MIDDLE EAST TECHNICAL UNIVERSITY

DEPARTMENT OF COMPUTER ENGINEERING

CENG491 FALL 2006

SENIOR DESIGN PROJECT

REQUIREMENT ANALYSIS REPORT

MULTIWAY

by

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1. INTRODUCTION

1.1 Project Title

Our project subject is “A Unified News Exchange Server with NNTP, Mail, Web and RSS” and our project title is “Multiway”.

1.2 Problem Definition

In today’s world, being capable of establishing high speed and secure communication with others is an important affair of life. Especially communication and file transmission between members of a group, a company should be built in a very secure and efficient fashion.

We intend to build a communication system containing several access methods with file sharing, email sending-receiving, RSS feed capabilities.

1.3 Project Scope

Multiway is a server application software package by which a communication system including Hypertext Transfer Protocol, , Network News Transfer Protocol, Simple Mail Transfer Protocol, Internet Message Access Protocol , File Transfer Protocol and RSS feed can be built up.This system will mainly provide the following facilities;

- ✓ Access to the system platform via HTTP and NNTP.
- ✓ Automatic email posting from system to system members.
- ✓ System members being capable of posting messages to the groups via sending email.
- ✓ RSS feed support.
- ✓ Spam filtering for received messages and received emails.
- ✓ File transfer among members .

1.4 Project Application Areas

This project product has wide application areas. All the applications needing interaction with subscribed users are possible to be implemented by other system. Some of these areas are below:

Distance or Traditional Education: The interaction between teachers and students may be provided by the newsgroups. There may be separate groups for different courses which give the students the opportunity to discuss their ideas and by our chat system which we may implement as an additional feature students can talk to each other online. Students can also upload their homework to the area created by the administrator of the newsgroup of the course.

Companies: The interaction between managers and workers may be provided by the newsgroups. There may be separate groups for different departments which give the workers the opportunity to discuss the projects and exchange ideas. Workers can also upload their weekly reports to the area created by the administrator of the newsgroup of the department.

Online Forums: This application can use our web module. People exchange ideas and share files on the web by subscribing to the forums formed by different newsgroups. File sharing will be managed by the administrator of each newsgroup. Subscribed users may also chat to each other by our system.

2. RESEARCH

2.1 Literature Research

2.1.1 Research of Similar Programs

- **MPNews:**

MPNews is a complete discussion forum solution for Windows. It integrated the advantages of NNTP newsgroup, web forums, blogs, mailing lists and RSS. The users of MpNews can choose one of the ways that Mpnews offered to them. They read the news from their newreader, from web or from RSS reader.

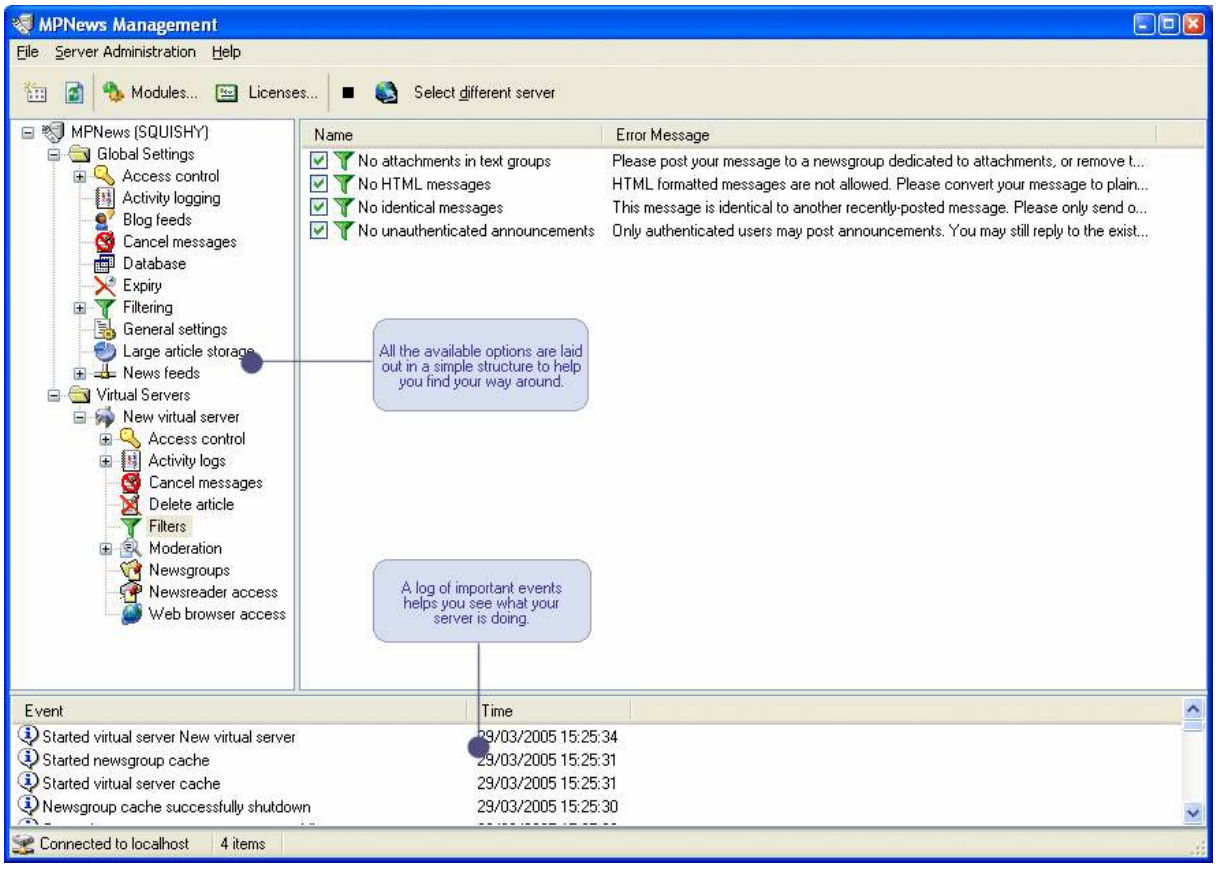
MPNews is a product of Mutant Penguin Software which is an independent software vendor (ISV) founded in 1997.

Configuration Part:

The MPNews Management application is the central point for configuring MPNews. The administrator of the system can change all the options for the server from here.He/she can add new newsgroups and users, and change the propeties of newsgroups and users.

Admin can also use the MPNews Management application to configure an MPNews server running on another computer, and set up the access rights so other people can change the settings for their own "virtual server".

The panel for MPNews Management loos like this:



NNTP newsgroups:

MPNews complies with all the accepted standards for NNTP newsgroups, and as such can easily be used from Windows, Linux and Mac newsreaders as well as mobile phones and any number of other devices. Moreover newsgroups can also be accessed via internet with http protocol.

Web Forums:

Users of the MPNews can read and post messages using their web browser and not have to worry about setting up a newsreader program. Web forums and newsgroups are completely integrated, so the same messages are available in both.

MPNews also makes available to use the web forum option to view extra information about other users and search through the existing messages.

RSS and Atom Format Feeds:

As being able to read messages in a newsreader program and a web browser, users of the MPNews can get the latest messages in their newsgroups by subscribing to an RSS or Atom format feed. A separate feed is available for each of your newsgroups.

Readers can also use standard blogging tools to post new messages to their newsgroups. As with the web forum option, these messages can also be read in NNTP newsgroups and web forums.User can set up an RSS to NNTP gateway to download their favourite blogs into their newsgroups, and post any new messages from the newsgroup back to the blog.

Mailing Lists

MPNews can also be used for running new mailing lists, user can use another mailing list server to run the list and set up MPNews as a gateway to allow people to participate in the list via NNTP newsgroups, web forums and blogs.

If users already have a mailing list set up and want to keep a web archive of all the messages, or want people to be able to post and read messages from the list in their

newsreader,they can set up MPNews to act as a normal subscriber to the list and it will save each message from the list in a newsgroup and send any new messages you post back to the list to be read by others.

MPNews can handle subscribe and unsubscribe requests for the list, and can automatically remove any invalid addresses after messages sent to the address bounce.

The other things MPNews include are:

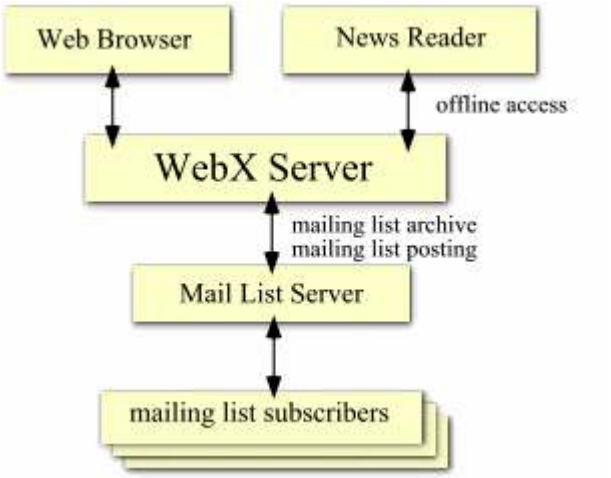
- Powerful access control option so users can restrict access to each newsgroup to only the people they want.
- Run newsgroups across multiple servers for reliability and performance, or just take a copy of favourite Usenet newsgroups.
- Filter out unwanted messages according to user own rules. Prevent HTML messages, attachments, excessive quoting, identical messages, or anything else.
- Cancel messages without leaving user system open to abuse by only allowing cancel messages from the original author of the message, verified by username.
- Find and delete any messages from user newsgroups quickly and easily.
- Use SQL database
- Searchable newsgroups.,Integrated search features
- Remove old messages automatically to save disk space, or keep your messages forever.
- Create as many newsgroups as you like

As it was seen the features of that program are similar to our project's features.How ever in contrast to us it can only execute in Windows platform.Moreover it is not open source so we can get information about the language,the methods they used.The devolopers of the program do not give information about the inside of the program.We can not find information about the languages the programs,the requirements of the program.It only help us to implement new features for our system.

- **Web Crossing:**

Web Crossing is a collaboration server which has a built-in message board and includes many internet protocols. It has features similar to the ones that our project requires. Web Crossing is available for Unix, Windows, and Mac servers. The Web Crossing can run either as in itself without an external web server or as conjunction with another web server. Web Crossing supports secure web service (HHTPS) via SSL (Secure Socket Layers) protocol. Information security between server and client is provided by encoding done by SSL. We also want to include this feature in our project.

The Web Crossing server can be accessed in several different ways. The most common way to access is with a web browser, such as Netscape Navigator or Microsoft Internet Explorer. However, it is also possible to participate in Web Crossing conferences via a mailing list and also by using a newsreader program, such as Netscape News, Microsoft Outlook. In this way, Web Crossing supports "Protocol Independent Participation" meaning users can connect and read the same database of the messages via web, electronic mailing lists or newsgroups. This "Protocol Independent Participation" is the main goal of our project. The "Protocol Independent Participation" approach of Web Crossing is illustrated in the below figure:



Web Crossing newsreader access is authenticated. User names and passwords are recognized, and users are handled according to their user groups and newsgroups access lists. Users can make search over the message groups, but they are only able to search areas to which they have access. For making searches very quickly, Web Crossing uses a mini-database called a search index. In this mini-database the headers of the messages are kept. Web Crossing has automatic archiving and expiration settings and the administrator of the system can delete messages, users. This will also be included in our project. Since Web-Crossing is not open-source, we will only be able to make use of the general working layout of it.

2.1.2 Research of Used Servers

- ***HTTP Servers:***

Open Source HTTP Servers:

1. APACHE :

Apache has been the most popular web server on the Internet since April 1996 for modern operating systems including Windows 2003/XP/2000/NT/9x, Netware 5.x and above, OS/2, and most versions of Unix. The goal of the server is providing a secure, efficient and extensible open source platform that provides HTTP services in sync with the current HTTP standards.

The Apache HTTP Server Project is part of the Apache Software Foundation and managed by a group of volunteers located around the world, using the Internet and the Web to communicate, plan, and develop the server and its related document.

The general properties of APACHE servers are:

- implements the latest protocols, including HTTP/1.1 (RFC2616)
- is highly configurable and extensible with third-party modules
- can be customized by writing 'modules' using the Apache module API
- is actively being developed
- Apache version 1.1 and above comes with a proxy module. If compiled in, this

will make Apache act as a caching-proxy.

- Apache provides content negotiation (It can choose the best representation of a resource based on the browser-supplied preferences for media type, languages, character set an)
- not included SSL
- not include a search engine, but it is compatible with many free search engines that can be found in the internet.
- The base Apache Web server package does not include support for Java, Java Server Pages, Enterprise Java Beans, or ASP. However those features are available as add-ons from the Apache's project site.

According to properties above apache will provide us secure develop able system. Because it is the most common http server in the market most programs in the market are compatible with it. That property of the server will be helpful to as when connecting different modules with different open source programs. However apache is not fast enough when it compared with some other servers in the market. Moreover not having SSL makes apache less secure.

2. ROXEN:

Roxen is a web server written in Roxen Internet Software Comunty's own programming language Pike. In addition to supporting all the usual features such as CGI, FastCGI, htaccess, SSI etc. Roxen WebServer also includes Roxen Comunity's own inlined language RXML. It runs on a number of different operating systems including Windows, Linux, Solaris and Mac OS X.

Some of the strong points of this server is:

- Open source code.
- A web-based interface for easy configuration and administration.
- The highly regarded Roxen graphics support which can be used for dynamic generation of e.g. headers, images and charts.

- Integrated MySQL database.
- Server-side programming via RXML, Java, Perl, PHP, CGI scripts and more.
- Strong encryption.
- Modular architecture where server extensions can be loaded without shutting down the server process.
- Platform-independent

Although Roxen is a good one of the best open source and free web server in the word because its written language is Pike and it users RXML it will be hard for us to adapt it to our system.

