“Rapid Resolve”
Help Desk System
P00033

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1.1 Abstract

The goal of our project is to develop as helpdesk management system for the Newark Public Library. For the Newark Public Library to provide services to the public they must accept technology in to the library as a means to provide service to the public and reduce the cost of internal operations. The driving force of technology has put a large burden on the Newark Public Library IT Departments to rapidly provide support and maintenance to the library staff and patrons. Rapid Resolve is the tool that will allow the IT Department to manage support requests. Rapid Resolve aims to increase the support services that the Newark Public Library's IT Helpdesk by automating the helpdesk system and providing performance analysis to management.

Rapid Resolve is a web-based application, which end-users can access to request support. End-users can login and make a request as well as view and edit previous requests. A request for support is often referred to as a ticket. Rapid Resolve can automatically assign the ticket to the appropriate tier one support staff based on the information provided. If a ticket remains unacknowledged it can be escalated to another tier after a specific time as passed. If tier one cannot resolve the issues then the ticket is escalated to the next tear. Rapid Resolve controls the flow of the transaction in order to facilitate the process of providing support. Rapid Resolve does this by automatically assigning ticket to support staff and moving them through the support structure as needed. Management can define the path of a request by implementing distribution lists and creating support groups and user groups.

Rapid Resolve models the industry standard three-tiered system. The three-tiered system starts at tier one, where support staff has a broad knowledge of technology and is not specialized in any particular field of technology. As you progress through the structure the support staff becomes specialized in a particular aspect of technology. This allows tier one to cope with more common problems while the upper tiers only deal with more complicated problems. The system allows a small number of support staff to provide services to a larger number of end-users.

One of Rapid Resolve's most important features is reporting. Since Rapid Resolve documents transactions from start to finish you can provide reports about the transactions. The aspect of reporting is an important feature to for managing the helpdesk. A manger can use this information in order to make informed decisions. Information such as tickets per month or tickets per group can allow a manger to better allocate resources.

Overall the goal of Rapid Resolve is to facilitate the support structure already implemented at the Newark Public Library and provide performance information to management.

1.2 Background

The Newark Public Library realized that having the library staff directlyu contact the MIS department for support led to poor quality of service. The poor quality of services resulted from many factors, which included limited support staff, undefined problems, and limited documentation of issues. The director of the department solved this issue by implementing the three-tiered structure for helpdesk support. The structure defined about twenty people as technical liaison or tier one support. The staff is assigned to a tier one support person and requests are made to that support person. This reduces the calls to the IT staff and allowed tier one to clarify or define the problem and attempt to solve it. Issues that remain unsolved are than sent to tier two or three. The upper tiers are divided into groups that provide a particular service. This structure allowed the Newark Public Library's IT department to provide greater service with a smaller amount of staff.

The second part of the solution was an implementation of an application to track requests. The Newark Public Library implemented a software application called Footprints. The software allowed tier one to make requests to tier two or three. The application allowed support staff to document the request. The addition of the software along with the support structure increased the department's ability to track and resolve issues.

1.3 Problem Statement

The Newark Public Library realized that having the library staff directly contact the MIS department for support led to a poor quality of service. The poor quality of service resulted from many factors, which included limited support staff, undefined problems, and limited documentation of issues. The director of the department solved this issue by implementing the three-tiered structure for helpdesk support. The structure defined about 20 people as technical liaison or tier one support. The staff is assigned to a tier one support person and requests are made to that support person. This reduces the calls to the IT staff and allowed tier one to clarify or define the problem and attempt to solve it. Issues that remain unsolved are than sent to tier two or three. The upper tiers are divided by groups that provide a particular services. This structure allowed the Newark Public Library's IT department to provide greater service with a smaller amount of staff

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The system has many down falls at different levels of the transactions. The first transaction is the initial request for support, which is not done executed electronically. Instead staff must manually contact their tier one support staff and make a request. This means that staff must be know who the support staff is. Staff will also delay reporting a problem because they aren't in constant contact with the support staff. The lack of tracking at this point means that staff may report a problem and support staff will delay responding to it. The staff lack of participation in the system means they are never aware of the status of their request. The most significant issue at this pint in the transaction is that no electronic documentation has been done creating a lack of accountability for service.

The second transaction occurs when tier one must report the problem to tier two. This transaction is electronically documented and some accountability for service is available. The downfall of the current system is the fact that the person who requested service isn’t involved in the system therefore they receive no information about their request. The tier two staff cannot communicate through the system to the person who made the request. Tier two staff can append notes or questions to the ticket for tier one, however tier one cannot respond to the notes via the system.

The goal for Rapid Resolve is to create a system that can address these issues and further facilitate the distribution of work.

1.4 Previous Work

In the last decade we have seen the acceptance of computer technology in every aspect of our life. The demand for the technology has resulted in equal demand for support services. The technology industry has responded with the development of electronic helpdesk systems in order to facilitate their support services. In most large businesses and enterprises these systems are custom built by the company and therefore information about these systems are limited or non-existent. However there are systems that are generic and target the small to medium sized organizations, these systems are Footprints™, and Remedy Helpdesk™

Footprints is the current system at the Newark Public Library. The system has been useful for the MIS Department, however it has reached its limitations. The staff doesn't have access to Footprint's therefore the initial request is not documented. The tier one staff cannot add information to a ticket after it has been entered. The addition of staff as full users on this system in very expensive. The most important issue for the department is that footprints doesn't use a standard DBMS and cannot be integrated with their intranet applications. Footprints however does provide some features that we will incorporate into our project. Footprints has the ability to automatically assign a request to a particular person. This is an important feature that will be cared over to our system.

Remedy Helpdesk™ is one of the most flexible helpdesk systems available to small to mid size businesses. Remedy can integrated into an intranet because it can use any standard SQL based DBMS. Another great aspect of Remedy™ is that is provides work analysis and can react to changes in workflow. It provides intelligent routing of requests based on the workflow analysis it conducts. Remedy supports access via wireless devices.

Remedy also integrates system management software such as Microsoft SMS. Remedy is an ideal system that is flexible and provides many features, However Remedy is out of the scope and budget of the Newark Public Library. Remedy is designed for a fairly large organization who fields hundred to thousands of requests per day.

1.5 Methodologies

Methodologies are comprehensive, multi-step approaches to systems development that will help guide our work and ease our understanding. With these methodologies we will have a strong solid foundation on which to build our system. The three methodologies I chose are Data Flow Diagrams (DFD), Entity-Relationship Models (ERM), and Prototyping.

Data Flow Diagrams

Data Flow Diagrams (DFDs) are versatile diagramming tools. With only four symbols, you can use data flow diagrams to represent both physical and logical information systems. DFDs are not as good as flowcharts for depicting the details of physical systems, but flowcharts are not very useful for depicting purely logical information flows. By only using four symbols, DFDs are much easier to utilize and understand than flowcharts.

The reason for using data flow diagrams in this proposal is because of its simplicity and clarity. It allows everyone involved to have a clear picture of what is going to be taking place allowing for early changes before the system is being developed. This will avoid any misunderstanding between users and developers so everything may be done right the first time, so there will be no need to go back and develop a whole new system.

Entity-Relationship Models

A common format used for data modeling is entity-relationship diagramming. Data modeling using the entity-relationship notation explains the characteristics and structure of data. These models show the relationships between the data stores and the systems entities. An E-R model represents conceptual data requirements for a particular system.

I am using these entity-relationship models in this proposal to show a clear picture of our website/ database system. It will show all relationships from all entities of the system both internally and externally. It will also give us a different perspective than our data flow diagrams and will also allow us to check for any inconsistencies in out DFDs.

Prototyping

Prototyping is an iterative process of systems development in which requirements are converted to a working system that is continually revised through close work between an analyst and users. Through this, developers and users can closely work together and exchange ideas so that the system is being made for the user's needs. This process takes time due to the fact that the system is being tested at every step so that each step is done correctly, allowing for more progress.

This has been a chosen methodology because it will allow us to design and build a scaled down but functional version of our website/ database system. It will allow us to make sure that each aspect that the developers create meet the needs of our consumers, managers, and employees.

1.6 Glossary

Administrator – The administrator is the person in charge of the help desk system

Assignment – The act of committing a user to a ticket.

Distribution Rules – The definition of how a ticket is assigned to tier one support.

Escalation – The act of assigning a ticket to another group higher in the tiered support system.

General Staff – These are the users who make request to the MIS department for support.

JAD - Joint Application Development

Priority – The priority defines the importance of a ticket

RAD - Rapid Application Development

Request – The process of obtaining support. This process involves the creation of a ticket.

Support Staff – These users are dealt the responsibility of managing and providing support to the general staff.

Ticket – A ticket is the documentation of request.

Tiered Support System – The tiered support system is a structure that defines different groups of support staff with different levels of support. The lowest level is tier one. All requests are made to tier one support, therefore tier one is the largest group. Tier one often has very little knowledge, however their knowledge is broad. The support staff in the higher tiers have more knowledge about a specific technology.

2.1 Project Team and Roles

Our project team consists of six members, Nelson Almeida, Frank Costeira, Eric Rodrigues, Lenny Rampergash, Muhammad Bhatti, and Peter Dziob. Below is a list of the roles played by each member in designing this project.

Nelson Almeida

Roles played:

- Project Manager
- Primary Planner
- Primary Organizer

Frank Costeira

Roles played:

- Systems Analyst
- Assistant Project Manager
- Technical Manager
- Primary Researcher
- Secondary Planner

Eric Rodrigues

Roles played:

- Database Designer
- System Critique
- Secondary Researcher

Lenny Rampergash

Roles played:

- Front-End Designer
- System Implementer
- Testing
- Quality Assurance

Muhammad Bhatti

Roles played:

- Programmer
- Implementation

Peter Dziob

Roles played:

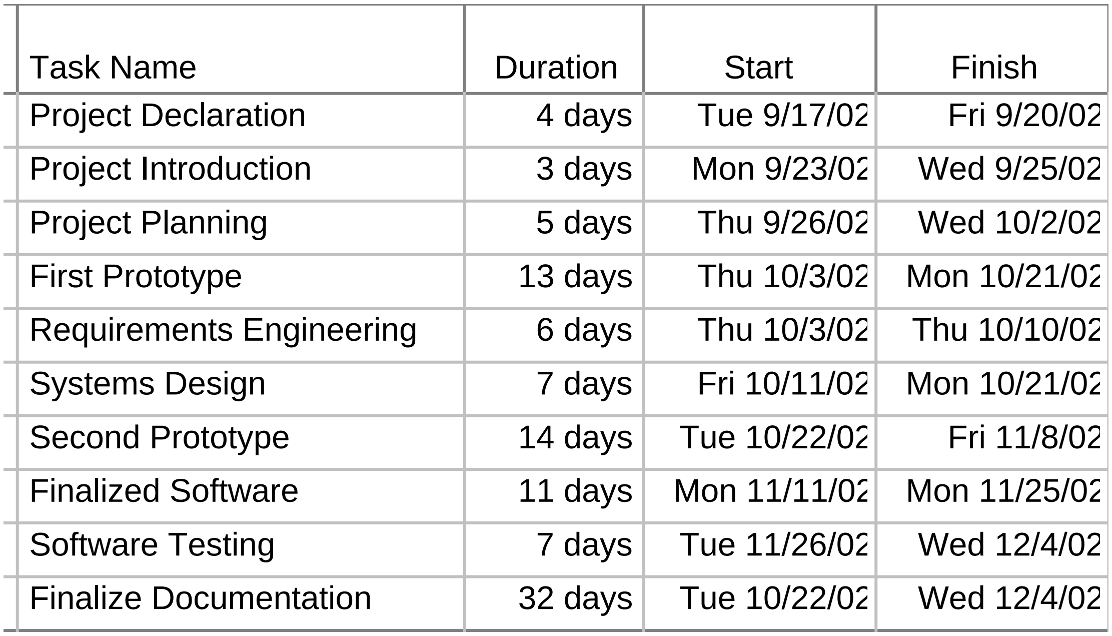
- Programmer
- Back-End Design

2.2 Resource Management

2.2.1 Work Breakdown Structure

ID	Task Name	Duration	Start	Finish
1	Project Declaration	4 days	Tue 9/17/02	Fri 9/20/02
	Nelson Almeida		*Tue 9/17/02*	*Fri 9/20/02*
2	Project Introduction	3 days	Mon 9/23/02	Wed 9/25/02
	Nelson Almeida		*Mon 9/23/02*	*Wed 9/25/02*
	Frank Costeira		*Mon 9/23/02*	*Wed 9/25/02*
3	Project Planning	5 days	Thu 9/26/02	Wed 10/2/02
	Nelson Almeida		*Thu 9/26/02*	*Wed 10/2/02*
	Frank Costeira		*Thu 9/26/02*	*Wed 10/2/02*
4	First Prototype	13 days	Thu 10/3/02	Mon 10/21/02
	Frank Costeira		*Thu 10/3/02*	*Mon 10/21/02*
	Eric Rodrigues		*Thu 10/3/02*	*Mon 10/21/02*
	Peter Dziob		*Thu 10/3/02*	*Mon 10/21/02*
5	Requirements Engineering	6 days	Thu 10/3/02	Thu 10/10/02
	Lenny Rampergash		*Thu 10/3/02*	*Thu 10/10/02*
	Muhammad Bhatti		*Thu 10/3/02*	*Thu 10/10/02*
6	Systems Design	7 days	Fri 10/11/02	Mon 10/21/02
	Eric Rodrigues		*Fri 10/11/02*	*Mon 10/21/02*
	Peter Dziob		*Fri 10/11/02*	*Mon 10/21/02*
7	Second Prototype	14 days	Tue 10/22/02	Fri 11/8/02
	Frank Costeira		*Tue 10/22/02*	*Fri 11/8/02*
	Eric Rodrigues		*Tue 10/22/02*	*Fri 11/8/02*
	Peter Dziob		*Tue 10/22/02*	*Fri 11/8/02*
8	Finalized Software	11 days	Mon 11/11/02	Mon 11/25/02
	Frank Costeira		*Mon 11/11/02*	*Mon 11/25/02*
	Eric Rodrigues		*Mon 11/11/02*	*Mon 11/25/02*
	Peter Dziob		*Mon 11/11/02*	*Mon 11/25/02*
9	Software Testing	7 days	Tue 11/26/02	Wed 12/4/02
	Muhammad Bhatti		*Tue 11/26/02*	*Wed 12/4/02*
10	Finalize Documentation	32 days	Tue 10/22/02	Wed 12/4/02
	Nelson Almeida		*Tue 10/22/02*	*Wed 12/4/02*
	Lenny Rampergash		*Tue 10/22/02*	*Wed 12/4/02*
	Muhammad Bhatti		*Tue 10/22/02*	*Wed 12/4/02*

2.2.2 Project Milestones



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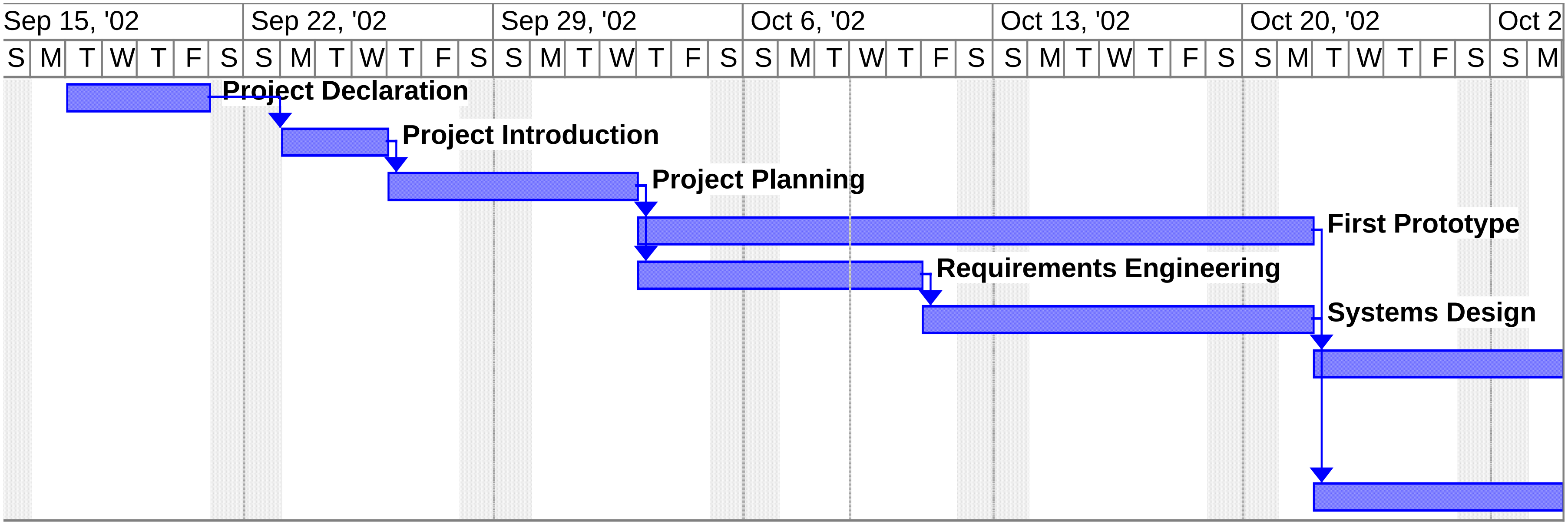
Finalize Documentation	32 days	Tue 10/22/02	Wed 12/4/02

2.2.3 Project Planning



Gantt Chart

2.3 Feasability Study

2.3.1 Cost-Benefit Analysis

Tangible Benefits Worksheet

A. Improvement in Management Planning and Control	5000
B. Increased Flexibility	0
C. Cost Reduction	10000
D. Error Reduction	5000
E. Other_______________	0
Total	20000

One-time Costs Worksheet

A. Development Costs	25000
B. New Hardware	0
C. New Purchased Software	0
D. User Training	3000
E. Advertsing	0
F. Site Preparation	2000
Total	30000

Recurring Costs

A. Maintenance	5000
B. Incremental Data Storage	0
Required	0
C. Communications	0
D. Leases	1000
E. Other_______________	
Total	6000

