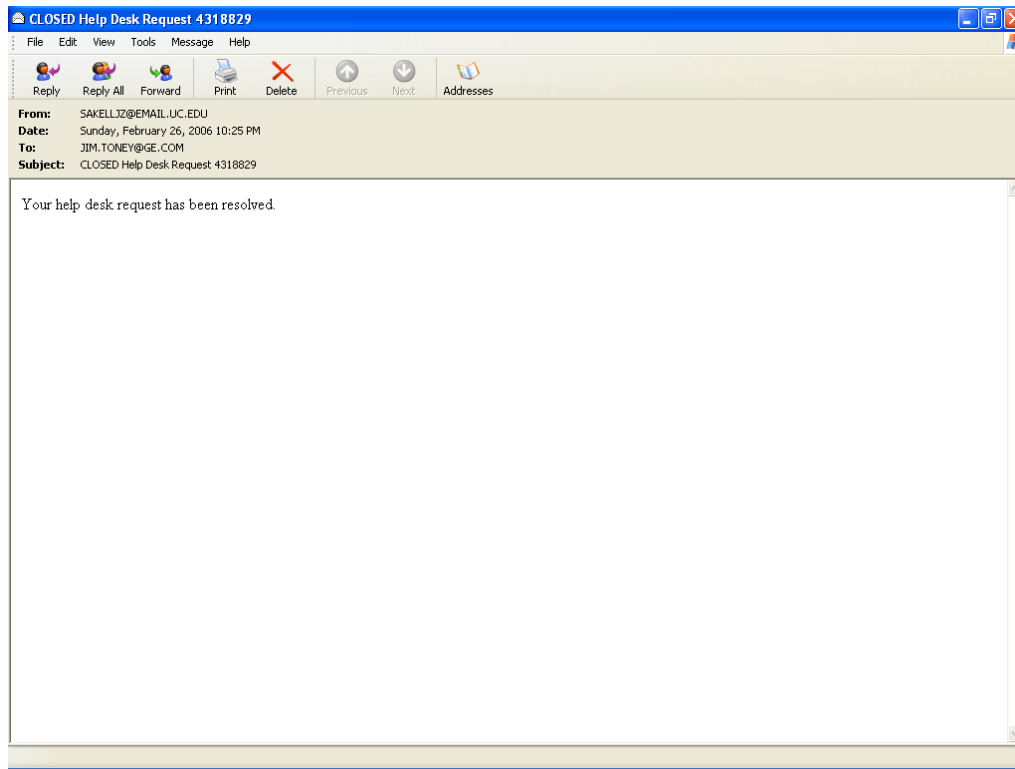


Figure 3. OHDT System Closed E-mail

5.1.4 Prioritizing Help Desk Request

Help desk requests can vary on the severity of an issue, and that is why the OHDT System allows for prioritizing help desk request. The priority function is an important feature of the OHDT System. Prioritizing allows help desk request to receive the needed attention based on the severity of the issue. Administrators will be responsible for processing help desk requests and responding back to the client in a timely fashion that is deemed appropriate by the institution's information technology department.

The administrator will have full privileges in using the priority function. Here are the following 6 priority levels the OHDT System offers from low priority to high:

- Unassigned
- Low
- Medium
- High
- Alert (Client created help desk request)
- Outage (Network Outage)

Administrators will be able to select one of the following priority levels in the event of creating or modifying a help desk request (See Figure 4.).

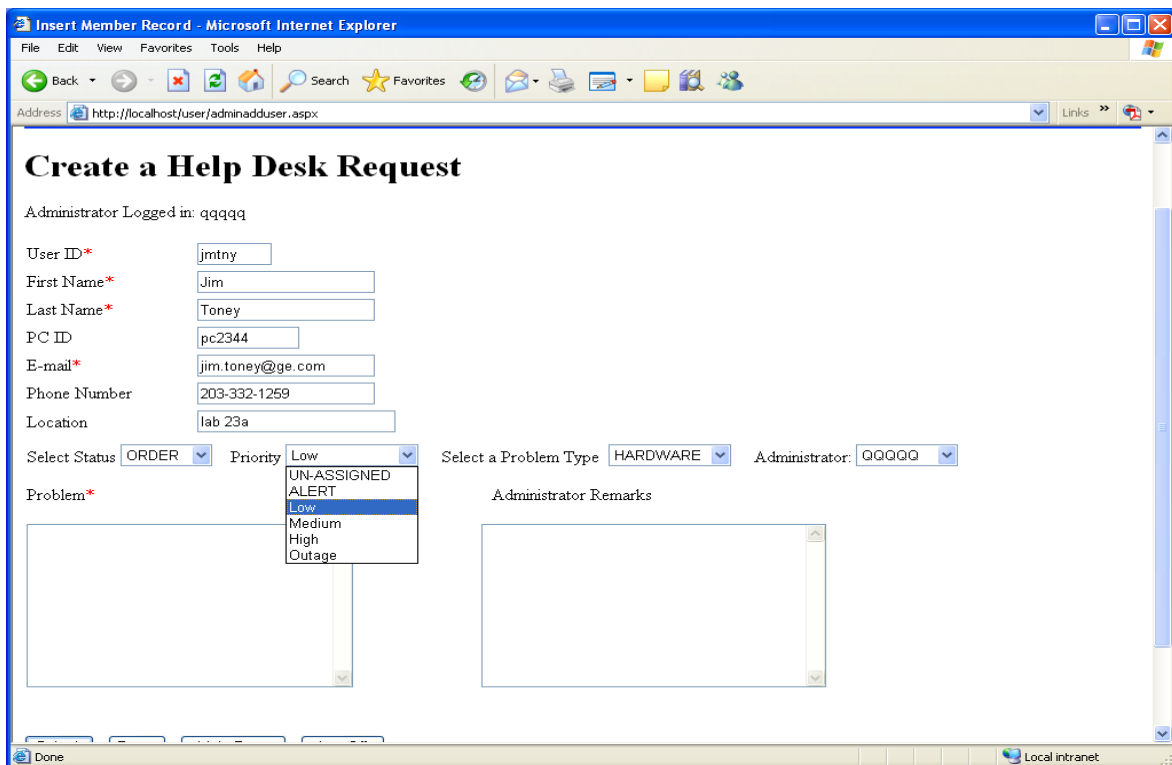


Figure 4. Selecting a Priority

The OHDT System will not allow clients to assign priority levels when creating a help desk request. This will prevent clients from assigning incorrect priority levels to help desk request. When a client creates a help desk request, the priority is automatically assigned to the level “Alert”. The “Alert” level is intended to alert an administrator to review the help desk request and assign it an appropriate priority level. The “Alert” priority will insure clients that all client created help desk request will be equally reviewed by an administrator.

5.2 Client Sections

The client section allows a client to login to the OHDT system and create a help desk request. Once a client has entered into the OHDT system, the client may log of the system at any point the client desires. Clients will be limited to only creating help desk requests.

5.2.1 Login Page

When a client accesses the OHDT system, the first page the client will see is the OHDT system login page. To authenticate, the client must provide their 5 character user ID and valid password, and then click on the “Client Login” button (See Figure 5. page 15).