3. LIGHTTPD

LIGHTTPD is a web server which is designed to be secure, fast, standards-compliant, and flexible while being optimized for speed-critical environments. It has a very low memory footprint compared to other web servers and takes care of cpu-load. Its advanced feature-sets are:

- virtual hosts
- virtual directory listings
- URL-Rewriting, HTTP-Redirects
- automatic expiration of files
- Large File Support (64bit fileoffsets)
- ranges (start-end, start-, -end, multiple ranges)
- on-the-fly output-compression with transparent caching
- deflate, gzip, bzip2
- authentication
    - basic, digest
    - back ends: plain files, htpasswd, htdigest, ldap
- fast and secure application controlled downloads
- Server Side Includes
- User Tracking

Although LIGHTTPD is not as common as Apache its properties are better than it. It has got fast CGI and SSI. In most test the performance of LIGHTTPD is much higher than the Apache in most cases. However as the apache is the common one most people prefer to use Apache rather than LIGHTTPD.

- ***NNTP Servers:***

1. ***InterNetNews (INN)***

The InterNetNews package (INN) is a complete Usenet system. It includes innd, an NNTP server, and nnrpd, a newsreading server. INN was originally written by Rich Salz. After Rich was unable to continue supporting it, Internet System Consortiums (ISC) took over development of INN in 1996 and many variants of the software were forming.

In brief, netnews is a set of protocols for exchanging messages between a decentralized network of news servers. News articles are organized into newsgroups, which are themselves organized into hierarchies. Each individual news server stores locally all articles it has received for a given newsgroup, making access to stored articles extremely fast. Netnews does not require any central server; instead, each news server passes along articles it receives to all of the news servers it peers with, those servers pass the articles along to their peers, and so on, resulting in "flood fill" propagation of news articles.

A news server performs four basic functions: it accepts articles from other servers and stores them on disk, sends articles it has received out to other servers, it accepts postings from users and offers stored news articles to readers on demand. Since our project does not require to connect Usenet network all over the World, we will make use of the last two features of the INN.

INN supports accepting articles via either NNTP connections or via UUCP. innd, the heart of INN, handles NNTP feeding connections directly. The part of INN that handles connections from newsreaders is nnrpd. Also included in INN are a wide variety

of supporting programs to handle periodic maintenance and recovery from crashes, process special control messages, maintain the list of active newsgroups, and generate and record a staggering variety of statistics and summary information on the usage and performance of the server. INN also supports a filtering system that allows the server administrator to reject unwanted articles (such as spam).

INN is free software, supported by Internet Systems Consortium and volunteers around the world. It comes with a set of man pages; there is a man page for every configuration file and program that comes with INN. INN is written in portable C and should work on any Unix platform. Therefore, using INN in our project is favorable.

2. Diablo Usenet Software

The other open source news server is Diablo. Diablo is a news feeding and news reading software package that was originally developed by Matthew Dillon and now run as an open source project. Diablo was originally developed on FreeBSD, but it can also work in BSD/OS, Linux, Solaris.

Apart from the news feeding and news reading capabilities, Diablo has some utilities. These utilities are adding/modifying/deleting newsgroups, article expiration and generating and recording a variety of statistics.

- ***Mail Servers:***

1.Courier Mail Server:

The Courier mail transfer agent (MTA) is an integrated mail/groupware server based on open commodity protocols, such as ESMTP, IMAP, POP3, LDAP, SSL, and HTTP. It provides ESMTP, IMAP, POP3, webmail, and mailing list services within a single, consistent, framework. Individual components can be enabled or disabled at will. This feature enable us to integrate the only necessary components, that we want, of

Courier into our core. Since it provides the SMTP, IMAP and POP3 together, we thought that we could use Courier mail components as our webmail server.

Courier evolved out of several related projects, that merged together.It has implemented SMTP extensions for mailing list management and spam filtering. In our core, we are supposed to implement spam filtering for mailing facilities. Thus, those SMTP extensions of Courier could also be beneficial for us while implementing spam filtering. Furthermore, Courier can function as an intermediate mail relay, relaying mail between an internal LAN and the Internet, or perform final delivery to mailboxes. It uses maildirs as its native mail storage format, but it can also deliver mail to legacy mailbox files as well. Courier's configuration is set by plain text files and Perl scripts. Most of Courier's configuration can now be adjusted from a web browser, using Courier's web-based administration module.

Another feature of Courier is that it can provide mail services for regular operating system accounts. Courier can also provide mail services for virtual mail accounts, managed by an LDAP, MySQL, or PostgreSQL-based authentication database.

Certain portions of Courier - the mail filtering engine, the webmail server and IMAP server - are also available are separate, smaller, packages that can be used with other mail servers.

2.Zimbra Collaboration Suite (ZCS):

Zimbra Collaboration Suite (ZCS) is a groupware product created by Zimbra Inc., located in San Mateo, California. It consists of both server and client components. Two versions of Zimbra are available: a community-supported open-source version, and a commercially supported version ("Zimbra Network") with closed-source enhancements. The latest open- source version of ZCS is the 4.0.3.

ZCS Server leverages existing open source projects such as Postfix, MySQL, OpenLDAP and Lucene. It exposes a SOAP application programming interface to all its

functionality and acts as an IMAP and POP3 server. The server runs on many flavors of Linux as well as on Mac OS X.

ZCS Web Client is a full-featured collaboration and administrator interface written using the Zimbra Ajax Toolkit**.** It supports email and calendars through a rich Ajax web interface allowing tool tips, draggable items, and right-click menus. Also included are advanced searching capability and date relations. Group calendaring and online document authoring is also included.

- ***FTP Servers:***

After we searched for existing FTP servers used in applications all around the world, we were left with two candidates, '**CrossFTP Server**' and '**JSCAPE Secure FTP Server**'. We will probably make use of one of them. These two are the ones most compatible with our application and the platform we use. Below is the comparison of the features of these two servers:

- Both CrossFTP Server and JSCAPE Secure FTP Server are platform independent.
- CrossFTP Server is free and open-source where JSCAPE Secure FTP Server is commercial.
- Both CrossFTP Server and JSCAPE Secure FTP Server support Implicit/explicit SSL/TLS for data protection.
- JSCAPE Secure FTP Server supports SFTP to maintain high security.
- CrossFTP Server supports anonymous login of the users.
- Both servers are capable of both uploading and downloading files.
- JSCAPE Secure FTP Server supports remote administration by which you can manage your servers from all around the world.
- Both servers have virtual file system, user virtual directory, write permission, idle time-out and upload/download bandwidth limitation support.
- CrossFTP Server has MTDM support for users to be able to change date-time stamp of files and MODE Z support for faster data transfer.
- Both servers have IP restriction and access rules for security.

- CrossFTP Server has an easy-to-use GUI for user to configure the server's behavior and a high-performance, multi-threaded design.
- JSCAPE Secure FTP Server supports virtual hosting which provides creating multiple FTP server instances each with their own users and configuration.
- CrossFTP Server is configurable and all FTP messages are customizable.
- JSCAPE Secure FTP Server has customizable logging support allowing you to log only those events that are important to you.
- JSCAPE Secure FTP Server supports passive port redirection which allows you to specify a different IP address to use in response to passive client connections and also supports passive port range to specify a range of ports for passive connections.
- With CrossFTP Server, you can use database and LDAP to store user data and monitor all user activities.

  Both servers support both ASCII and binary data transfers.

2.2 Market Research

For learning customer requirements, we met managers from two companies and asked some questions to them.

→ Interview with director of Ada Bilişim&Yazılım:

- Do you have a news exchange server to provide communication between the people in your organization?
  - ❖ Yes.
- What is the name of your system software?
  - ❖ Sorry, due to our regulations we can not mention the name of our program.
- What are the protocols that your current news exchange server supports?
  - ❖ It supports NNTP. We use a specific newsreader program for writing and reading messages.
- Do you have RSS functionality?
  - ❖ Yes, we have it just for the last four months.

- What are the features that you like and dislike about your current system?
  - ❖ It is sufficient for current needs but it would be better if we could also share and transfer files between the employees.
- What are hardware and software requirements of your system?
  - ❖ Any currently used PC is sufficient to use the system. We do not have any problem at that point.
- What kinds of user groups do you have in your current system?
  - ❖ Groups are divided to different departments of our company. I mean every department has its own newsgroup and only workers of that department can exchange messages on this newsgroup.
- Does your system have administrator web interface?
  - ❖ No we don't have. Neither the employees nor the administrator can use internet to access the newsgroups. A specific newsreader program is used for that purpose by the employees. Our administrator also uses a desktop program on the network to manage the system.
- Do you provide email accounts for the people in your organization?
  - ❖ No we do not. We do not find it necessary.

→ Interview with manager of human resources department of Iveco:

- Do you have a news exchange server to provide communication between the people in your organization?
  - ❖ No, unfortunately we do not.
- Do you need such a system?
  - ❖ Yes it would be good for our company because we sometimes have some problems about communication between workers. Telephoning is an old and inefficient way for the communication in a company. By the help of such a program informing all related people about news would take less time.
- How do you provide communication between people in your organization?
  - ❖ We usually use telephoning, making announcements in our web site or send mails to the workers if they have registered mail addresses.

- If you had such a system, what would be your expectations from the system?
  - ❖ We would like to have a system which provides users to reach the newsgroups by using the internet. Because our company is not a company directly related to computers and some of our employees can use only the internet on the computer. It will be hard for us to educate all new workers about how they can use the system. Due to the same reason, the web page would be easy to use. It would also be good if the system sent new messages to the employees by email.

We also made an interview with the developer of the newsgroup of METU Department of Computer Enginnering. He informed us technical features and requirements of such a system. Below is the interview we made with Ahmet Saçan:

- What are the protocols that your current news exchange server supports?
  - ❖ The posts in our news exchange server are accessible through a web interface using HTTP protocol. They are also can be read from Thunderbird or Tin using NNTP protocol.
- What kind of user groups do you have in your current system?
  - ❖ Mainly, we have two user groups in our system. The first one is administrator of the system; the second one is academic staff and students of our department. However, rights of students and academic staff on the system differ in some aspects. For example, a teaching assistant can give and collect homeworks over the system whereas students are only allowed to send their homeworks to the system.
- Is there a web interface for your administrator of the system?
  - ❖ There is no specially designed web interface for administrators. They are performing their tasks through low level interactions with the system.
- What are the features that you are planning to include in your current system?
  - ❖ Now, the posts sent by users can be canceled by any user. I am planning to change this feature. Every user would be able to cancel only his/her own message.

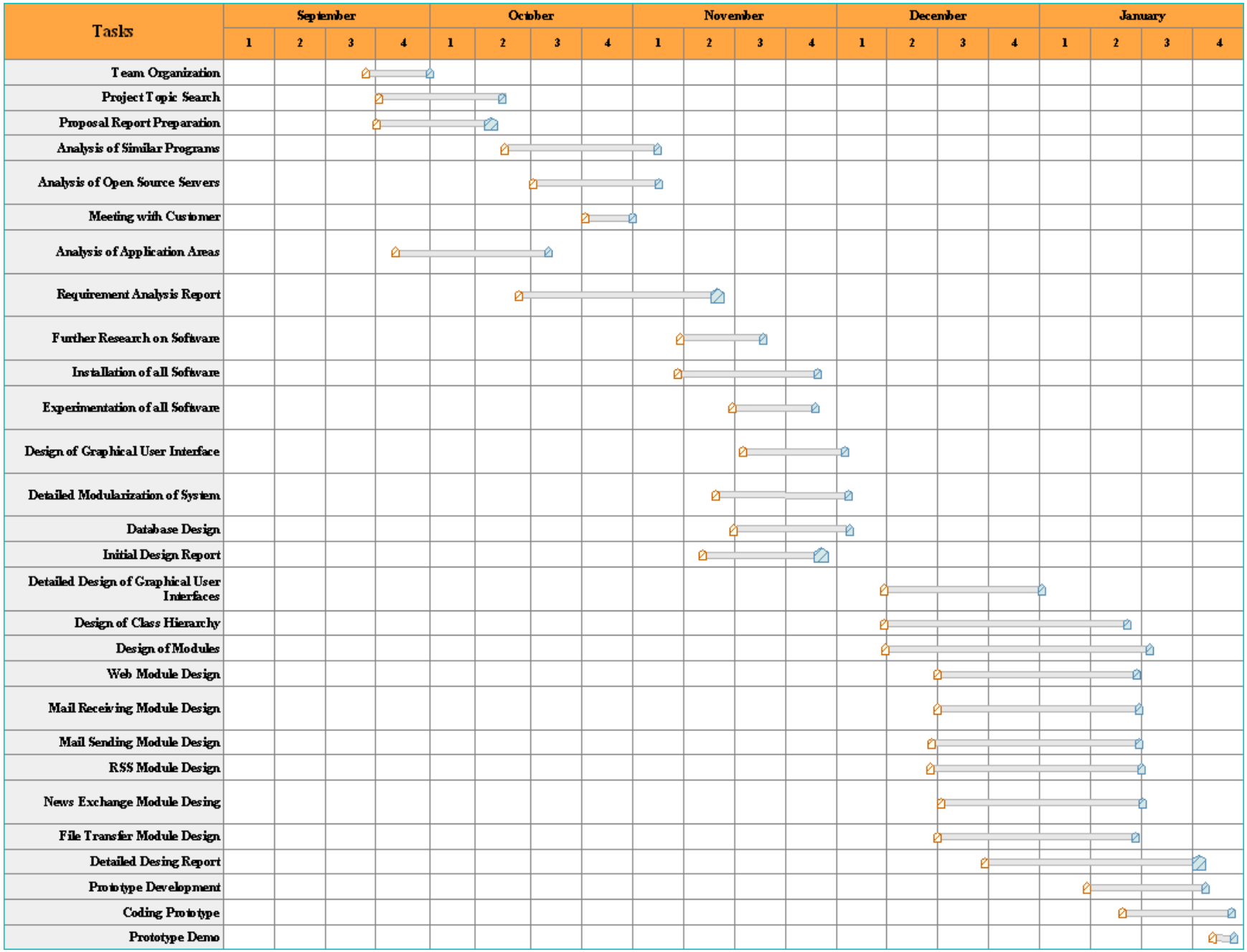
- What kind of data storage do you recommend us for our system? Should we use a file system or a database?
  - ❖ I recommend you to use database to store your messages since it is more efficient.
- According to you, what would be software and hardware requirements of our system?
  - ❖ For sending messages to your news exchange server by e-mail, you should include STMP and POP3 or IMAP server in your system. You should use NNTP server for dealing with message posts and requests done by NNTP protocol. As your system will be accessible via a web browser through internet, you should also include a web server in your system.For the hardware requirements, I think it will be enough to have 512 MB RAM, 80 GB hard disk.

