

**Local Area Network and Intranet Web Site  
for the Assistive Technology Department  
at  
Beechwood Home**

By

Linda Harrell

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

**University of Cincinnati**  
College of Applied Science

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Mark Stockman, Faculty Advisor

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Date

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## **Abstract**

The residents who use the computer lab in the Assistive Technology Department at Beechwood Home face many obstacles before they can begin using a personal computer to write a letter, create a card, or access the Internet. The local area network for the Assistive Technology Department at Beechwood Home was designed to facilitate the residents' independence by removing many of those obstacles. The network supplies a roaming profile with tailored accessibility options and Windows Desktop for each resident along with access to file shares and the print server after he/she is authenticated into the network. Red Hat Linux 8.0 Professional provides an inexpensive solution as the server operating system while Windows 98 continues to deliver the same, familiar computer environment. The intranet Web site allows the administrators and residents to share information, letters, graphics, and pictures.

## **1 Statement of the problem**

Beechwood Home is “a charitable, non-profit, philanthropic, non-sectarian organization whose purpose is to provide a nursing home for the skilled care of chronically ill adults regardless of race, creed, national origin or economic status, for whom the facilities of the organization are suitable to meet their physical, mental, emotional, and social needs” (9, p. 8). It is an eighty eight unit home consisting of 74 skilled nursing home beds and 14 Residential Care Units. Eight of the Residential Care Units have been designated Assisted Living apartments. The residents are primarily victims of multiple sclerosis, adult cerebral palsy, stroke, Parkinson’s disease, rheumatoid arthritis, and diabetes.

Seeking to improve the residents’ quality of life by prolonging their independence, the Assistive Technology Department was formed to provide technological assistance to aid the residents in their daily activities. Kay Barker, Assistive Technology Coordinator, manages the Department while Lisa Smith, Technology Implementation Specialist, manages the Department’s computer lab. Residents use the lab to write letters, create cards, send e-mail, enhance graphic images, and play computer games.

In the computer lab, residents become frustrated with the Windows desktop clutter, accessing multiple graphic CDs, and setting up the accessibility options in Windows 98. The first thing he/she confronts is the amount of time spent setting up the accessibility options for Windows 98 in addition to any required adaptive devices upon his/her arrival. The next is the multitude of large icons for all of the available software which appear on the Windows desktop. Since many residents are easily distracted, this is confusing. Finally, many of the residents have physical limitations which prohibit them from changing the CD-ROMs in the CD drive when they want to use an image from one or more graphics CDs (2 and 23).

To solve this problem, Beechwood Home Assistive Technology Department's computer lab required the implementation of an intranet network designed specifically to meet its needs. The server would have to provide the additional functionality required to support the residents' need for tailored computer accessibility through roaming profiles. It would also need ample storage space to allow for shared files. File, print, and e-mail services must be available. A Web server must be included for the intranet Web site. As a non-profit organization, there would be very little budget available. Also, the server and Web site must be simple enough to be managed by non-technical users with minimal support from an expert. Finally, the network must be scalable and secure.

## **2 Description of the solution**

After being presented with a cost analysis of network operating systems for the server, Ms. Barker agreed that Red Hat Linux seemed to be a better choice. With this decided, I began its implementation to specifically meet the needs of Beechwood Home's Assistive Technology Department and the residents.

### **2.1 User Profiles**

The intended users for Beechwood Home's Assistive Technology Department's intranet network are the Department's administrative staff, the residents of Beechwood Home, and network technical support personnel.

#### **2.1.1 Assistive Technology Department Administrative Staff**

These employees introduce the residents to the many types of technology available to assist them. The employees then train the residents how to use this technology after first training themselves on it. Currently, their assistance enables the residents to use the computer lab daily. While these employees are not computer experts, they do have a substantial understanding of

what computers can be used for and a level of knowledge which allows them to manage the Department's computer lab with a minimum of technical assistance from a consultant.

### **2.1.2 Beechwood Home's Residents**

The level of technical experience and interest among the residents varies widely. Most of the residents have little or no knowledge of computers, though there are a few who possess a substantial amount of knowledge regarding the computer field. One example of this level of expertise is a current resident who was an electrical engineer. However, a great deal of knowledge or experience is not required by the residents to use the lab to write letters, create cards, send e-mail, enhance graphic images, or play computer games.

### **2.1.3 Technical Support (Network Consultant)**

The Network Consultant will provide the technical support for the Assistive Technology Department's network. This person will be responsible for troubleshooting all software and hardware problems that the Administrative Staff are unable to resolve. He/she will recommend and perform repairs and upgrades as needed. Many years of training and experience are required in the computer field, specifically in networking. Also, a strong background in the Red Hat Linux operating system on a server computer system is required.

## **2.2 Design Protocols**

The network was designed to meet the Assistive Technology Department's needs. Red Hat Linux 8.0 Professional operating system was installed on the server system to meet the requirements of a file, print, e-mail, and intranet Web server. Windows98, the client operating system remained, as did all currently installed software.

Red Hat Linux can be purchased for \$149.95 or downloaded for free. Red Hat provides access to update notifications, automatic updates, and software support through either a

subscription service for \$60.00 a year or through the purchase of one of their products (21). Also, there are no limitations as to the number of computer systems the software package can be installed on or additional licensing fees for adding additional clients to the network, unlike Microsoft and Novell. Microsoft 2000 Server with 10 client access licenses is priced at \$1,199.00 while Novell NetWare 6 with 10 user licenses is priced at \$1840.00 (27 & 17). Both Microsoft and Novell require additional fees when any additional clients are added to the network. Also, software installation is limited to one computer system.

While the server is multi-functioning, its primary functions are to provide user authentication and roaming user profiles. Through Samba, the Linux server verifies the login name and password. Once the server has validated the user's identity, his or her profile or work environment is copied from the server to the PC from which the user has logged in. A few of the items that the user's roaming profile consists of are his or her desktop settings, local settings with history files, cookies with the user's information and preferences, and the user's Internet Explorer Favorites folder (13 & 15). For a complete listing of the files, folders, and settings that are part of the roaming user profile, see "Contents of a user profile" on Microsoft's Web site (15).

Along with the roaming profile, the many accessibility features built into Windows 98 provides the tailored accessibility features that each resident requires. These features include options for people with vision, hearing, and mobility impairments. The options can be set using the Accessibility Wizard and then saved to a file on the network server. When the server copies the user's roaming profile to the PC, the file containing the user's accessibility options are included (13 & 15).

Since the Linux operating system does not have wizards, unlike Microsoft and Novell, to assist with the administrative functions, additional training would be required at Beechwood Home in order to administer the new server. While this makes Red Hat more complicated to understand, training in some basic commands would solve this potential problem. All operating systems require some expert support by an Information Technology specialist to maintain the integrity of the network and to insure its security.

The Assistive Technology Department's new intranet network operates in a star topology through a central hub. The star topology most easily allows for future expansion. It is connected to a router through a hub to continue providing Internet access for the residents who use the computer lab. The router provides additional security through a built-in firewall (See Appendix A).

During the process of this project, I was informed by Lisa Smith that there had been some discussion regarding the use of the current Beechwood Home main server system in the computer lab when the main server is replaced. I would have then received the old server to use as an intranet network server for the Assistive Technology Department's computer lab. However, more recent developments indicate that Beechwood Home's administration have decided to employ their current consultant to upgrade where needed. While Ms. Barker and Ms. Smith had previously approved this project for the Department, Beechwood Home's administration felt that this was a better solution (2 and 23). I am furnishing Beechwood Home a copy of this report, which contains the information I acquired to implement the network and Web site.

In order to continue this project, I had been granted permission by Professor Mark Stockman to simulate the network in the College of Applied Sciences Networking Lab. I was

able to use three PCs and a printer from my home along with my laptop to simulate the project. I then brought them to the Networking Lab to demonstrate the project. To better simulate a larger number of PCs in the network, I downloaded a trial copy of Centrix Corporation's Virtual PC (5). One PC was designed to be the print server and an administrator's system. Virtual PC was installed on the second and third PCs. Five client systems were simulated on one of those PCs while four client systems were simulated on the other. At this point, the network and Web site appears as I had proposed for the Assistive Technology Department's use.

### **3 Deliverables**

Several items were put into service to meet the Department's requirements. They are listed as follows:

- A file, print, and intranet Web server for a network of 8-10 Computers
- Red Hat Linux 8.0 Professional for the server operating system
- Windows 98 for the client operating system
- Roaming profiles
  - Tailored computer accessibility
  - Minimize windows desktop clutter
- Additional disk storage
- Intranet Web site
- Server backup
- Security
- Allow for scalability

Red Hat Linux was implemented to authenticate Windows 98 clients. The incorporation of roaming profiles has allowed each user's Windows desktop to be tailored to meet his/her

specific disabilities using the accessibility options in Windows 98. Also, the desktop clutter has been minimized. The only desktop icons that each user sees are the ones that he/she requires. A file server provides ample disk storage where users can share files while a Web server with an Intranet Web site provides a place for residents and administrators to share information, pictures, graphics, and letters. The entire system was backed up to another location on two different occasions. Finally, the entire network is secure and scalable. The users have been prevented from accessing files and folders that they shouldn't. Also, if they have not been authenticated, they are not allowed access to the network. With the star topology and using a hub, the network can easily be increased in size as needed.

Due to time constraints, two items were not completed that were initially proposed. These are an e-mail server and the server recovery method was not tested. Since the server was not installed at Beechwood Home, it complicated the e-mail server configuration. First, by configuring and testing the network server at my home, I would have been required to install the e-mail server to meet the requirements of my Internet Service Provider (ISP). Second, the University of Cincinnati would have prevented my system from accessing its network even if I had re-configured the server for my e-mail account with the university. Finally, should the recovery not have worked, more time would have been spent reconstructing the entire server. It was safer at this time not try it. I do plan to work on these two items at a later time so that I may have a more complete understanding of the Linux operating system.

#### **4 Design and Development**

Although the design for this project was relatively easy, the development was very complex. Linux, when used for a server, is a difficult operating system to learn. However, once learned, it provides a strong understanding of networking and server operating systems.

## 4.1 Budget

The proposed budget was changed because Beechwood Home decided not to implement my proposed project. Their decision eliminated the proposed hardware costs. I have listed the current values of the hardware I used to simulate this project. As most of it is more than two years old, they do not have much value. I did not include the router and the hub because they were already installed at Beechwood Home. Also, they are more than two years old and do not have any value.