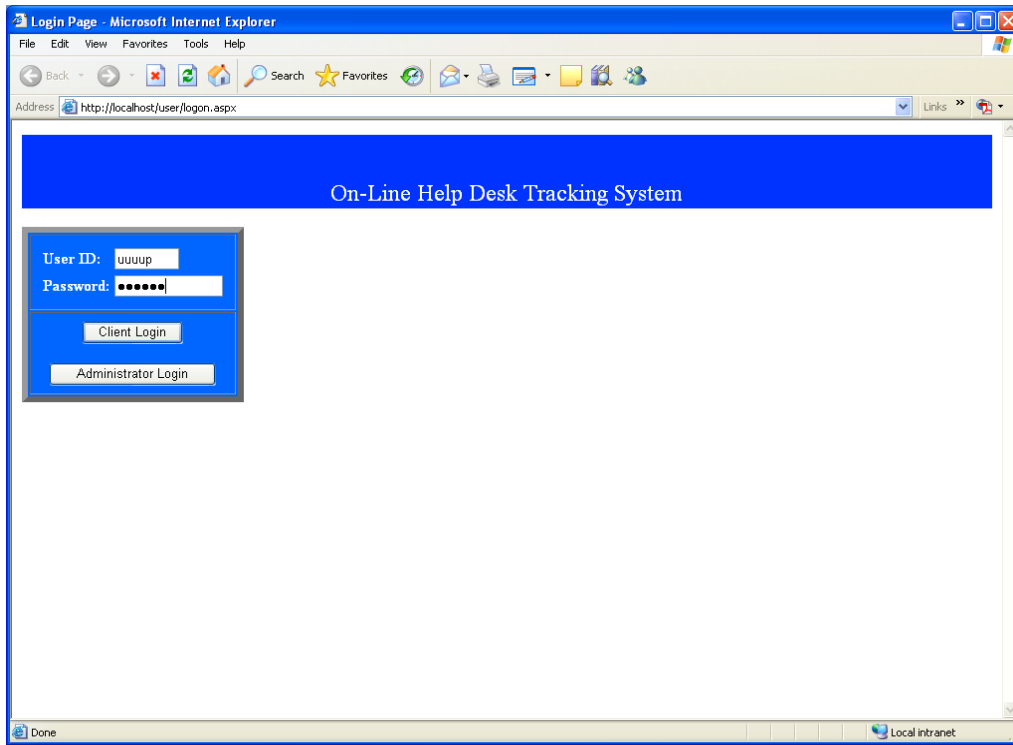


Figure 5. Login Page

If a client enters an invalid user ID and/or password, the client will be presented with the appropriate error message(s). The client will not be allowed access into the system until the client presents a valid user ID and/or password. Once the client has presented a valid user ID and password, the client will be allowed to proceed to the “Create a Help Desk Request” page.

5.2.2 Create a Help Desk Request Page

The “Create a Help Desk Request” page allows a client to create a help desk request that will be submitted to and stored in the OHDT system. The “Create a Help Desk Request” page allows the client to enter the information for the following fields:

- User ID
- First Name
- Last Name

- PC ID
- E-mail
- Phone Number
- Location
- Problem Type (Client can select one of the following: hardware, software, network, email, comm, or other)
- Problem Description

The OHDT system will require the client to enter a user ID, first name, last name, valid e-mail address, and problem description. These required fields are presented with an “*” after the required field name. If a client does not enter a required field name, the appropriate error messages will be displayed to remind the client to enter the required information. The OHDT system will not accept a help desk request until all required fields have been entered by the client. Once the client has entered all required fields, the client can submit a help desk request to the OHDT system (See Figure 6. page 17).

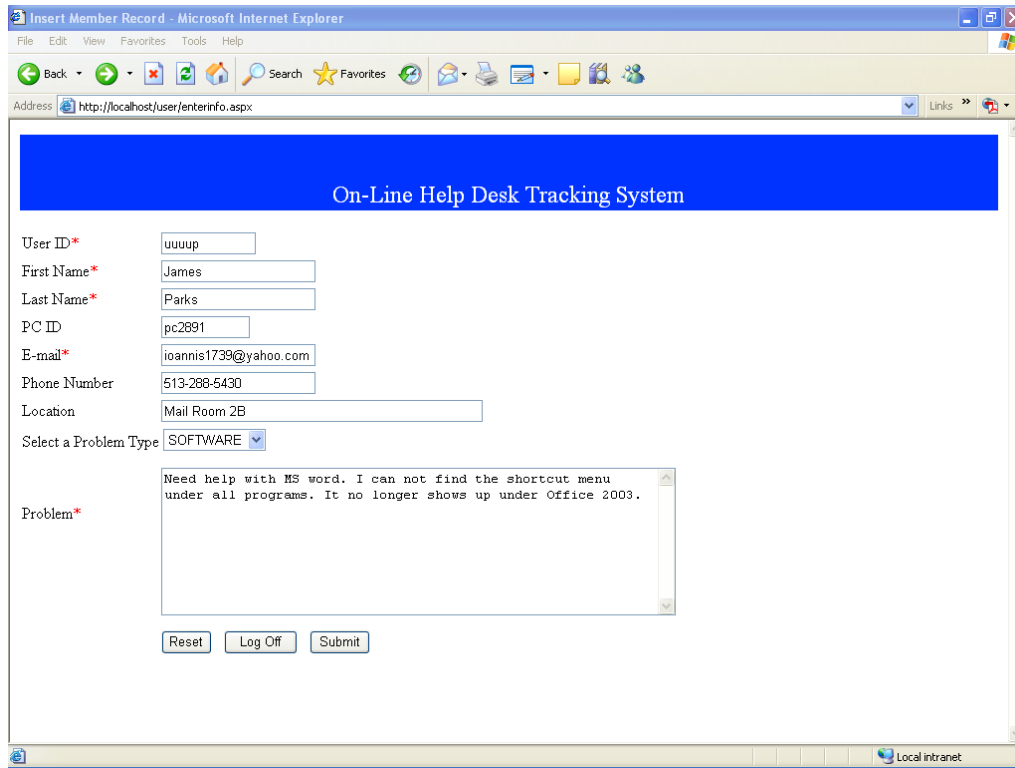


Figure 6. Client Creating a Help Desk Request

5.2.3 Confirmation Page

Once the help desk request has been submitted, the client will be presented with a confirmation page (See Figure 7. page 18).