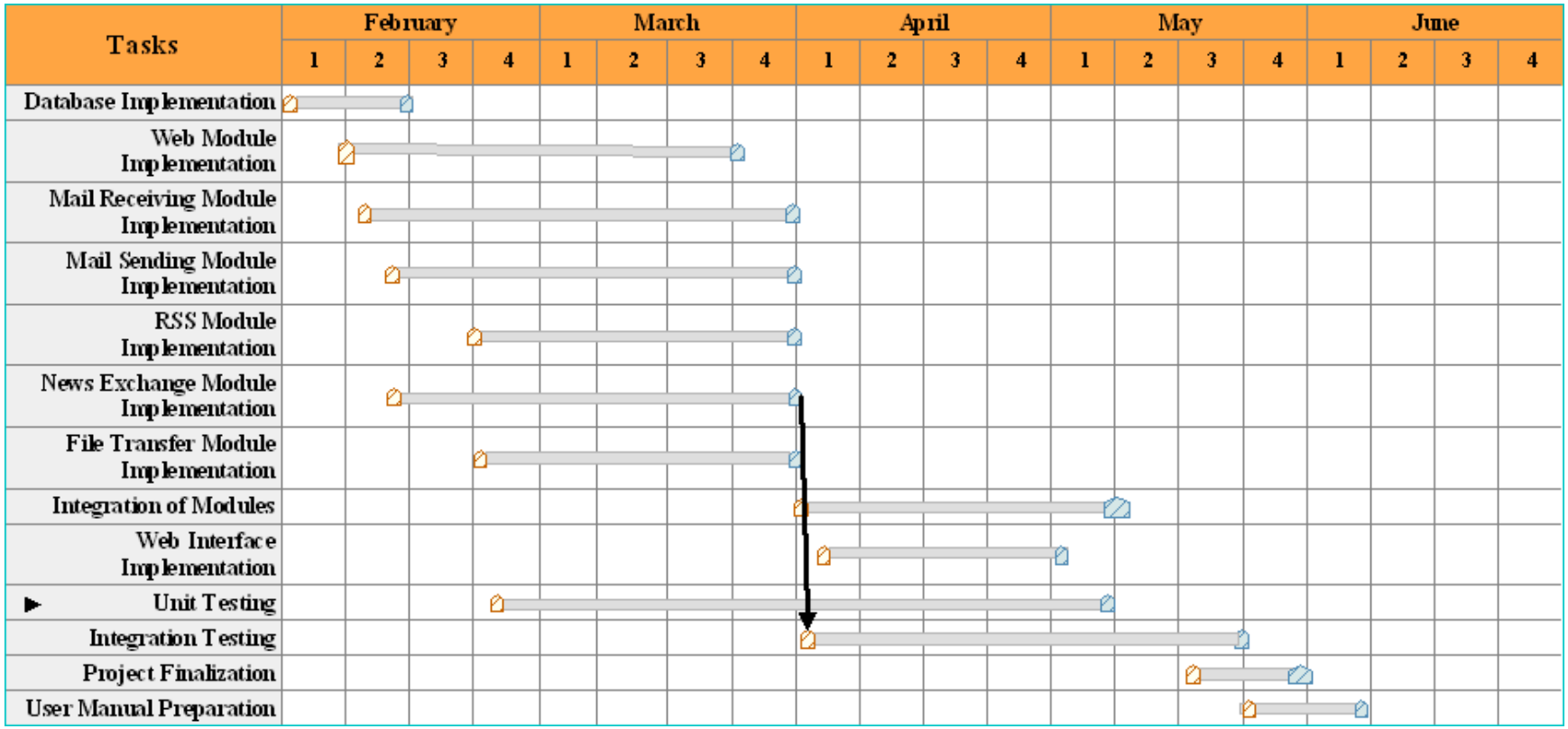
3. TEAM ORGANIZATION

We have decided to select "Controlled Decentralized" model as our team structure. We have chosen this model since it is necessary to have a team leader for providing coordination of tasks and meetings. Also, it is important to have horizontal communication between group members to accomplish project goals by providing good communication within the team members. The roles that we have decided for team members are below:

Group Members	Çiğdem	Aslı	Başak	Safiye	Efser
Project Manager		√			
Achieve Keeper	√				
Contact People	√				
Schedule Coordinator				√	√
Summarizer			√		
Time Keeper		√			√
Meeting Clerk			√	√	

4. PROJECT SCHEDULE (Gannt Chart)


Tasks
September
October
November
December
January
1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4
Team Organization
Project Topic Search
Proposal Report Preparation
Analysis of Similar Programs
Analysis of Open Source Servers
Meeting with Customer
Analysis of Application Areas
Requirement Analysis Report
Further Research on Software
Installation of all Software
Experimentation of all Software
Design of Graphical User Interface
Detailed Modularization of System
Database Design
Initial Design Report
Detailed Design of Graphical User Interfaces
Design of Class Hierarchy
Design of Modules
Web Module Design
Mail Receiving Module Design
Mail Sending Module Design
RSS Module Design
News Exchange Module Desing
File Transfer Module Design
Detailed Desing Report
Prototype Development
Coding Prototype
Prototype Demo


Tasks
February
March
April
May
June
1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4
Database Implementation
Web Module Implementation
Mail Receiving Module Implementation
Mail Sending Module Implementation
RSS Module Implementation
News Exchange Module Implementation
File Transfer Module Implementation
Integration of Modules
Web Interface Implementation
Unit Testing
Integration Testing
Project Finalization
User Manual Preparation

5. PROCESS MODEL

This project will be developed as our graduation project. We are supposed to progress through analysis, design, coding and testing phases. Therefore, we will follow linear sequential model as our main process model. While developing our product, we will first release a prototype of it and then we will implement our final version of the product. This methodology is suitable with spiral process model. Therefore, in later development stage, we will use spiral process model to be able to make adjustments over our prototype model.

6. PROJECT REQUIREMENTS

6.1 Functional Requirements

- ***Create a new newsgroup on the system:***

This function will be used by the administrator in our system. He may create a new newsgroup on the system by his own will or on desire of the newsgroup chiefs. A name for the group is required when it is created and also user permissions of the group should be determined. Depending on its permissions, a newsgroup may be public (read or written by all users), private (read or written by subscribed users only) or private private (read or written by some subscribed users). The administrator should decide on this functionality when he creates the newsgroup. If the created newsgroup is private private, its subscribed users and its chief should be determined. The administrator should also register if RSS functionality would be used for the created newsgroup and how long the posts of the group would be kept in the system database.

- ***Edit/Remove a newsgroup from the system:***

The functionalities of some newsgroup would be edited a while after it is created. The newsgroup would also be removed. These functionalities are also managed by the administrator.

- ***Create/remove a user account:***

There are some subscribed users of the system which have personal accounts in the system database. The user accounts are created by the administrator on demand. Subscribed users can read and write on private groups using their accounts. The user accounts are also removed by the administrator when it is desired.

- ***Create file transfer data area:***

There is an FTP extension of our system, but in addition to it, the users will send files to the system in some special times. For this purpose, the administrator is responsible for creating some area on the database on desire of the newsgroup chiefs and subscribed users of the newsgroup whose chief has desired it, will upload their files to that created area.

- ***Secure login:***

The subscribed users of the system, including the administrator and newsgroup chiefs should login the system to do actions. An authentication check will exist in the system to maintain the security. Username and password of the users will be checked to match with the ones on the database; if they match, the user will be allowed to login.

- ***Update user information:***

There will be the possibility for the subscribed users to update their personal information. This is also valid for the administrator and the newsgroup chiefs. The administrator will also be able to change user information and accounts on demand, then inform the user of this.

- ***Upload/Download files:***

The subscribed users will be able to upload or download files by using FTP URL. That is, file transfer between subscribed users (including newsgroup chiefs) will be possible using FTP. This will be valid for all the times; there will also be a file transfer

channel between subscribed users and chief of a newsgroup where the chief will be the receiver and other users will be the sender. A temporary area on the database will be created by the administrator for this purpose on the desire of the chiefs.

- ***RSS Functionality:***

The administrator will decide on if a newsgroup would have an RSS Service or not. The required newsgroups will have the RSS XML files to be sent to users in some time intervals. The users will be able to choose some newsgroups to get posts from and read them by using their RSS readers.

6.2 Non-Functional Requirements

- ***Web Interface:***

The Web interface will be for all public and private users and will use HTTP protocol. Users will be able to reach all functionalities of the system by using Internet. The web interface will certainly be user-friendly and easy to use because all the users will access the system by Internet.

- ***Security:***

Because there will be lots of ways to access our system, the security gains much importance. The system will use SSL with HTTPS and SFTP to maintain the security. A Proxy Server will also be provided to the system to be both fast and secure. Because Internet will be the most used way to use our system and it is also used by unsubscribed users, it is more necessary to maintain the security on Internet.

- ***Spam Filtering:***

Our system will send emails to and receive emails from the users. At this point spam filtering will be an important issue. The system will check for spam mails and filter them for the goodness of the subscribed users and the system.

- ***Platform Independence:***

Although the servers of our system will use Unix as the platform of development, the users will be able to access the system on every platform such as Windows, Linux, etc.

- ***Performance:***

There are many user groups and will be accordingly a high number of users accessing the system at the same time. So, the system will be affected at a minimum and have a high speed performance all the time.

- ***Reliability:***

The system should be as bug free as possible. All sub components should work asynchronously, so that any delay caused by one of the components should not block other components work on its own.

6.3 Minimal Hardware Requirements

Minimal hardware requirements for our project are: A PC with the following configuration will be needed:

>>Development	***>>End User***
_ Intel Pentium IV 2 GHz	_ Intel Pentium IV 1 GHz
_ 1GB DDR RAM	_ 512 MB DDR RAM
_ 100MB Hard Disk Space	_ 40GB Hard Disk Space
_ Local or Wide Area Network	_ Internet Connection

6.4 Minimal Software Requirements

Software requirements for the project are divided into categories: Development and End-user. For the Development part, whole the requirements of the open source servers that could be used in our project core are also considered.

- ***Development***

_ Linux Distribution such as Ubuntu 6.0 or OpenBSD 2.8 and up or FreeBSD 2.2.x and up etc.
_ C++ compiler (such as egcs, g++)
_ GNU make
_ Either the GDBM or Berkeley DB library.
_ Perl 5.
_ Python 1.5.2 or higher
_ An implementation of yacc
_ File system supporting FIFOs
_ File system domain sockets as a must.

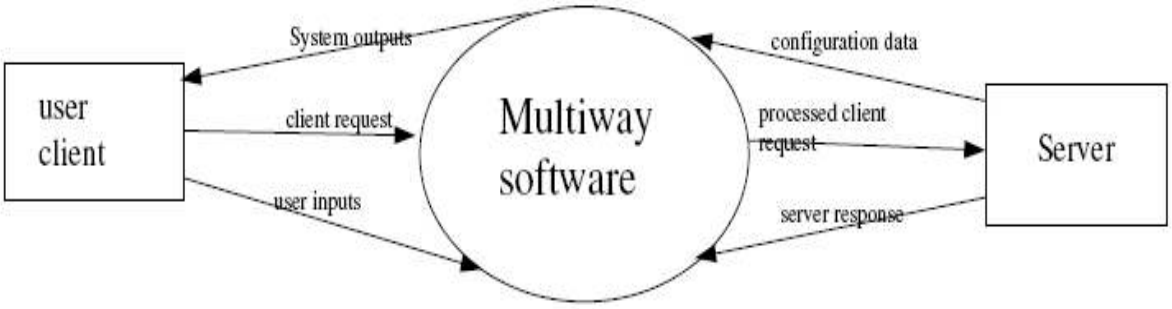
- ***End user***

_ Recent Linux Distribution such as Ubuntu 6.0, or Windows XP (or
newer) or Mac OS
_ Web Browser (Mozilla Firefox, Microsoft Internet Explorer etc) or News Reader (Mozilla Thunderbird, OutlookExpress etc)
_ Any RSS reader