Rapid Resolve System

				Year of Project		
	Year 0	Year1	Year 2	Year 3	Year 4	Totals
Net economic benefit	0	20,000	20,000	20,000	20,000	
Discount rate (10%)	1	0.909	0.8264	0.7513	0.683	
PV of benefits	0	18180	16528	15026	13660	
NPV of all benefits	0	18180	34708	49734	63394	63394
One-time Costs	-30,000					
Recurring costs	0	-6000	-6000	-6000	-6000	
Discount rate (10%)	1	0.909	0.8264	0.7513	0.683	
PV of recurring costs	0	-5454	-4958.4	-4507.8	-4098	
NPV of all Costs	-30000	-35454	-40412.4	-44920.2	-49018.2	-49018.2
Overall NPV						14375.8
Overall ROI						0.29

Break-even analysis

Yearly NPV Cash Flow	-30000	12726	11569.6	10518.2	9562
Overall NPV Cash Flow	-30000	-17274	-5704.4	4813.8	14375.8

break-even occurs between years 2 and 3 years
break-even fraction 0.5423

Actual Break Even Time 2.5423 yrs

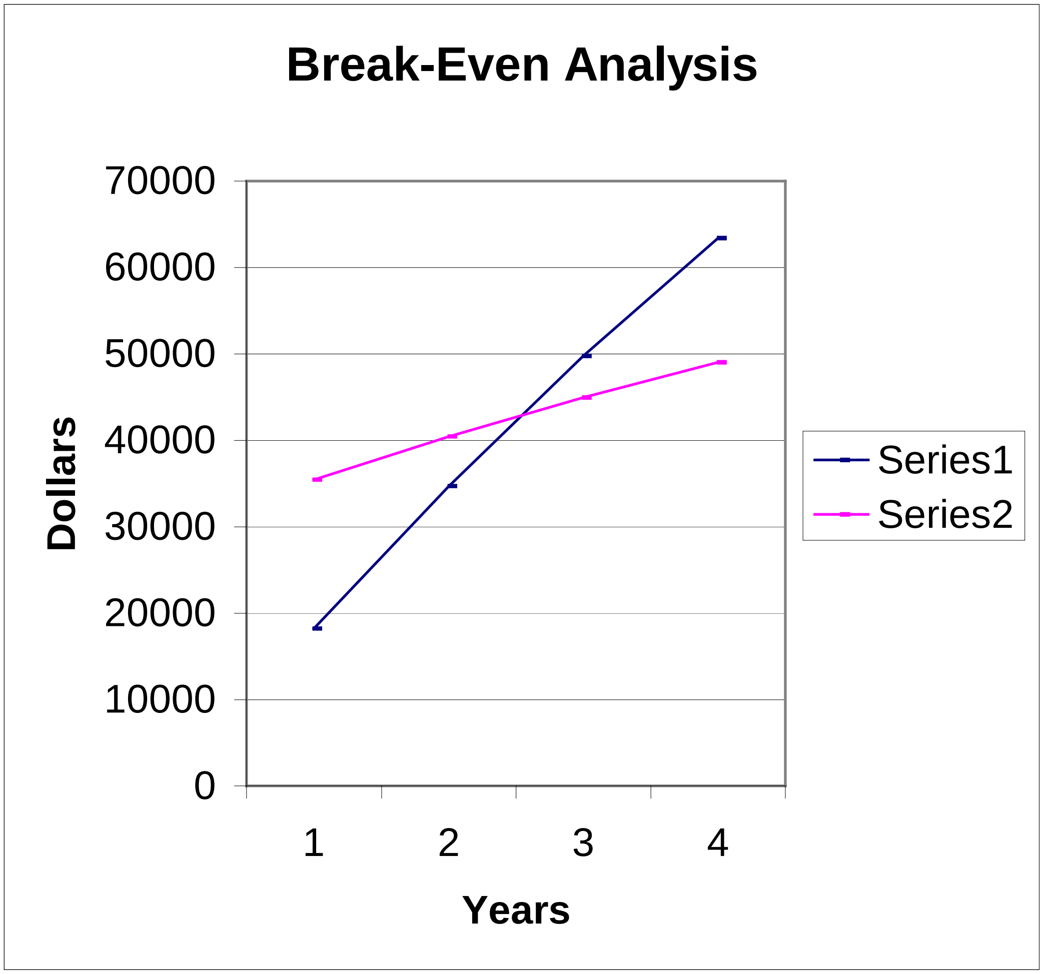


Figure 1. Graph of break-even point

2.3.2 COCOMO Analysis

Function Point Information	
Unadjusted Function Points	314
Value Adjustment Factor	0.93
Adjusted Function Points	292
Language	VB v5
Source Lines of Code	8468.6

Cocomo Information	
Source Lines of Code	8468.6
Nominal Effort	32.8
Adjusted Effort	32.8
Time to Develop	8.5 Calendar Months

2.4 Risk Management

Time Constraints

The main risk in this system is the issue of time constraints and meeting deadlines. The only way to overcome this obstacle is to accomplish as much of the project as quickly as possible. In order to do this, we have decided to implement a mixture of the RAD and JAD methodologies. We decided to split our team in half, one half to handle the programming and implementation and the other half to handle the research and documentation. With all of our group members busy with school and work, this makes it easier to schedule productive meetings. Rather than try to get all six members into one meeting, it is easier to have groups of three meet to handle their respective part and then to collaborate with the other half at a full group meeting. Also with one of our members being the network systems analyst at the Newark Public Library, he will be able to have many quick meetings with our sponsor, rather than having one long meeting every week.

Hardware

There is no risk involved in the hardware aspect of our system. The Newark Public Library has more than enough hardware to run and operate this system. All servers, network connections, storage devices, workstations and printers are already in place and in use.

Quality Assurance

There is very low risk involved in guaranteeing a quality product to our customer. By having many brief meetings every week, we have plenty of opportunity to display out prototypes and get feedback from the sponsor. This way, at every step of development we can make sure that everything is being done correctly and this will save us a lot of valuable time since we won't be wasting it on redesigning the system.

3.1 Stakeholders

Patrons – Without the patrons, the public library would not exist. They are the reason that the library is there, and therefore making them the most important stakeholders. They check out books, read and gather knowledge from them, and then return the books. They make the library a community oriented environment.

User – The user is basically the employee with the problem. The user must create a trouble ticket that is sent to the level one IT Support Group in order to have their problem resolved. They are the roots of the library and without them; there would be no need for a help desk system.

IT Support Group (Level 1) – These employees are the first line of defense when it comes to taking care of a problem. The user calls them when they are having a problem, and the level one tech does all they can over the phone to solve the problem. Yet, in the rare instance that the problem cannot be solved, and then the level one tech sends the ticket to a level two tech to then solve the problem.

IT Support Group (Level 2) – These employees are the second line of defense when it comes to taking care of a problem. If the level one tech cannot solve the problem over the phone, the ticket is then escalated to the level two tech. The level two techs can then proceed to do an on-site evaluation of the problem. He then attempts to fix the problem and allow the user to get back to work.

Circulation – This is an entire department within the Newark Public Library that tracks all books, people borrowing books, dates, and times. It is necessary for them to be informed of all problems and actions that are taking place within the facility. If a terminal is down, they must be aware of the problem so that they can contact the help desk to resolve it, and make arrangements for other terminals to temporarily replace the defective ones.

Reference – Another department within the library that job is to track all books that the library carries. They must be aware of any problems within the system, since they have a responsibility to the inventory of the facility. If there is a problem in the system, then it may throw off their numbers and cause an even bigger problem.

Accounting – This department takes care of the financial aspect the library. Since their job deals with finances, it is imperative for them to have all knowledge of problems within the system. If money is lost because of a computer problem, it could mean chaos for all those involved.

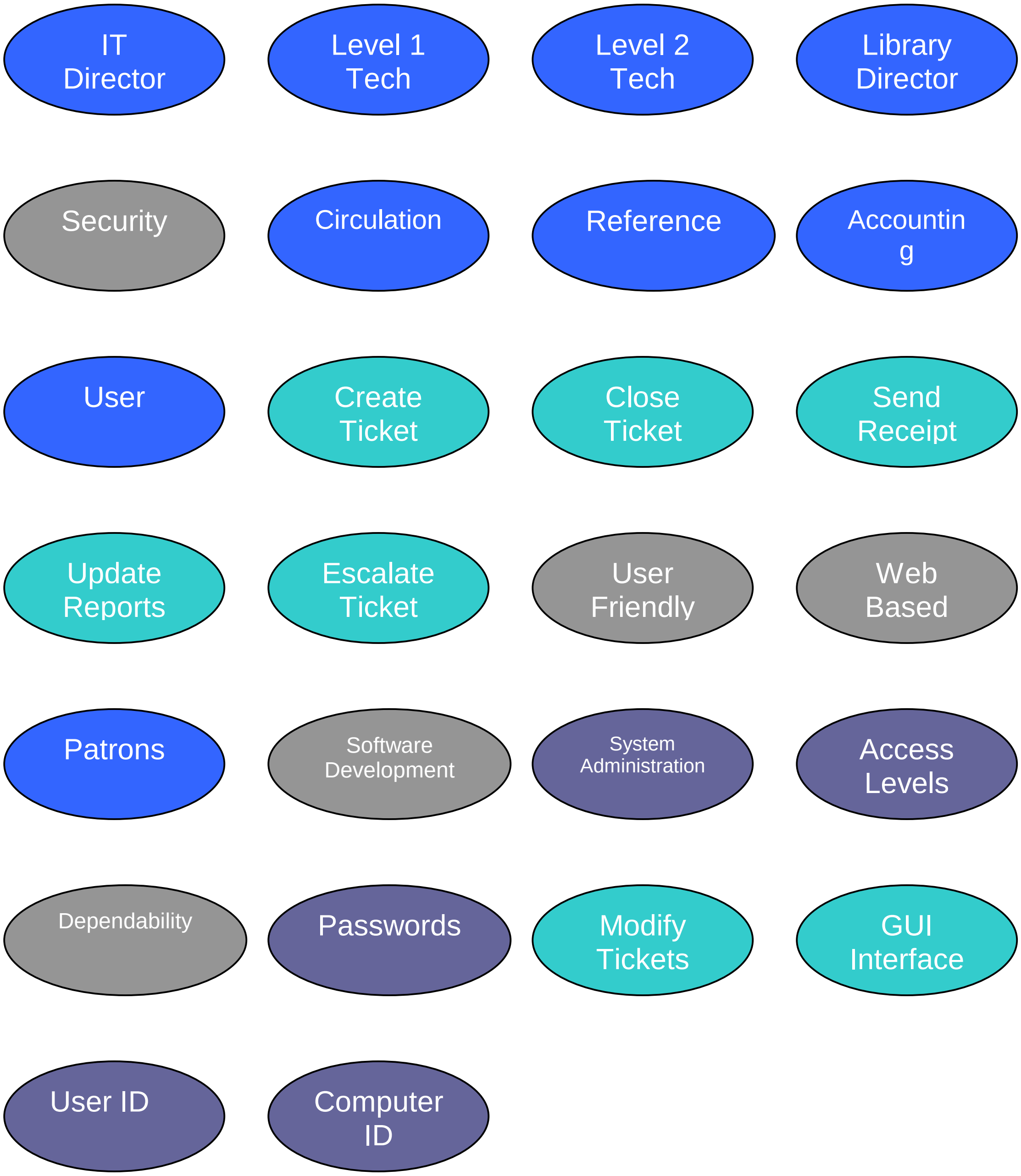
Directors – These are the people that oversee all matters that take place within the library. Since it is their job to make sure that everything runs smoothly within the complex, it is extremely important they know of any problems or corrections that are made; in the system or out. Thus, the earlier they know about it, the earlier the problem is taken care of.

City of Newark – The city of Newark is the most important stakeholder of all. They are the ones that pay all of the bills at the Newark Public Library. If there are too many problems going on there, then the city of Newark reserves the right to shut it down.

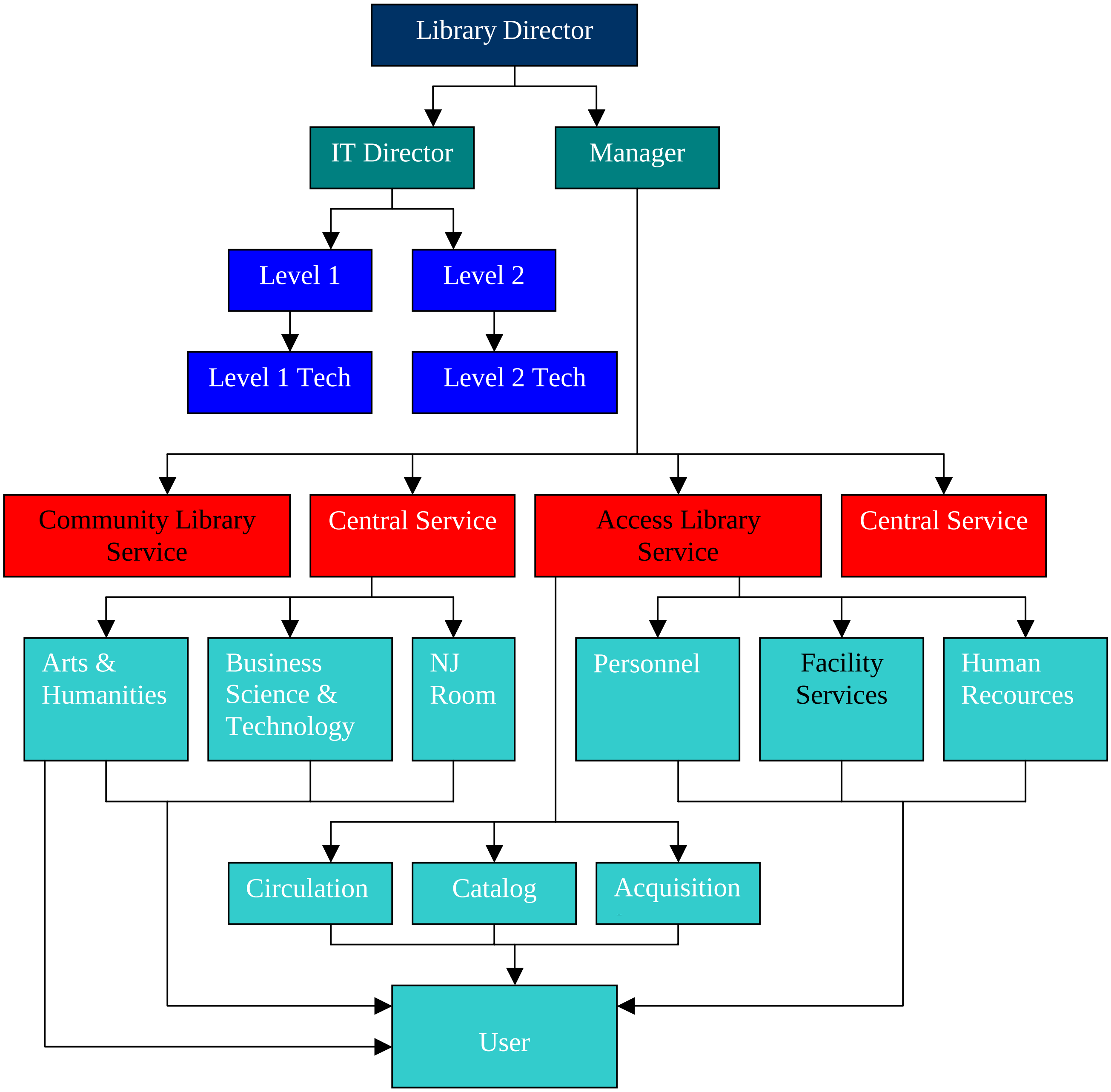
3.2 Vord Method

3.2.1 Brainstorming

Brainstorming for View Points



3.2.2 Hierarchy Diagram



3.2.3 View Point & Service Templates

View Point & Service Template for Administrator

References:	Administrator
Attributes:	Administrator ID Unique Password
Events:	Add and Delete Edit profile
Services:	Add and remove (sites and departments) Create groups and arrange auto assignments.
Sub-VPs:	None

Reference	Final Solution
Rationale:	The administrator views the problem and provides the solution by using precise tools
Specifications:	The administrator receives the request from the helpdesk support. The Administrator views the problem and provide the final solution.
Viewpoints:	Administration
Non-Functional Requirements	To administrate the online library system.
Provider	

Viewpoint & Service Template for Customer

References:	Customer
Attributes:	Customer ID Unique Password Social Security Number Address Phone
Events:	Login Request Service Edit: Password, Address, phone
Services:	Report a problem Browse online Library Database Inquire order status
Sub-VPs:	

Reference	Place Online Order
Rationale:	To place an order by viewing the online library and making the appropriate selection.
Specifications: .	Customer browse online database and select the appropriate item of interest . Customer can also place order for multiple selections. Customer can modify orders if necessary. Customer provides a Unique User ID to use online library system.
Viewpoints:	Registered Customers
Non-Functional Requirements	Customer unique ID must be held strictly confidential.
Provider	

Viewpoint & service Template for General staff

References:	General Staff
Attributes:	Staff ID Unique Password
Events:	Login View Ticket
Services:	Create a Ticket Edit a Ticket
Sub-VPs:	