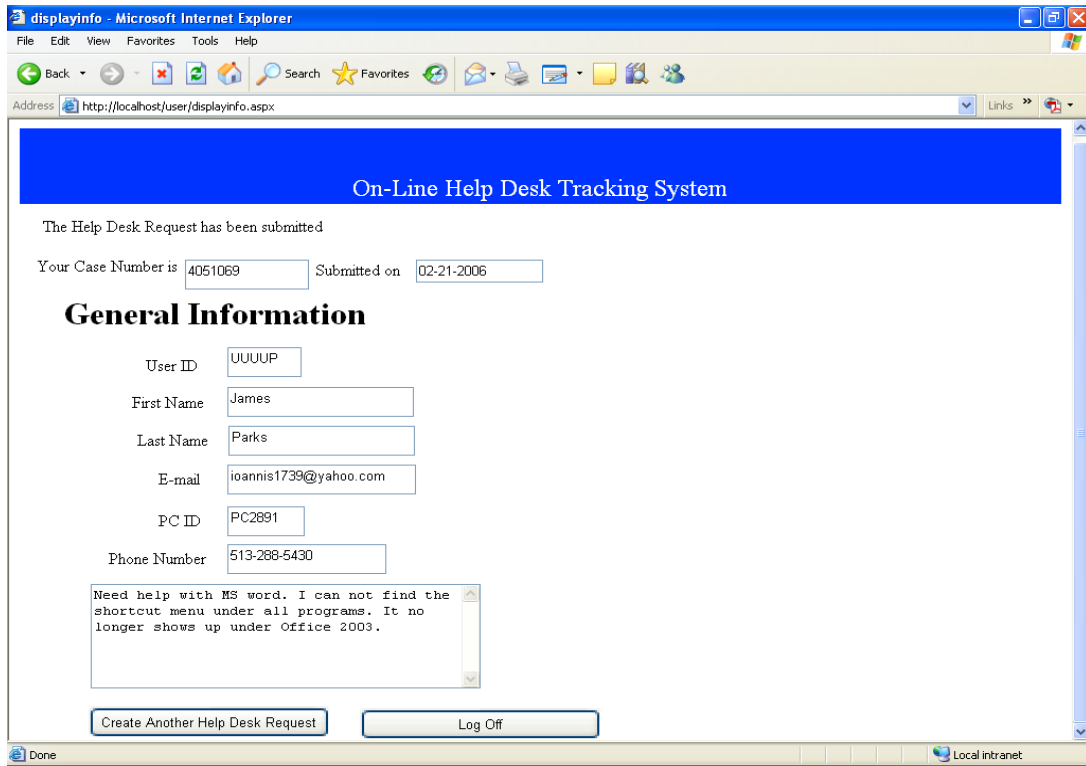


Figure 7. Confirmation Page

The confirmation page will display information that was entered in by the client from the “Create a Help Desk Request” page. In addition, the “Confirmation” page will display a case number and sent date. The case number is generated when a new request is entered into the OHDT system. The sent date is a time stamp that the OHDT system places on a submitted help desk request.

Once the help desk request has been submitted, the client will receive a confirmation e-mail. The e-mail will confirm the case number and that the help desk request has been opened and received by the OHDT system (See Figure 8. page 19).

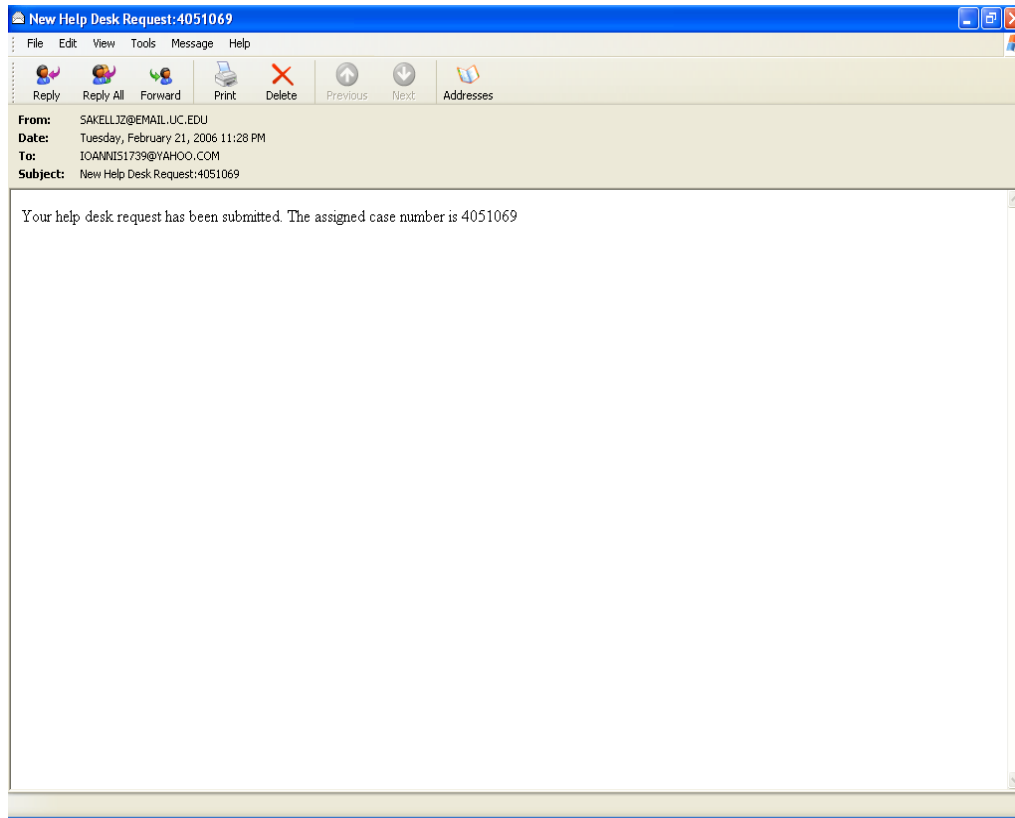


Figure 8. Confirmation E-mail

5.3 Administrator Sections

The administrator section allows an administrator to login to the OHDT system and administrate help desk request. Once an administrator has entered into the OHDT system, the administrator may log of the system at any point. Administrators will have full permissions to all the OHDT system functionality.

5.3.1 Login Page

When an administrator access the OHDT system, the first page the administrator will see is the OHDT system login page. To authenticate, the administrator must provide their 5 character user ID and valid password, and then click on the “Administrator Login” button (See Figure 9. page 20).

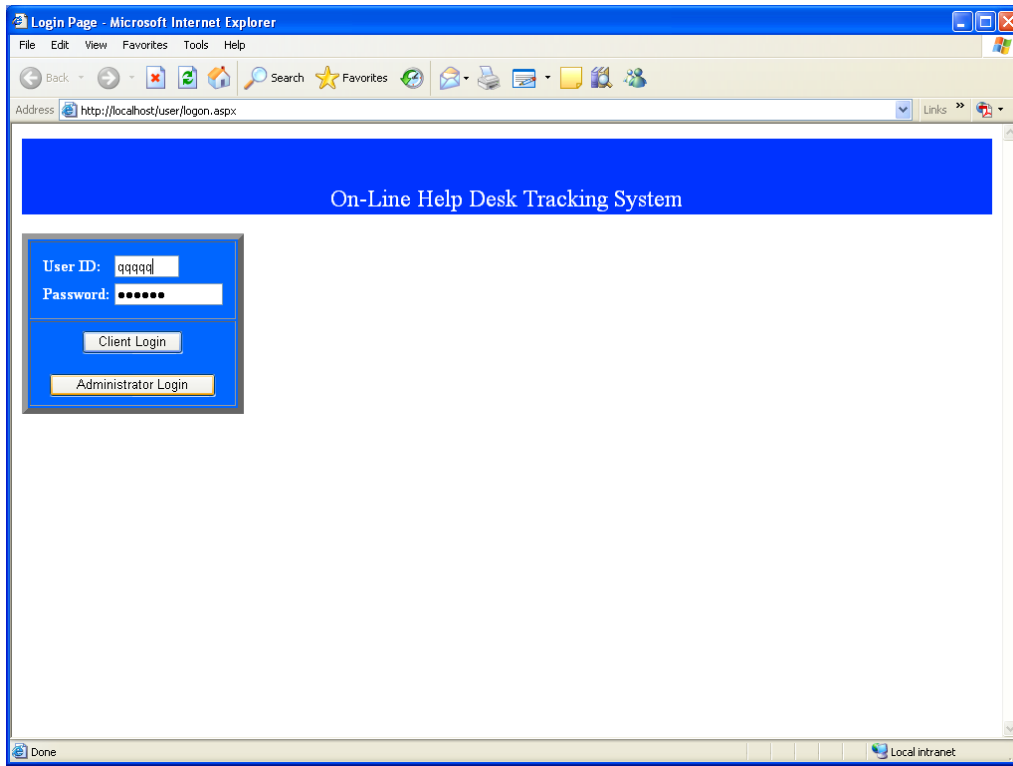


Figure 9. Login Page

If an administrator enters an invalid user ID and/or password, the administrator will be presented with the appropriate error message(s). The administrator user ID and password will be validated against the information in the Admin table. The administrator will not be allowed access into the system until the administrator presents a valid user ID and/or password. Once the administrator has presented a valid user ID and password, the administrator will be allowed to proceed to the “Main Page” page.