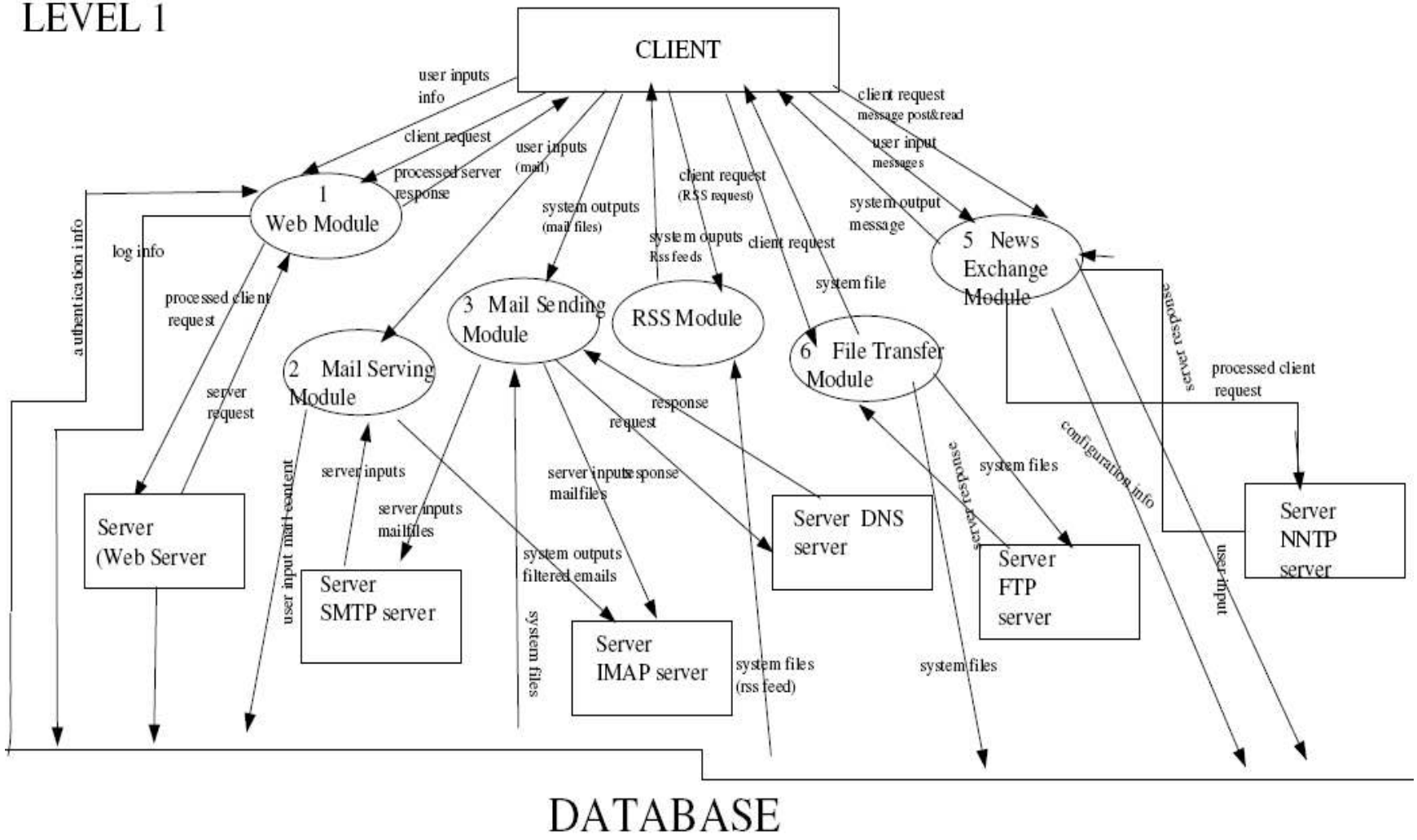
7. MODELING

7.1 Functional Modeling--Data Flow Diagram--:

- ***Data Flow Level 0:***



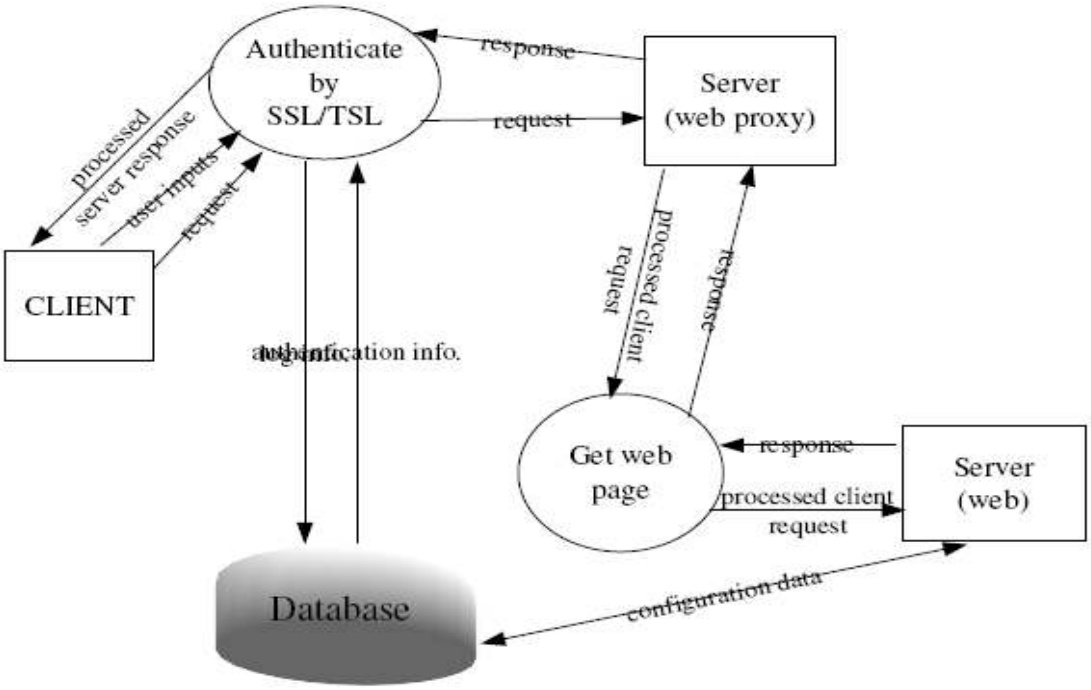
- ***Data Flow Level 1:***


LEVEL 1
CLIENT
user inputs info
client request
processed server response
user inputs (mail)
client request message post&read
user input messages
client request (RSS request)
system outputs (mail files)
system ouputs Rss feeds
client request
system output message
system file
1 Web Module
log info
authentication info
processed client request
server request
2 Mail Serving Module
3 Mail Sending Module
RSS Module
5 News Exchange Module
6 File Transfer Module
server response
processed client request
response request
server inputs
server inputs mailfiles
server inputs mail content
server inputs response mailfiles
system outputs filtered emails
system files
configuration info
system files
Server (Web Server
Server SMTP server
Server IMAP server
Server DNS server
Server FTP server
Server NNTP server
system files (rss feed)
system files
user input
DATABASE

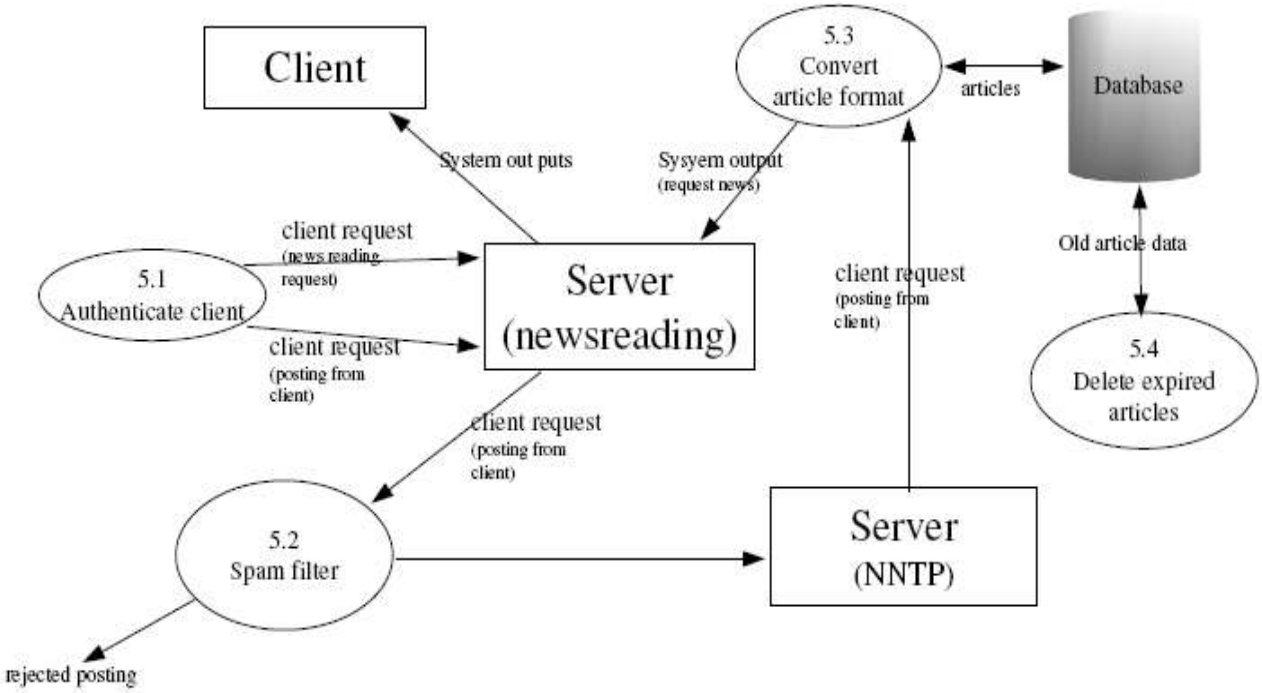
- ***Data Flow Level 2:***

Below are the data flow diagrams for separate modules of our system. The servers an the database below will be implemented in a single computer, there are not separate computers for the servers, but we used below representation (wrote server name in parantheses) to explain the system more detailed.