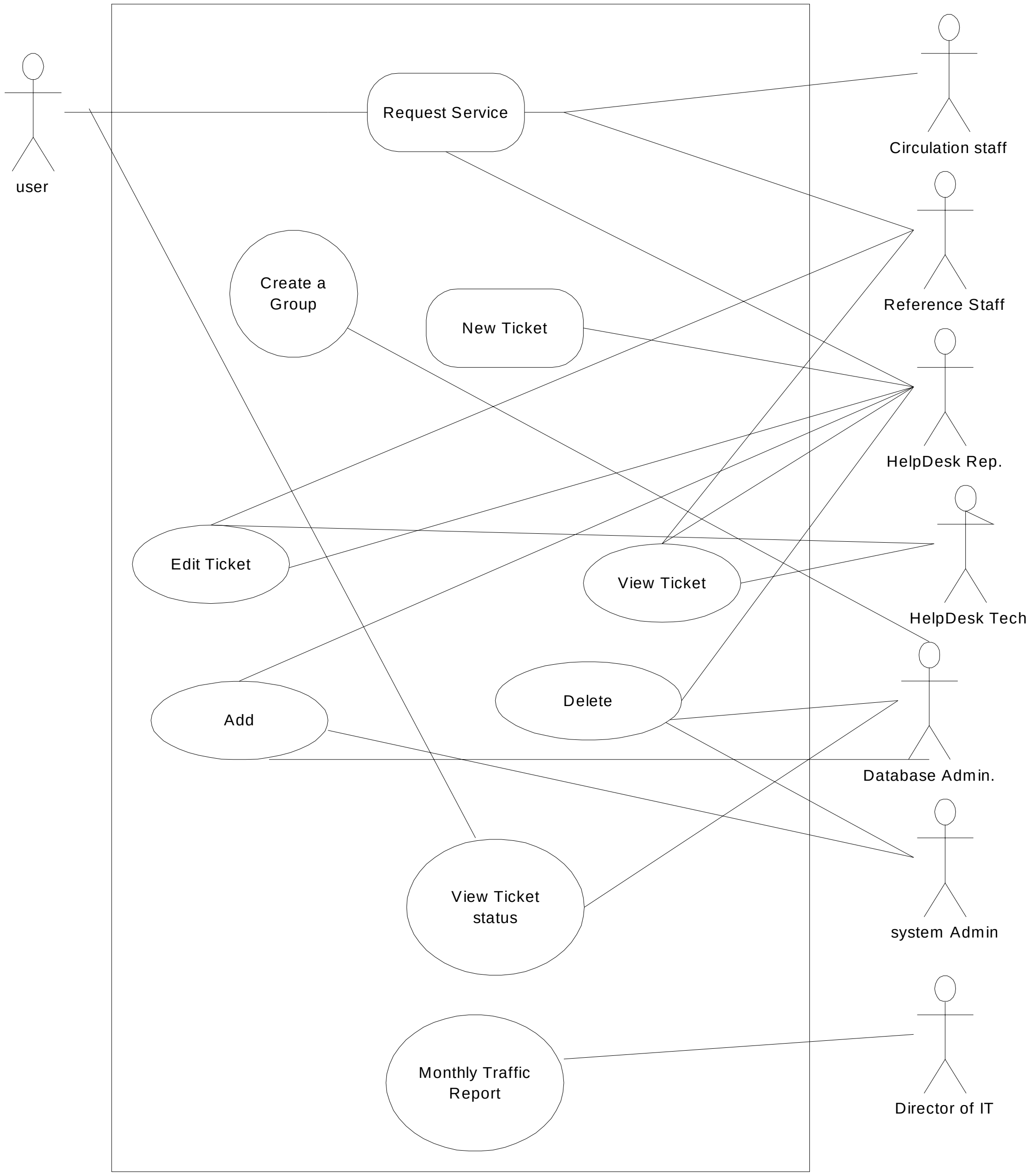
Reference	Report a Problem
Rationale:	The general staff reports a problem of an online library customer to helpdesk.
Specifications:	The General Staff view a ticket and sort out a problem and forward it to the helpdesk staff in order to resolve the problem.
Viewpoints:	View a Problem
Non-Functional Requirements	General Staff must report a problem in a reasonable timeframe
Provider	

Viewpoint & service Template for Helpdesk Support

References:	Helpdesk Support
Attributes:	Employee ID Unique Password
Events:	Login View Ticket
Services:	Create a Ticket Edit a Ticket
Sub-VPs:	

Reference	Solve a Problem
Rationale:	The Helpdesk support receives a message from General staff relating a customer problem.
Specifications:	The helpdesk support views a ticket and tries to solve the customer problem in a best possible way. Incase of an unresolved problem the helpdesk support informs the administrative level.
Viewpoints:	Solve a problem
Non-Functional Requirements	If helpdesk is unable to solve the problem then it must report the administrative level immediately.
Provider	None

3.3 Use Case Scenario



3.4 Requirements Definition

3.4.1 Functional Requirements

- Staff members must have a unique login and password that they, and only they have access to.
- Staff can make changes to pending trouble tickets based upon their set level of access.
- Staff must be able to create and open their own tickets.
- Any information about tickets must be kept confidential to those who pertain to it.
- Logs of all problems found must be kept for statistical purposes.
- The user will be able to check the status, and history of any ticket that was processed.
- The system will have a communication function for staff to be able to speak to help desk personnel.
- The system will have a solid security function, in house as well as outward.
- Users will receive an email every time a change is made to a pending ticket.
- Modifications to any tickets must be fast and simple.
- Logs must be kept of resolutions to all problems for future instances.
- Tables must be created for each ticket, including: Employee Name, PC ID, Problem, and Resolution.
- Database must be capable of performing queries, for quick searches.
- Deletion of any files will only be performed by IT Director

3.4.2 Non-Functional Requirements

- The problem that the Newark Public Library was having was that their help desk repairs were taking too long. It is for this reason that dependability has been placed as a main requirement. If Rapid Resolve fails, then it will cause utter chaos within the complex.
- Our system must be web-based, as opposed to an in house software program, because of the fact that if an error does occur within our system, it can be corrected quickly, and without having to re-access all the machines in which, the software was installed.
- Maintenance and changes to the program should be simple enough to be made by the IT Director to suit the needs of the library.
- The software must be user-friendly; so all employees can learn and work with the system as quickly as possible. This reduces down time, serves as a learning tool and increases employee awareness.
- Security measures much be implicated, to prevent from hacking into the site. If a hacker should ever access the system, they could change ticket status, or open new tickets for work to be preformed on a machine that may be harmful to it.
- In-house security measures must also be present. If an employee wanted to sabotage another employee's work, they could simply put a ticket in to format the hard drive on a computer.

3.5 Requirements Specifications

The Rapid Resolve System was designed solely for the use of the Newark Public Library. The software that they are currently using is causing excessive downtimes, and does not cater to all of their needs. The thinking behind the Rapid Resolve System was to allow all of the parties that are involved in the problem to view, change, and resolve open trouble tickets.

1.) This system will allow users to open a trouble ticket when they are having a pc problem.
    - The user will log into the system with an issued username and password.
    - Access levels will be determined and implemented by the IT Directors.

2.) The system will be accompanied by a reliable database.
    - The user will log into the system where all information pertaining to them and their equipment resides.
    - The database will be created using SQL, a rather easy-to-use, yet very effective program.

3.) We, the creators of the Rapid Resolve System have decided to use C++, Dreamweaver, and SQL. These languages will be used to build a system that will perform efficiently, quickly, and accurately.

- C++ will be used to design the backbone of our system. It will perform all calculations, and logic functions in a timely manner.
- Dreamweaver will create the web pages, and templates for system
- SQL will be used to secure the database.

4.) Of course, since our system will be brand new, and not have the same functions or work the same as another other help desk program out there, some sort of training will need to be established.

- Our system is rather simplistic and straight to the point, a training class of one day will be established. There is where the employees will learn how to:

  Create tickets

  Modify tickets

  Chat with Help Desk Personnel

  Retrieve closed tickets

  Check status on open tickets

  Etc.

5.) Since this a web-based program, specifications on system requirements are minimal.

- Windows 95, equivalent, or higher as an operating system
- Minimum 32 MBs of RAM
- Minimum 2 GIG hard drive space

- Minimum 266 Mhz processor

6.) The user will be able to check the status, and history of any ticket that was processed.

7.) The system will have a communication function for staff to be able to speak to help desk personnel.

8.) The system will have a solid security function, in house as well as outward.

9.) Users will receive an email every time a change is made to a pending ticket.

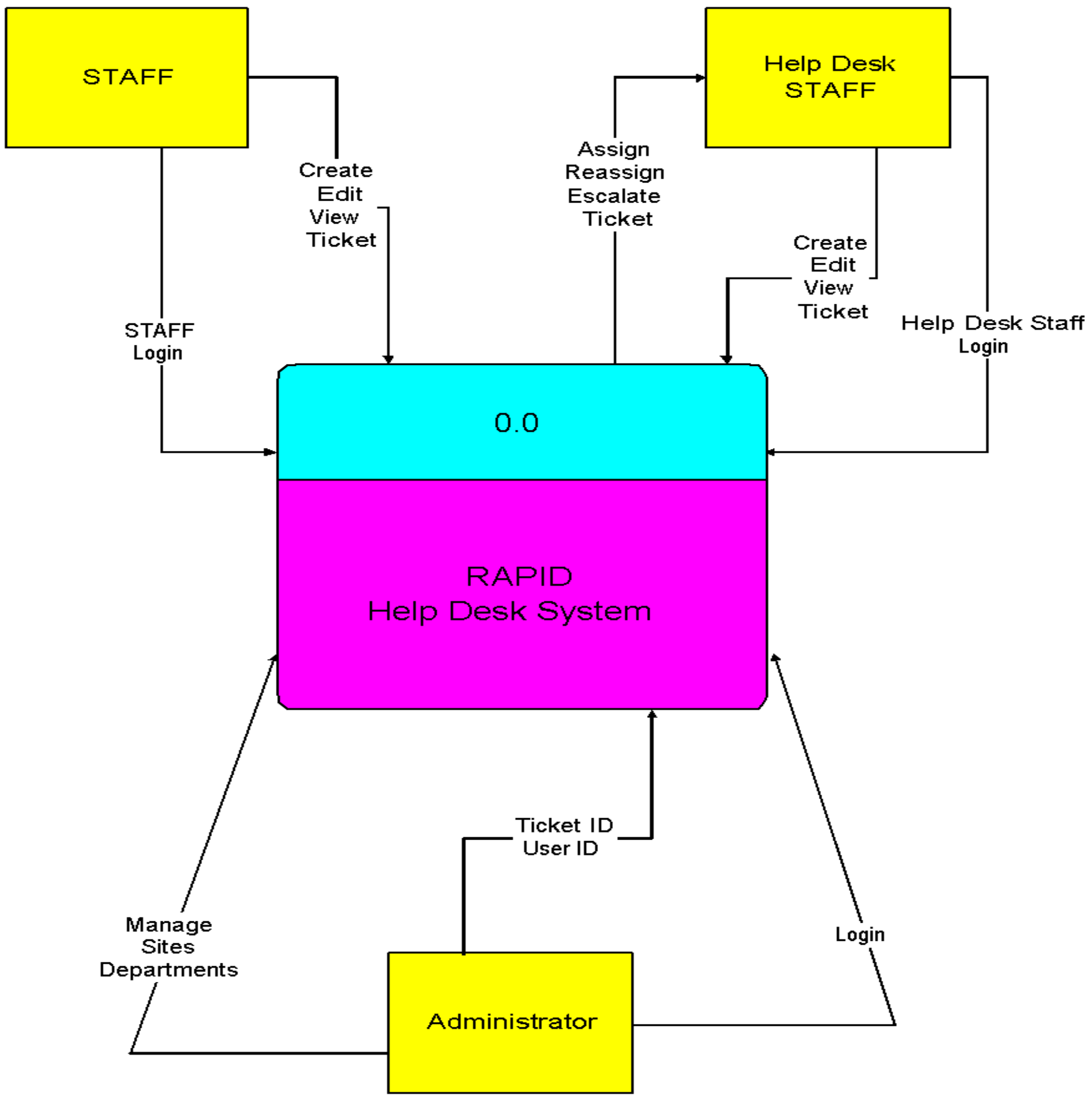
3.6 Data-Flow Diagrams

3.6.1 Grammatical Analysis

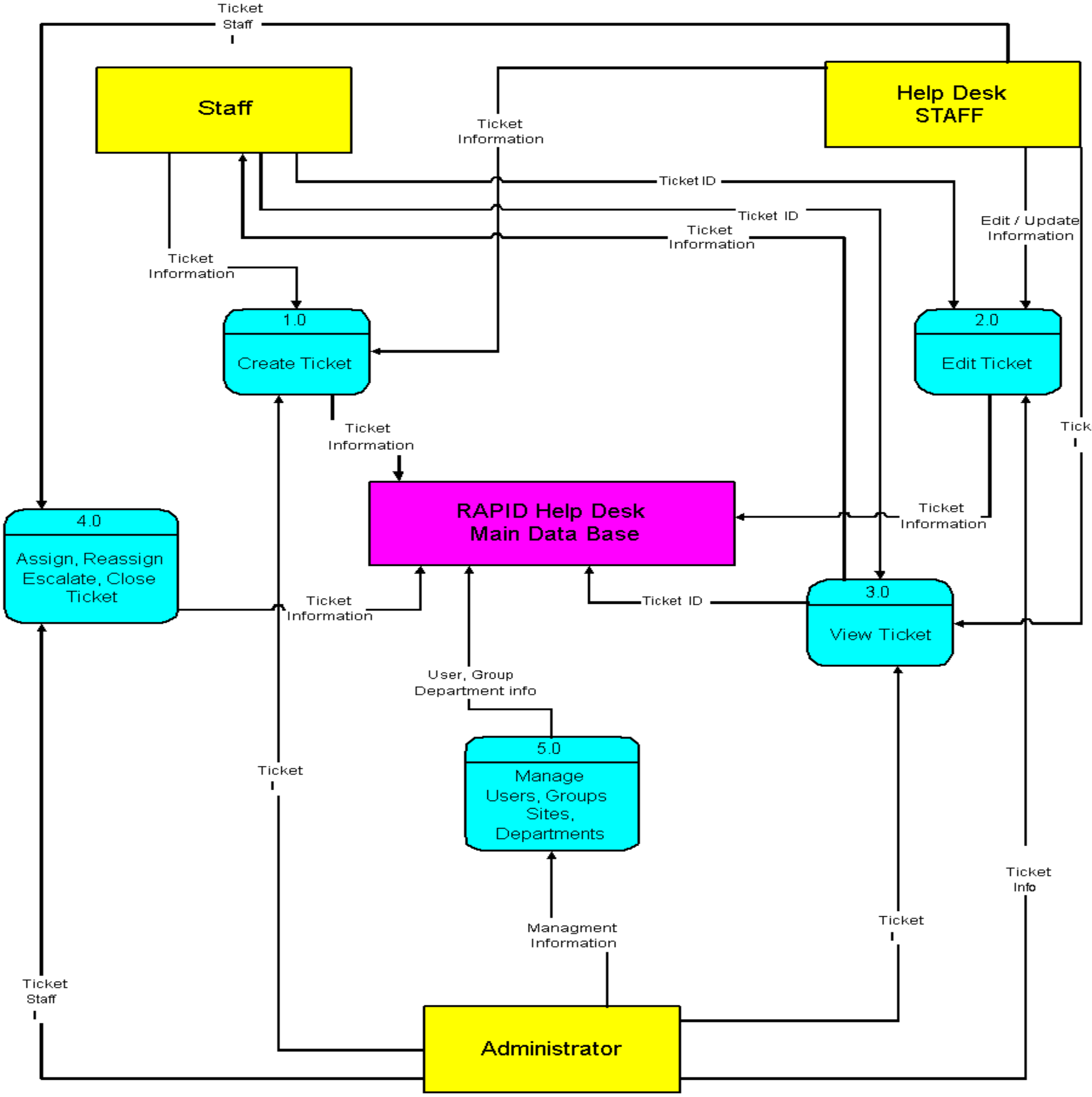
RAPID Help Desk System is design provide company with quick and efficient way to resolve computer related problems. In today's business every organization depends deeply on it's IT infrastructure and it's ability to overcome system downtime. RAPID System will help staff report problems to help desk staff, and at the same time administrators will have better control over the whole process of ticket escalation up until it's successful resolution with every single step properly recorded. Currently company uses very basic system with limited functionality. RAPID Help Desk System will allow administrator to have full and total control over the system with ability to establish a user profile for every single staff member who wish to create and post new trouble ticket. Help Desk Staff must have all user profiles created on the RAPID System. Staff and Help Desk Staff profiles are different and have limited functions than the administrator's profile. Staff after successful login could open new trouble ticket specifically stating the problem definition, location, contact information etc. Later on staff will be allowed to view or edit ticket by adding more information that could help communicate with help desk. If the ticket is escalated, reassign or closed staff shall be sent notification. Help Desk Staff in addition to Staff ability could assign, reassign, escalate and close the ticket. Ticket could only be assign to any other Help Desk member, also administrator can assign tickets.