5.3.2 Main Page

The administrator “Main Page” will allow the administrator to navigate throughout the OHDT system. An administrator has the option to select any of the following buttons:

- Add Client
- Add Administrator

- Edit Client Profile
- Edit Administrator Profile
- Create Help Desk Request
- Show Help Desk Request
- Show Closed Help Desk Request
- Log Off

5.3.3 Adding a Client

An administrator has the ability to add a new client to the OHDT system. The “Add Client” page requires an administrator to add a client user ID, first name, last name, and password (See Figure 10.).

The screenshot shows a web browser window titled "Add Administrator - Microsoft Internet Explorer". The address bar contains "http://localhost/user/adduser.aspx". The page content includes a blue header with the text "On-Line Help Desk Tracking System". Below the header, the page title is "Add Client". The form fields are as follows:

User ID*	<input type="text" value="mika1"/>
First Name*	<input type="text" value="Mike"/>
Last Name*	<input type="text" value="Anderson"/>
Password*	<input type="password" value="....."/>
Re Enter Password*	<input type="password" value="....."/>

At the bottom of the form, there are four buttons: "Submit", "Reset", "Main Page", and "Log Off".

Figure 10. Add Client Page

If an administrator does not enter the required fields, the administrator will be presented with the appropriate error message(s). If an administrator attempts to add a

client user ID that all ready exist, the administrator will presented with an error message stating that duplicate user IDs are not permitted.

Once all required fields have been entered, the administrator can continue with creating a new client. When the administrator clicks on the “Submit” button, the new client will be added to the OHDT system and the administrator will be redirected to the “Edit Client Profile” page (See Figure 11.).

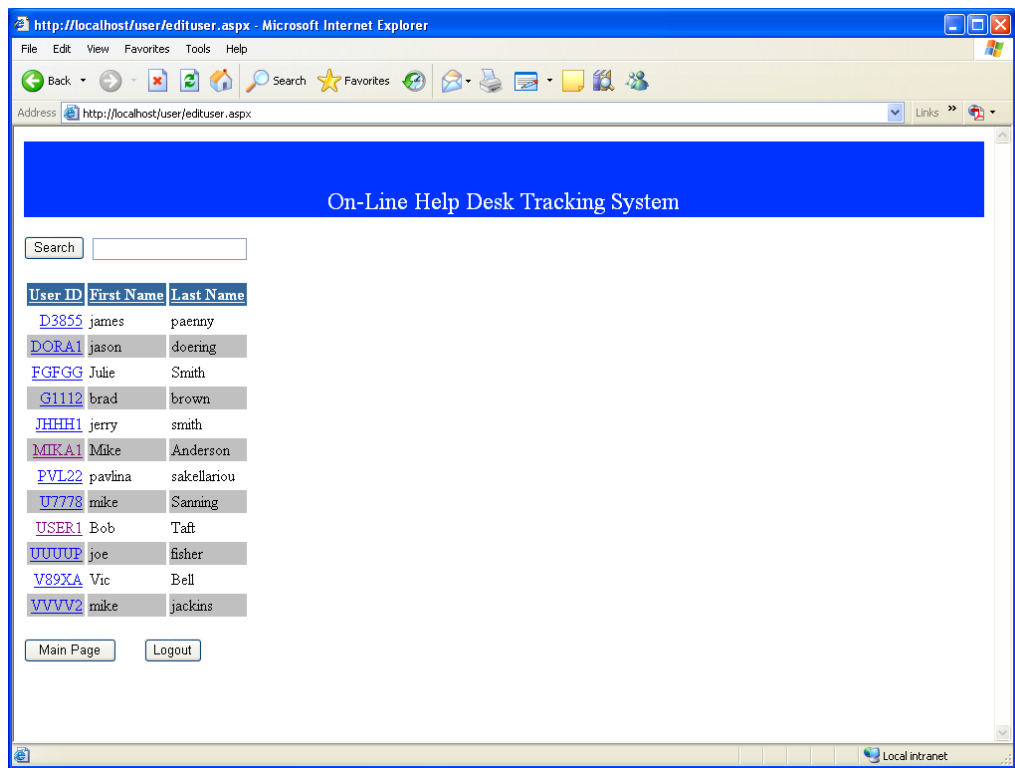


Figure 11. Edit Client Profile Page

5.3.4 Adding an Administrator

An administrator has the ability to add a new administrator to the OHDT system. The “Add Administrator” page requires an administrator to add an administrator’s user ID, first name, last name, and password (See Figure 12. page 23).

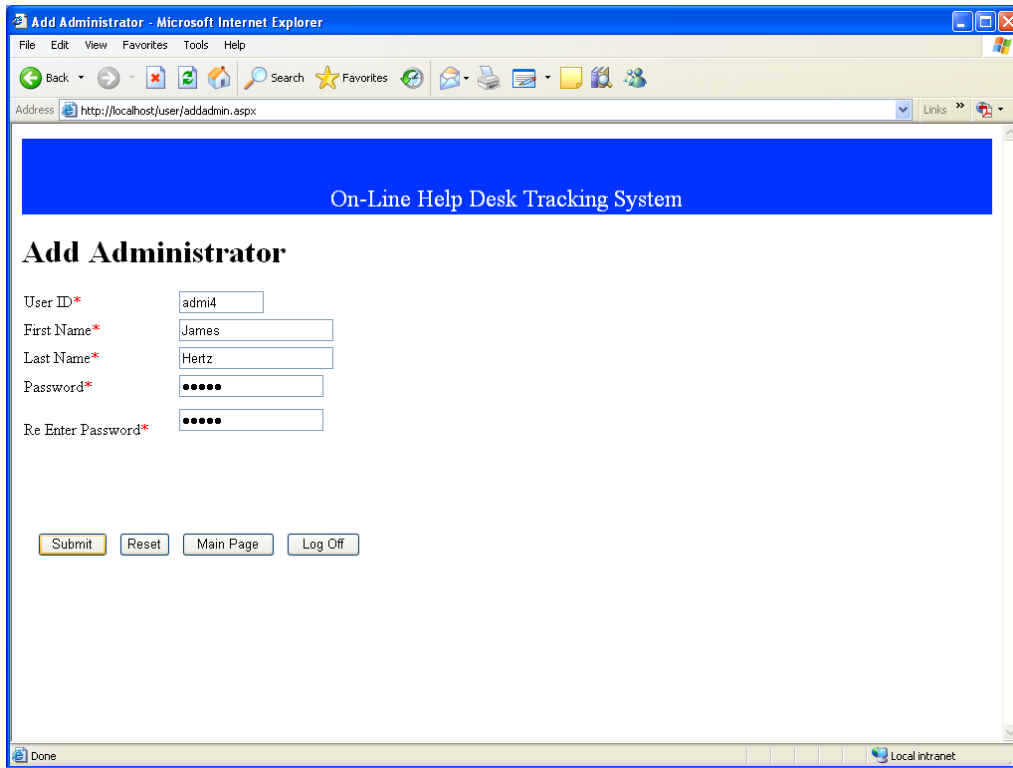


Figure 12. Add Administrator Page

If an administrator does not enter the required fields, the administrator will be presented with the appropriate error message(s). If an administrator attempts to add an administrator user ID that all ready exist, the administrator will presented with an error message stating that duplicate user IDs are not permitted.

Once all required fields have been entered, the administrator can continue with creating a new administrator. When the administrator clicks on the “Submit” button, the new administrator will be added to the OHDT system and the administrator will be redirected to the “Edit Administrator Profile” page (See Figure 13. page 24).