### Hardware:

Dell Latitude Laptop	\$600.00	(11)
HP Pavilion – 6475z (466 MHz)	0.00	
Generic Desktop System (800 MHz)	0.00	
PowerSpec 7806	0.00	
Brother MFC-3100C Printer	214.99	(8)

### Intranet Web Site:

Web site Software: html and java script	0.00	
---	------	--

### File, Print, E-mail, and Intranet Web Server:

Red Hat Linux 8.0 Professional operating system	149.95	(21)
---	--------	------

### Client Systems:

Microsoft Windows 98 (Client owned)	0.00	
Virtual PC (free download)	0.00	(5)
	<u>\$ 987.99</u>	

I purchased Red Hat Linux 8.0 rather than downloading it from the Internet so that I could receive support and software updates. At the time of purchase, I had very little exposure to the Linux operating system; therefore, I expected to require some assistance while implementing a Linux server. The availability of the software updates has been an excellent service, one that I would highly recommend for anyone using the Linux operating system.

The costs for the laptop are minimal because it is nearly three years old. While it has ample capacity for this project, I would not consider it as a server otherwise. The older system that Beechwood Home is replacing would have provided the necessary capacity for the Assistive Technology Department. I did not list it since the project was simulated with my Dell laptop computer and other personal systems.

Considering the scale of this project, the expenses are relatively small. Using the Linux operating system provided the necessary cost savings this project required. Also, not purchasing additional hardware would have provided another large cost savings. This project would have met Beechwood Home's goal to minimize the cost for implementation.

#### **4.2 Timeline**

There was a delay during the execution of this project due to a higher than expected learning curve. Much of the implementation and testing were completed in my home. While this allowed easy access to the network, it prevented being able to obtain help externally. It was not possible to demonstrate any problems to a Linux expert. Of course, finding an expert was the first problem. It became evident that there are not many people in this career field who could be considered experts in Linux. Once I did learn how to enable the two operating systems to communicate with each other, it became much easier to put into operation the rest of the deliverables. Figure 1 displays the timeline for this project.

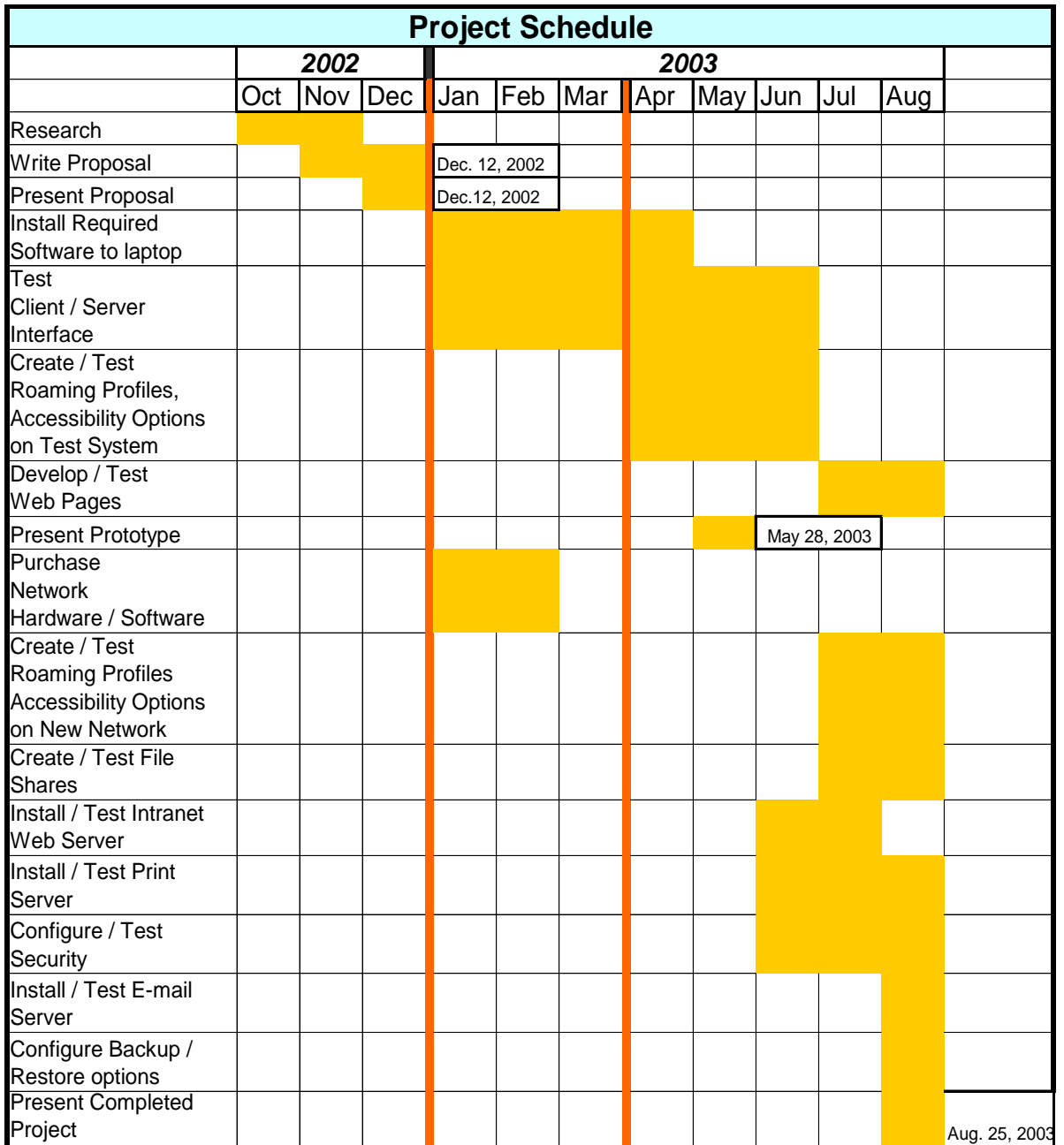


Figure 1. Timeline

### 4.3 Network Design

The intranet network for Beechwood Home’s Assistive Technology Department consisted of a server using Red Hat Linux 8.0 Professional operating system and provisions for eight personal computers, a hub, and a router which are currently installed in the Department’s

computer lab. The implementation of Red Hat Linux 8.0 Professional for the server computer system included the following

- Installation
- Samba configuration
- Domain Name System (DNS) Server configuration
- User/Machine configurations
- File Server configurations
- Web Server configuration
- Security
- Backup / Recovery

The implementation of Windows 98 for the client computer systems included the network configuration, User profiles, print server configurations, and mapped network drives. The intranet web site was created in Microsoft's Notepad utility program.

#### **4.3.1 Hardware**

The network at Beechwood Home consisted of a star topology with all eight personal computers in the computer lab connected to a hub. The hub was then connected through a router to the hub for the main network. With most of the hardware already installed, the only additional hardware which would have been required to implement an intranet network in the Assistive Technology Department's computer lab was a server system designed specifically for the residents' use (See Appendix A).

I used a Dell Latitude CPxJ laptop as the Linux server. A PowerSpec 7806, a generic tower PC with an 800 MHz processor, and a Hewlett Packard (HP) Pavilion 6475z were implemented as the client systems. Virtual PC was installed on the PowerSpec and the generic

tower systems to simulate multiple client systems. The HP was designated an administrator's system and also the network print server for a Brother MFC-3100c printer with a Universal Serial Bus (USB) connection.

I used the hub and router that I have at home for testing and the hub in the Networking Lab at the College of Applied Science for the project demonstration. After moving the network from home to the lab, only the IP address needed to be changed. The entire network used standard Cat-5 cables with RJ45 connectors.

### **4.3.2 Red Hat Linux 8.0 Professional Operating System**

While Red Hat Linux 8.0 Professional Operating System can be downloaded from the Internet for free, I chose to purchase it. This provided 60 days of support with full documentation. Knowing that I had a very limited knowledge of Linux and Red Hat in particular, I felt that this would be the best choice to begin my training. Also, I have received free updates and update notifications for all aspects of the Red Hat Linux operating system.

#### **4.3.2.1 Installation**

I purchased a separate 20Gb hard drive for my Dell Latitude CPxJ laptop computer system. This allowed the separation of personal and school processing in Windows XP from my exploration of Linux. While more storage was provided for the Linux operating system, it also allowed for the separation of the different types of disk file systems. The Linux disk file system is complicated by the creation of several disk partitions during installation.

Appendix A of the *Official Red Hat Linux Administrator's Guide* describes the installation process in detail (19). The documentation that is included with the operating system when purchased is the same as that in the *Guide* (20). The following is a list of the settings that I used during installation (See Appendix B):

- Language Selection: English
- Keyboard Configuration: U.S. English
- Mouse Configuration: ALPS PS/2
- Installation Type: Server
- Disk Partitioning Setup: Automatically partition
- Automatic Partitioning:
  - Remove all Linux Partitions on this system
  - Select the drive(s) to use for this installation: /dev/hda
  - Review (and modify if needed) the partitions created: selected
- Disk Setup: Accepted automatic configuration
- Boot Loader Configuration:
  - Used default – GRUB boot loader
  - Other operating systems: Used default – Red Hat Linux
  - Use a boot loader password: Selected – Changed Password
  - Configure advanced boot loader options: Not selected
- Network Configuration:
  - Network Devices: eth0 (Select Active on Boot)
  - Edit Network Device
    - Configure using DHCP: Not selected
    - IP Address: 192.168.1.101
    - Netmask: 255.255.255.0
  - Set the hostname:
    - manually: ATDNetS1

- Miscellaneous Settings:
  - Gateway: 192.168.1.1
  - Primary DNS: 65.24.0.167
  - Secondary DNS: 65.24.0.171
  - Tertiary DNS: 65.24.0.169
- Firewall Configuration: No firewall
- Additional Language Support: English (USA)
- Time Zone Selection: America/New\_York – Eastern Time
- Account Configuration: Entered a root password
- Authentication Configuration:
  - Enable shadow passwords
  - Enable MD5 passwords
- Package Group Selection: Accept default selections
- Installing Packages
- Boot Disk Creation: No, I do not want to create a boot disk
- Graphical Interface (X) Configuration: ATI Rage Mobility
- Monitor Configuration:
  - Generic Laptop
    - Display Panel 1024 x 768
    - Horiz. Sync: 31.5 – 48.5 KHz
    - Vert. Sync: 40 – 70 Hz
- Custom Graphics Configuration:
  - Color Depth: True Color (24 bit)

- Screen Resolution: 1024 x 768
- Login Type: Graphical
- Installation Complete / Reboot
- Red Hat Startup Agent:
  - Date and Time Configuration: Entered current date and time
  - Sound Card Configuration:
    - ESS Technology
    - Ess1983S Maestro – 3i PCI Audio Accelerator Maestro 3
  - Red Hat Update Agent: Yes, I would like to register with Red Hat Network
  - Red Hat Network Configuration:
    - Red Hat Network Server to use:
      - <https://xmlrpc.rhn.redhat.com/XMLRPC>
  - Retrieval/Installation:
    - Package storage directory:
      - /var/spool/up2date
  - Install GPG keyring:
    - Red Hat, Inc. public key:
      - `rpm --import /usr/share/rhn/RPM-GPG-KEY`
      - [www.redhat.com/network](http://www.redhat.com/network)
  - Channel: redhat-linux-i386-8.0

After performing the installation several times, I settled on the Installation Type as Server rather than Custom and accepted the defaults for Package Group Selection rather than select all packages. This decreased the installation time by approximately two hours. Obviously, it

simplified configuration since only those packages needed for a server were installed and enabled (19, p. 418 & pp. 440-441).