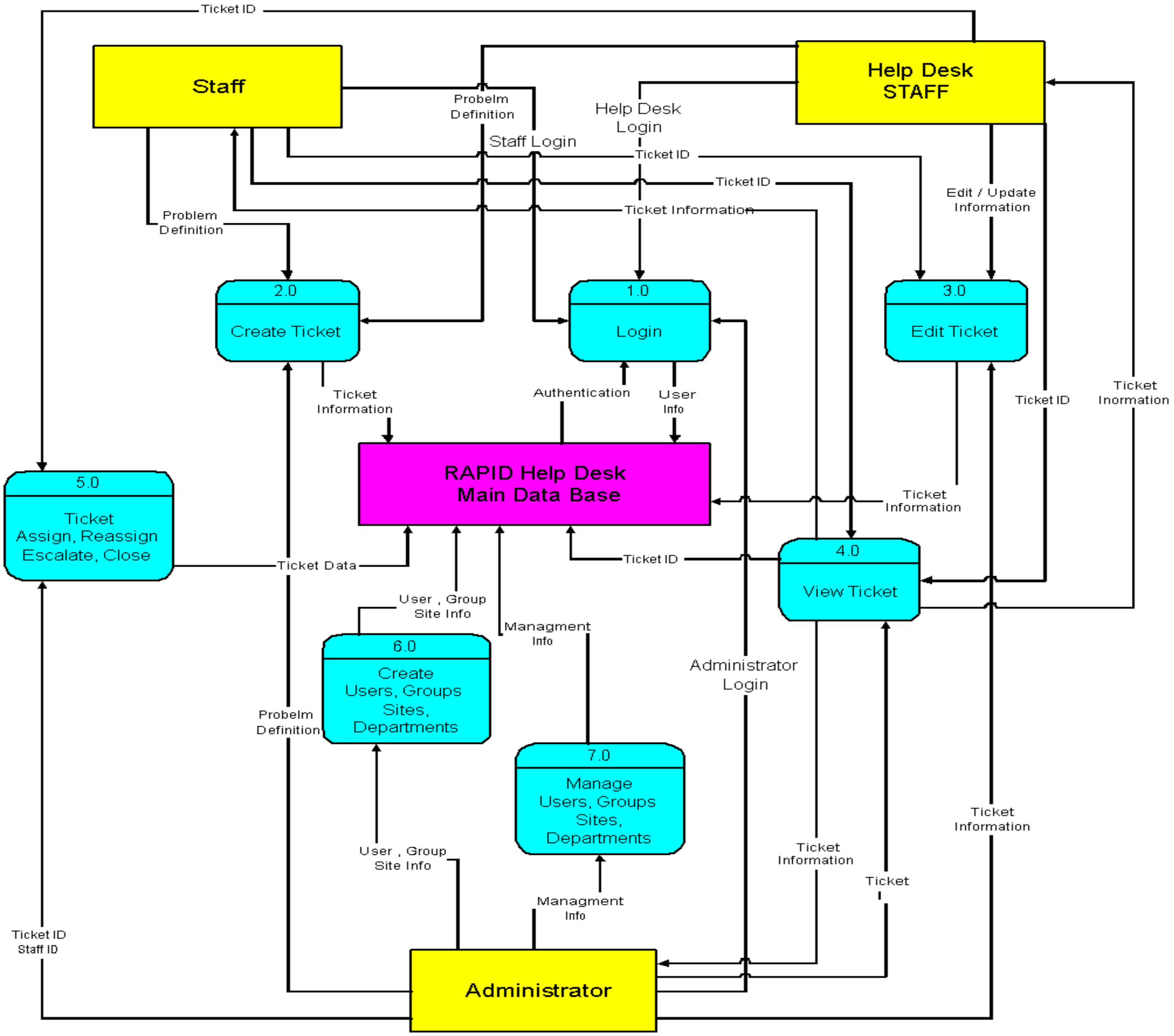
NOUN **VERB**

3.6.2 Context Diagram



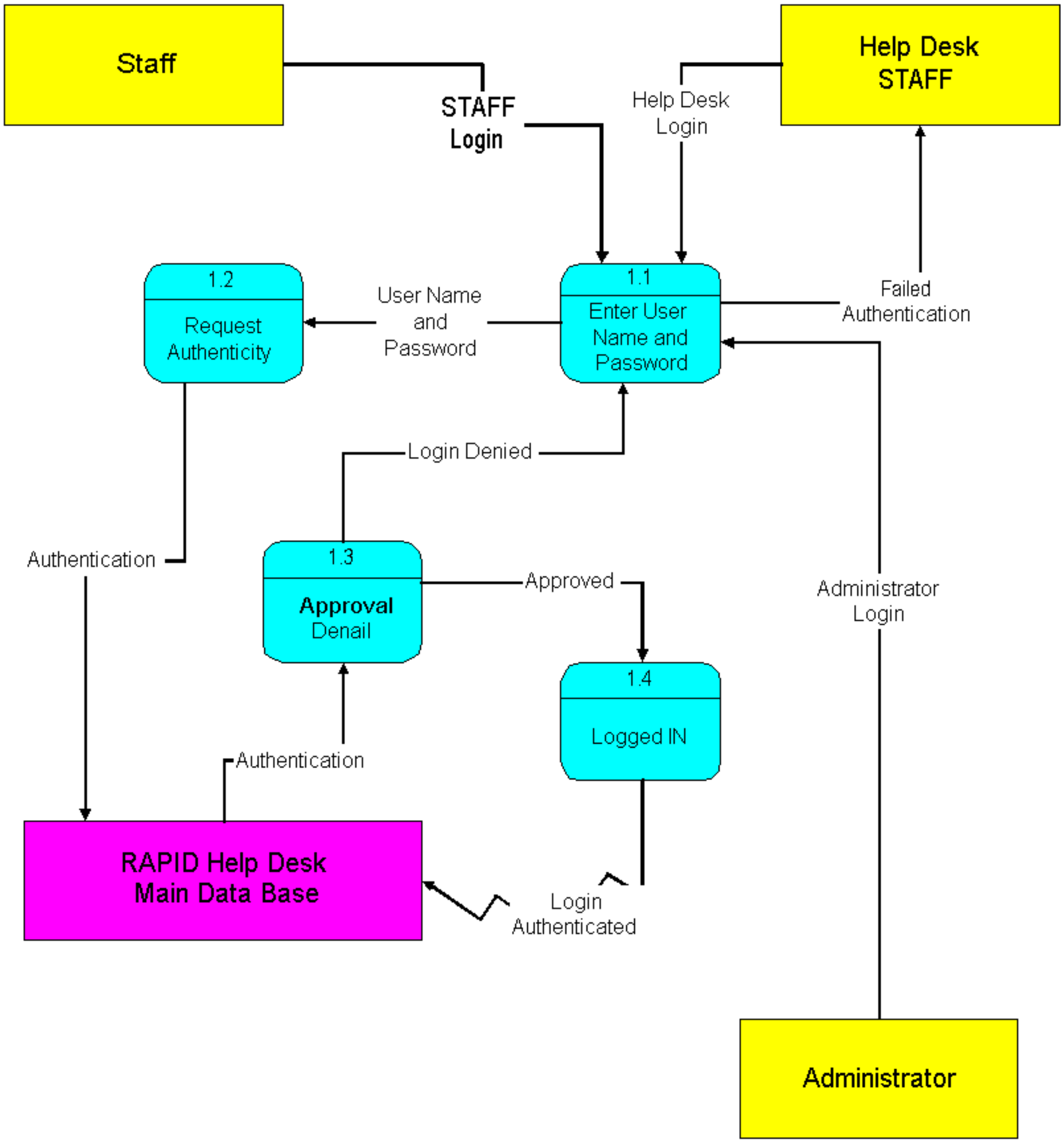
3.6.3 General DFD



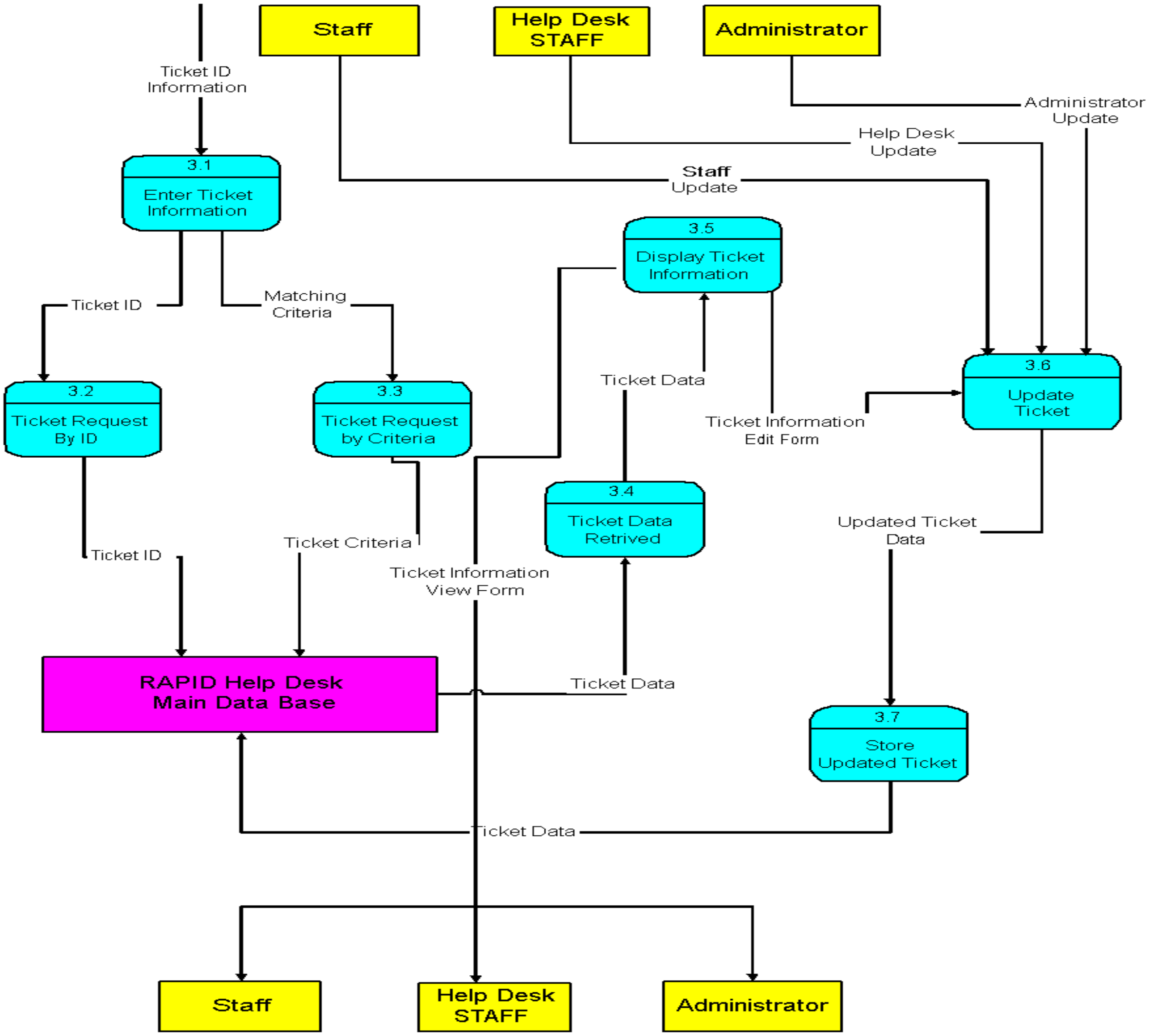

Staff
Help Desk STAFF
Ticket ID
Probelm Definition
Staff Login
Help Desk Login
Ticket ID
Ticket ID
Ticket Information
Edit / Update Information
Problem Definition
2.0
Create Ticket
1.0
Login
3.0
Edit Ticket
Ticket Information
Authentication
User Info
Ticket ID
Ticket Inormation
RAPID Help Desk Main Data Base
5.0
Ticket Assign, Reassign Escalate, Close
Ticket Information
4.0
View Ticket
Ticket Data
Ticket ID
User , Group Site Info
Managment Info
6.0
Create Users, Groups Sites, Departments
Administrator Login
Probelm Definition
7.0
Manage Users, Groups Sites, Departments
Ticket Information
Ticket Information
User , Group Site Info
Ticket
Managment Info
Ticket ID Staff ID
Administrator

3.6.4 Decompositions

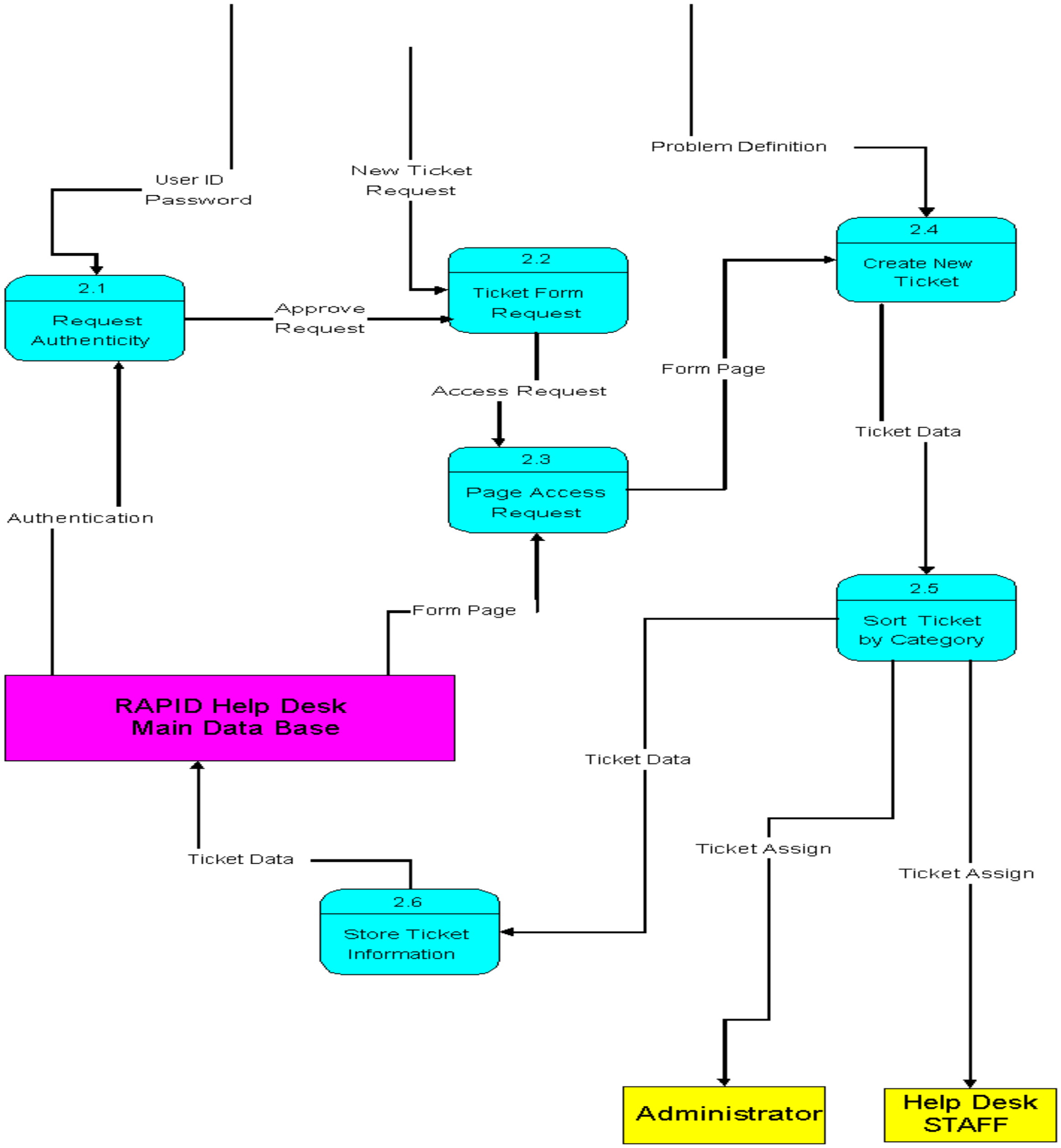
Decomposition 1.0 Login Process



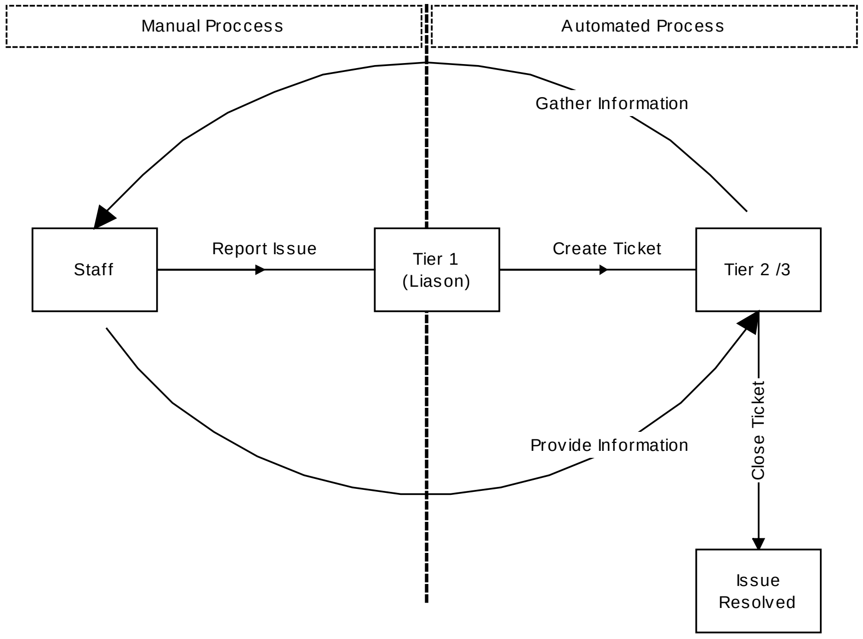
Decomposition 3.0 Edit Ticket



Decomposition 2.0 Create Ticket

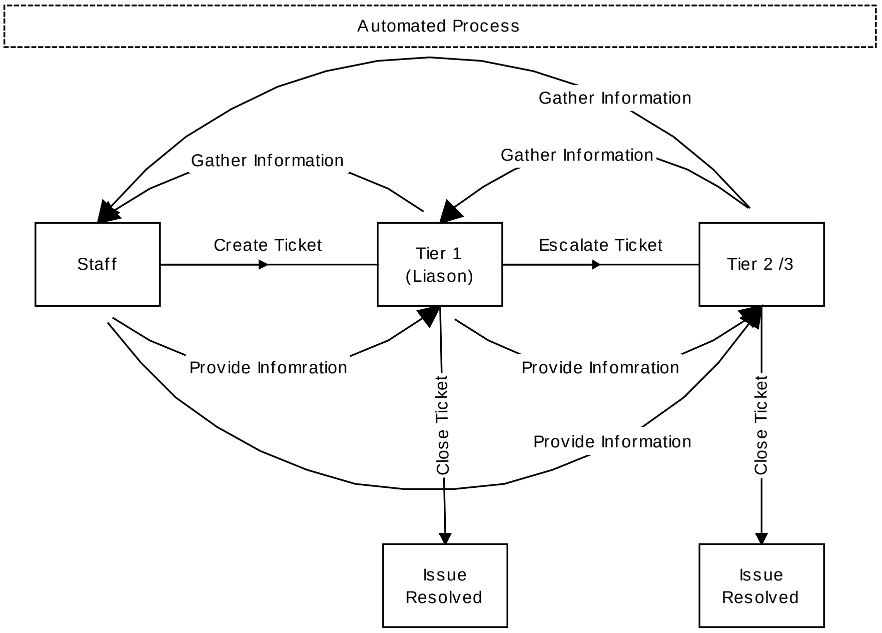


Current Work Flow Analysis of Help Desk System



- The process is partially automated
- Tier 1 is passive, Tier 1 only enters tickets into the system.
- The manual process increases response time
- No accountability between staff request and tier 1 response.
- No means to escalate request to TIER 2 since the transaction isn't recorded unstill after TIER 1 has entered a ticket