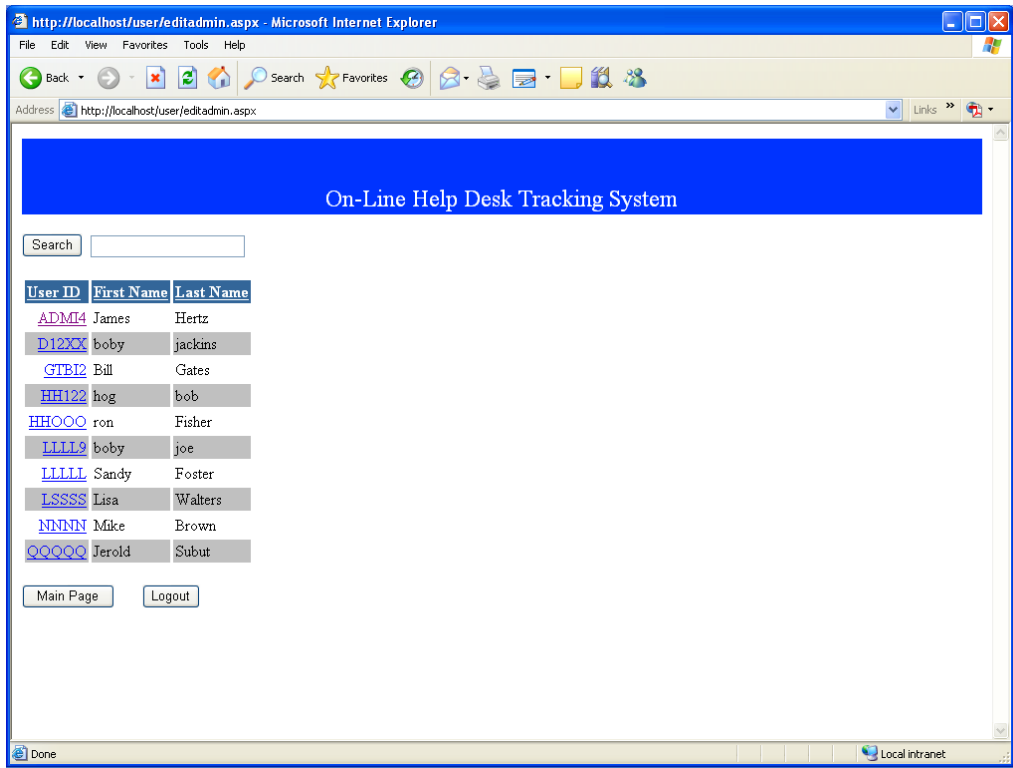


Figure 13. Edit Administrator Profile Page

5.3.5 Editing a Client Profile

The “Edit Client Profile” page has been created to allow an administrator to edit a client profile. On this page, an administrator can modify a client’s user ID, first name, last name, and password. The administrator can also check to see what the client’s current password is. If required, the administrator can reset the password (See Figure 14. page 25).

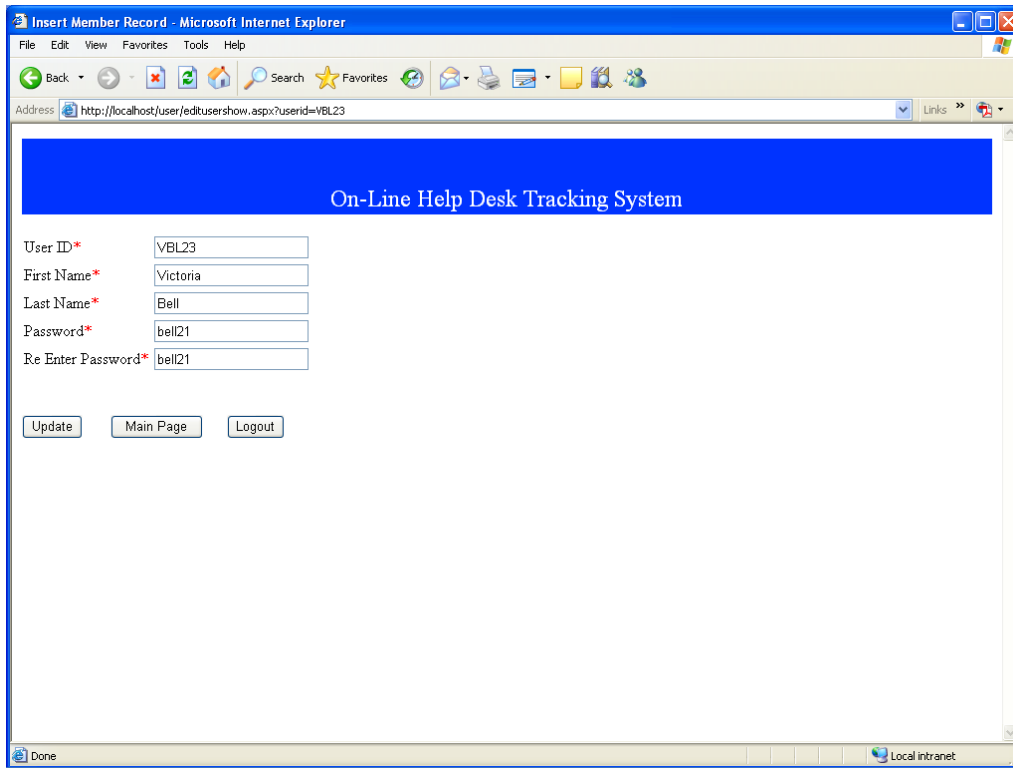


Figure 14. Edit Client Profile

5.3.6 Editing an Administrator Profile

The “Edit Administrator Profile” page has been created to allow an administrator to edit an administrator profile. On this page, an administrator can modify an administrator’s user ID, first name, last name, and password. The administrator can also check to see what the administrator’s current password is set to. If required, the administrator can reset the password (See Figure 15. page 26).

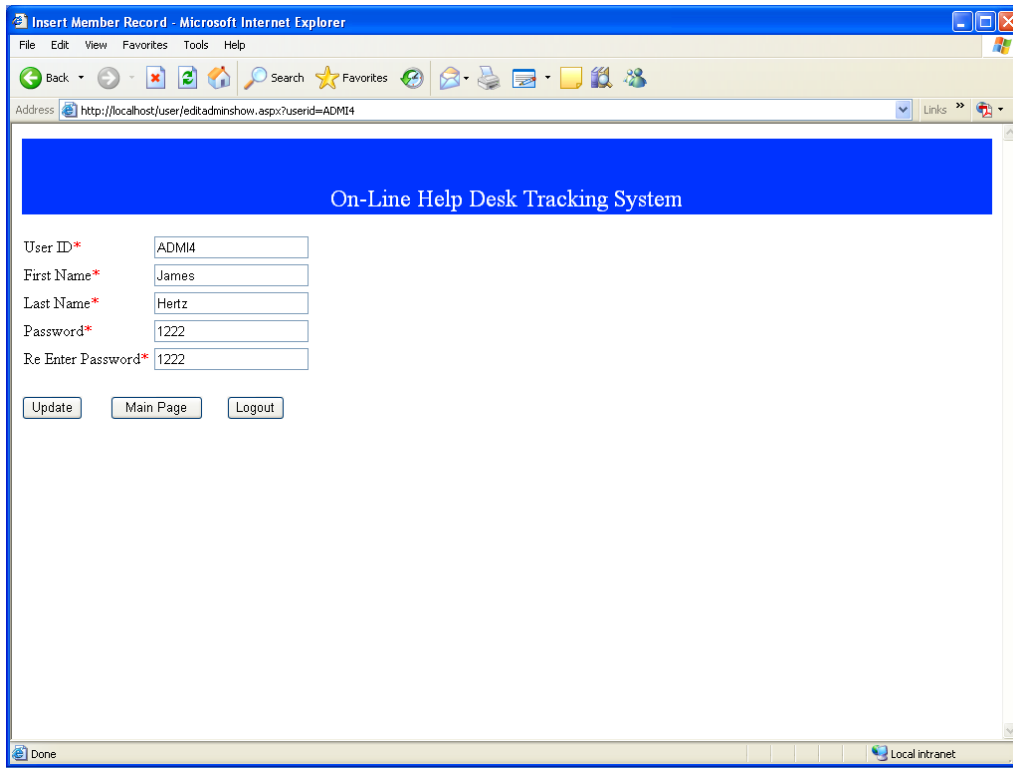


Figure 15. Edit an Administrator Profile

5.3.7 Create a Help Desk Request

The “Create a Help Desk Request” page allows an administrator to create a help desk request that will be submitted to and stored in the OHDT system. The “Create a Help Desk Request” page allows an administrator to enter the information for the following fields:

- User ID
- First Name
- Last Name
- PC ID
- E-mail
- Phone Number

- Location
- Problem Type (Administrators can select one of the following: hardware, software, network, email, comm, or other)
- Problem Description
- Administrator Remarks

The OHDT system will require the administrator to enter a user ID, first name, last name, valid e-mail address, and problem description. These required fields are presented with an “*” after the required field name. If an administrator does not enter a required field name, the appropriate error messages will be displayed to remind the administrator to enter the required information. An administrator must also specify the status, priority level, and problem type.

The OHDT system will not accept a help desk request until all required fields have been entered by the administrator. Once the administrator has entered all required fields, the administrator can submit a help desk request to the OHDT system (See Figure 16. page 28).

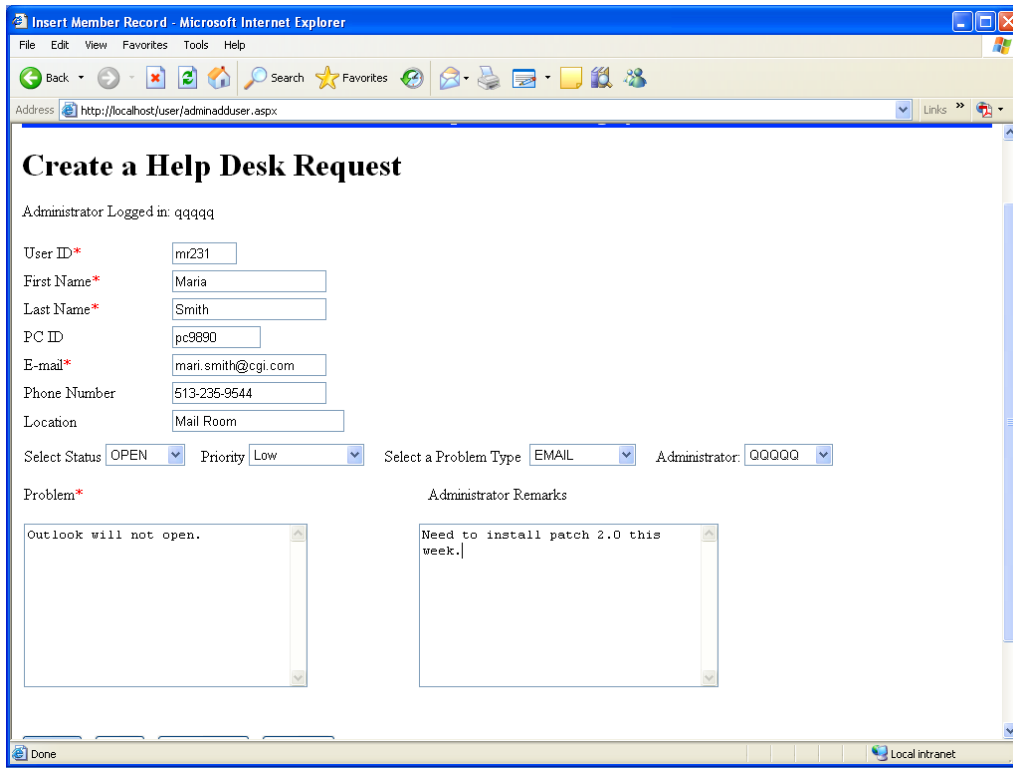


Figure 16. Administrator Creating a Help Desk Request

5.3.8 View and Modify Help Desk Request

Once a help desk request is created, a administrator has the access to view and modify the request. To view a request the administrator can navigate to the “Open Help Desk Request” or “Closed Help Desk Request” pages. Either page will show help desk request in a data grid. All help desk requests in the data grid can be sorted by case number, client user ID, problem type, priority, create date, status, or by assigned administrator ID. A Specific help desk request can be opened for viewing by clicking on the case number or by searching by the case number (See Figure 17. page 29).

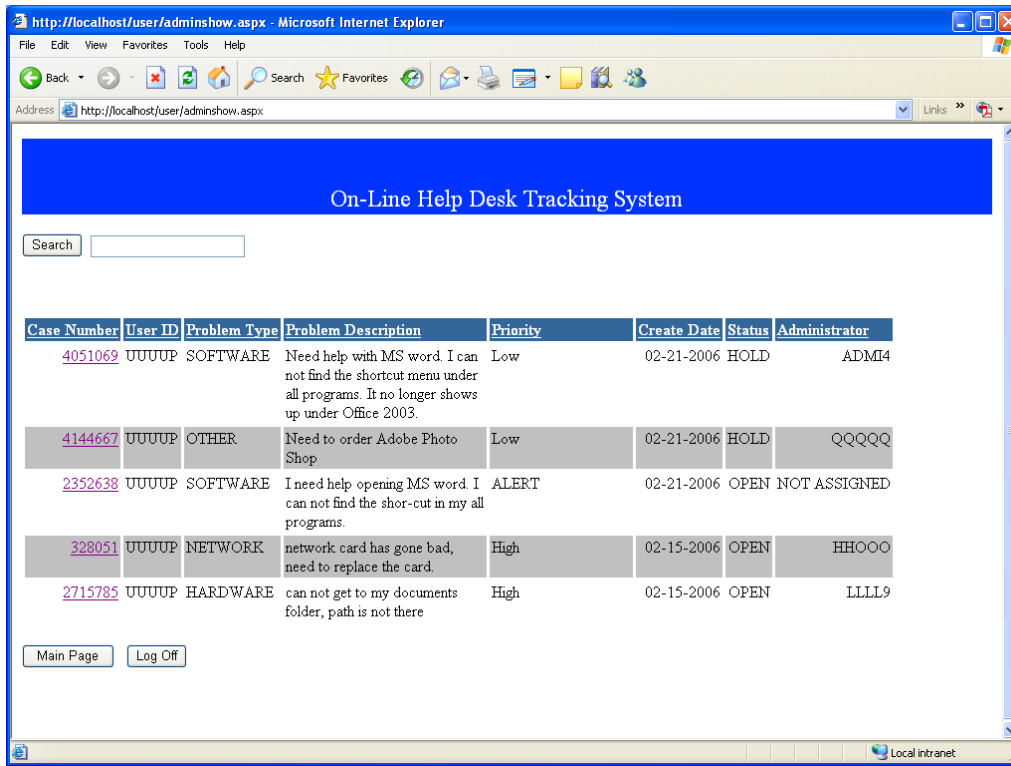


Figure 17. Help Desk Data Grid

Once an administrator has opened a specific help desk request, the administrator can modify the help desk request. The following fields in a help desk request can be modified by an administrator:

- First Name
- Last Name
- PC ID
- E-mail
- Phone Number
- Location
- Assigned Administrator
- Status

- Problem Description
- Priority
- Problem Type
- Administrator Remarks

Before a help desk request is modified, all required fields must be entered.