In order to simplify as much as possible the installation, configuration, and testing of the new client/server system, I chose to use the Internet Protocol (IP) addresses assigned by the router in our workgroup network. The Primary DNS, Secondary DNS, and Tertiary DNS IP addresses had been assigned by Road Runner's DNS server to the router.

The hostname was set to ATDNetS1 as an acronym for the Assistive Technology Department Network – Server One. The network has been named ATDNet, which follows the same naming convention.

I chose not to create a boot disk and not to configure a firewall. These options can be performed at a later time (19, pp. 457 & 471). Also, a boot disk is not required for installation when using the CD-ROMs. While the firewall could be configured during the last step when the server's security is implemented, I chose not to do so. If this network had been fully implemented, an external firewall device would have been implemented rather than using a software solution which is more vulnerable to attack.

There are two important files created during the installation process in the /root directory. The **install.log** file contains a list of the installed packages (19, p. 469). The Kickstart file, **anaconda-ks.cfg**, contains all of the installation options (19, p. 4). The information in this file can be used by the administrator to automate the installation process for multiple machines by creating a file which will answer all of the questions asked during the process (See Appendix B).

#### **4.3.2.2 Samba Configuration**

Samba is the software suite in the Linux operating system which allows it to impersonate a Windows server system through the Server Message Block (SMB) protocol, the protocol

Windows uses for client-server networking. A Linux server with Samba installed can share files, share printers, and authenticate users. It allows a Windows client system to browse the Network Neighborhood and it provides Windows Internet Name Service (WINS) support. With a minimal understanding of Samba and the Linux operating system, I began the process of implementing a Linux server.

After many failed attempts, I attended the March meeting of the Cincinnati Network Professional Association (CiNPA). I was introduced to Matthew Econnomou when I asked the members for help with this project (4 & 7). Upon his recommendation, I stopped trying to use the graphical user interfaces (GUIs) like **Webmin** and **SWAT** (26, pp. 198-210 & pp. 34-45). This forced me to learn Linux and the commands necessary to add users, machine accounts, and directories for file shares. He also recommended that I read many more articles and books about Linux and about Samba in particular. Later, members of the Cincinnati Linux Users Group (CLUG) recommended that I use **SWAT** (3). I also found in IBM's Redbooks more information regarding this utility (25, pp 17-25). However, I have not used it since I was able to use the command line to execute everything that was required.

I found that the Samba Configuration file (**smb.conf**) is the most important file in Samba because it contains the runtime configuration information for the Samba programs. It can also be very complicated. The man pages for the **smb.conf** file that is included in Red Hat Linux 8.0 Professional is 120 pages long. It can be found by typing **man smb.conf** at the command prompt in Linux.

Trying to decide which options are necessary for Samba to operate as required can be a daunting task. There is a default **smb.conf** file included in Red Hat Linux. Throughout the book, *SAMBA ESSENTIALS FOR WINDOWS ADMINISTRATORS*, the author presented a

configuration file that he recommended (26). The IBM developerWorks' Web site article titled, "Using Samba as a PDC," presented a concise, step-by-step tutorial for configuring a Samba server (10). It, too, described a configuration file. With a need for further clarification, I posted a request on the Cincinnati Linux User Group's (CLUG) Q&A page (3). Jason Cook responded with a copy of a configuration file that he recommended and the sample configuration file that was included in his copy of Debian Linux (6). (See Appendix C for a compilation of all these files.)

Armed with the combined knowledge of all those resources and using PICO as an editor, which was included in Linux, I created a new Samba configuration file. After several modifications, the file currently in use is providing the necessary options (See Appendix D for the current file).

The first problem that I corrected was changing the path for the netlogon share from **/ATDNetS1/netlogon** to **/netlogon/scripts**. (The path should not have included the server name.) This directory is where the user script files and the CONFIG.POL file are located for Windows to process during logon. This prevented Samba from authenticating the user. The user would receive the message, "Password is incorrect."

Another problem was in not having a DNS Server or WINS support. Windows 98 uses WINS, while Windows 2000 uses both. This prevented the user from accessing the ATDNet network. Setting **wins support** to yes in the **smb.conf** file provided the necessary support for Windows 98.

The next problem that I corrected was the naming of the shared directories. I had named **shargraf** as **sharegraphics**. Unfortunately, Linux only recognizes user names that are eight

characters or less (26, pp. 48-49). This seemed to carry through for the directory name as well. Windows could not find the share until the name was corrected.

At the April CLUG meeting I discussed another problem with Windows 98 (3). It did not automatically set the home drive on the server for the user like Windows 2000 did. It was suggested that I incorporate a **net use** command in the logon batch file. After reading about the **net** utility and then searching the Microsoft Web site for the parameters, I put **net use H: /home** in each Windows 98 user's logon script file (14 & 26, pp. 162-167). Testing proved that this was the method needed to correct the problem.

Recently, I reviewed the **smb.conf** file that was created using the **Webmin** tool. It appears that I had set **hosts allow** to **127.0.0.1 192.168.1.101/255.255.255.0** in that file. This allows only the localhost and the server access to the network. Also, I had not created a CONFIG.POL file to "push out" policies (22, pp. 12-13 & 24, p. 117 & 24, p. 108). Additional testing proved that there must be a CONFIG.POL file, even if it is empty.

Finally, there are shares for both **profiles** and **Profiles** in the **smb.conf** file, it has become apparent that both shares are required. Testing proved that the Windows 2000 client systems need the **Profiles** share, while the Windows 98 systems need the **profiles** share. These become the home directories for each type of client system.

Two improvements were implemented after some further testing. It became apparent that Gary Wilson's recommendation to make the user's profile that is stored in the user's home share be a hidden directory was an excellent one (26, p. 107). By beginning the directory name with a dot (.) and setting Windows to hide system files and directories, the user's logon directory would be hidden. Further, when access is limited, only the administrator and the system will be able to browse and/or change the files. The other improvement was to use the Red Hat Linux 8.0

default setting of **%U.bat** for the logon script. This allowed individualized logon scripts for each user.

Lastly, any changes to the **smb.conf** file have been tested with the **testparm** utility. This is a simple syntax checker for Samba's configuration file. It was recommended in the Samba HowTo Collection and described in the man pages for Samba (22).

More modifications will need to be made to the **smb.conf** file to improve the server's security.

#### **4.3.2.3 DNS Server Configuration**

After a discussion in Networking III class, it became apparent that a DNS Server or some similar service would be required for the Linux network. At that time, there were still some communication problems between the Windows and Linux systems. Also, I did not know that the Windows 98 systems did not use DNS. Since I was trying to get either the Windows 2000 or the Windows 98 system to communicate with the Linux server, I was willing to try anything. As it turned out, the Berkley Internet Name Domain (BIND) DNS Server allowed the Windows 2000 system to begin communicating with the Linux server. It seems that I did not have the **wins support** option in the Samba configuration file set correctly at that time. This was later corrected. Therefore, based on the book, *Linux for Windows Administrators*, recommended by Professor Mark Stockman, I configured a DNS Server (16, pp. 291-323) on ATDNetS1.

The first two required files for the BIND DNS Server program that I installed were **named.ca** and **named.conf**. The **named.ca** file is found on a Windows NT system as **\winnt\system32\dns\cache.dns**. It is the hints file which contains all the information on the locations of the world-wide "root servers" (16, p. 297). I obtained a copy of the **named.cache** file from **ftp://ftp.rs.internic.net** in the domain directory. I used this file rather than copying it

from a Windows system so that there would be no problems with carriage return/line feeds in the file. After renaming it **named.ca**, I placed it in the **/var/named** directory on ATDNetS1. The **named.conf** file contains the locations for the local network's zone files. It also contains any required basic parameters (See Appendix E). After creating the current file based on directions from *Linux for Windows Administrators*, I placed it in the **/etc** directory (16, pp. 299-305).

Chapter 22 of *Linux: The Complete Reference, Fifth Edition* provided further insight into the BIND DNS Server for a Linux system (18). Using it as a guide, I created the following files:

<b>named.local</b>	localhost reverse mapping file
<b>localhost.zone</b>	localhost cache file
<b>ATDNet.zone</b>	master server zone file
<b>0.0.127.in-addr.arpa.zone</b>	localhost reverse mapping zone file
<b>1.168.192.in-addr.arpa.zone</b>	master server reverse mapping zone file

These files were then placed in the **/var/named** directory (See Appendix E). However, there were two additional files that the BIND DNS Server program needed. Located in the **/etc** directory, they are **named.custom** and **rndc.key**. The **named.custom** file contains “any changes not supported by redhat-config-bind” (See Appendix E – **named.conf** file.) The Remote Name Daemon Controller (rndc) utility is used by the BIND DNS controller to prevent unauthorized access. The key, located in the **rndc.key** file is created by an algorithm which is used to grant privileges to hosts (18).

The two books and the man pages provided much of the information required to configure the necessary files. While this server was also complicated to configure, it did not present as many difficulties as the Samba server. The many hours I had spent reading and analyzing Linux, Red Hat Linux, Samba, and the BIND DNS Server had given me a basic understanding of the operating system, especially as it is used in networking.

#### 4.3.2.4 User/Machine Configurations

In the book *SAMBA ESSENTIALS FOR WINDOWS ADMINISTRATORS*, the author states that “every Samba user must have a regular Linux account” (26, p. 46). Therefore, after a user is created in Linux, that user must then be added to Samba. A complete description of the logon process by a Windows 98 client can be found in “How to Configure Samba 2.2 as a Primary Domain Controller” (22, pp. 12-13). These two functions are easily implemented by using the **useradd**, **passwd**, and **smbpasswd** commands (10, p.20 & 21, pp. 263-264). The user accounts must be synchronized. This option is set in the Samba configuration file. The configuration files that contain the user information are **passwd** and **smbpasswd** (See Appendix F). The **passwd** file is found in the **/etc** directory, while the **smbpasswd** is stored in the **/etc/samba** directory (10, p. 19 & 24, chap. 5). A complete description of the files and information regarding user accounts management can be found in *Linux System Administration, Second Edition* (24).

Machine accounts are created in a similar way. The first change is to use a dollar sign (\$) as the last character in the machine name. Next, there is no home directory and no shell access. Finally, the dollar sign (\$) is not required for the **smbpasswd** command (26, pp. 270-271). For security reasons, machine accounts should not be created until the client is ready to connect (10, p. 19). Machine accounts are maintained in the same configuration files as user accounts (See Appendix F).

User and machine accounts are then added to groups through the **groupadd** account (26, p.264). The configuration file, **group**, is found in the **/etc** directory (See Appendix F).

There are some naming conventions that must be adhered to. User/machine names are allowed to be 11-characters maximum; however, Linux recognizes only the first eight characters (26, p. 49 & p. 270). No spaces, periods, or underscore characters are allowed (26, p. 270).