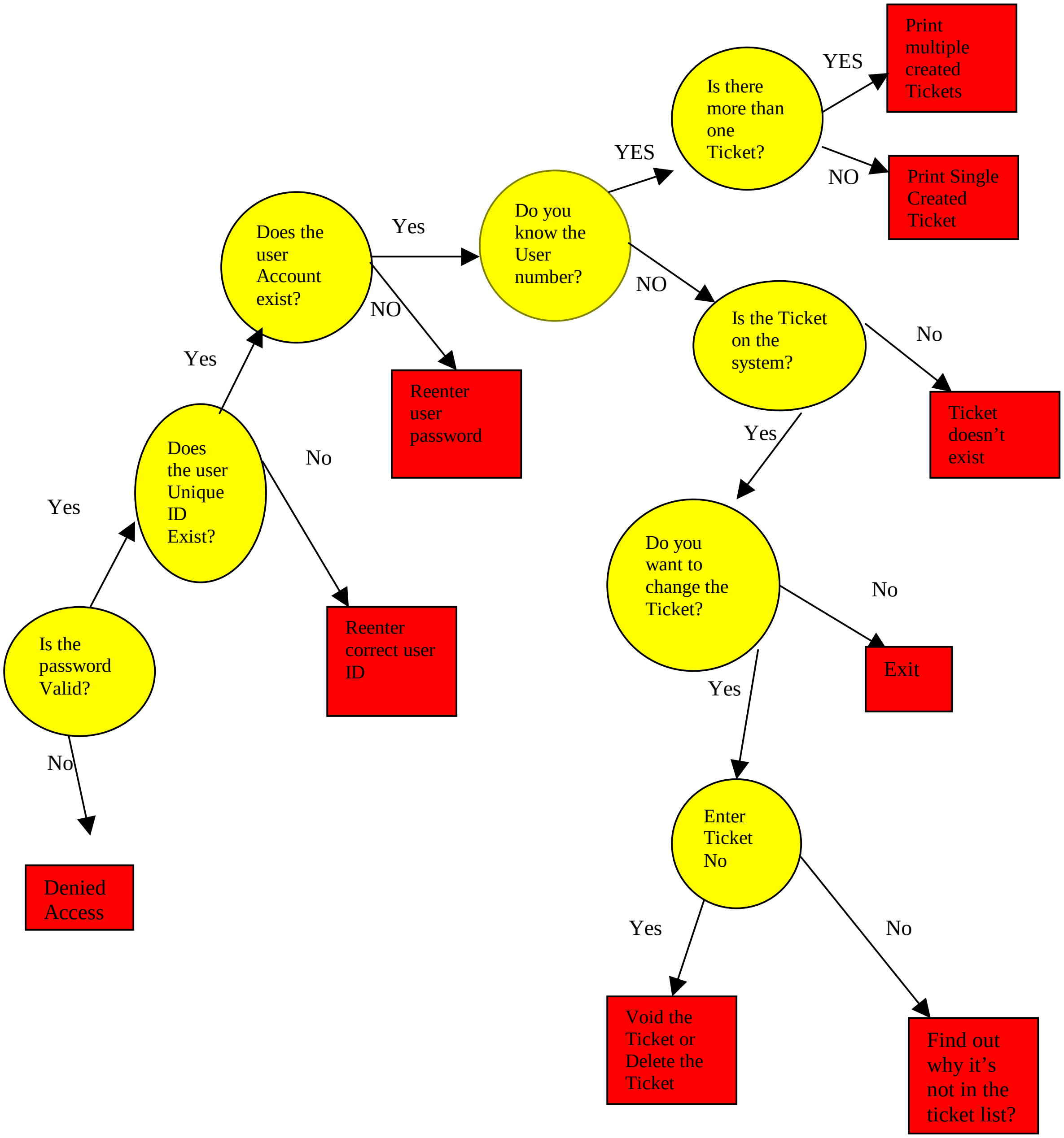
Work Flow Analysis of Ticket in New System



- The process is automated from the initial request
- The process is documented from beginning to end.
- Increases the probability that an issue resolved before reaching tier 2 or 3
- Providing accounting for transactions between staff and TIER 1

4. Process Specifications

4.1 Decision Tree

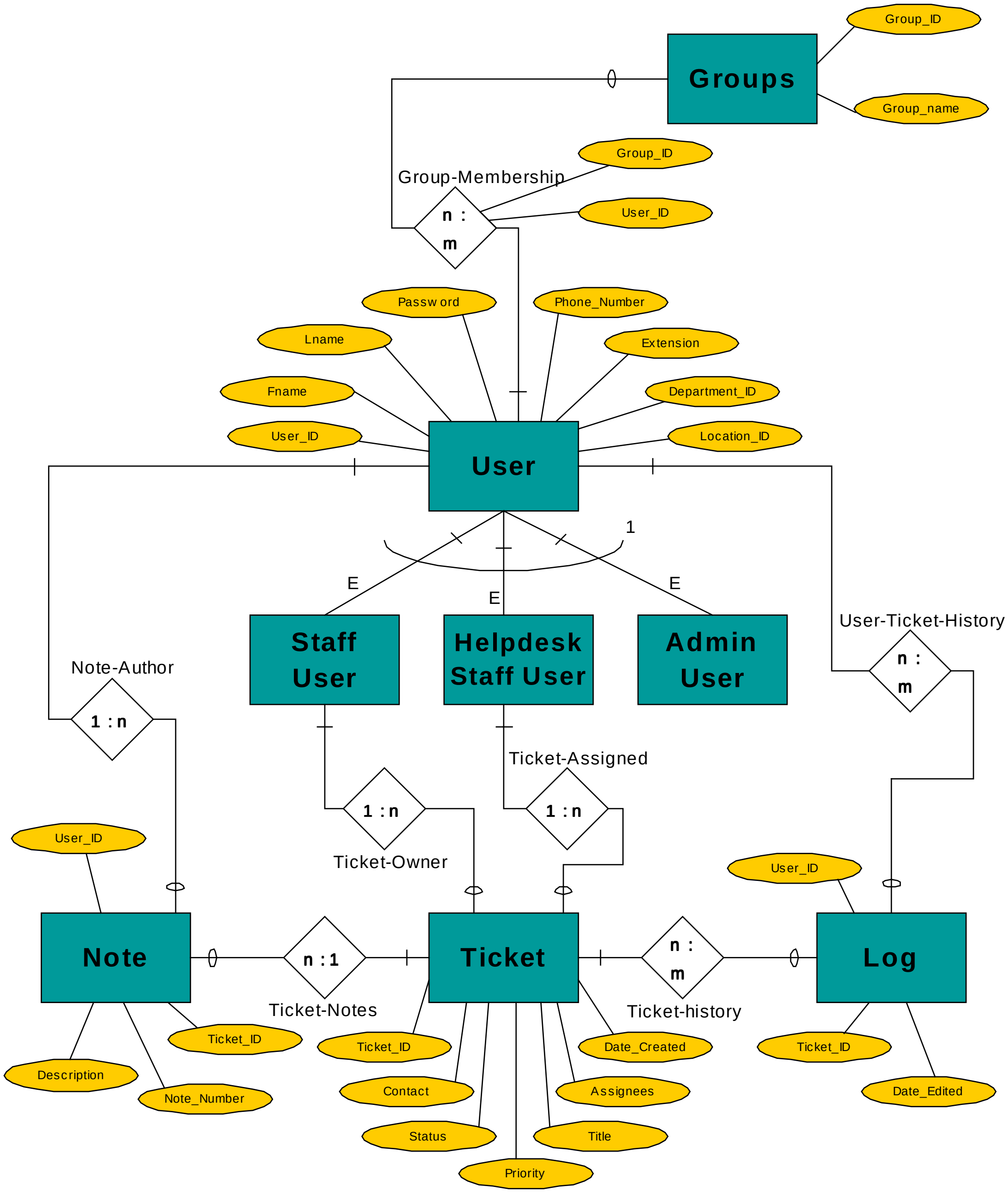

Print multiple created Tickets
YES
Is there more than one Ticket?
NO
Print Single Created Ticket
YES
Does the user Account exist?
Yes
Do you know the User number?
NO
NO
Is the Ticket on the system?
No
Yes
Reenter user password
Ticket doesn't exist
Yes
Does the user Unique ID Exist?
No
Yes
Do you want to change the Ticket?
No
Reenter correct user ID
Is the password Valid?
Exit
Yes
No
Enter Ticket No
Denied Access
Yes
No
Void the Ticket or Delete the Ticket
Find out why it's not in the ticket list?

4.2 Decision Table

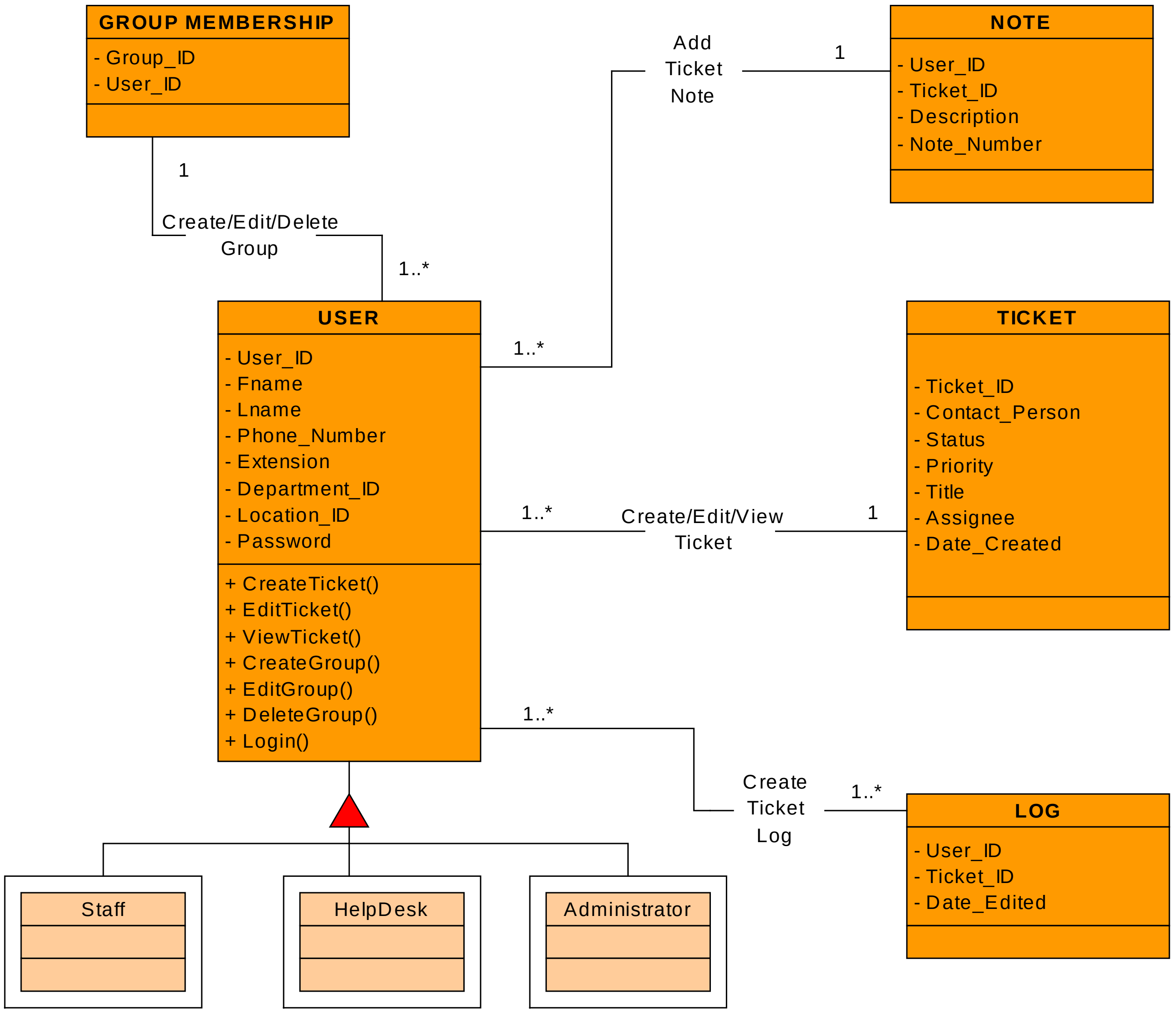
Final draft
Decision Table for User

Conditions						R	U	L	E	S						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Does User Have an User ID?	Y	Y	Y	Y	Y	Y	Y	Y	N	N	N	N	N	N	N	N
Does user Have Required higher security level?	Y	Y	Y	Y	N	N	N	N	Y	Y	Y	Y	N	N	N	N
Any history Of Ticket problem?	Y	Y	N	N	Y	Y	N	N	Y	Y	N	N	Y	Y	N	N
Is Password Correct?	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N
Actions																
View a Ticket	X	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-
Create a Ticket	X	-	X	-	X	-	X	-	-	-	-	-	-	-	-	-
Add and Delete A ticket	X	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-
Deny Access to System	-	X	-	X	-	X	-	X	X	X	X	X	X	X	X	X

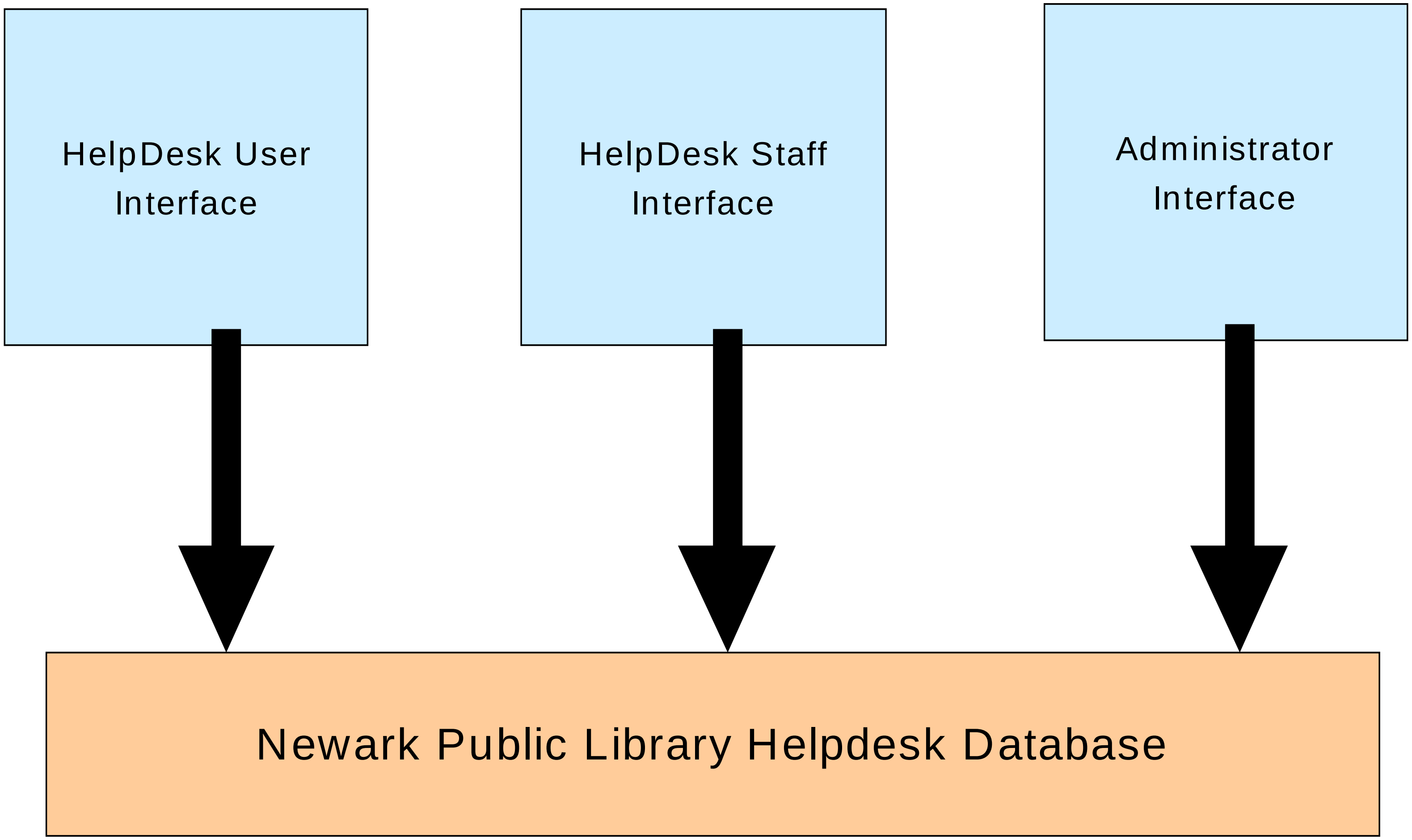
5. ERM Model


Group_ID
Groups
Group_name
Group_ID
Group-Membership
n : m
User_ID
Password
Phone_Number
Lname
Extension
Fname
Department_ID
User_ID
Location_ID
User
1
E
E
E
Staff User
Helpdesk Staff User
Admin User
User-Ticket-History
n : m
Note-Author
1 : n
Ticket-Assigned
1 : n
1 : n
Ticket-Owner
User_ID
User_ID
Note
n : 1
Ticket
n : m
Log
Ticket-Notes
Ticket-history
Ticket_ID
Ticket_ID
Date_Created
Ticket_ID
Description
Note_Number
Contact
Assignees
Date_Edited
Status
Title
Priority