Required fields are noted with a red asterisk next to the required field. Once a help desk request has been modified, the administrator must click on the “Update” button to update the request (See Figure 18.).

Insert Member Record - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address http://localhost/user/adminresult.aspx?casenumber=4051069

On-Line Help Desk Tracking System

Case Number: 4051069 Sent Date: 02-21-2006

User ID: UUUUP

First Name* James PC ID PC2891

Last Name* Parks E-mail* IOANNIS1739@YAHOO.C

Phone Number 513-288-5430 Location Mail Room 2B

Administrator ADM14 Status: HOLD Problem Type SOFTWARE Priority Low

Problem* Administrator Remarks

Need help with MS word. I can not find the shortcut menu under all programs. It no longer shows up under Office 2003.

working on the issue.

Main Page Update Show Help Desk Request Logout

Done Local intranet

Figure 18. Updating a Help Desk Request

5.3.9 Assigning an Administrator to a Help Desk Request

The OHDT system allows administrators to assign a help desk request to a specific administrator. This function was added to the OHDT system to allow help desk request to be assigned to the needed administrator. To assign a help desk request to a specific administrator, a administrator must first view a help desk request. Once the administrator has opened the request for viewing, the administrator can click on the drop down administrator list box. The drop down administrator list box will populate a list of all available administrators that can receive a help desk request (See Figure 19.).

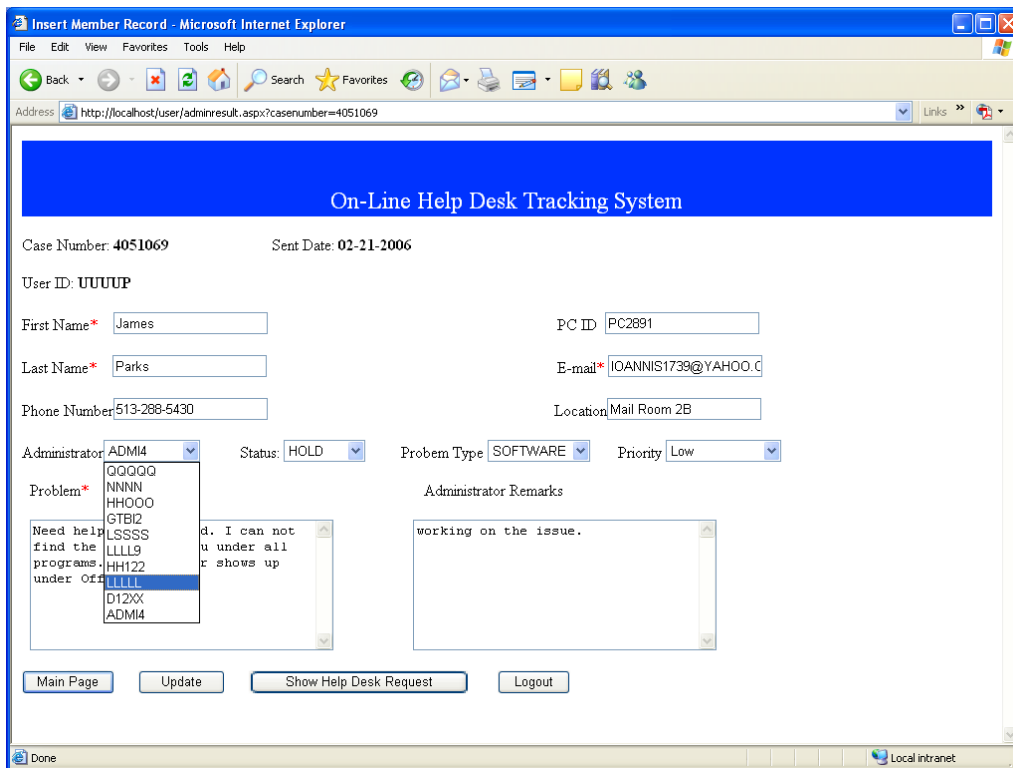


Figure 19. Selecting a Specific Administrator

Once a specific administrator has been selected, the administrator must select the “Update” button. Once the request has been modified, the request will be assigned to the selected administrator.

5.3.10 Assigning a Specific Status to a Help Desk Request

The OHDT system will allow administrators to assign a specific status to any help desk request. The OHDT system allows an administrator to select one of the following statuses for a specific help desk request:

- Open
- Hold
- Order
- Closed

An administrator can assign a specific status when he or she is creating or viewing a help desk request. To assign a specific status, the administrator must click on the status drop down list box. This action will cause the status list box to populate with all the different status options. From here, the administrator can select the needed status for the request (See Figure 20. page 33).

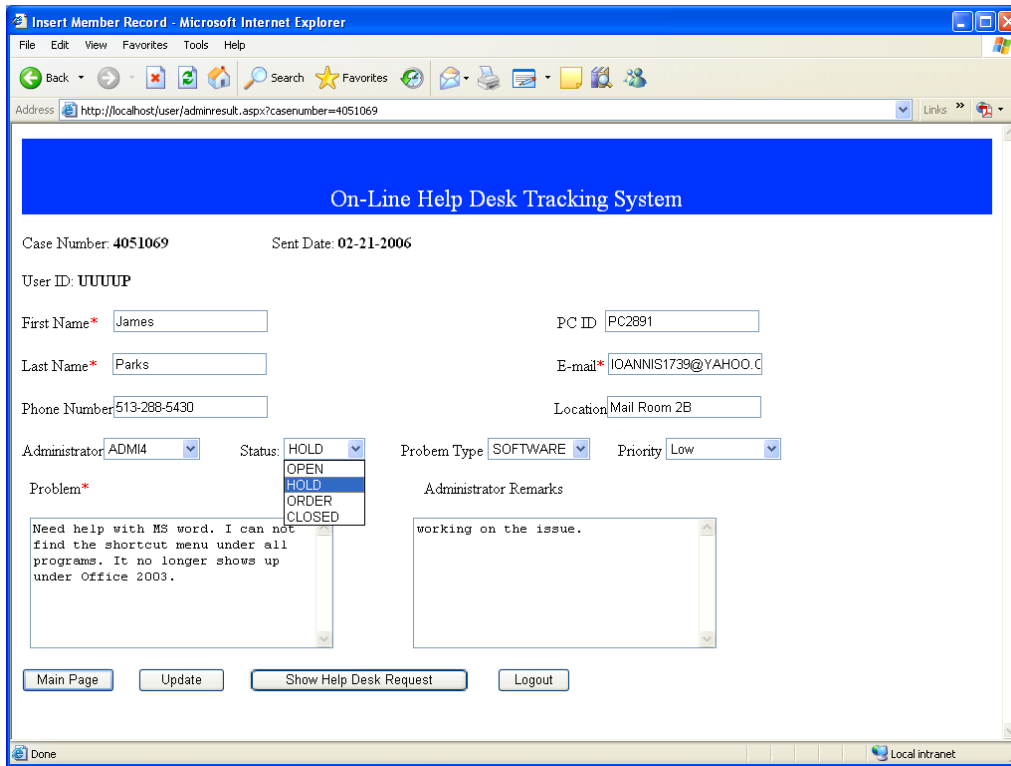


Figure 20. Selecting a Status

Once the needed status has been selected, and all required fields have been entered, the administrator can update the request by clicking on the “Update” button.