There are two additional user configuration files. These are **smbusers** and **smbusers.map** (See Appendix F). They are used by Linux to “map Windows usernames to Linux usernames” (26, p. 49). They are located in the **/etc/samba** directory. I have not used this aspect of Linux as I have not found a need to do so.

#### 4.3.2.5 File Shares Configurations

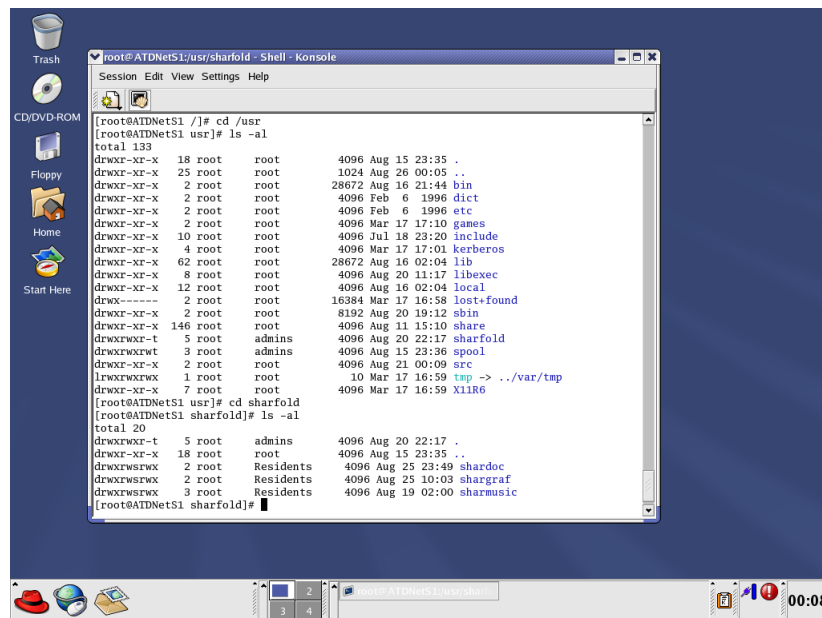
Once the shares are configured in the **smb.conf** file, two groups were created to manage the new shares. The first group, **admins**, is a user group which will be given security access to administer the file shares. The second group, **machines**, simply allows the machine accounts to be organized together. The groups are created with the **groupadd** command.

The next step is to create the directories themselves. These are created with the **mkdir**, **chown**, and **chmod** commands, which are found in the **man pages**. Setting security levels and ownership levels are specified for each file share or directory based on who should have access, and how much access they should have, to the files in that directory. Currently, I have very little security in place. I have given full access to all users in the interest of testing the original server configuration without security measures interfering. This will be corrected during the next phase of this project.

Directory permissions are set with an octal number system in Samba. It uses a set of four numbers with the first being a “sticky” bit. This bit can be used to **set user ID (SUID)**, **set group ID (SGID)**, and to enable the sticky bit. The second number sets permissions for the

directories owner, the third one for the group associated to the directory, and the final number sets permissions for everyone else (26, pp. 58-79).

The file shares are listed in the **smb.conf** file surrounded by brackets [ ]. They are the **homes**, **netlogon**, **profiles**, **tmp**, **sharfold**, **shardoc**, **sharmusic**, and **shargraf** directories. The first three are, of course, necessary for the user logon process. The **tmp** is a directory created to temporarily store files on an as needed basis. The final four directories were created so that users could share files on the server, including graphics compact disks (CDs) for a graphics program that the residents use to create cards and banners. (See Figure 2 for a screenshot of the **sharfold** directory.)



**Figure 2. /usr/sharfold directory**

By moving the users' files to the server through the use of roaming profiles and also allowing space for their shared files, the limited capacity for storage on the client systems would become less critical. The server was designed to have a large capacity for disk storage for this reason. Extra room, to allow for growth, was calculated into the required server disk storage system. This solved the need for additional disk storage.

#### 4.3.2.6 Apache Web Server

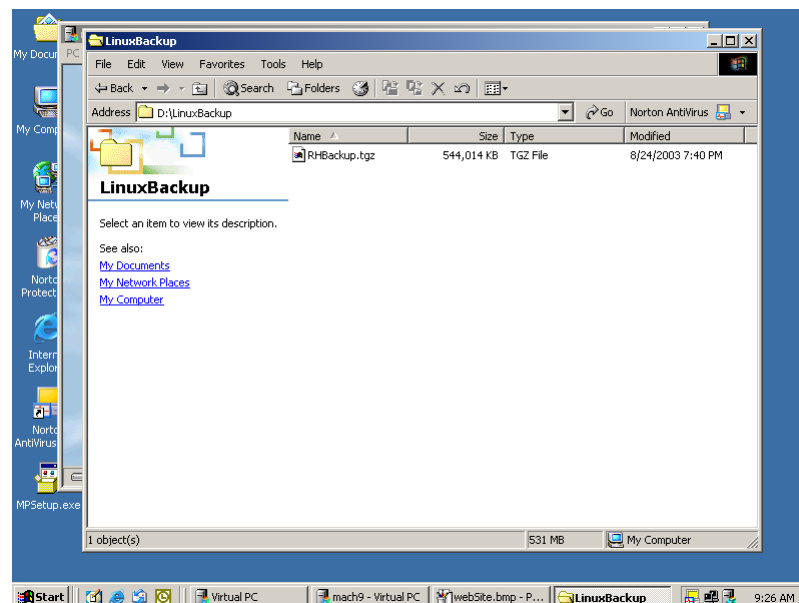
In *Linux for Windows Administrators*, the authors stated that the Web site directory was `/var/www/html` (16, p. 336). I copied the files for a Web site that was created for “The Internet” class into the directory. After opening the Web browser, Mozilla, I typed in the name of the server, ATDNetS1 to test the Apache Web Server. The main page for the Web site immediately opened without any difficulties. The server was installed and turned on when the operating system was installed. By copying files into the directory, the Web Server became active. See section 4.4 Intranet Web Site for a description of its implementation. At this point, the Server is operating with the default configuration file. As it seemed to be working, even after testing, I did not try to make any changes to it.

#### 4.3.2.7 Security

Much of the security for the server was declared in the `smb.conf` file. One option that I used was `browseable=no` for the `.profile` shares folder. This does not prevent a user from accessing the directory and its files, but it does make it invisible. If the user does not know the path, it will be more difficult for him/her to access it. To prevent a user or a group of users from accessing certain folders and files, I used the `chown` and `chmod` commands. The users were given access to their home share folders, a `shardoc` share folder, a `shargraf` share folder, and a `sharmusic` folder. These provide additional storage for each user and a place that could be used to share certain types of files. However, I did not set up disk quotas; so the users were not limited to a certain amount of storage space. After security was implemented, only the allowed share folders were displayed for each user in his/her Network Neighborhood and My Computer. The `chmod` and `chown` commands can be found in the `man` pages.

### 4.3.2.8 Backup

Using the **mkdir**, **smbmount**, and **tar** commands, I was able to backup the entire system to the hard drive on another PC. The **mkdir** command creates a point in the file system where the Windows folder can be attached for further communications. The **smbmount** command attaches the Windows shared folder to the directory created in **/mnt**. The **tar** command compresses the data in the files and copies them to the designated file. When the **--exclude-from** option is used, a file with a list of the files to exclude from the copy is read. I recommend this option with a file containing a list of any files which can be easily re-loaded, such as music or graphics CDs. Also, the name of the backup file should be listed in the exclude file. This will prevent the backup operation from trying to copy its backup file. (See Figure 3 for the Linux backup file located on the Windows system.)



**Figure 3. Backup of Linux Server on Windows system**

### 4.3.3 Windows 98

All of the PCs in the Assistive Technology Department's computer lab have Windows 98 Second Edition installed. There was no need to update these systems to another operating

system. Implementing the Red Hat Linux server designed specifically for the residents' use provided the required additional functionality. However, some changes were made to update the Windows 98 configuration files to enable roaming user profile logons with the requisite accessibility options for each resident.

#### **4.3.3.1 Network Configuration**

Configuring the Network Property in the Control Panel allows Samba on the Linux server and Windows 98 on the client systems to communicate. First, Transmission Control Protocol / Internet Protocol (TCP/IP) must be configured. After selecting TCP/IP in the "Configuration" tab, click on the "Properties" button. As a router with Dynamic Host Control Protocol (DHCP) capabilities is connected to the network, I selected the "Obtain an IP address automatically" option in the IP Address tab. This will cause the Windows 98 system to obtain its IP address from the router. In the "WINS Configuration" tab select "Enable WINS Resolution" and then I added the IP address of the Linux server. I added the IP address of the Linux server in the "Gateway" tab also. For the "DNS Configuration" tab, I selected "Disable DNS." Finally, in the "Bindings" tab I selected both "Client for Microsoft Networks" and "File and printer sharing for Microsoft Networks" (26, pp. 138-144).

The "Client for Microsoft Networks" component must be configured also. After selecting it, click on the "Properties" button. The check box for "Log on to Windows NT domain" must be selected and in the box under "Windows NT domain:," **ATDNet** must be entered. The "Logon and restore network connections" options must be selected under "Network logon options." The window can now be closed.

Next, the "Computer name" in the "Identification" tab must match the machine account name on the Linux sever and "Workgroup" must contain the domain name, **ATDNet**. Finally,

“User-level access control” must be selected in the “Access Control” tab and in the box under “Obtain list of users and groups from:” must be the domain name, **ATDNet**. After closing the Network Properties window to save these new settings, the system must be restarted (26, pp. 138-144).

At this point, the server should be seen in the “Network Neighborhood” as **Atdnets1**. The Comment field should state “atdnets1, Red Hat Linux 8.0, Samba 2.2.7-.” If the server does not appear, there are several utilities available to troubleshoot the problem. These include **ping**, **ipconfig**, **winipcfg**, **tracert**, **netstat**, **nbstat**, and **net**. Of course, most of these are run in a Disk Operating System (DOS) prompt window. The exception is **winipcfg**, which is executed with Run in the Start menu (26, pp.147-150).

#### **4.3.3.2 User Profiles**

There are two user properties in the Control Panel that must be configured to allow for roaming profiles. The first is the Passwords Property. The option in the User Profiles tab, “Users can customize their preferences and desktop settings. Windows switches to your personal settings when log on,” should be selected. Under User Profile Settings, “Include desktop icons and Network Neighborhood contents in user settings,” and “Include Start menu and Program groups in user settings,” should both be selected. Close the window and save the settings.

The second property to configure is the Users Property. After selecting a user and clicking the “Change Settings...,” button, the “Personalized Items Settings” window pops up. All of the check boxes under “Items” should be selected. Also, the “Create copies of the current items and their contents” option should be selected. Close both open windows.