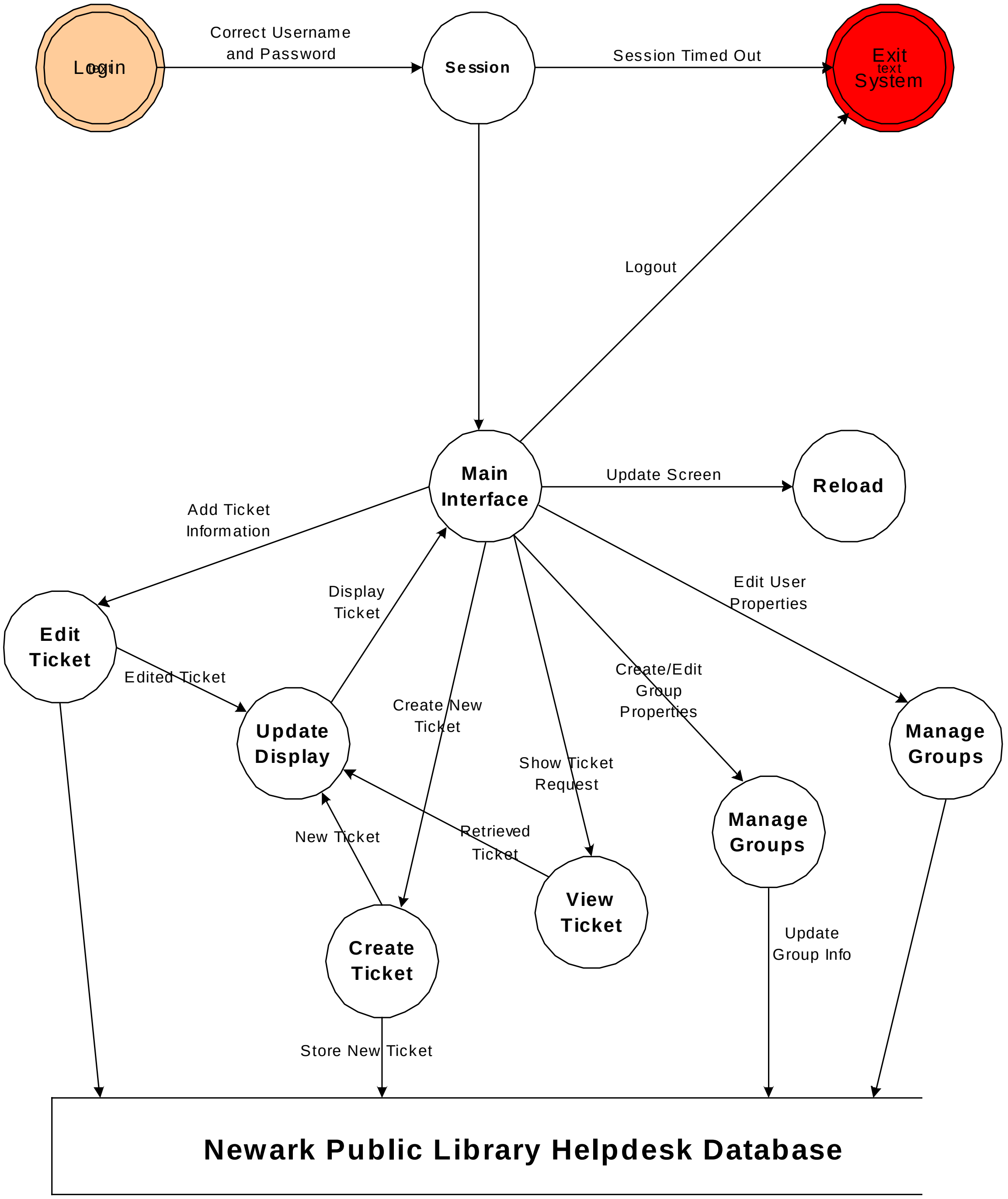
6. Static Object Model



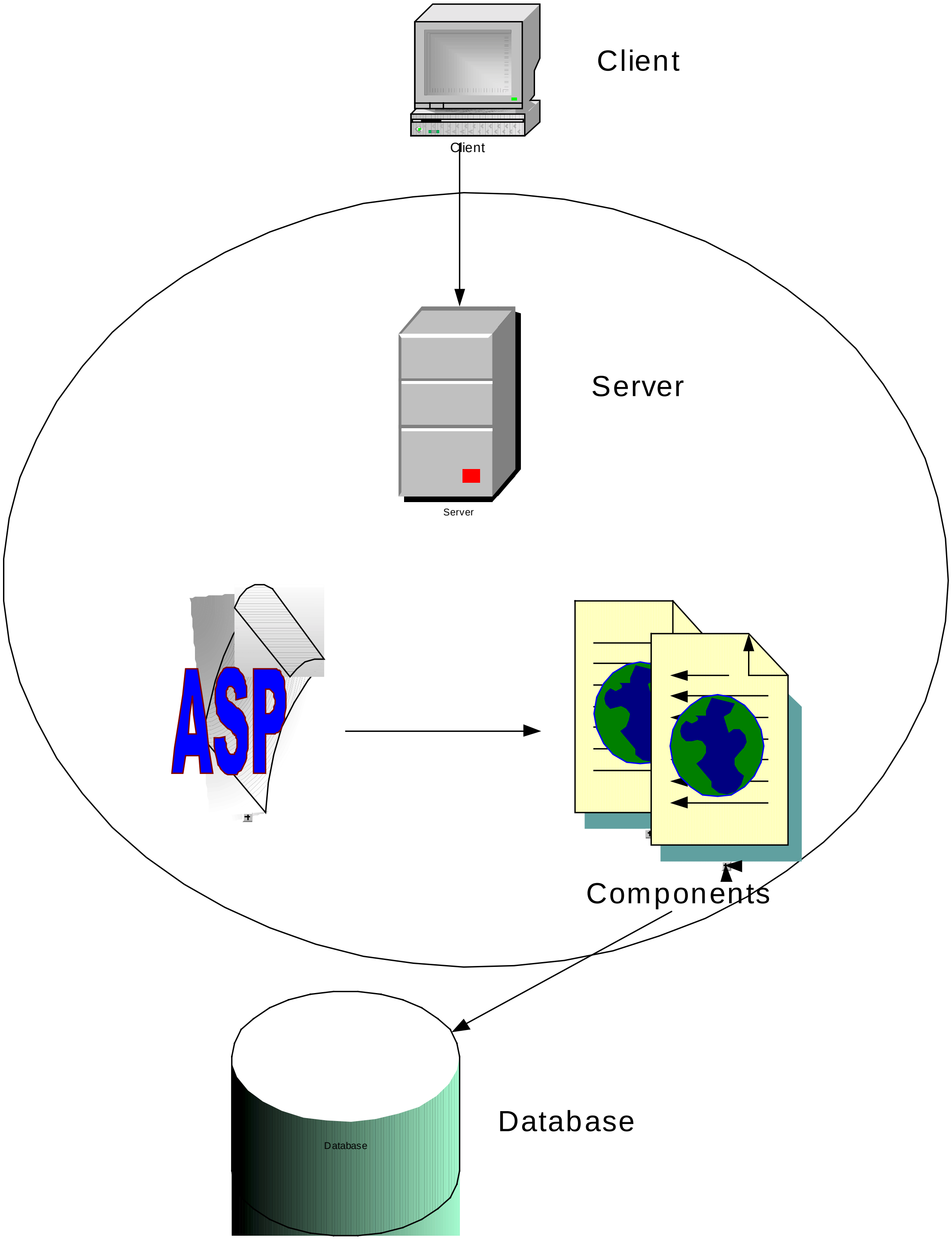
7. Repository Model



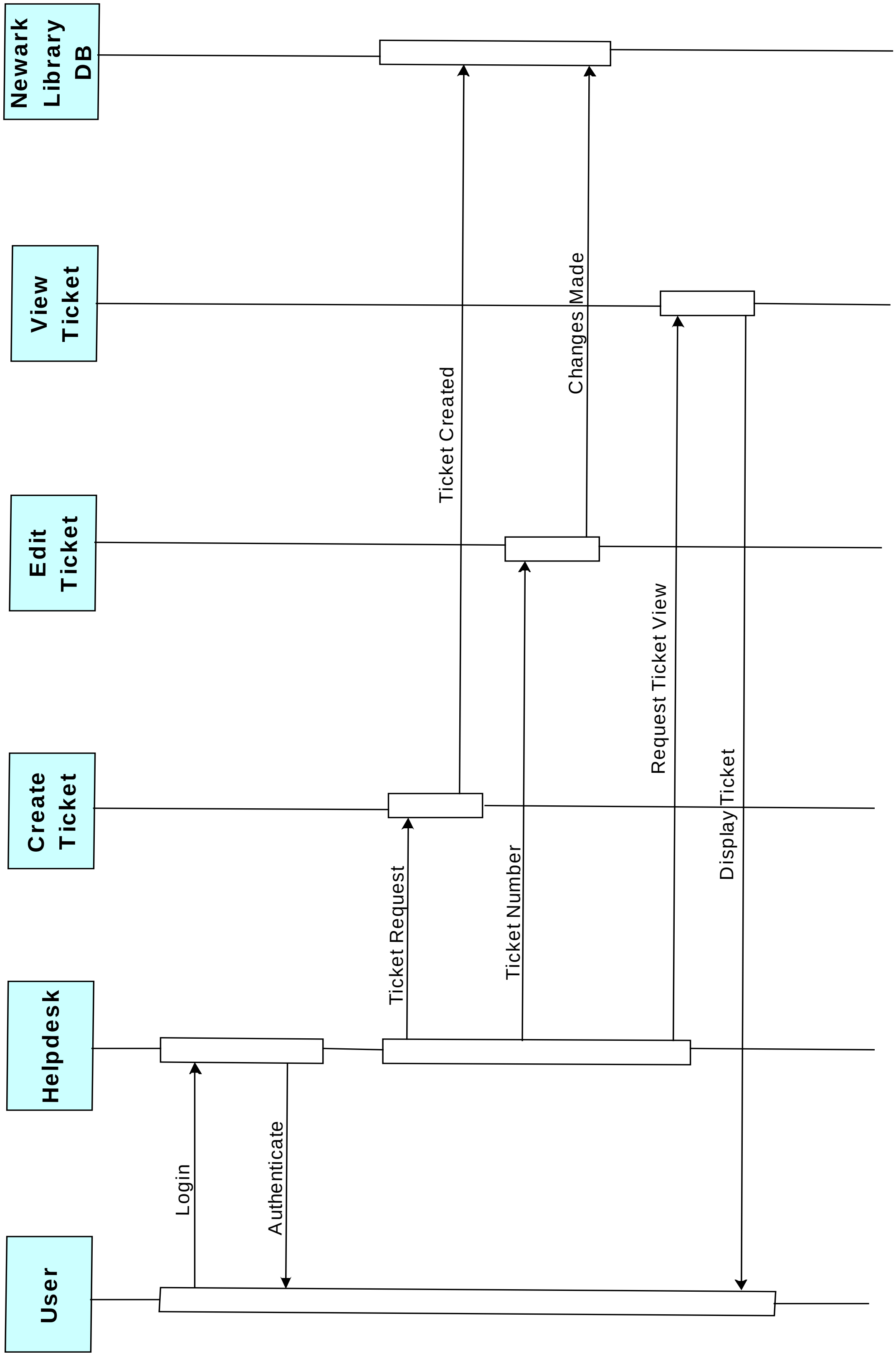
8. State Diagram



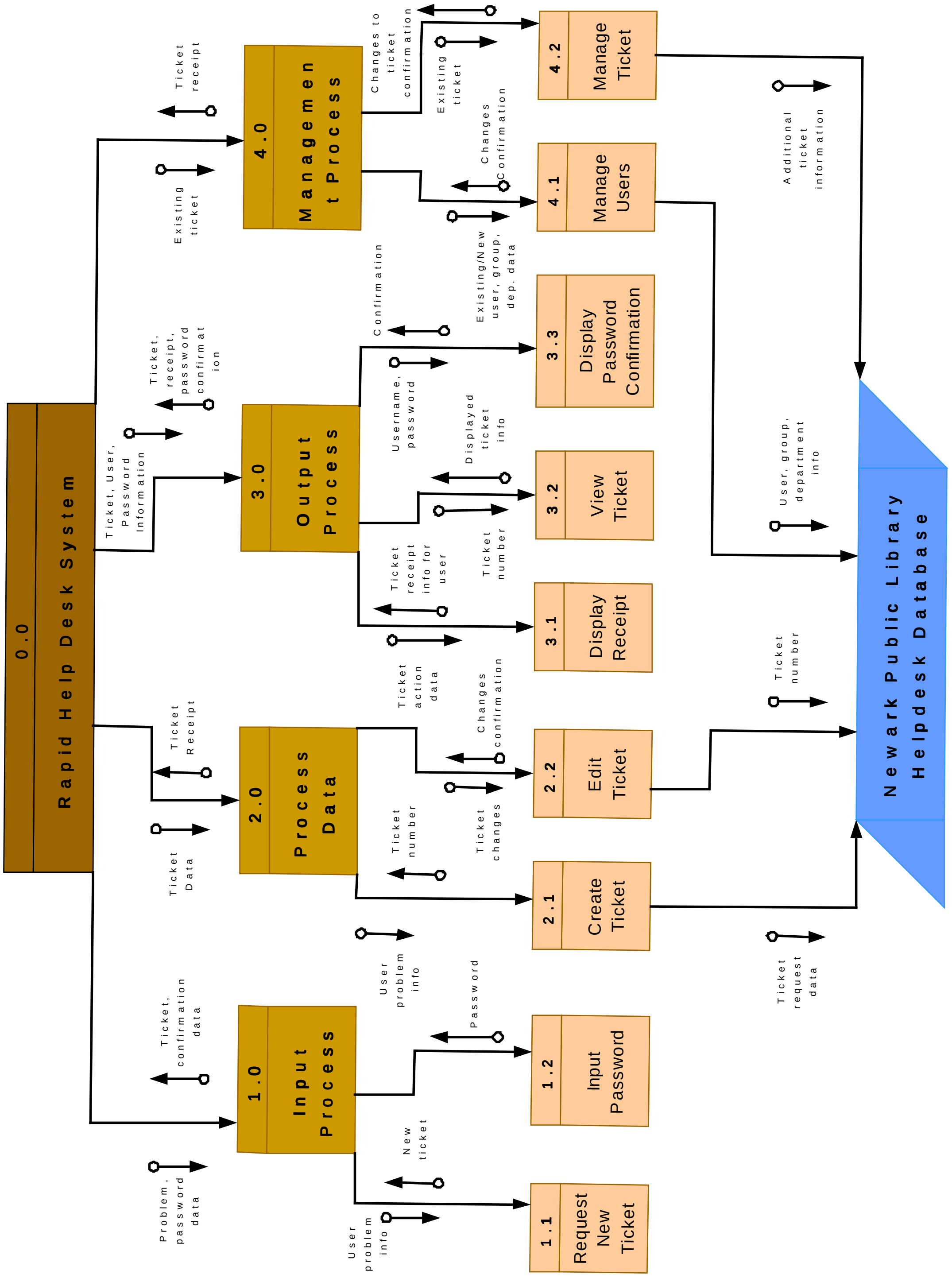
9. Network Diagram



10. Sequence Diagram



11. Structured Chart

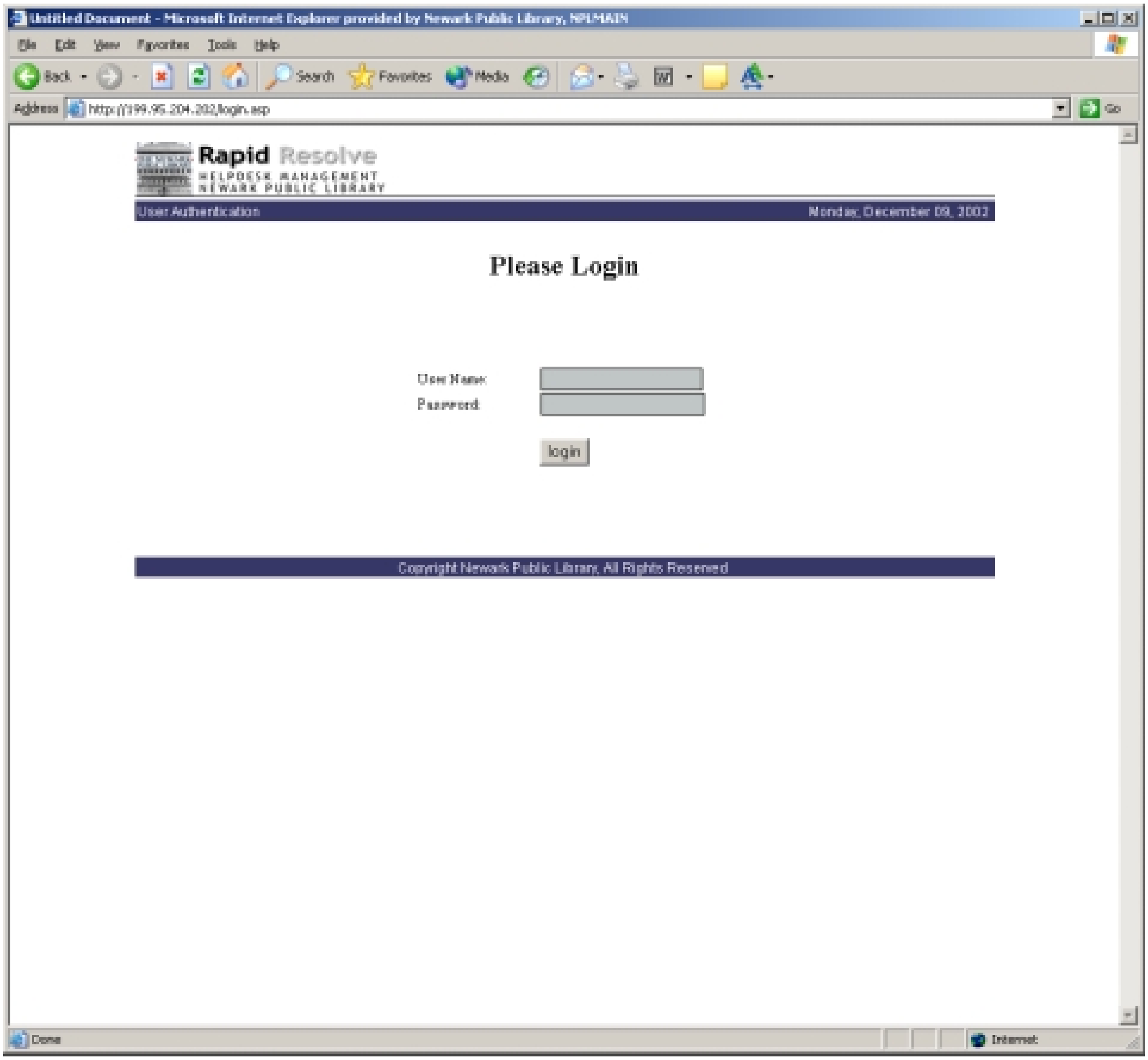


12. Data Dictionaries

<table>
<tr><td>User</td><td>User_ID + Name + Phone_Number + Extension + Department_ID + Location_ID + Password</td></tr>
<tr><td>Name</td><td>Fname + Lname + Minitial</td></tr>
<tr><td>Phone_Number</td><td>AreaCode + Number</td></tr>
<tr><td>Fname</td><td>[{A | B | C | … | a | b | c | … }]</td></tr>
<tr><td>Lname</td><td>[{A | B | C | … | a | b | c | … }]</td></tr>
<tr><td>Extension</td><td>[{0 | 1 | 2 | … | 0 | 1 | 2 | … | 0 | 1 | 2 | … | 0 | 1 | 2 | …}]</td></tr>
<tr><td>Department_ID</td><td>[{1 | 2 | 3 | 4 | 5}]</td></tr>
<tr><td>Location_ID</td><td>[{1 | 2 | 3}]</td></tr>
<tr><td>Password</td><td>[{A | B | C | … | a | b | c | … | 0 | 1 | 2 | … | ! | ? | . | , |…}]</td></tr>
<tr><td>Ticket</td><td>Ticket_ID + Contact_Person + Status + Priority + Title + Assignee + Date_Created</td></tr>
<tr><td>Status</td><td>[{1 | 2 | 3 | 4}]</td></tr>
<tr><td>Priority</td><td>[{1 | 2 | 3 | }]</td></tr>
<tr><td>Date_Created</td><td>[{0 | 1 | 2 | … | 0 | 1 | 2 | …}] + / + [{0 | 1 | 2 | … | 0 | 1 | 2 | …}] + / + [{0 | 1 | 2 | … | 0 | 1 | 2 | …}]</td></tr>
</table>