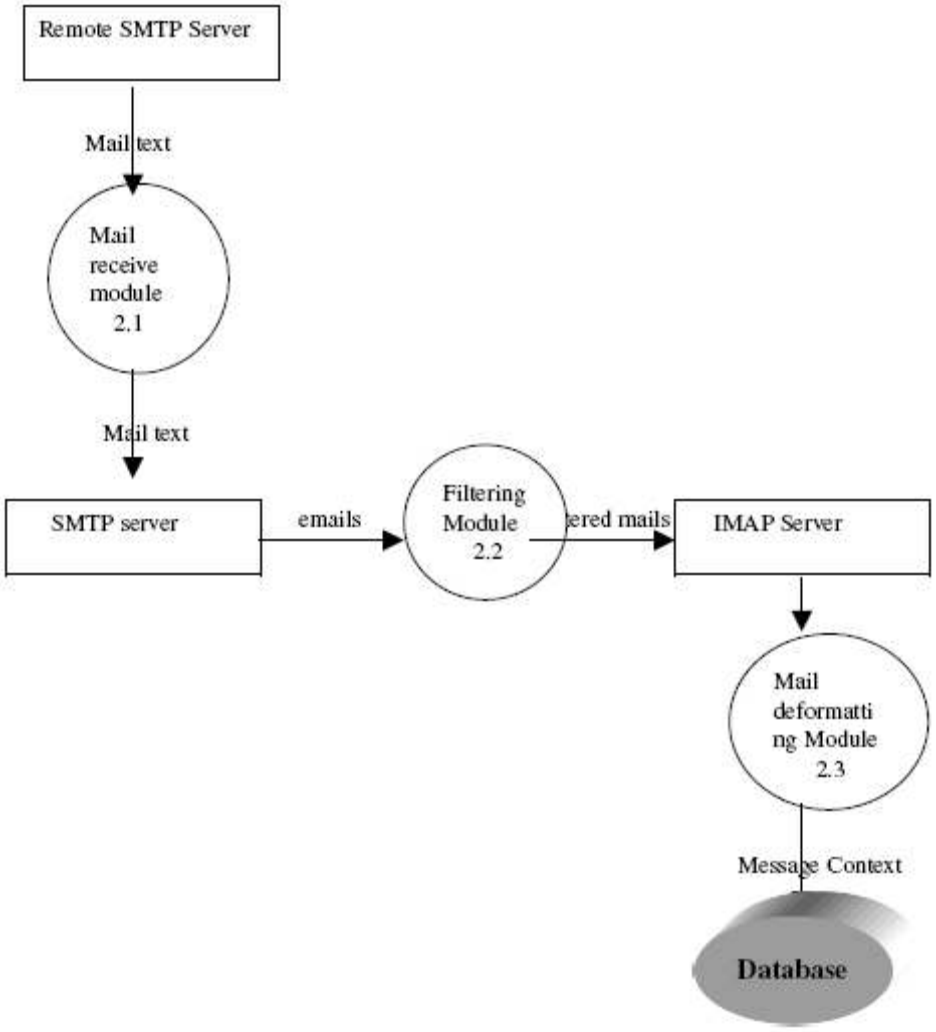
- ***Web Module:***



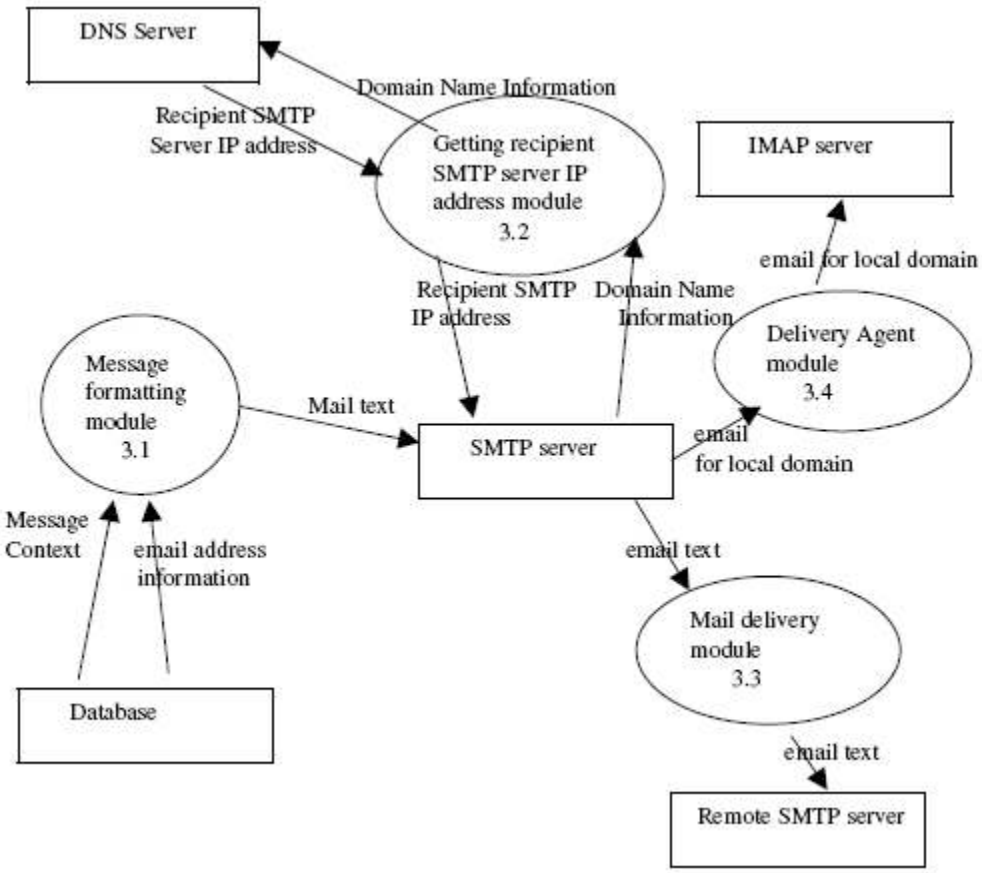
- ***News Exchange Module:***



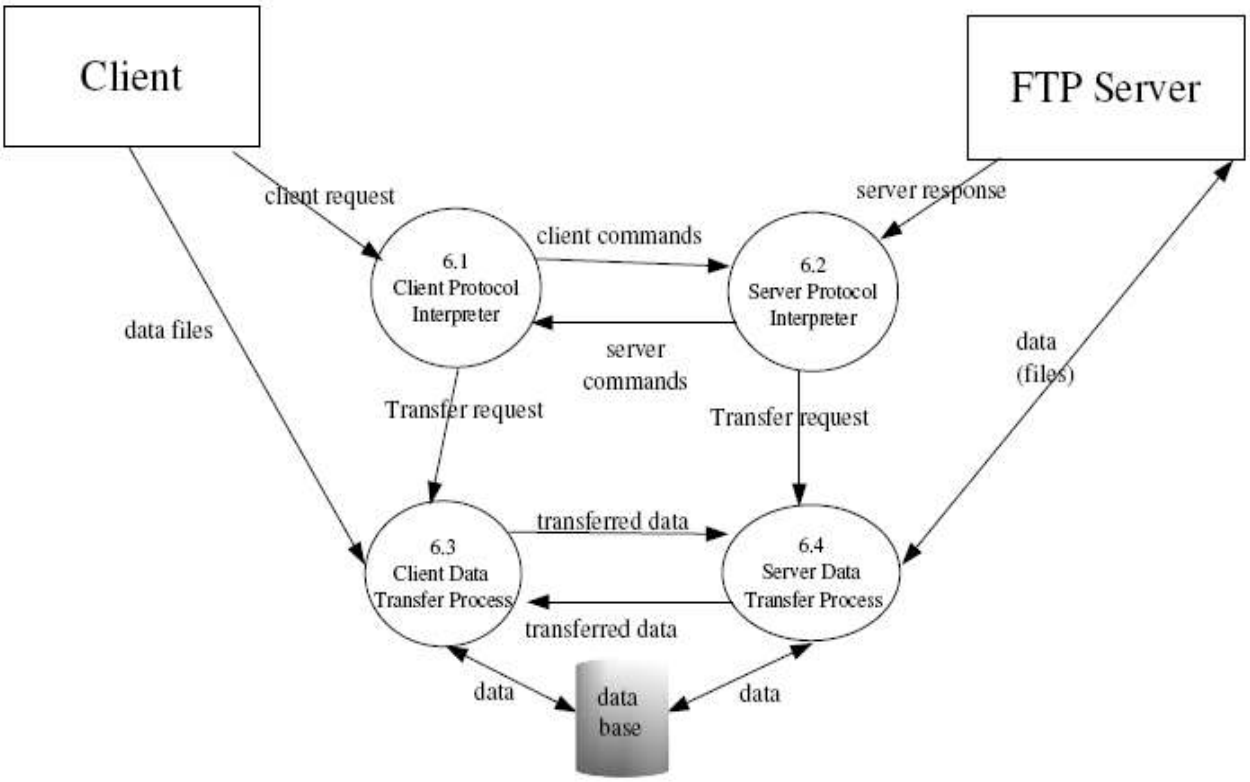
- ***Receive Email Module:***



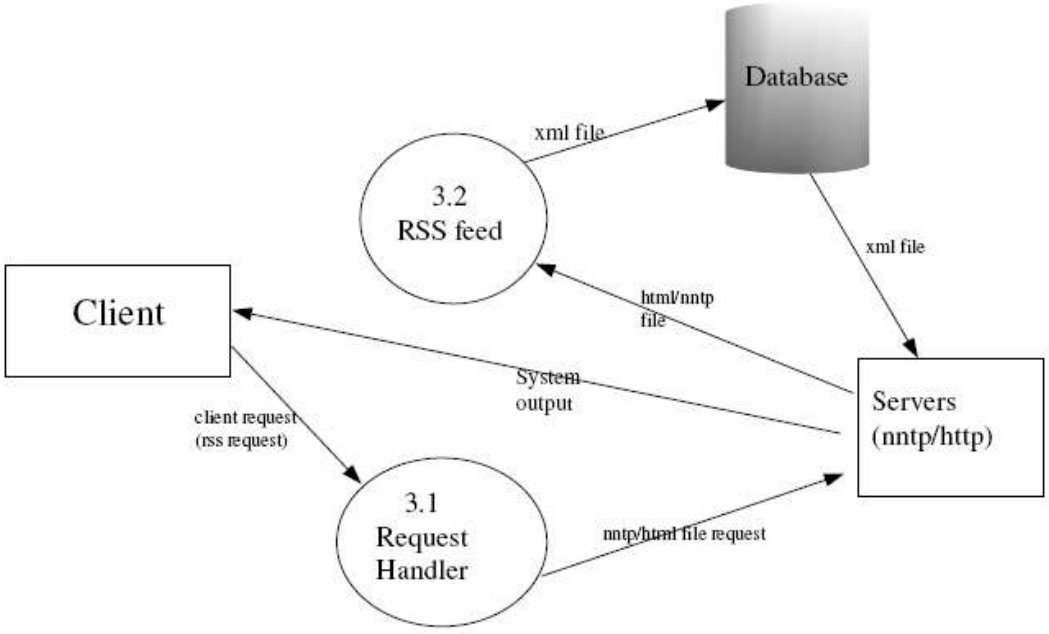
- ***Send Email Module:***



- ***File Transfer Module:***

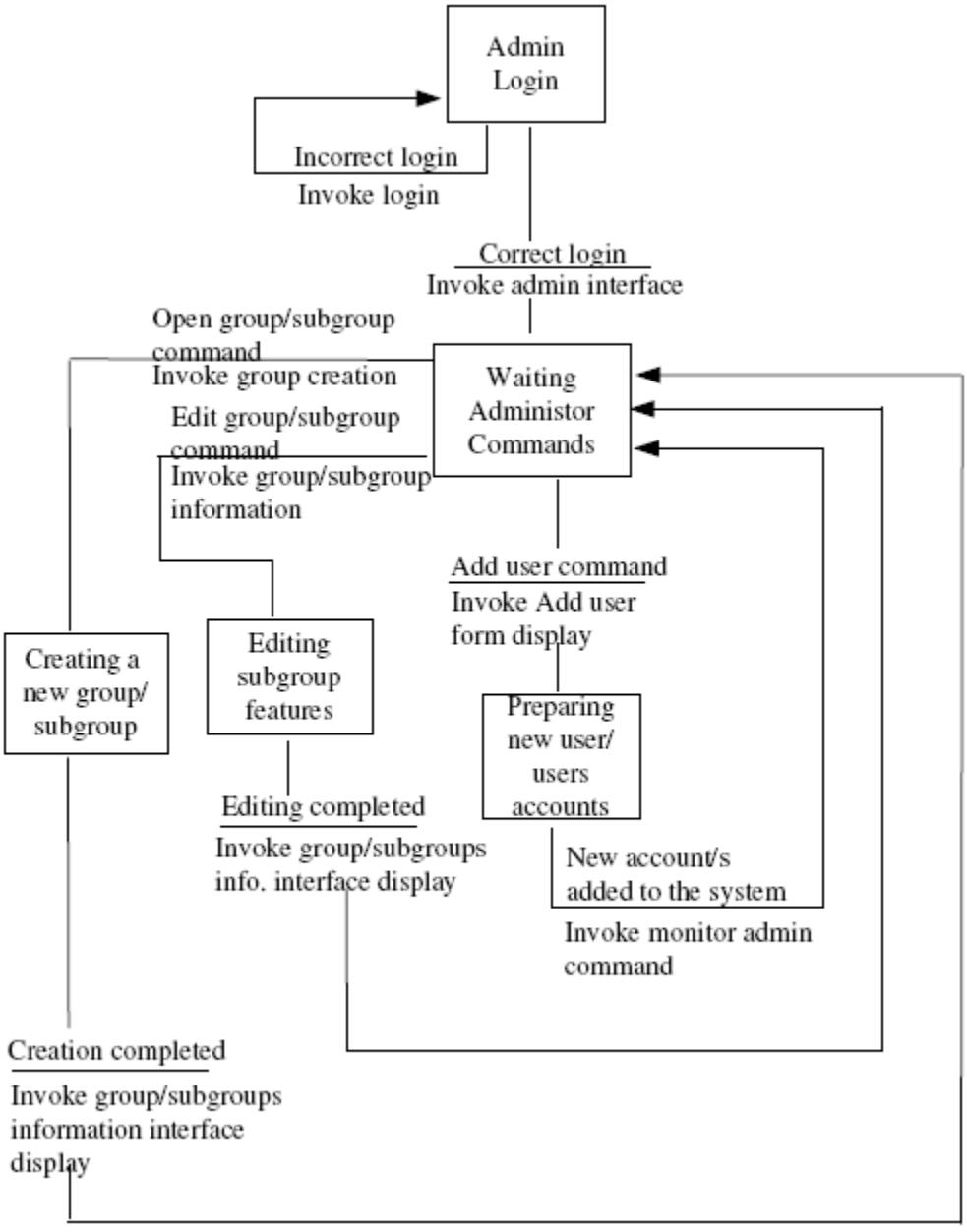


- ***RSS Module:***

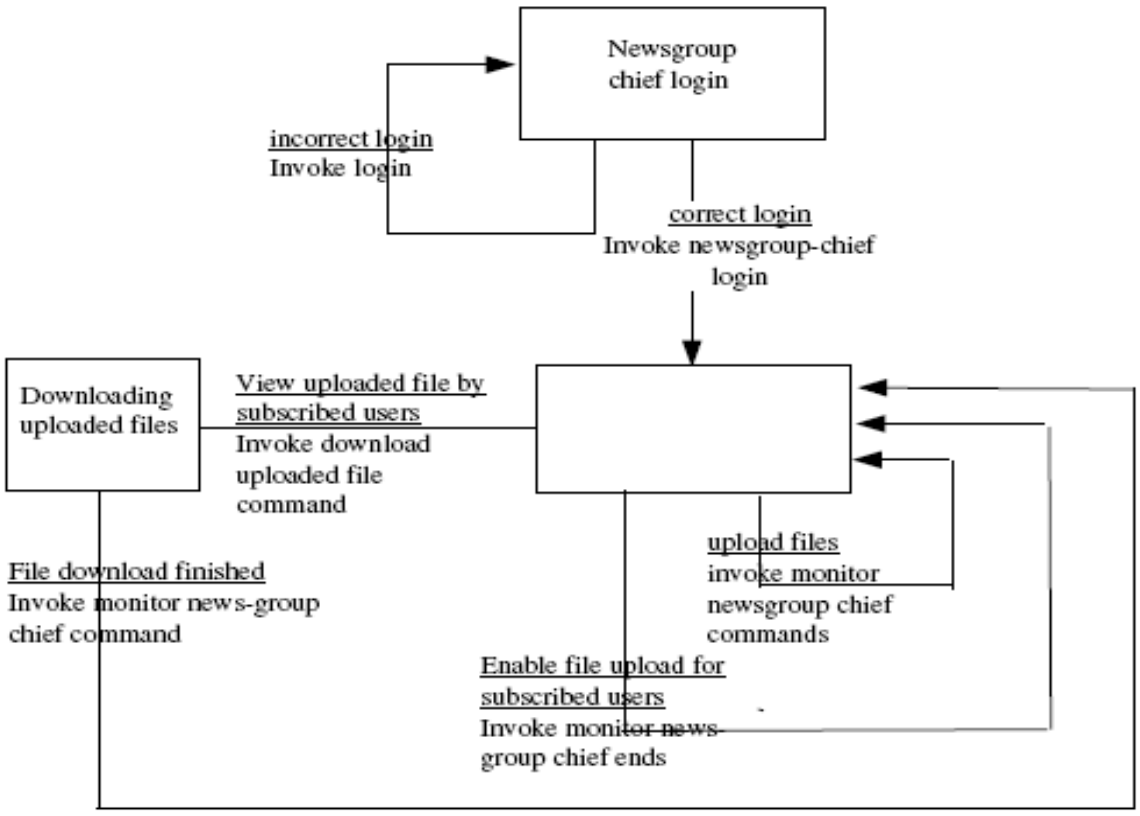


7.2 Behavioral Modeling—State Transition Diagram--:

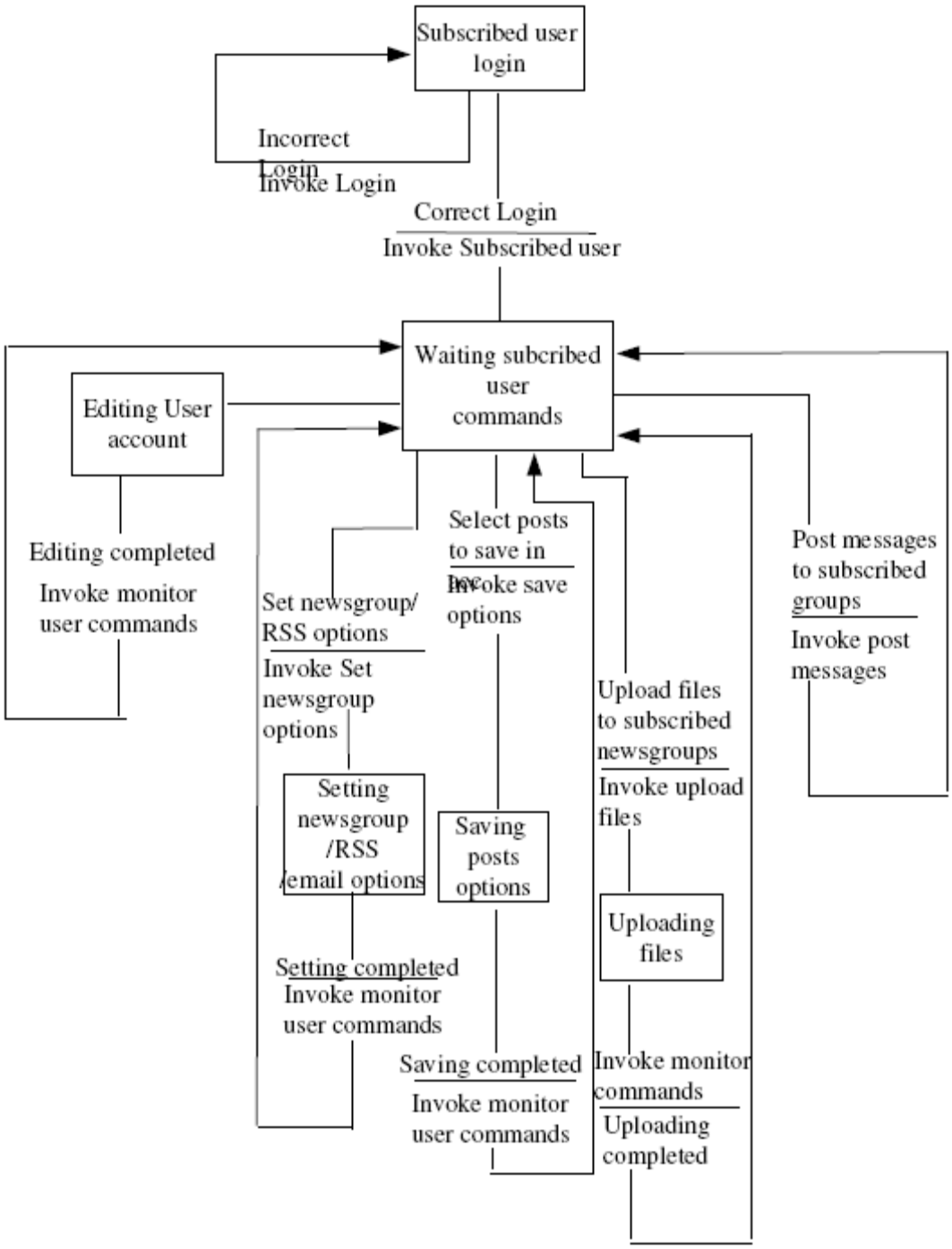
- ***STD for Administrator:***



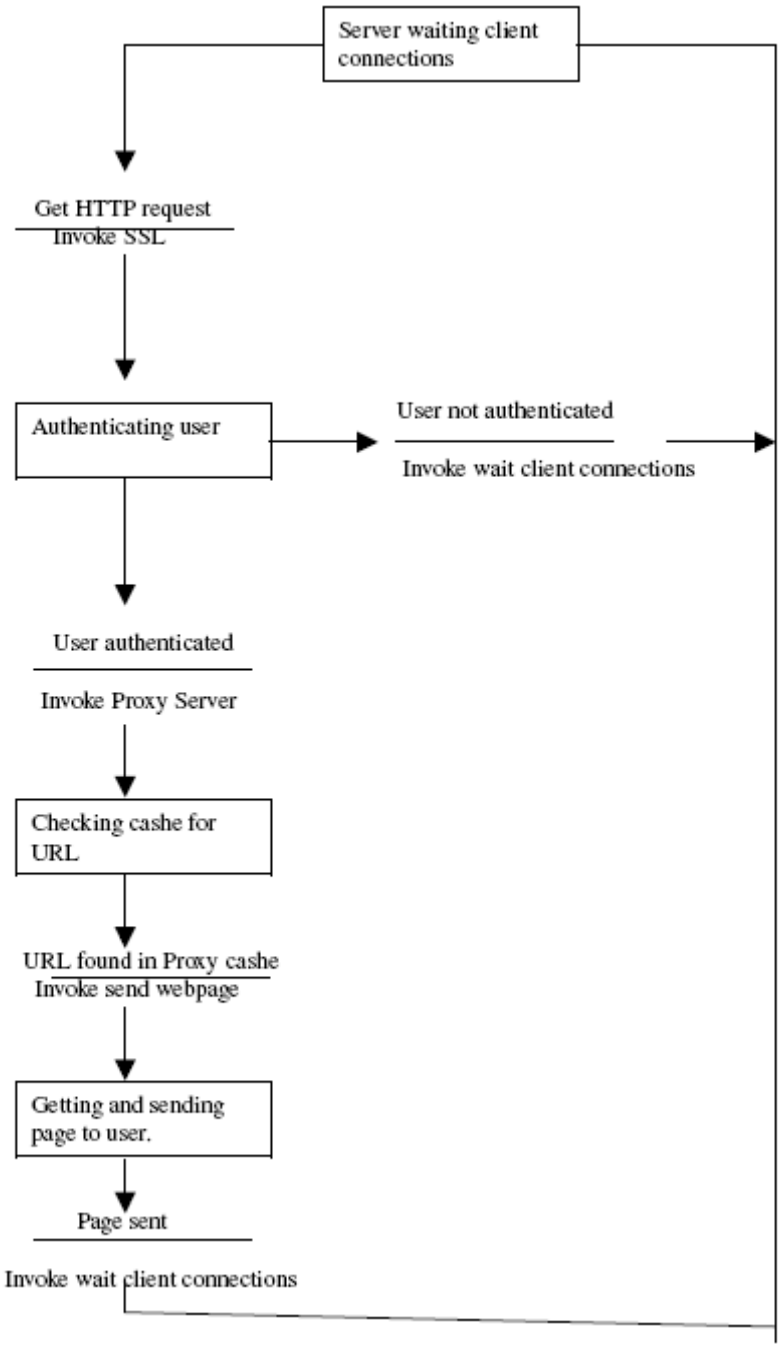
- ***STD for Newsgroup Chief:***



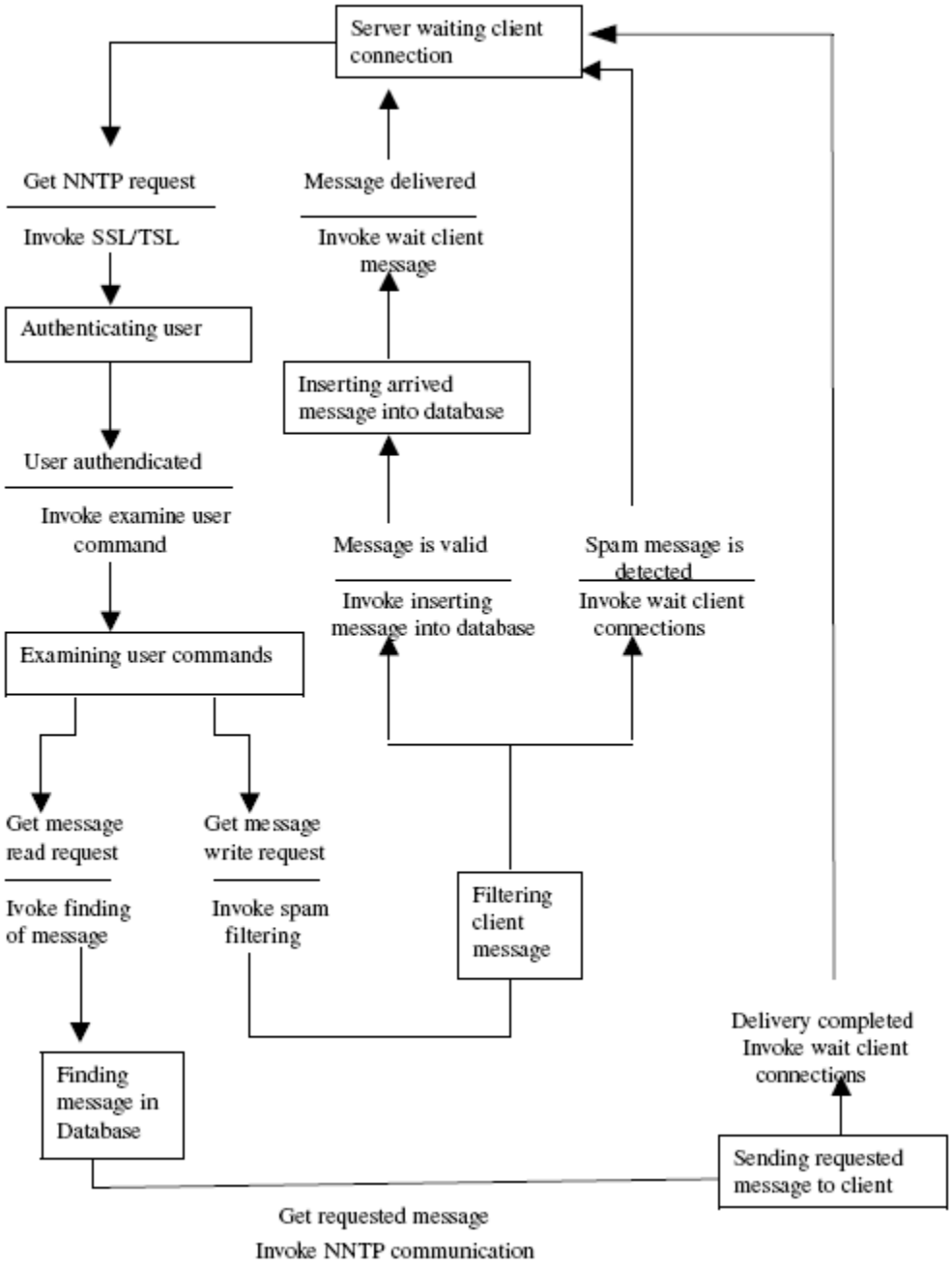
- ***STD for Subscribed User:***



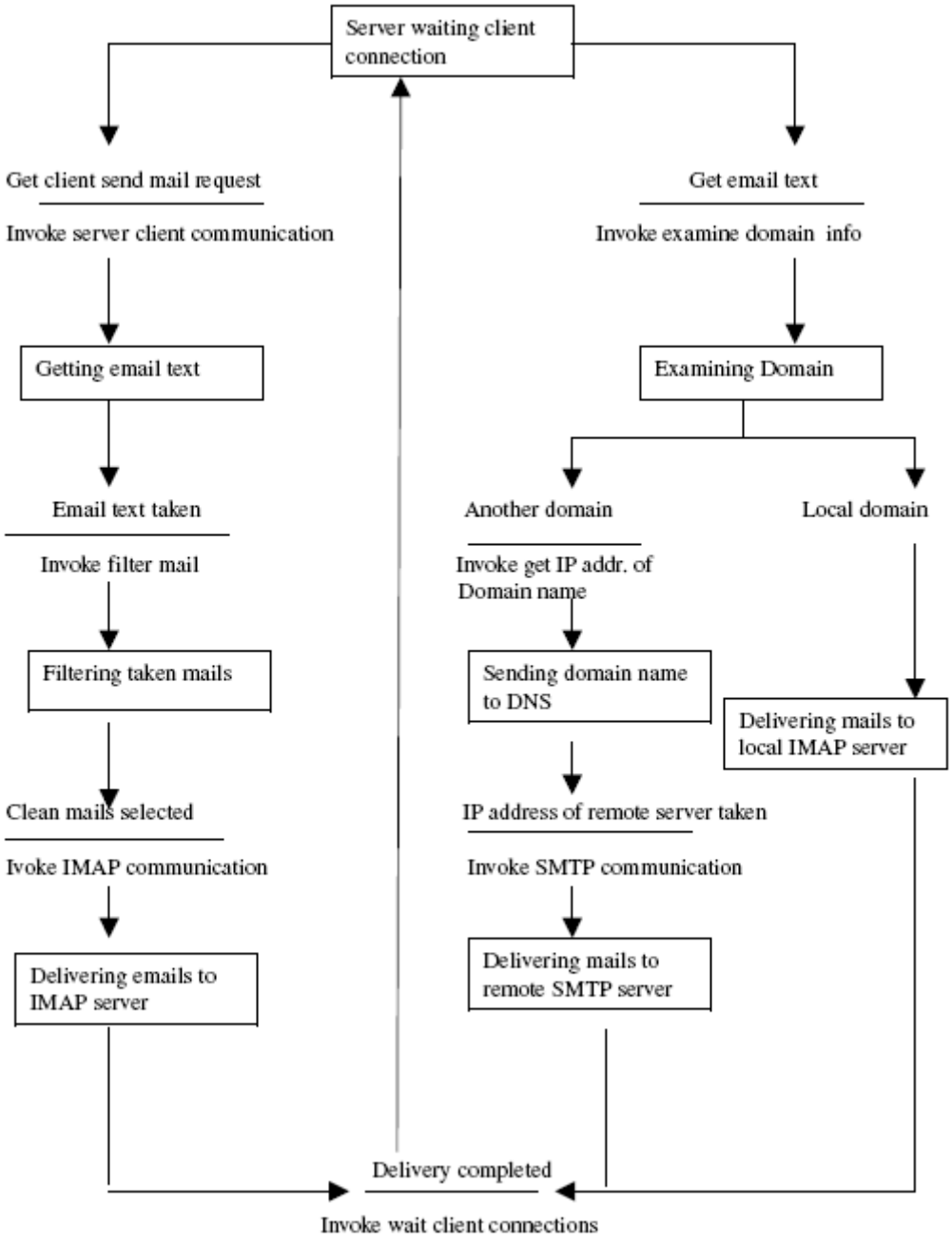
- ***STD for HTTP Server:***



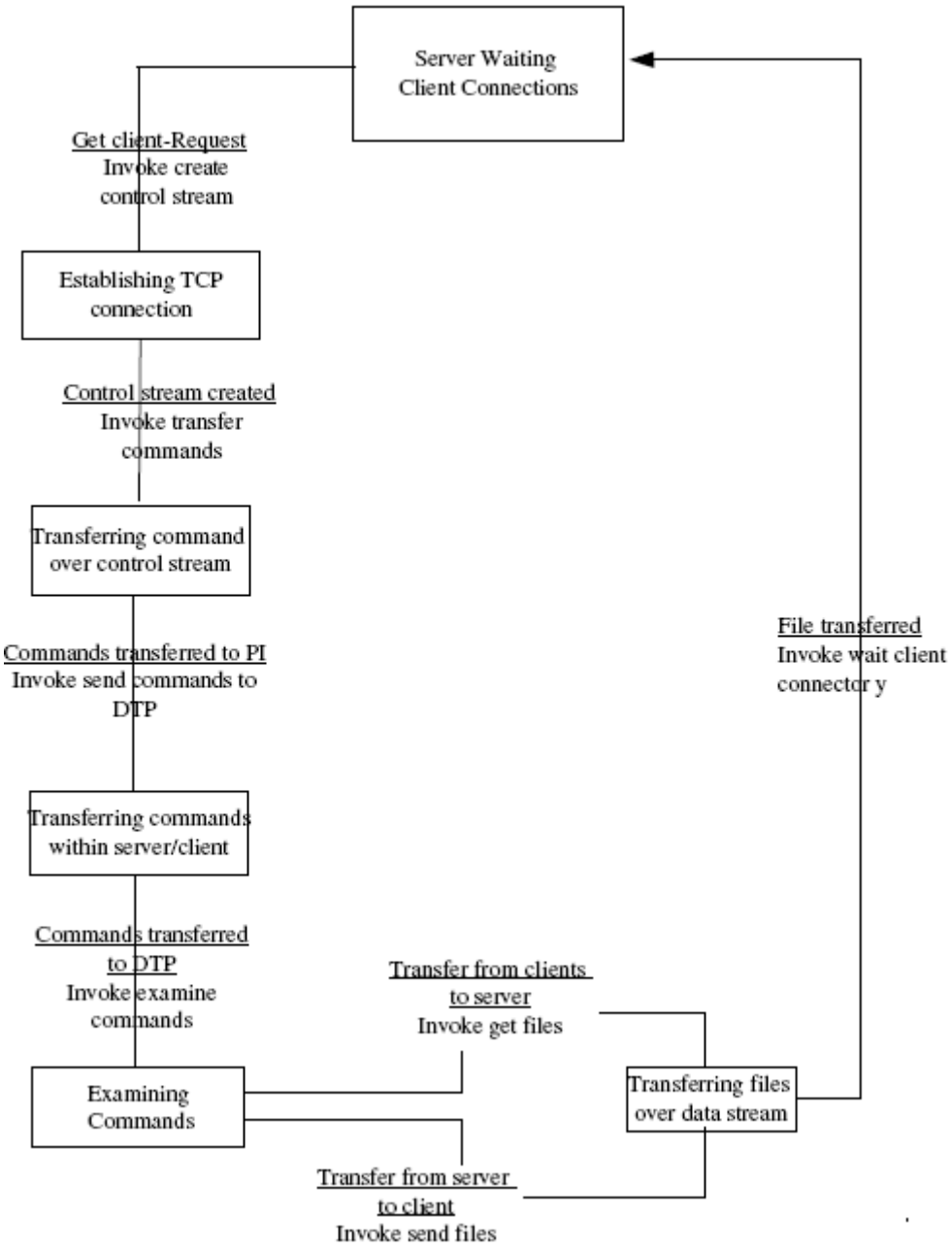
- ***STD for NNTP Server:***



- ***STD for Email Server:***



- ***STD for FTP Server:***



8. USE-CASE ANALYSIS

8.1 Usage Scenarios:

- ***Admin Scenarios***

Mr. Brown who is the manager of Zengin Holding ,wants a system which enables safe communication between members of the company and installs Multiway software package to their servers.He takes the responsibility of being the administrator of the system.He enters the user list information to the system and the system automatically generates a unique password and account for each user.

Mr. Brown opens some groups whose posts can be read without being registered such as Latest News,Cinema etc. Contributing to advertisement issues of the company these groups can be viewed by anyone who enters the Internet page of the system.He opens "Departments" group and subgroups