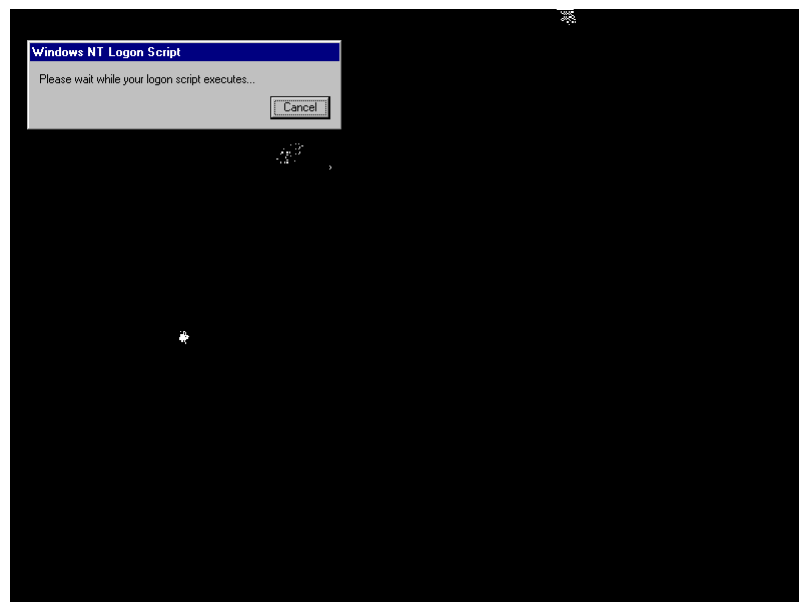
The PC must be restarted. The first time each user logs on, a dialog box will pop up with the following message: “You have not logged on at this computer before. Would you like this

computer to retain your individual settings for use when you log on here in the future?” Click on “Yes” to save the user’s settings on the server. Finally, all user names and passwords in the Windows 98 systems must match the user names in the **passwd** and the **smbpasswd** files on the Linux server (26, pp. 137-138).

#### 4.3.3.3 Logon Procedure

In order to properly configure the Linux server, it became necessary to understand how Windows 98 executed the logon procedure. I found a step-by-step guide in “Domain Control for Windows 9x/ME” (22). Simply put, it stated the following:

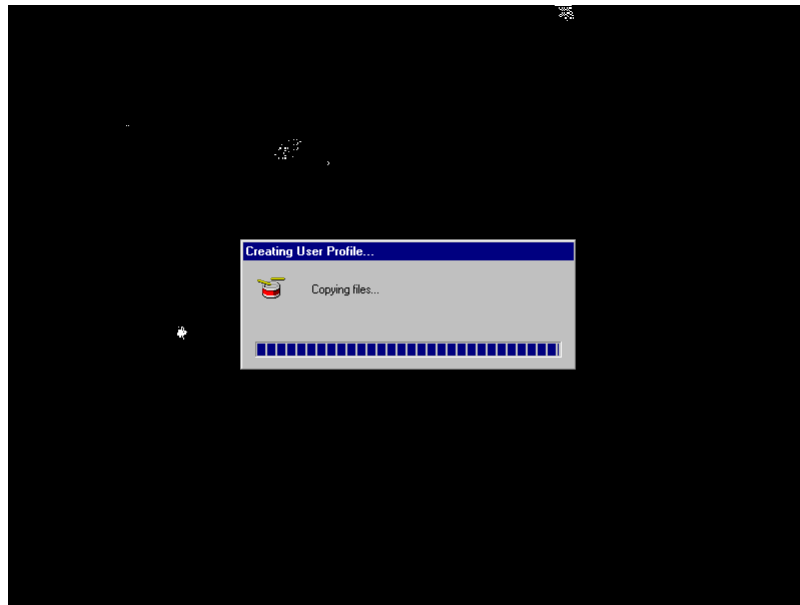
1. After broadcasting a NetLogon request, the Windows client system selects the first response it receives with the NetBIOS name of the domain server using the format of the uniform naming convention (UNC).
2. The client system logs on to the server after making the connection.
3. The client system then sends a NetWkstaUserLogon request, which sends the user’s name and password for verification to the server. The user’s logon script is then retrieved and executed. (See Figure 4.)



**Figure 4. Logon script executed**

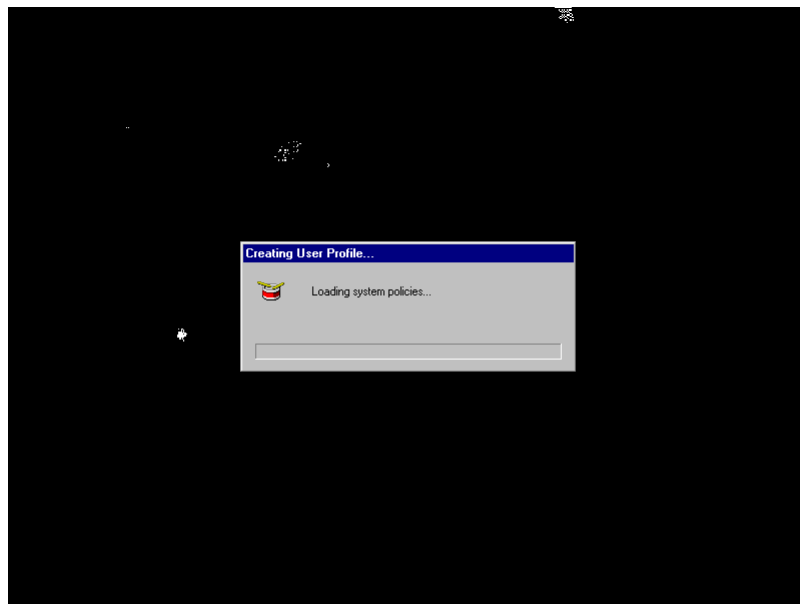
4. Upon finding the NetLogon share, it is executed by the client system. When completed, the connection with the NetLogon share is severed.

5. The client system sends a NetUserGetInfo request to retrieve the user's home share. It is then used to search for the user's profile. This location is specified in the **smb.conf** file.
6. The files in the user's profile are then retrieved from the user's home share and applied. (See Figure 5.)



**Figure 5. Copying user files from server to client system**

7. After disconnecting from the user's home share, the client system then reconnects to the NetLogon share to implement the policies file, **CONFIG.POL**. (See Figure 6.)



**Figure 6. Loading system policies**

At this point, the user's entire working environment has been copied from the Linux server and implemented on the user's client system. A screenshot of a user's **home** and **.profile** directories as they are stored on the Linux server can be seen in Figure 7. A more detailed description can be found in *Red Hat Linux 8 Unleashed* (1). The accessibility options file for this user, named **MySettings.acw**, can also be seen in Figure 1 (13 & 15).

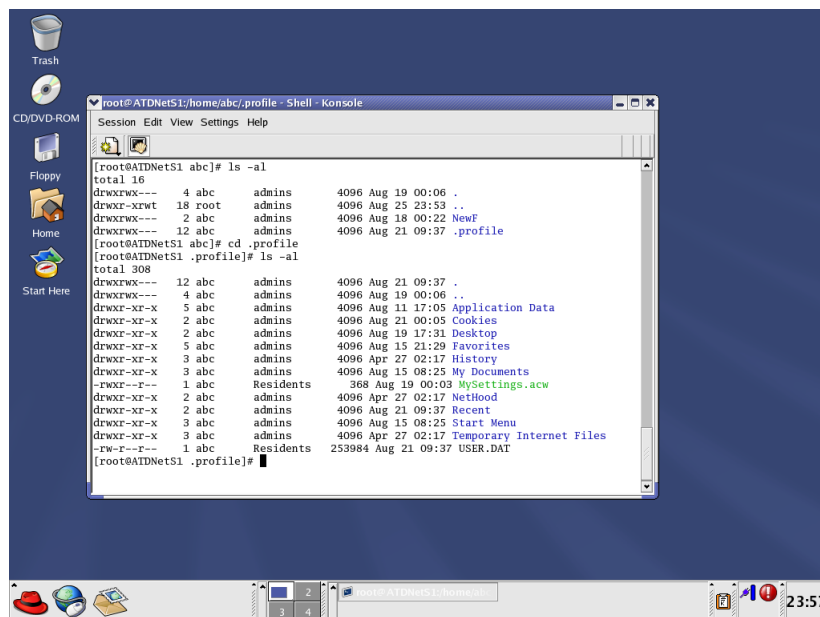
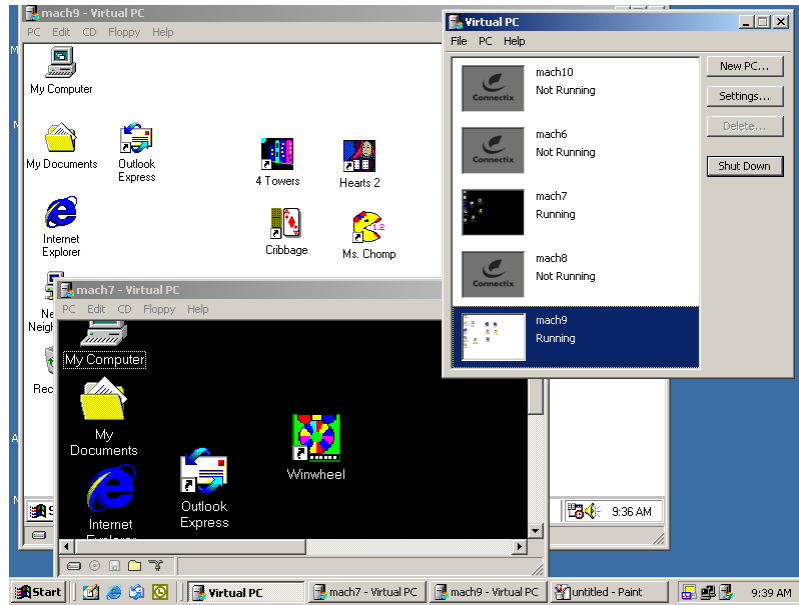


Figure 7. User's home directory with Windows files

#### 4.3.3.4 Accessibility Options

User's roaming profiles which include the user's accessibility options have provided the tailored computer accessibility required for each resident. The Accessibility Wizard in Windows 98 was used to configure the accessibility options for each logon name. When the Administrative Option is selected, it allows the settings to be saved as an **\*.acw** file in that user's profile folder on the server. It then becomes a part of the user's working environment. Therefore, when Windows retrieves the user's profile from the server, it also retrieves the **\*.acw** file with that person's accessibility options and implements them (13 & 15). (See Figure 8.)



**Figure 8. Two users' desktops in Virtual PC**

#### **4.3.3.5 Print Server**

Many printers do not have driver files for Linux because their manufacturers do not support Linux. This is especially true for the new multi-functioning printers. Hewlett-Packard supports Linux more than any other manufacturer. For a list of the printers which are supported as well as those that are not, see [linuxprinting.org](http://linuxprinting.org) (12). Unfortunately, the Brother MFC-3100c is not supported. This required that the printer be installed to a Windows PC to become the network print server. With the Brother printer's driver disk, I used the Add Printer wizard found in Start, Settings, and then Printers for the installation. I could then go to the Network Neighborhood for each of the client systems and double-click on the Brother printer icon. The Windows system would then need to install the drivers to each of the other systems to complete the installation of the network printer.