<table>
<tr><th></th><th></th></tr>
<tr><td>Note</td><td>User_ID + Ticket_ID + Description + Note_Number</td></tr>
<tr><td>Log</td><td>User_ID + Ticket_ID + Date_Edited</td></tr>
<tr><td>Date_Edited</td><td>[{0 | 1 | 2 | … | 0 | 1 | 2 | …}] + / + [{0 | 1 | 2 | … | 0 | 1 | 2 | …}] + / + [{0 | 1 | 2 | … | 0 | 1 | 2 | …}]</td></tr>
</table>

13. User-Interface Design



Untitled Document - Microsoft Internet Explorer provided by Newark Public Library, NPLMAIN
File Edit View Favorites Tools Help
Back
Search
Favorites
Media
Address
http://199.95.204.202/login.asp
Go
Done
Internet

Rapid Resolve
HELPDESK MANAGEMENT
NEWARK PUBLIC LIBRARY

User Authentication — Monday, December 09, 2002

Please Login

User Name:

Password:

login

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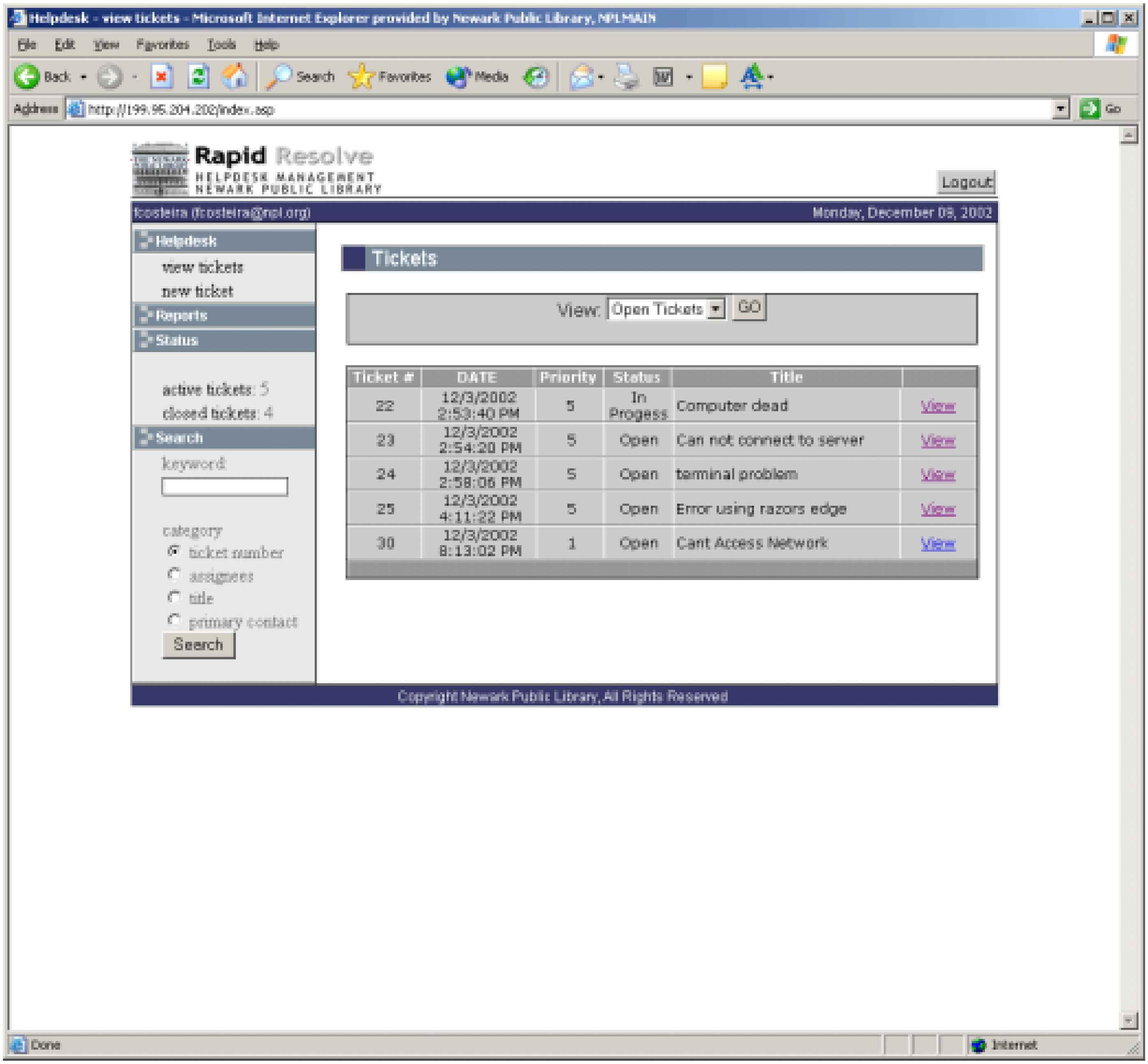

fcosteira (fcosteira@npl.org)

Monday, December 09, 2002

active tickets: 5

closed tickets: 4

● ticket number
○ assignees
○ title
○ primary contact

View: Open Tickets

Ticket #	DATE	Priority	Status	Title	
22	12/3/2002 2:53:40 PM	5	In Progess	Computer dead	View
23	12/3/2002 2:54:20 PM	5	Open	Can not connect to server	View
24	12/3/2002 2:58:06 PM	5	Open	terminal problem	View
25	12/3/2002 4:11:22 PM	5	Open	Error using razors edge	View
30	12/3/2002 8:13:02 PM	1	Open	Cant Access Network	View

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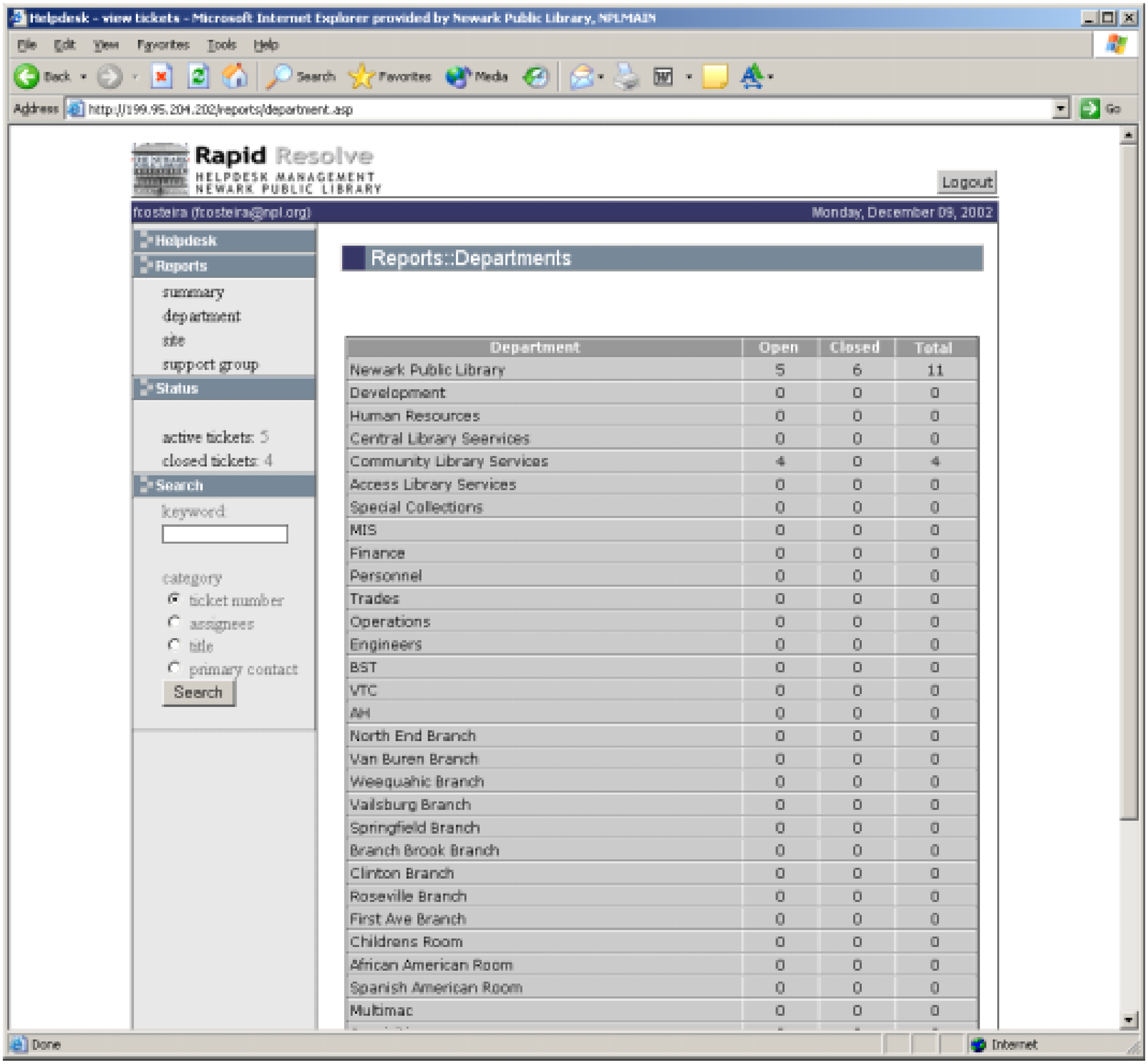


fcosteira (fcosteira@npl.org)

Monday, December 09, 2002

active tickets: 5

closed tickets: 4

category

● ticket number

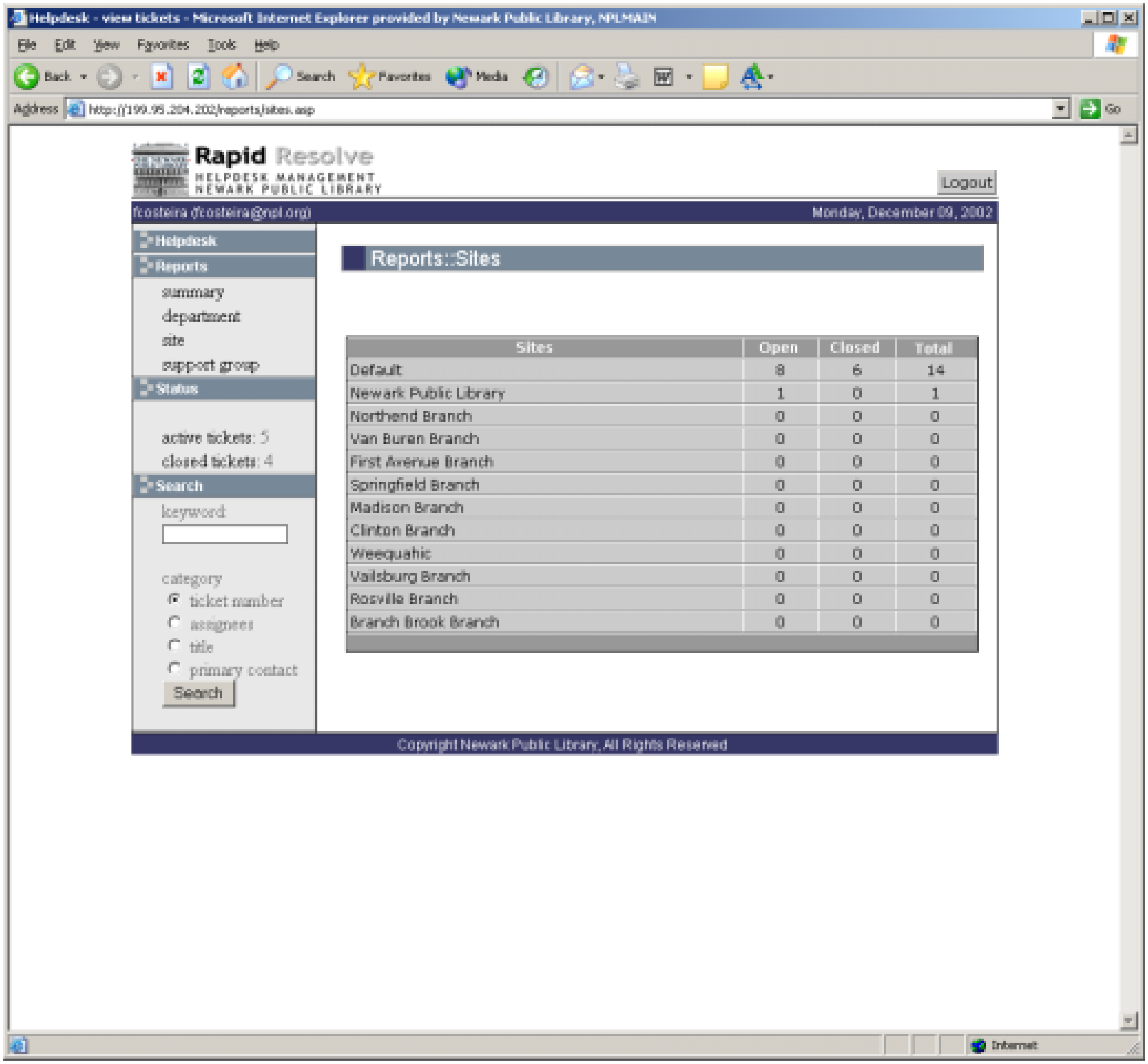
○ assignees

○ title

○ primary contact

Reports::Departments

Department	Open	Closed	Total
Newark Public Library	5	6	11
Development	0	0	0
Human Resources	0	0	0
Central Library Seervices	0	0	0
Community Library Services	4	0	4
Access Library Services	0	0	0
Special Collections	0	0	0
MIS	0	0	0
Finance	0	0	0
Personnel	0	0	0
Trades	0	0	0
Operations	0	0	0
Engineers	0	0	0
BST	0	0	0
VTC	0	0	0
AH	0	0	0
North End Branch	0	0	0
Van Buren Branch	0	0	0
Weequahic Branch	0	0	0
Vailsburg Branch	0	0	0
Springfield Branch	0	0	0
Branch Brook Branch	0	0	0
Clinton Branch	0	0	0
Roseville Branch	0	0	0
First Ave Branch	0	0	0
Childrens Room	0	0	0
African American Room	0	0	0
Spanish American Room	0	0	0
Multimac	0	0	0



Address: http://199.95.204.202/reports/sites.asp

fcosteira (fcosteira@npl.org) Monday, December 09, 2002

active tickets: 5
closed tickets: 4

keyword

category
● ticket number
○ assignees
○ title
○ primary contact

Reports::Sites

Sites	Open	Closed	Total
Default	8	6	14
Newark Public Library	1	0	1
Northend Branch	0	0	0
Van Buren Branch	0	0	0
First Avenue Branch	0	0	0
Springfield Branch	0	0	0
Madison Branch	0	0	0
Clinton Branch	0	0	0
Weequahic	0	0	0
Vailsburg Branch	0	0	0
Rosville Branch	0	0	0
Branch Brook Branch	0	0	0