for different departments and assigns the department managers as the newsgroup chiefs .While arranging the settings of the subgroups ,he decides that some of these sub groups should have longer post duration times while the messages in other groups needn't be seen more than one day.Also some groups would need RSS feed while others not.In addition to these some departments were working on special topics and the posts in these departments' groups should have not be accessable to other departments' staff.Mr. Brown took all of these into account while opening the subgroups and regulated the settings of the groups in that way.At the end he recognized that he had made created unneccessary groups and had written some names of the staff wrong,so he removed some groups and edited some user information.

- ***Newsgroup Chief Scenarios***

Mrs. Brown was the department manager of Human Resources Department.After the installlation of Multiway Software Package to their servers ,she had become the newsgroup chief of Human Resources sub newsgroup.In those days a subgroup of 5 people from her department were working on a special research and she wanted the administrator to open a special-private subgroup to which only these 5 people could sign

in.By that way she also could get secret project reports uploaded by project group members and make some important files downloadable to them.

- ***Subscribed User Scenarios***

Mr.Junior Brown was working in Sales Department.After the his company began using Multiway Communication System software ,he became a member of the system automaticaly.He selected the groups he wanted to read and he has to follow to be visible in his interface.Now he is able to communicate with other company members , follow latest news about their group project,send his reports to his manager ,download the files uploaded by his manager,read some posts by his RSS reader.He accesses the system via web browsers or application programs such as Thunderbird,Outlook.He posts messages to the groups either with these ways or by just sending it as an e-mail.

- ***Server Scenarios***

SMTP server delivers the system sent mails to either remote SMTP servers after getting their IP address from DNS server or to our own IMAP server (if the domain name of the recipient is local).It also delivers the mails which are taken from remote SMTP servers to IMAP server.

IMAP server holds the email accounts of the members of the system to which clients can connect.

DNS server handles the IP address requests remote servers for “sanzatu.tr” second level domain name and IP address requests from our SMTP server .

FTP server gets user commands through the control stream and then files are sent to or taken from the clients by the data stream depending on user’s command.

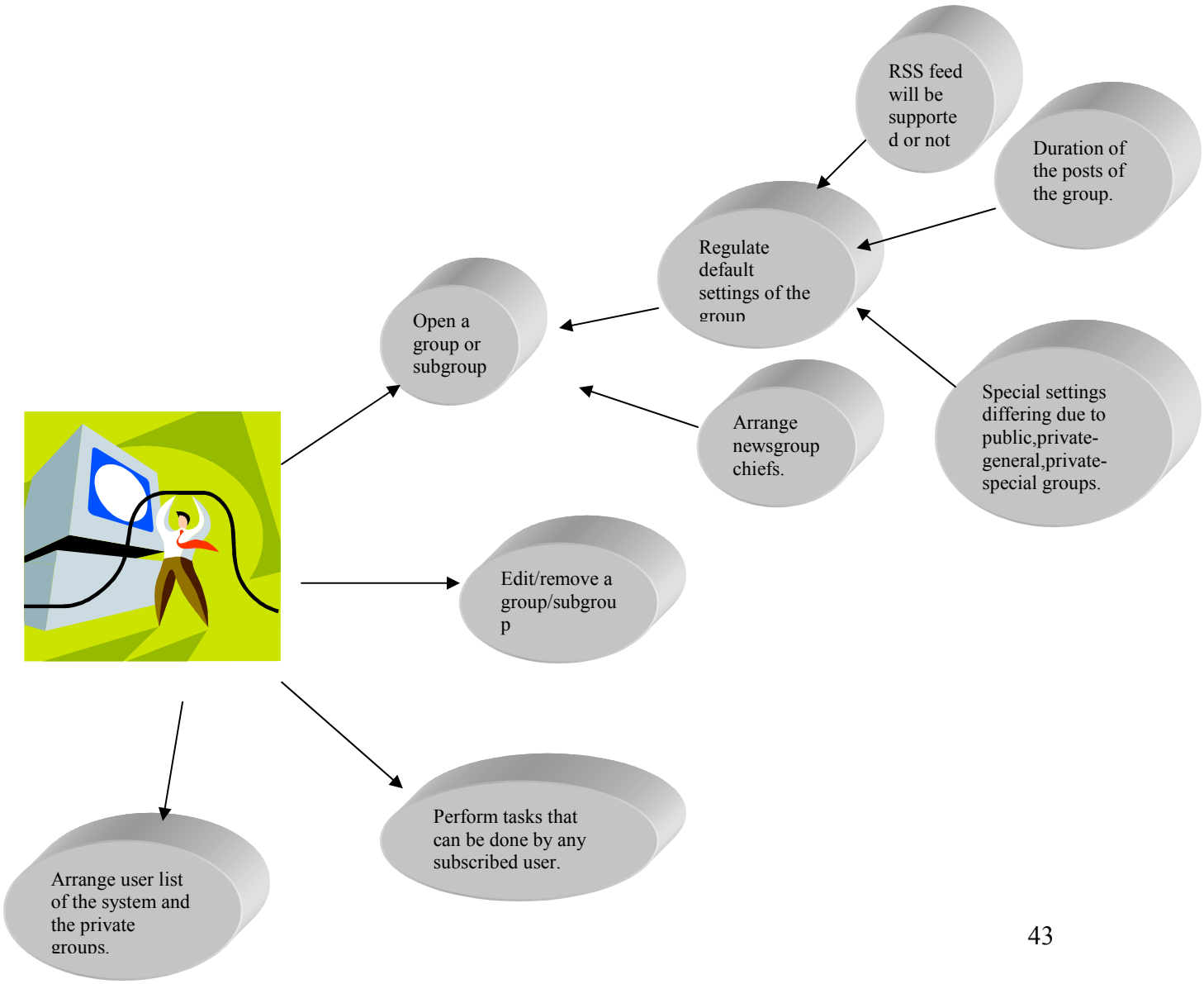
RSS feed gets html and new files from the servers and tranfer them into xml format so that any kind of rss reader can get.

HTTP server holds the requests from the clients and delivers to the client SSL certicate. It also generates the HTML code as a response, if the client could authenticated by server. **HTTPS Proxy** server receives the request and stores them in a cache. It also acts as a request filter and provides security log in to the system.