#### **4.3.3.6 Mapped Drives**

Since the shared folders had already been created in the **smb.conf** file and permissions had been set while the network's security was being implemented, Windows needed to be

directed to them. This was accomplished by using Mapped Drives. In Network Neighborhood, I right-clicked on the desired folder, selected Map Network Drive, the drive letter to be designated, and then the checkbox to Reconnect at Logon. I used the convention that the **shargraf** folder would be designated as the G drive on the Windows system, with **shardoc** as the T drive, and **sharmusic** as M. Users were then able to find all of the share folders in My Computer along with their home share folder.

#### 4.4 Intranet Web Site

The Web site was created by modifying the projects for “The Internet” class. I changed the style sheet, the picture on the main page, and the menu page. A history page and an Internet Web sites page were added. The title page was changed to reflect the name of a newsletter that Beechwood Home currently distributes. All pages were updated to operate as a unit. I then copied the files to the **/var/www/html** directory on the Linux server (16, p. 336). (See Figure 9.)

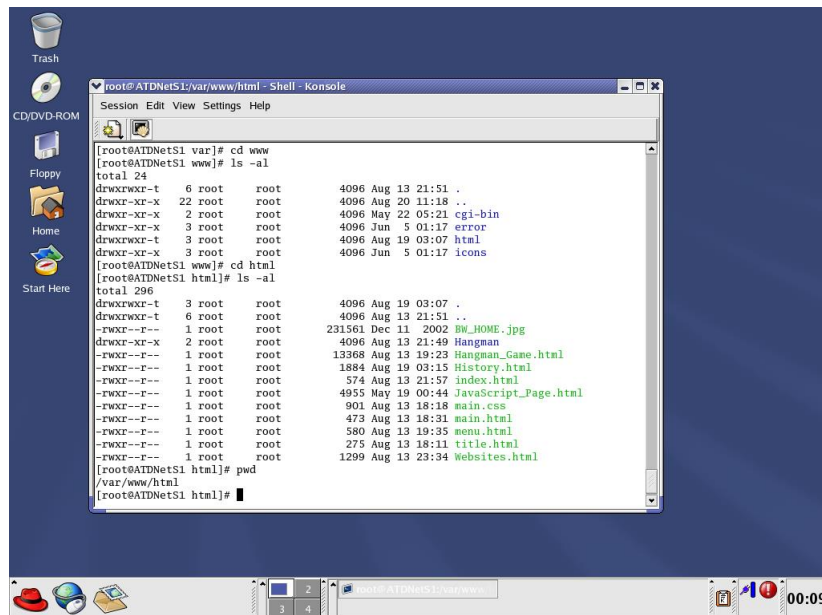


Figure 9. Intranet Web site directory

## 5 Proof of design

The following is a brief list of the items that were tested in order to verify that the project's requirements are met:

- Authentication / Security
  - Are all users authenticated when they login to the ATDNet network?
  - Does the server prevent unauthorized access?
  - Can users change their own passwords?
- Desktop Environments
  - When users logon, do their desktop environments reflect the accessibility options they require?
  - Are only the icons for the software that user needs displayed on the desktop?
- File Server
  - Does the file server operate as required?
  - Are all users prevented from accessing files and directories that they shouldn't?
  - Can the users access all the files and directories that they should?
  - Is there adequate disk storage now that everything has been installed?
  - Can they share specific files as required?
  - Is there room on disk for future storage expansion?
- Web Server
  - Does the intranet Web server operate as required?
  - Can Administrators update the information as needed without difficulty?
  - Are all users within the intranet network allowed access to the Web site?
  - Is access limited to only within the intranet?

- Print Server
  - Can the users print letters and cards easily?
  - Does the print server operate correctly?

The file, print, and intranet Web server are able to serve 8 to 10 client computer systems. This was demonstrated to Professor Mark Stockman and during the Oral Presentation. When each resident logs off from one client system on the network and logs on to another, he/she is able to see the same tailored desktop environment with the same functionality as was previously seen.

With the exception of the e-mail server and the recovery method, all proposed deliverables have been met. All testing has been completed and the project has been concluded. The server operates efficiently to provide the necessary services that Beechwood Home's Assistive Technology Department requires in their computer lab for the residents.

## **6 Conclusions and recommendations**

This project was an excellent opportunity for me to learn another operating system. However; I understand that this is supposed to be a learning experience. It would have been much better if there were someone that I could go to when I could not find an answer to a problem after spending several days trying to research it rather than spending more than a month to research each large problem, especially with the time constraints for each quarter.

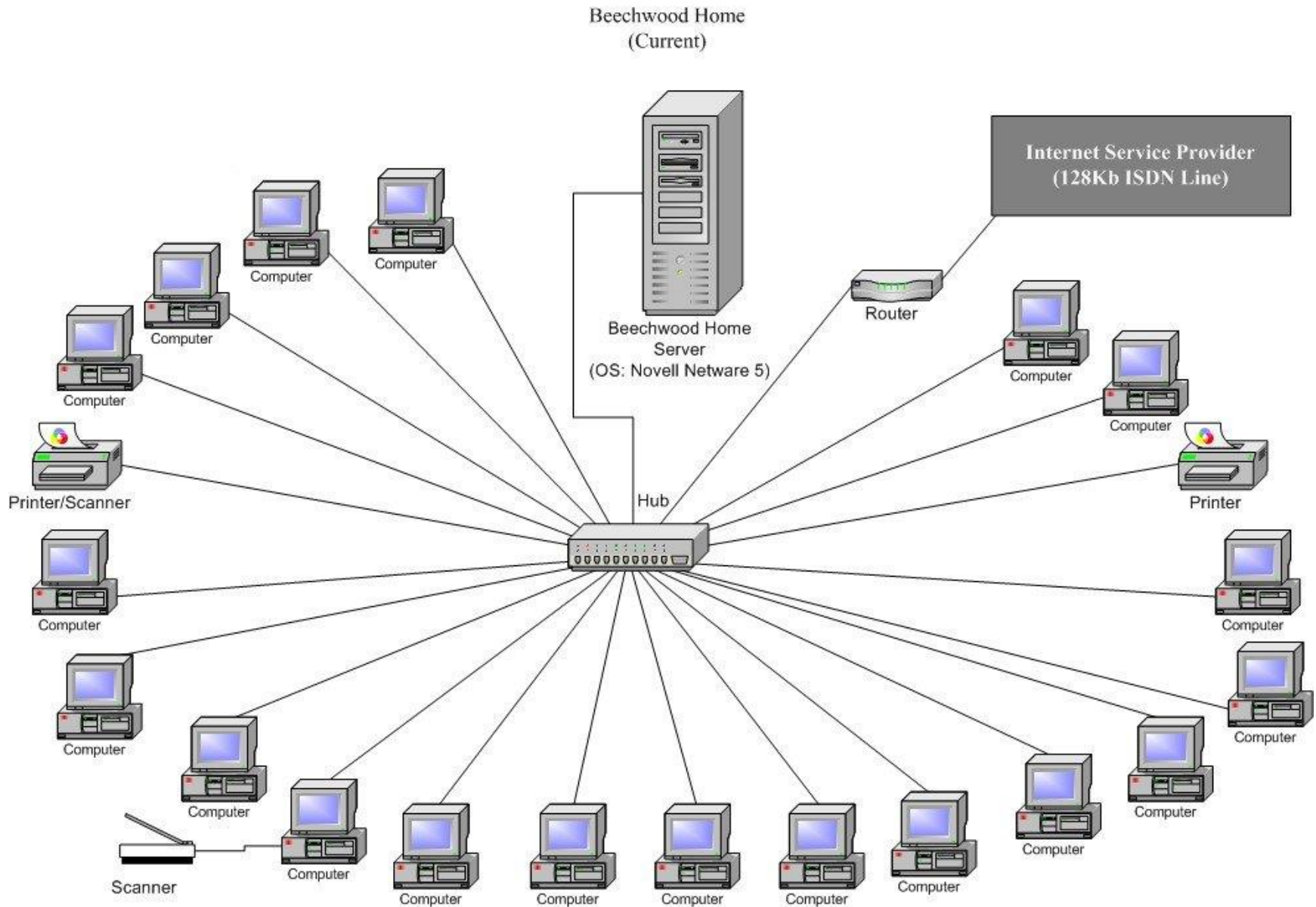
As for Beechwood Home, I understand why they changed their mind regarding the implementation of my project. When a business must balance their requirements between cost and experience, most often experience must win. While this project would have provided a less expensive solution, the consultant that has been providing the computer service necessary for

Beechwood to continue operating has a great deal more experience with networks and with Beechwood Home's requirements.

I am making friends with many people who are also interested in networking. I have attended several CiNPA meetings. I plan to attend more CLUG meetings in the future. I have not been able to do so in the past due to time conflicts. For instance, this past weekend was the monthly meeting and of course, this week was finals.

I do feel that as much as I have learned about Linux as a server operating system, I have much more to learn. I found that Linux could provide a very sophisticated network server with the right configuration. The server that I implemented for this project was basic. I hope to someday use this new skill in a job where I could have someone to teach me more about the complexities of Linux.