5.3.11 Searching for a Specific Help Desk Request

The OHDT system will allow administrators to search for a specific help desk request by a case number. An administrator must navigate to the “Show Help Desk Request” or “Closed Help Desk Request” page to access the search feature. Once an administrator has navigated to either page, the administrator will be able to search for a specific request. For an administrator to search for a specific help desk request, the administrator must enter the all numeric case number. If an administrator enters a non-numeric case number, an error message will be displayed. Once the administrator enters a valid case number and clicks on the “Search” button, the help desk request that is

associated with the case number will be displayed (See Figure 21. and Figure 22.)

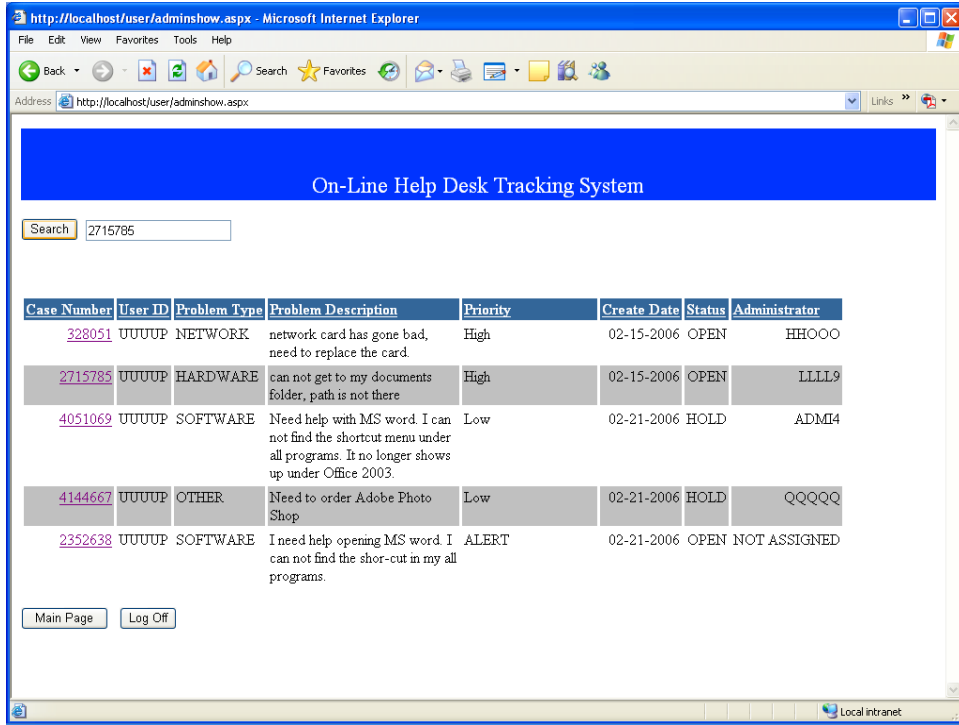


Figure 21. Searching for a Help Desk Request

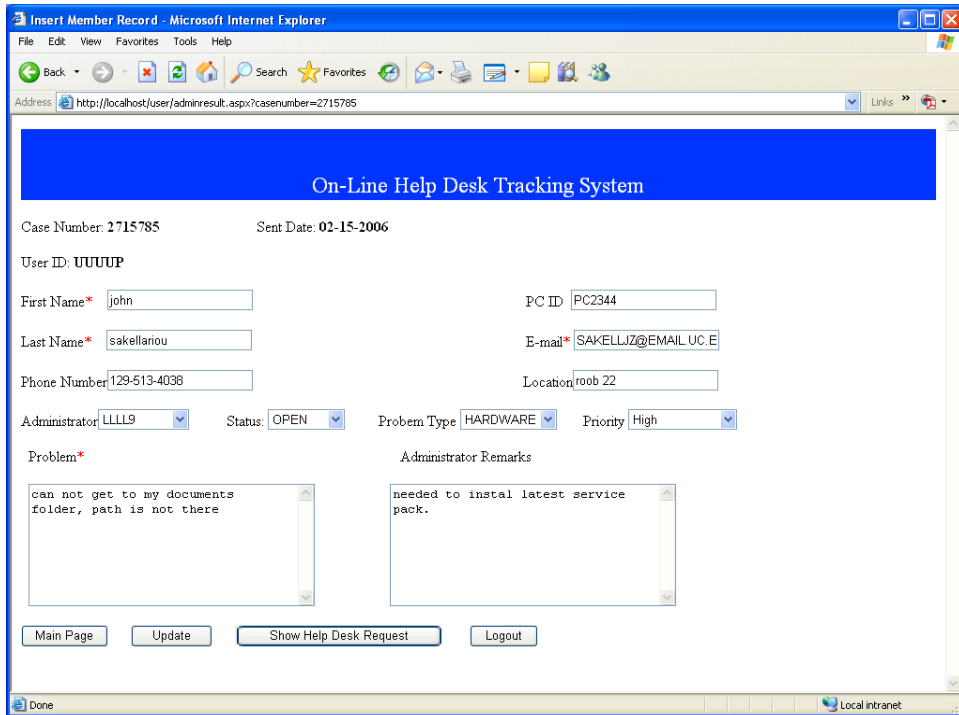


Figure 22. Displayed Search Result

6. Testing Procedures

The OHDT system was tested to prevent and catch any fatal system errors that would cause the system to be unusable by clients and administrators. Each piece of code was tested to make sure that the code didn't contain any compile, run-time, or logic errors. And once all programming errors were eliminated, real users would test the OHDT system.

As Visual Basic.NET attempts to convert code to machine language (called compiling code), it finds any compile errors. Compile errors would occur when the syntax rules for Visual Basic.NET were invalid and non translatable for the compiler. Common compile errors were inconsistent spelling of object names. All errors that caused compile errors were quickly found and corrected.

Run-time errors were discovered quite quickly while programming the OHDT system. Run-time errors would cause the system to halt during execution. As a result, Visual Basic.NET would display an error dialog box, and then go into break mode. Once this would happen, the statement causing the run-time error would be modified and corrected. The final version of the OHDT system is free of fatal run-time errors that would crash the system.

Finding logic errors in the OHDT system was one of the greatest challenges. With logic errors, the OHDT system would run but produce incorrect results. Test data was created to help determine where the logic errors were in the OHDT system. The OHDT system was put through a rigorous test with validation data. Through the validation testing, all logic errors were located and corrected.

Once all programming errors had been resolved, the OHDT system was tested by real users. Simulated users such as client and administrator accounts were created to test the OHDT system. User feedback help address issues about the interface of the system. The OHDT system was modified to make the user pages more user friendly.

7. Conclusions and Recommendations

7.1 Conclusions

This project was created to provide better administrative support between clients and administrators in a particular organization. The OHDT system gives a company's users 24-hour access to administrator(s) from any computer with an Internet/Intranet connection. The project was created using Visual Studio.Net 2003, written in Visual Basic.NET code using ASP.NET. User information was stored in a Microsoft Access 2003 database. The project was completed over the three quarter Senior Design sequence. The project fulfilled all Design Freeze deliverables and testing was performed to ensure the system's usability.

7.2 Recommendations

A solid understanding of Visual Basic.NET and HTML programming is recommended before creating an interactive Web application. Also, a solid understanding of Microsoft Access 2003 is needed in order to understand how to store information in a database. Knowledge of these programs will come in handy for a Web database application.

Web database development is a powerful combination in creating applications for business related environments. But before an application can be created, a programmer

must interact with the users that are requesting an application. A programmer must have excellent listening skills and not be hesitant when it comes to asking questions.

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