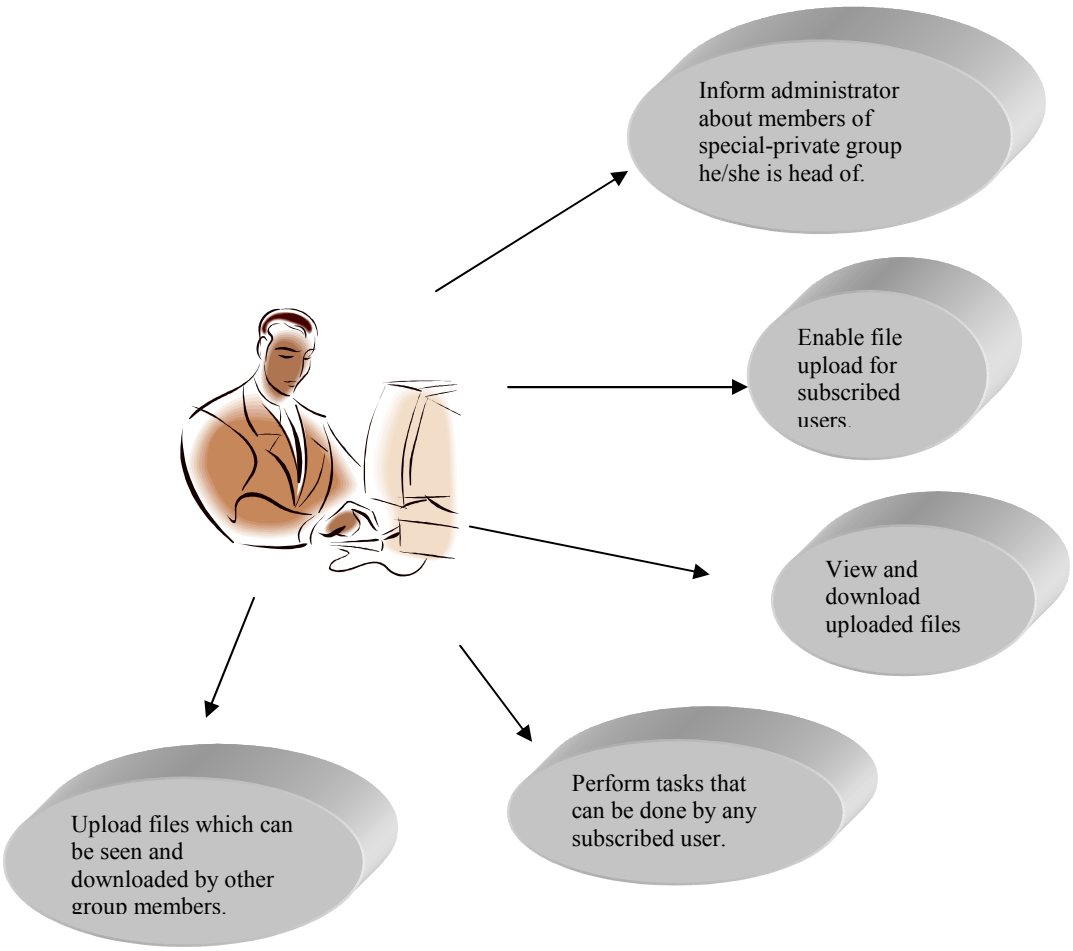
NNTP server can get a news reading request from clients. Server can look into its message database to find the requested news. When server finds the requested message, it will send it to the client.Server can get a new message posting from clients. Then, server will do filtering to newly arrived messages. If the new message is a valid message coming from a known client, it will send new message to database. Otherwise, it will be rejected.Server can get configuration request like adding / removing / modifying a newsgroup from clients. Then, server will make requested modifications on its configuration according to requested configuration.

8.2 Use-Case Diagrams:

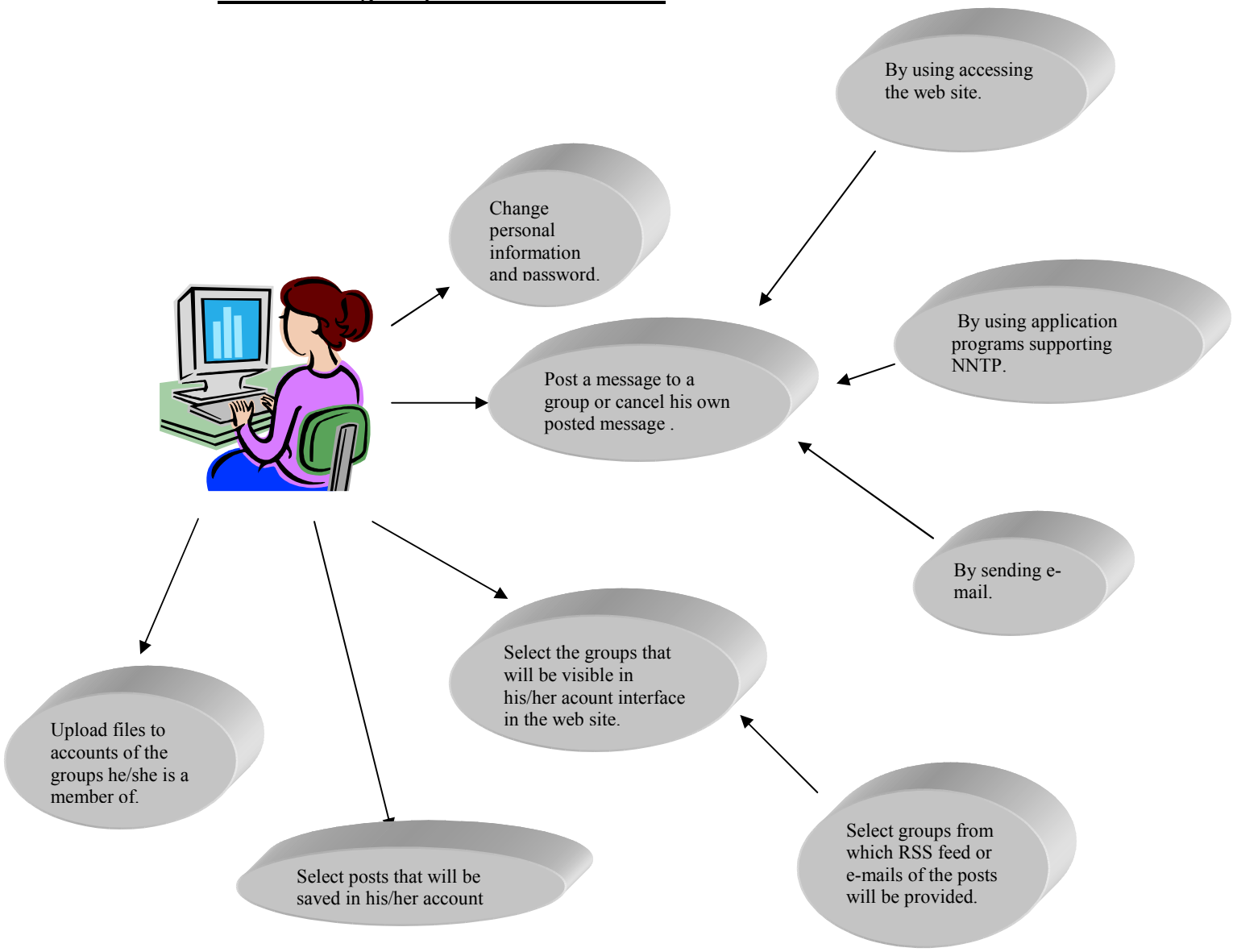
- ***Use-Case Diagram for the Administrator:***



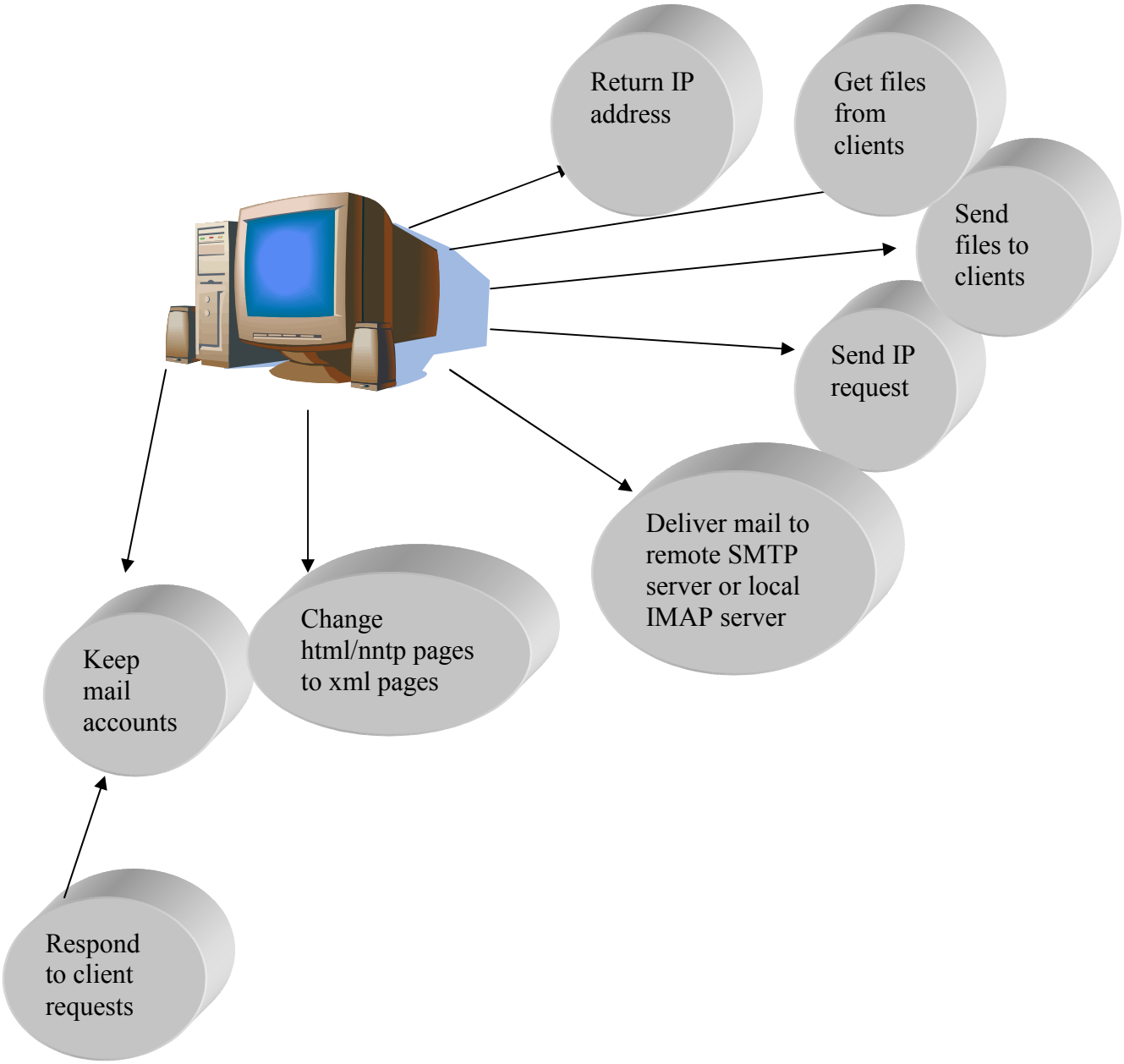
- ***Use-Case Diagram for a Newsgroup Chief:***

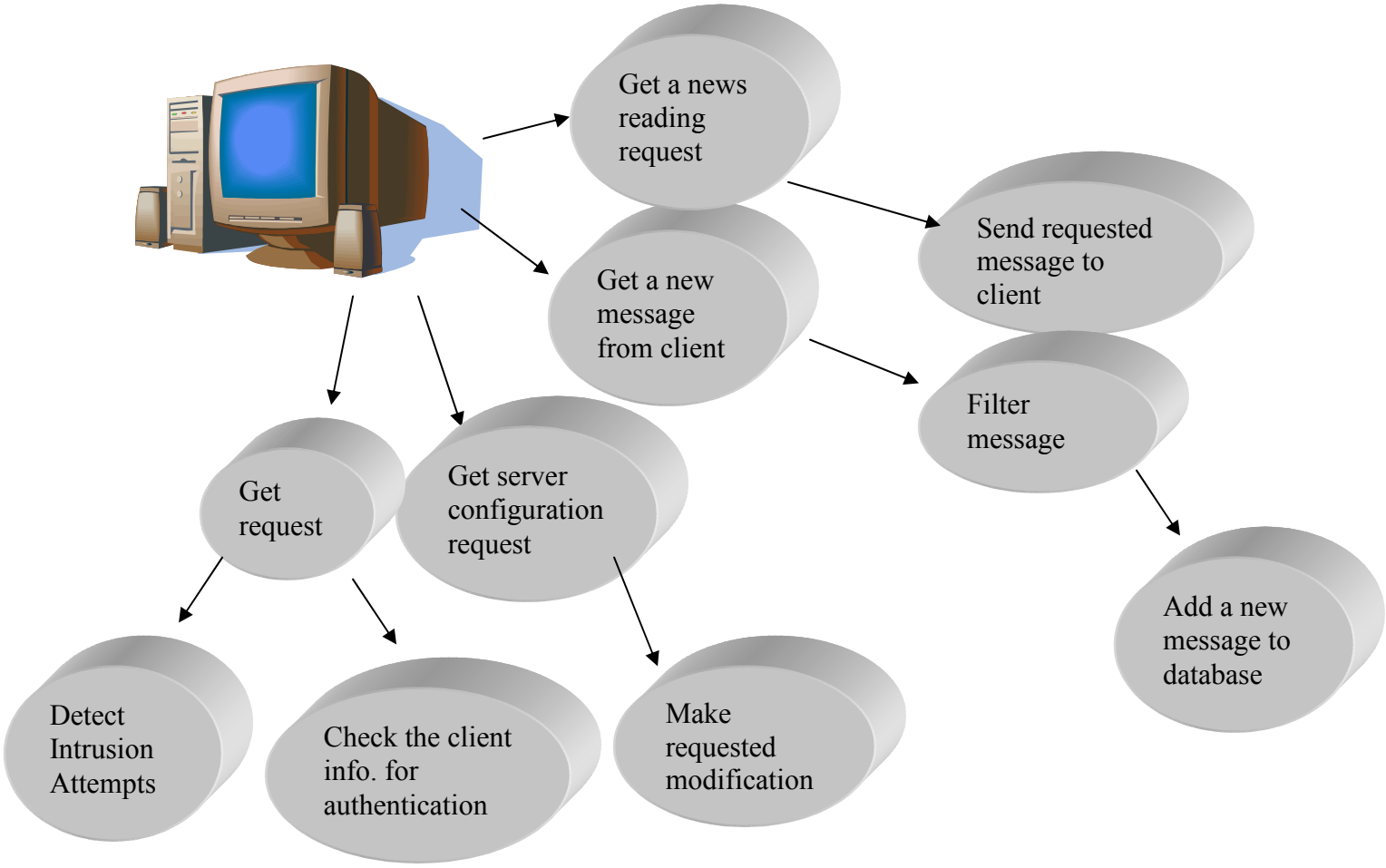


➢ ***Use-Case Diagram for a Subscribed User:***



➢ ***Use-Case Diagrams for the Server:***




Get a news reading request
Send requested message to client
Get a new message from client
Filter message
Get request
Get server configuration request
Add a new message to database
Detect Intrusion Attempts
Check the client info. for authentication
Make requested modification