## Appendix A Current/Future Topologies





## Appendix B

### anaconda-ks.cfg

```
# Kickstart file automatically generated by anaconda.

install
lang en_US
langsupport --default en_US.UTF-8 en_US.UTF-8
keyboard us
mouse alpsps/2 --device psaux --emulthree
xconfig --card "ATI Rage Mobility" --videoram 8192 --hsync 31.5-48.5 --vsync 40-70 --
resolution 1024x768 --depth 32 --startxonboot --defaultdesktop gnome
network --device eth0 --bootproto static --ip 192.168.1.101 --netmask 255.255.255.0 --gateway
192.168.1.1 --nameserver 65.24.0.167 --hostname ATDNetS1
rootpw --iscrypted $1$r nU$RXL8I7d0OkmGWHJk7Lj/I1
firewall --disabled
authconfig --enablshadow --enablemd5
timezone America/New_York
bootloader --location=mbr --md5pass=$1$ mmoeL$ly4jdtGiY.4BlHJXHJnwy/
# The following is the partition information you requested
# Note that any partitions you deleted are not expressed
# here so unless you clear all partitions first, this is
# not guaranteed to work
#clearpart --all --drives=hda
#part /boot --fstype ext3 --size=100 --ondisk=hda
#part /usr --fstype ext3 --size=1400 --grow --ondisk=hda
#part swap --size=512 --grow --maxsize=1024 --ondisk=hda
#part /home --fstype ext3 --size=512 --grow --ondisk=hda
#part / --fstype ext3 --size=512 --ondisk=hda
#part /var --fstype ext3 --size=384 --grow --maxsize=1024 --ondisk=hda

%packages
@ Administration Tools
@ Dialup Networking Support
@ Editors
@ GNOME Desktop Environment
@ Graphical Internet
@ KDE Desktop Environment
@ Network Servers
@ Server Configuration Tools
@ Sound and Video
@ System Tools
@ Text-based Internet
@ Windows File Server
@ X Window System
kpaint
gnome-audio
lisa
xmms
```

## Appendix B

anaconda-ks.cfg - Continued

firstboot  
ggv  
kppload  
redhat-config-kickstart  
cdparanoia  
kamera  
gtk-engines  
gnome-vfs-extras  
xdelta  
kdemultimedia-kfile  
cipe  
kiconedit  
authconfig-gtk  
gnome-media  
ethereal  
autorun  
fetchmail  
lrzsz  
redhat-config-httpd  
gdm  
gnome-system-monitor  
cdp  
finger-server  
gimp-print-utils  
kdvi  
openssh-askpass  
ark  
xawtv  
xchat  
redhat-config-printer-gui  
gedit  
kdeaddons-knewsticker  
gconf-editor  
kit  
gqview  
slrn  
redhat-logviewer  
rhn-applet  
desktop-backgrounds-extra  
magicdev  
kedit  
redhat-config-bind  
file-roller  
mozilla-mail  
ypserv  
telnet-server

**Appendix B**  
anaconda-ks.cfg - Continued

hpijs  
nmap  
pxe  
mozilla-psm  
redhat-config-services  
kghostview  
mutt  
kpf  
openssh-askpass-gnome  
kdeaddons-kicker  
kdepim  
redhat-switchmail-gnome  
kdict  
kmail  
gftp  
xisdload  
gnome-vfs2-extras  
hwbrowser  
evolution  
gtk2-engines  
redhat-config-nfs  
redhat-config-network  
redhat-config-proc  
screen  
mtr-gtk  
talk-server  
rsh-server  
kppp  
psgml  
kdeartwork-locolor  
gnome-user-docs  
redhat-config-xfree86  
grip  
dvdrecord  
redhat-config-users  
kdeaddons-konqueror  
vim-enhanced  
redhat-switch-printer-gnome  
gaim  
koncd  
gtoaster  
kuickshow  
cdlabelgen  
  
%post

## Appendix C

### Samba Configurations

	Red Hat 8.0 Default	SAMBA for Windows Admin	IBM by DeveloperWorks	Jason Cook	Sample Configuration file for Debian GNU/Linux
[global]					
workgroup	ATDNet	ATDNet	ATDNet		
netbios name	ATDNetS1	ATDNetS1	ATDNetS1		
server string	%L running Red Hat Linux 8.0 Samba %v	%L running Red Hat Linux 8.0 Samba %v	%L running Red Hat Linux 8.0 Samba %v		%L running Red Hat Linux 8.0 Samba %v
invalid users					root
hosts allow	192.168.1. 192.168.2. 127.		127.0.0.1 192.168.1.0/255.255.255 .0		
guest account	pcguest	guestAcct			nobody
domain admin group		@adm			
log file	/var/log/samba/%m.log		/var/log/samba/%m.log		/var/log/samba/log.%m
log level			2		
max log size	0		50		1000
deadtime		0			
security	user	user	user	user	user
password level	8				
username level	8				
encrypt passwords	yes	yes	yes		no
smb passwd file	/etc/samba/smbpasswd	/etc/samba/smbpasswd			
unix password sync	yes	yes			false
passwd program	/usr/bin/passwd %U	/usr/bin/passwd %U			
passwd chat	*New*password* %n\n *Retype*new*password* %n\n *passwd: *all*authentication*tokens*upd ated*successfully*	*old*password* %o\n *new*password* %n\n *new*password* %n\n *changed*			*Enter\snew\sUNIX\spass word:* %n\5 *Retype\snew\sUNIX\spa ssword:* %n\n
pam password change	yes				no
username map	/etc/samba/smbusers	/etc/samba/smbusers.map			
include	/etc/samba/smb.conf.%m				/home/samba/etc/smb.co nf.%m

**Appendix C**  
Samba Configurations - Continued

	Red Hat 8.0 Default	SAMBA for Windows Admin	IBM by DeveloperWorks	Jason Cook	Sample Configuration file for Debian GNU/Linux
include	/etc/samba/smb.conf.%m				/home/samba/etc/smb.conf.%m
obey pam restrictions	yes				
socket options	TCP_NODELAY SO_RCVBUF=8192 SO_SNDBUF=8192	IPTOS_LOWDELAY TCP_NODELAY SO_RCVBUF=8192 SO_SNDBUF=8192	TCP_NODELAY IPTOS_LOWDELAY SO_RCVBUF=8192 SO_SNDBUF=8192		TCP_NODELAY SO_RCVBUF=8192 SO_SNDBUF=8192
local master	no	yes	yes	yes	yes
os level	33	64	64	65	20
domain master	yes	true	yes	yes	auto
preferred master	yes	true	yes	yes	auto
domain logons	yes	yes	yes	true	
logon home (9x,Me)		\\%L\%U\profile	\\%L\%U\		
logon drive		H:	H:	w:	
logon script	%U.bat	logon.bat	netlogon.bat		
logon path (W2K,NT)	\\%L\Profiles\%U	\\%L\Profiles\%U	\\%L\profiles\%U	\\ATDNetS1\profiles\%U	
wins support	yes	no	yes	yes	no
wins proxy	no				
dns proxy	no				no
preserve case	no				yes
short preserve case	no				yes
default case	upper				
case sensitive	no				
name resolve order					lmhosts host wins bcast

**Appendix C**  
Samba Configurations - Continued

	Red Hat 8.0 Default	SAMBA for Windows Admin	IBM by DeveloperWorks	Jason Cook	Sample Configuration file for Debian GNU/Linux
# ===== shares =====					
[homes]					
comment	Home Directories	Home Directories	Home Directories		Home Directories
path		/home/%S			
browseable	no	no	no		no
writable	yes		yes		yes
valid users	%S	%S			
create mode	0664	0700			
directory mode	0775				
map to guest	bad user				
create mask		0700			0700
directory mask		0700			0700
read only		no			
guest ok		no			
available		yes			
hosts allow		127.0.0.1 192.168.1.			
level2 oplocks		yes			
dos filetimes		yes			
		# This is required for Windows 9x/Me clients			
[netlogon]					
comment	Network Logon Service		Network Logon Service		Network Logon Service
path	/usr/local/samba/lib/netlogon	/ATDNetS1/netlogon	/home/netlogon	/usr/share/samba/netlogon	/home/samba/netlogon
guest ok	yes	no		no	yes
guest only		no			
writable	no			no	no
share modes	no	no			no
read only		no	yes		
browseable		no	no		
write list			abc		

**Appendix C**  
Samba Configurations - Continued

	Red Hat 8.0 Default	SAMBA for Windows Admin	IBM by DeveloperWorks	Jason Cook	Sample Configuration file for Debian GNU/Linux
[Profiles]					
path	/usr/local/samba/profiles				
browseable	no				
guest ok	yes				
[profiles]					
path			/home/samba/profiles		
writeable			yes		
browseable			no		
create mask			0600		
directory mask			0700		
[tmp]					
comment	Temporary file space				
path	/tmp				
read only	no				
public	yes				
	#public access, read only, except for "staff" group				
[public]					
comment	Public Stuff				
path	/home/samba				
public	yes				
writeable	yes				
printable	no				
write list	@staff				

**Appendix C**  
Samba Configurations - Continued

	Red Hat 8.0 Default	SAMBA for Windows Admin	IBM by DeveloperWorks	Jason Cook	Sample Configuration file for Debian GNU/Linux
	# public access, read/write = all users, owner = default user (any user can delete ANY files)				
[public]					
path	/usr/somewhere/else/public				
public	yes				
only guest	yes				
writable	yes				
printable	no				
[myshare]					
comment	Mary's and Fred's stuff				
path	/usr/somewhere/shared				
valid users	mary fred				
public	no				
writable	yes				
printable	no				
create mask	0765				
[BasicGroup]					
path		/sharedFolders			
comment		Share Folders			
read only		no			
valid users		@Residents			
create mask		0770			
directory mask		0770			
force group		Residents			
force create mode		0770			
force directory mode		0770			
level2 oplocks		yes			
dos filetimes		yes			

**Appendix C**  
Samba Configurations - Continued

	Red Hat 8.0 Default	SAMBA for Windows Admin	IBM by DeveloperWorks	Jason Cook	Sample Configuration file for Debian GNU/Linux
[SecureGroup]					
path		/sharedFolders			
comment		Share Folders			
read only		no			
valid users		@Residents			
hosts allow		127.0.0.1 192.168.1.			
browseable		no			
create mask		0770			
directory mask		0770			
force group		Residents			
force create mode		0770			
force directory mode		0770			
level2 oplocks		yes			
dos filetimes		yes			
[BasicPublic]					
path		/ATDNetS1/Public			
read only		no			
create mask		0666			
directory mask		0666			
level2 oplocks		yes			
dos filetimes		yes			
[Limited Public]					
path		/ATDNetS1/Public			
read only		no			
create mask		0644			
directory mask		0644			
level2 oplocks		yes			
dos filetimes		yes			

**Appendix C**  
Samba Configurations - Continued

	Red Hat 8.0 Default	SAMBA for Windows Admin	IBM by DeveloperWorks	Jason Cook	Sample Configuration file for Debian GNU/Linux
[Secured Public]					
path		/ATDNetS1/Public			
read only		no			
valid users		@Residents			
hosts allow		127.0.0.1 192.168.1.			
force group		Residents			
create mask		0640			
directory mask		0640			
level2 oplocks		yes			
dos filetimes		yes			

## Appendix D

### smb.conf

```
# smb.conf
# created 3/23/2003
# Linda Harrell

[global]
; basic server settings
read only = no
workgroup = ATDNet
netbios name = ATDNetS1
server string = %L running Red Hat Linux 8.0, Samba %v
socket options = IPTOS_LOWDELAY TCP_NODELAY SO_RCVBUF=8192
SO_SNDBUF=8192
wins support = yes

; PDC and master browser settings
os level = 64
preferred master = yes
local master = yes
domain master = yes

; security and logging settings
security = user
encrypt passwords = yes
log file = /var/log/samba/%m.log
log level = 3
max log size = 1000
hosts allow = 192.168.1. 127.0.0.1
domain logons = yes
username map = /etc/samba/smbusers.map

; password settings
smb passwd file = /etc/samba/smbpasswd
unix password sync = yes
passwd program = /usr/bin/passwd %U
passwd chat = *new* password* %n\n *retype*new*password* %n\n *changed*

; user profiles and home directory
logon home = \\%N%\%U\.profile
logon drive = H:
logon script = %U.bat
logon path = \\%L\Profiles\%U

# ===== shares =====
[homes]
comment = Home Directories
path = /home/%S
```