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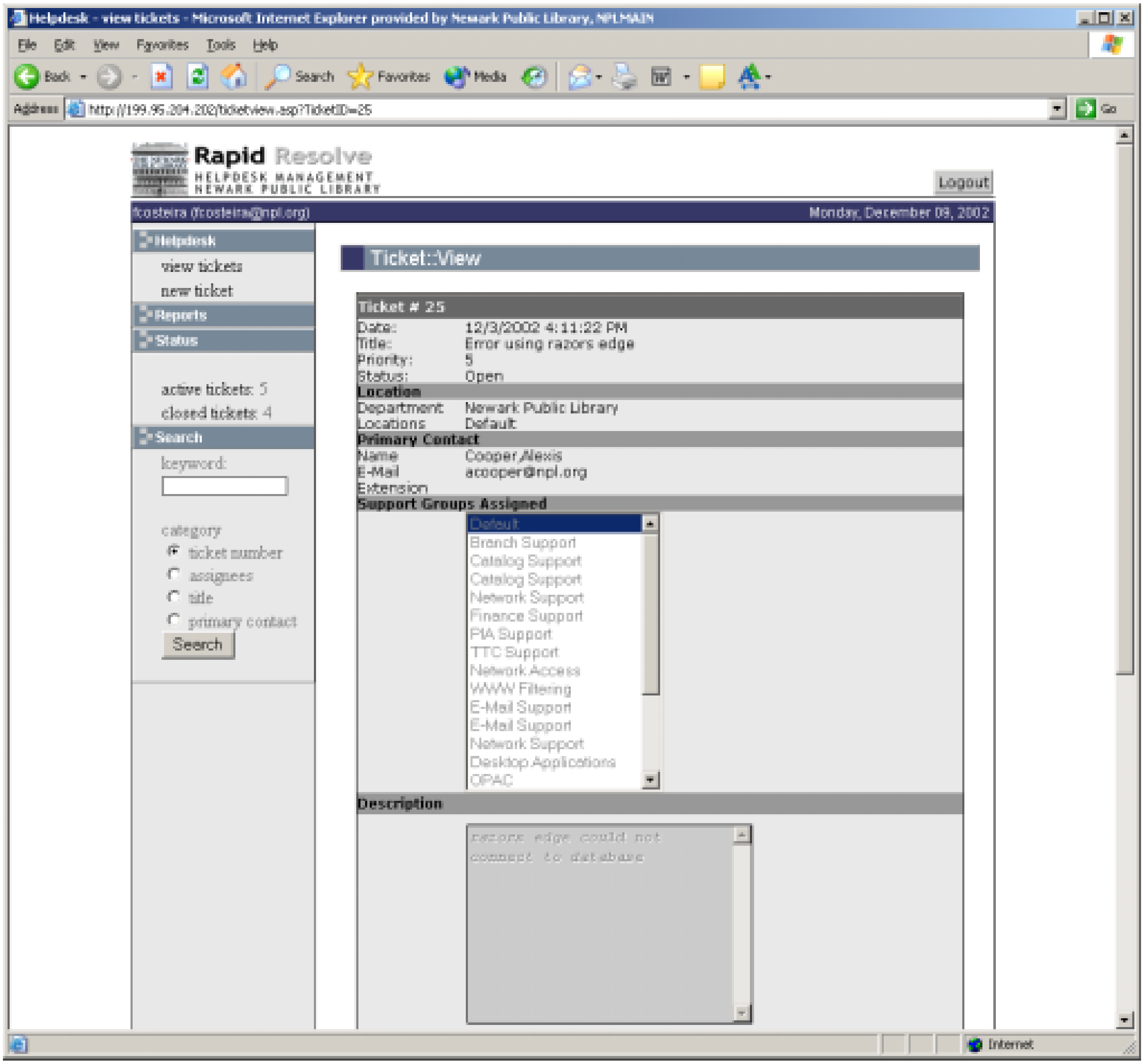

Helpdesk - view tickets - Microsoft Internet Explorer provided by Newark Public Library, NPLMAIN
File Edit View Favorites Tools Help
Back Search Favorites Media
Address http://199.95.204.202/ticketview.asp?TicketID=25
Go
Rapid Resolve
HELPDESK MANAGEMENT
NEWARK PUBLIC LIBRARY
Logout
Helpdesk
view tickets
new ticket
Reports
Status
Search
Internet

fcosteira (fcosteira@npl.org) Monday, December 09, 2002

active tickets: 5
closed tickets: 4

keyword:

category
● ticket number
○ assignees
○ title
○ primary contact

Search

Ticket::View

Ticket # 25

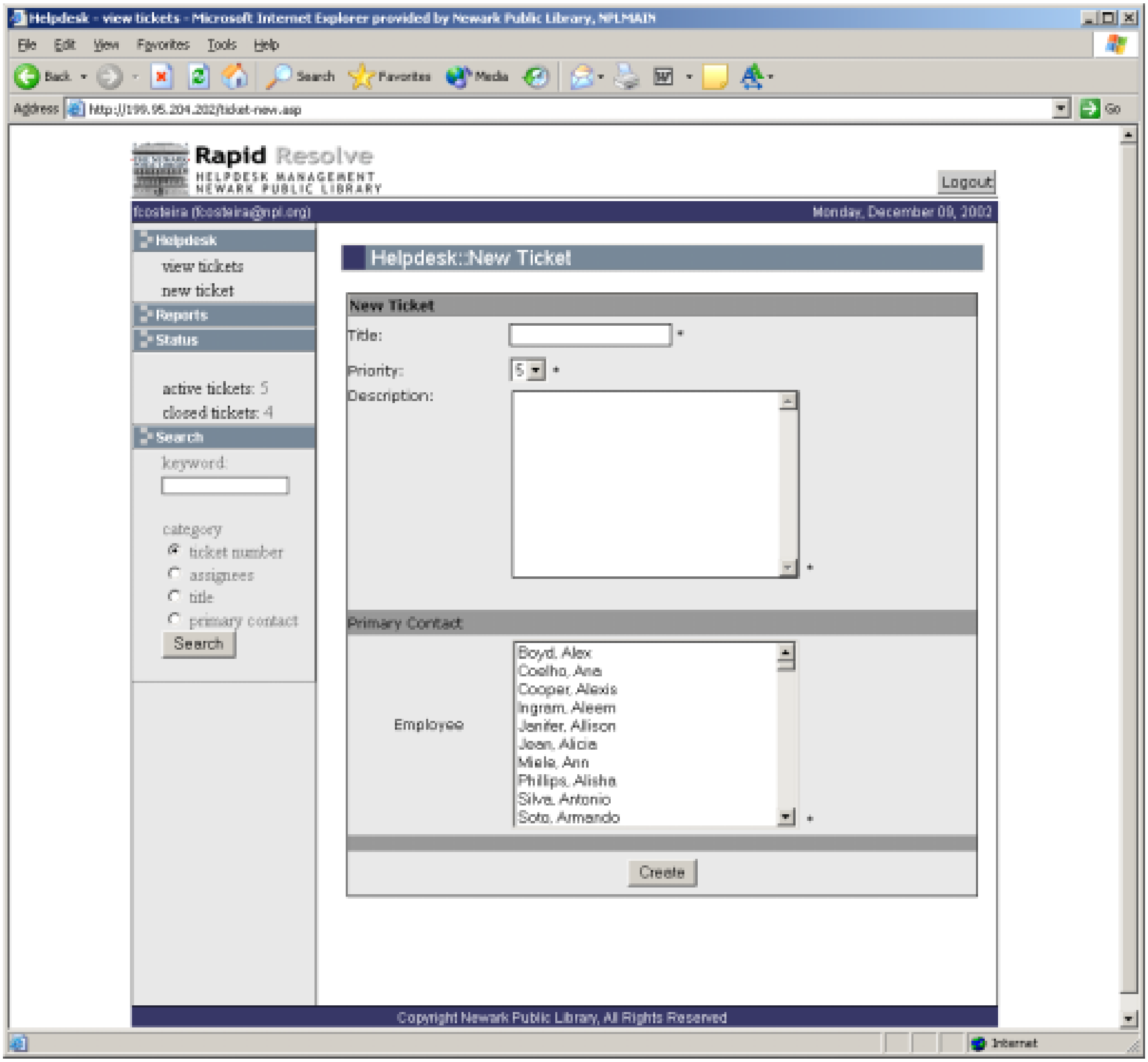
Date:	12/3/2002 4:11:22 PM
Title:	Error using razors edge
Priority:	5
Status:	Open
Location	
Department	Newark Public Library
Locations	Default
Primary Contact	
Name	Cooper,Alexis
E-Mail	acooper@npl.org
Extension	

Support Groups Assigned

Default
Branch Support
Catalog Support
Catalog Support
Network Support
Finance Support
PIA Support
TTC Support
Network Access
WWW Filtering
E-Mail Support
E-Mail Support
Network Support
Desktop Applications
OPAC

Description

razors edge could not connect to database



Helpdesk - view tickets - Microsoft Internet Explorer provided by Newark Public Library, NPLMAIN

Address: http://199.95.204.202/ticket-new.asp

Rapid Resolve
HELPDESK MANAGEMENT
NEWARK PUBLIC LIBRARY

fcosteira (fcosteira@npl.org) Monday, December 09, 2002

active tickets: 5
closed tickets: 4

Helpdesk::New Ticket

New Ticket

Title: *

Priority: 5 *

Description: *

Primary Contact

Employee: *

Boyd, Alex
Coelho, Ana
Cooper, Alexis
Ingram, Aleem
Janifer, Allison
Jean, Alicia
Miele, Ann
Philips, Alisha
Silva, Antonio
Soto, Armando

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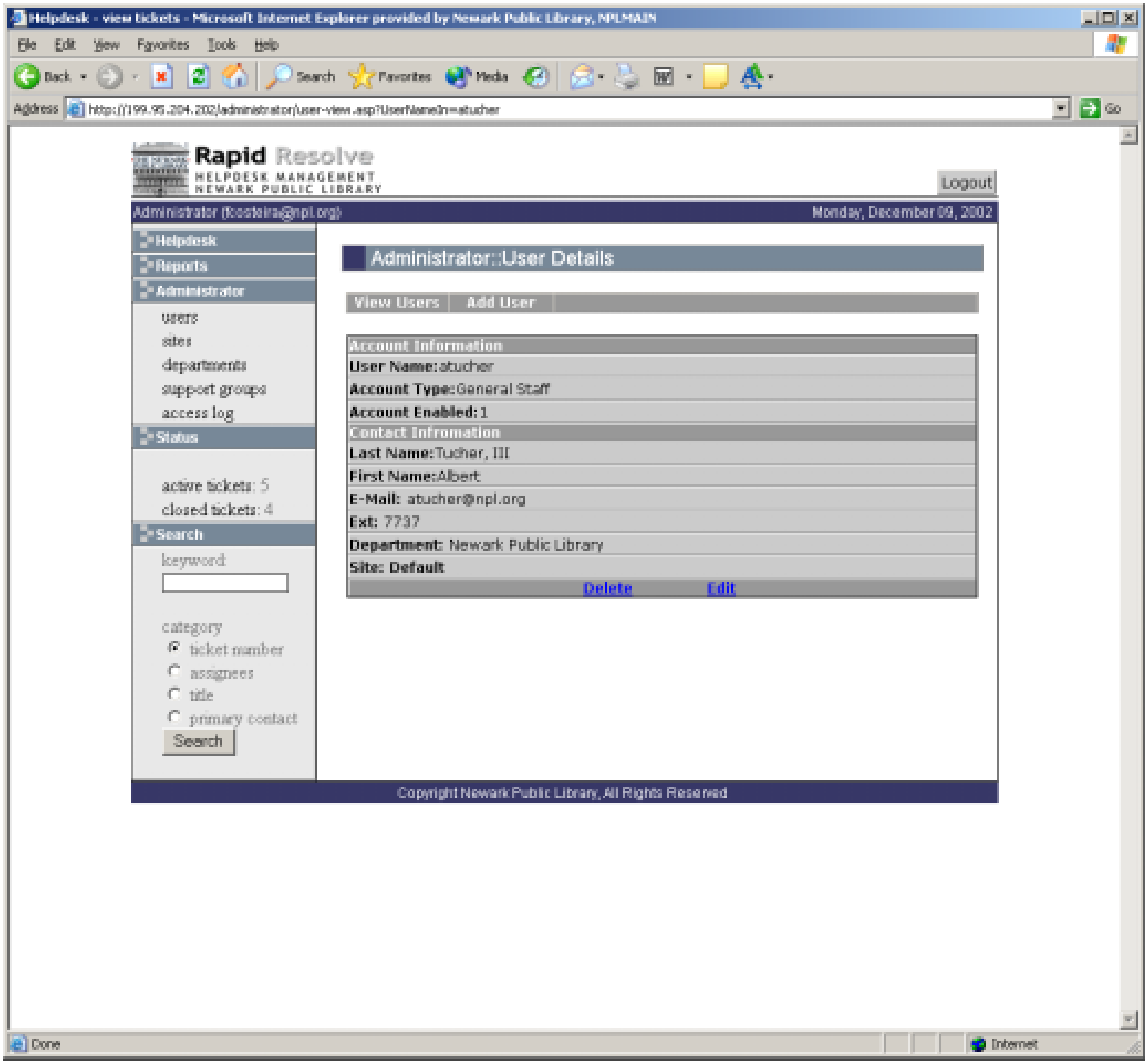

Helpdesk - view tickets - Microsoft Internet Explorer provided by Newark Public Library, NPLMAIN
File Edit View Favorites Tools Help
Back Search Favorites Media
Address http://199.95.204.202/administrator/user-view.asp?UserNameIn=atucher
Go
Rapid Resolve
HELPDESK MANAGEMENT
NEWARK PUBLIC LIBRARY
Logout
Administrator (kcosteira@npl.org)
Monday, December 09, 2002
Helpdesk
Reports
Administrator
users
sites
departments
support groups
access log
Status
active tickets: 5
closed tickets: 4
Search
keyword
category
ticket number
assignees
title
primary contact
Search
View Users
Add User
Delete
Edit
Copyright Newark Public Library, All Rights Reserved
Done
Internet

Administrator::User Details

Account Information

User Name:atucher

Account Type: General Staff

Account Enabled: 1

Contact Infromation

Last Name: Tucher, III

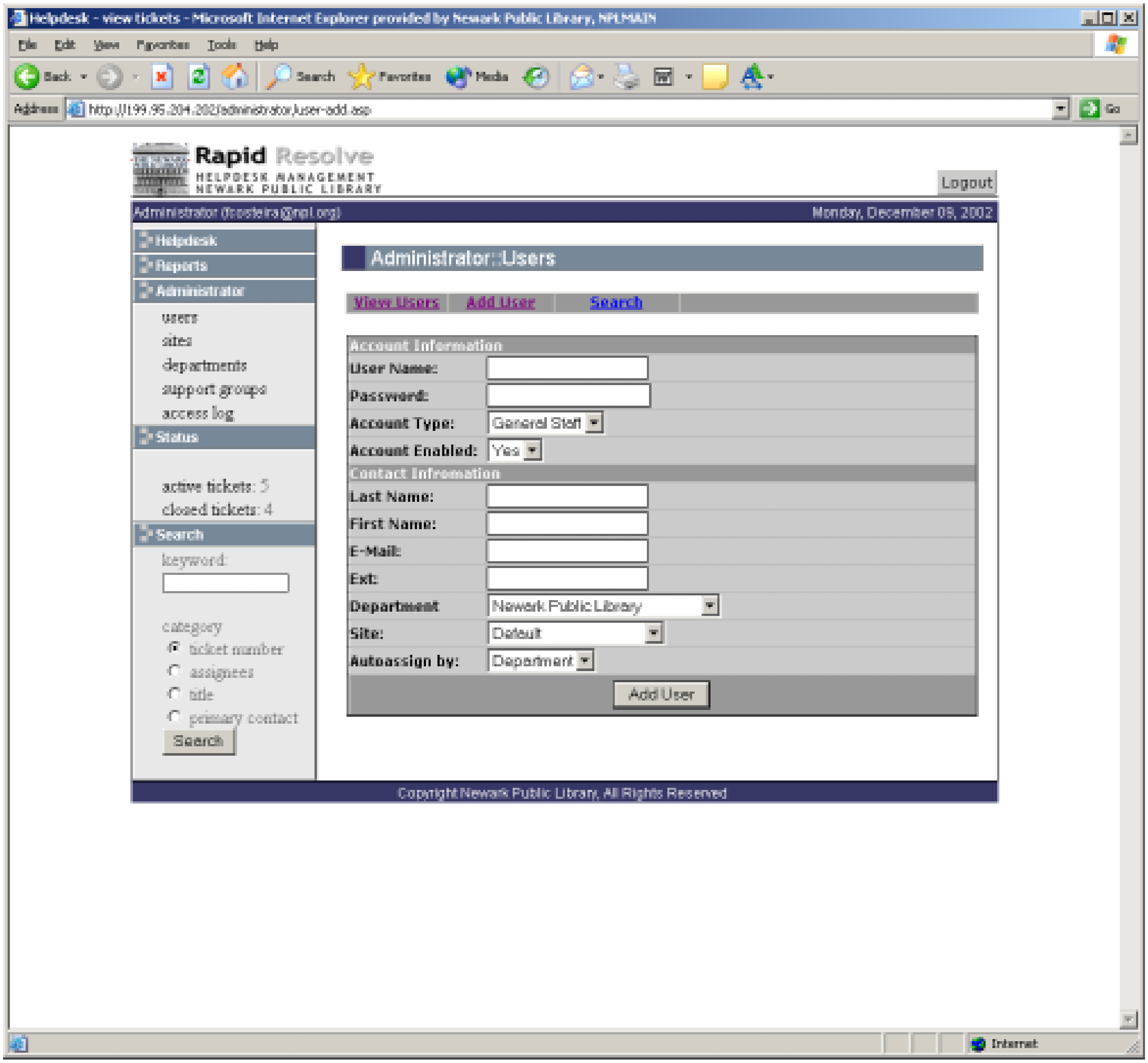
First Name: Albert

E-Mail: atucher@npl.org

Ext: 7737

Department: Newark Public Library

Site: Default



Helpdesk - view tickets - Microsoft Internet Explorer provided by Newark Public Library, NPLMAIN
File Edit View Favorites Tools Help
Back
Search
Favorites
Media
Address
Go
Internet

http://199.95.204.202/administrator/user-add.asp

Rapid Resolve
HELPDESK MANAGEMENT
NEWARK PUBLIC LIBRARY

Administrator (fcosteira@npl.org)

Monday, December 09, 2002

active tickets: 5
closed tickets: 4

keyword:

category
● ticket number
○ assignees
○ title
○ primary contact

Administrator::Users

Account Information	
User Name:	
Password:	
Account Type:	General Staff
Account Enabled:	Yes
Contact Information	
Last Name:	
First Name:	
E-Mail:	
Ext:	
Department	Newark Public Library
Site:	Default
Autoassign by:	Department

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14. Testing

Testing was performed as each module was completed. For example once the user management module was complete each function was tested to verify it’s functionality. Testing involved creating mach tickets, user and other entities related to each module in order to verify the module’s functionality. This would test the modules functions but wouldn’t test for valid data. To insure data integrity we would perform the functions and insure that data was being manipulated in the database as we accepted. The use of reports allowed us to verify that the function was fully successful in it’s task.

The simultaneous function of testing and coding allowed us to increase our productivity and insure that the beta version had limited bugs. The bugs that where found related to asp scripting errors, sql errors, or the lack of error capturing. A simple example dealt with the database not responding because of a network error. This could happen at the beginning of a transaction or in the middle of the transaction in which case the entire transaction would have to be reversed. Another error we found was related to using SQL keywords in a text box. The error would result in a transaction failure. The finding would result in the debugging of a particular module in order to correct the problem.

Overall testing allowed us to test functionality as well as the data integrity of our system. The simultaneous tasks of coding and debugging allowed us to decrease the time needed to insure the operation of this program.