**Appendix D**  
smb.conf - Continued

```
browseable = yes
writeable = yes
valid users = %S
// create mode = 0700
// directory mode = 0700
// create mask = 0700
// directory mask = 0700
// read only = no
// guest ok = no
available = yes
hosts allow = 192.168.1. 127.0.0.1
```

```
[netlogon]
comment = Network Logon Service
path = /netlogon/scripts
guest ok = no
browseable = no
```

```
[profiles]
path = /%U/.profile
writeable = yes
browseable = yes
// create mask = 0600
// directory mask = 0700
```

```
[Profiles]
path = /Profiles
writeable = yes
browseable = yes
// create mask = 0600
// directory mask = 0700
```

```
[tmp]
comment = Temporary file space
path = /tmp
read only = no
public = yes
```

```
[sharfold]
path = /usr/sharfold
comment = Shared Files Directory
read only = no
hosts allow = 192.168.1.
browseable = yes
// create mask = 0770
// directory mask = 0770
```

**Appendix D**  
smb.conf - Continued

```
// force create mode = 0770  
// force directory mode = 0770
```

```
[shardoc]  
path = /usr/sharfold/shardoc  
comment = Shared Documents Folder  
read only = no  
hosts allow = 192.168.1.  
browseable = yes  
// create mask = 0776  
// directory mask = 0776  
// force create mode = 0776  
// force directory mode = 0776
```

```
[shargraf]  
path = /usr/sharfold/shargraf  
comment = Shared Graphics Folder  
read only = no  
hosts allow = 192.168.1.  
browseable = yes  
// create mask = 0776  
// directory mask = 0776  
// force create mode = 0776  
// force directory mode = 0776
```

## Appendix E

### Domain Name Service (DNS) Configuration Files

#### **named.conf**

```
## named.conf - configuration for bind
# Created 3/23/03
# by Linda Harrell
#
# Generated automatically by redhat-config-bind, alchemist et al.
# Any changes not supported by redhat-config-bind should be put
# in /etc/named.custom
#
controls {
    inet 127.0.0.1 allow { localhost; } keys { rndckey; };
};

include "/etc/named.custom";

include "/etc/rndc.key";

options {
    directory "/var/named/";
};
zone "0.0.127.in-addr.arpa" {
    type master;
    file "named.local";
};
zone "1.168.192.in-addr.arpa" {
    type master;
    file "1.168.192.in-addr.arpa.zone";
};
zone "localhost" {
    type master;
    file "localhost.zone";
};
zone "ATDNet" {
    type master;
    file "ATDNet.zone";
};
```

## Appendix E

### Domain Name Service (DNS) Configuration Files - Continued

#### **named.local**

```
; localhost reversed mapping file
; Created 3/23/03
; by Linda Harrell
; see Linux: The Complete Reference, Fifth Edition - Chapter 22
$TTL 86400
@      IN      SOA    localhost.    root.localhost (
        1 ; serial
        28800 ; refresh
        7200 ; retry
        604800 ; expire
        86400 ; ttk
        )

@      IN      NS     localhost.

1      IN      PTR    localhost.
```

## Appendix E

### Domain Name Service (DNS) Configuration Files - Continued

#### localhost.zone

\$TTL 86400

```
@    IN    SOA    @ root.localhost (
                1 ; serial
                28800 ; refresh
                7200 ; retry
                604800 ; expire
                86400 ; ttl
                )
```

```
@    IN    NS     localhost.
```

```
@    IN    A     127.0.0.1
```

## Appendix E

### Domain Name Service (DNS) Configuration Files - Continued

#### ATDNet.zone

```
; ATDNet zone file - domain database file
; Created 3/27/03
; by Linda Harrell
;
; see Linux: The Complete Reference, Fifth Edition - Chapter 22
;
$TTL 86400
@           IN      SOA   ATDNetS1.ATDNet.  root.localhost (
                2 ; serial
                28800 ; refresh
                7200 ; retry
                604800 ; expire
                86400 ; ttl
                )
;
; Define the nameservers
;
                IN      NS      ATDNetS1.ATDNet.
;
; Define the hosts
;
                IN      A       192.168.1.101
hp             IN      A       192.168.1.102
ps            IN      A       192.168.1.100
localhost     IN      A       127.0.0.1
```

## Appendix E

### Domain Name Service (DNS) Configuration Files - Continued

#### 0.0.127.in-addr.arpa.zone

\$TTL 86400

```
@    IN    SOA    localhost.    root.localhost (
        1 ; serial
        28800 ; refresh
        7200 ; retry
        604800 ; expire
        86400 ; ttk
    )
```

```
@    IN    NS     localhost.
```

```
1    IN    PTR    localhost.
```

## Appendix E

### Domain Name Service (DNS) Configuration Files - Continued

#### 1.168.192.in-addr.arpa.zone

```
; reverse mapping of domain names 1.168.192.IN-ADDR.ARPA
; Linda Harrell
; created 3/27/03
; see Linux: The Complete Reference, Fifth Edition - Chapter 22
;
$TTL 86400
@           IN      SOA   ATDNetS1.ATDNet. root.localhost (
                1 ; serial
                28800 ; refresh
                7200 ; retry
                604800 ; expire
                86400 ; ttk
                )

@           IN      NS    ATDNetS1.ATDNet.

100        IN      PTR    ps.ATDNet.
102        IN      PTR    hp.ATDNet.
```

**Appendix E**  
Domain Name Service (DNS) Configuration Files - Continued

**named.custom**

```
## named.custom - custom configuration for bind
#
# Any changes not currently supported by redhat-config-bind should be put
# in this file.
#

zone "." {
    type hint;
    file "named.ca";
};
```

## Appendix F

### Users/Machines Configuration Files

#### passwd

```
root:x:0:0:root:/root:/bin/bash
bin:x:1:1:bin:/bin:/sbin/nologin
daemon:x:2:2:daemon:/sbin:/sbin/nologin
adm:x:3:4:adm:/var/adm:/sbin/nologin
lp:x:4:7:lp:/var/spool/lpd:/sbin/nologin
sync:x:5:0:sync:/sbin:/bin/sync
shutdown:x:6:0:shutdown:/sbin:/sbin/shutdown
halt:x:7:0:halt:/sbin:/sbin/halt
mail:x:8:12:mail:/var/spool/mail:/sbin/nologin
news:x:9:13:news:/etc/news:
uucp:x:10:14:uucp:/var/spool/uucp:/sbin/nologin
operator:x:11:0:operator:/root:/sbin/nologin
games:x:12:100:games:/usr/games:/sbin/nologin
gopher:x:13:30:gopher:/var/gopher:/sbin/nologin
ftp:x:14:50:FTP User:/var/ftp:/sbin/nologin
nobody:x:99:99:Nobody:./:/sbin/nologin
ntp:x:38:38:./etc/ntp:/sbin/nologin
rpc:x:32:32:Portmapper RPC user:./:/sbin/nologin
vcsa:x:69:69:virtual console memory owner:/dev:/sbin/nologin
nscd:x:28:28:NSCD Daemon:./:/sbin/nologin
sshd:x:74:74:Privilege-separated SSH:/var/empty/sshd:/sbin/nologin
rpm:x:37:37:./var/lib/rpm:/bin/bash
mailnull:x:47:47:./var/spool/mqueue:/sbin/nologin
smmisp:x:51:51:./var/spool/mqueue:/sbin/nologin
rpcuser:x:29:29:RPC Service User:/var/lib/nfs:/sbin/nologin
nfsnobody:x:65534:65534:Anonymous NFS User:/var/lib/nfs:/sbin/nologin
pcap:x:77:77:./var/arpwatch:/sbin/nologin
xfs:x:43:43:X Font Server:/etc/X11/fs:/sbin/nologin
named:x:25:25:Named:/var/named:/sbin/nologin
gdm:x:42:42:./var/gdm:/sbin/nologin
desktop:x:80:80:desktop:/var/lib/menu/kde:/sbin/nologin
apache:x:48:48:Apache:/var/www:/sbin/nologin
postfix:x:89:89:./var/spool/postfix:/sbin/nologin
hp$:x:551:502:mach1:/dev/null:/bin/false
ps$:x:552:502:./dev/null:/bin/false
abc:x:601:503:./home/abc:/bin/bash
abc2:x:602:503:./home/abc2:/bin/bash
pabc:x:603:503:./home/pabc:/bin/bash
abc3:x:604:503:./home/abc3:/bin/bash
pabc2:x:605:503:./home/pabc2:/bin/bash
num1:x:606:606:./home/num1:/bin/bash
```

**Appendix F**  
Users/Machines Configuration Files - Continued

**smbpasswd**

hp\$:551:FC8A067B0E96E8D7AAD3B435B51404EE:A6F27F4AD4966283928B626611F9C6FD:[W	]:LCT-3E7E6C42:
ps\$:552:EAD1C6FE9FB378B029687C1CD15EA850:881C6D0DB33505EB862C0F08E45DFA4E:[W	]:LCT-3EB13656:
abc:601:13FE51336A20AC8EAAAD3B435B51404EE:8895E989934E3B8F39A9F099FD71BFC4:[UX	]:LCT-3E7E8091:
abc2:602:595B2CC0D2FCA714AAD3B435B51404EE:10DF8E70BB1763A9E37A9009ACAE424A:[UX	]:LCT-3E7E82F3:
root:0:E1C5FAAFD93DE6DDAAD3B435B51404EE:22685AC717894CBD3AEE755E86A54986:[UX	]:LCT-3EC5997B:
pabc:603:AC8DFBF2853A831DAAD3B435B51404EE:D77A139B4B313C7E7EA086F6229CDF89:[UX	]:LCT-3EC589DC:
abc3:604:0E76468684B69DEFAAD3B435B51404EE:D3C9E112D788D06899E8A88C00D38099:[UX	]:LCT-3EB0813D:
pabc2:605:ED3E6B2694AD6C35AAD3B435B51404EE:4175CC98B9308CA41BBB013D690C4816:[UX	]:LCT-3EC5998C:
num1:606:89E7C91D467417BFAAD3B435B51404EE:E875C3346AC9DFDD54E4B424ABE1B2B3:[UX	]:LCT-3EC65463:

**Appendix F**  
Users/Machines Configuration Files - Continued

**smbusers**

```
# Unix_name = SMB_name1 SMB_name2 ...  
root = administrator admin  
nobody = guest pcguest smbguest
```

**Appendix F**  
Users/Machines Configuration Files - Continued

**smbusers.map**

```
# Unix_name = abc abc2 root
root = administrator admin
nobody = guest pcguest smbguest
```

## Bibliography

1. Ball, Bill and Hoyt Duff. *Red Hat Linux 8 UNLEASHED*. Indianapolis: Sams Publishing, 2003.
2. Barker, Kay. Assistive Technology, Beechwood Home. Personal Interview. October 10, 2002.
3. Cincinnati GNU/Linux Users Group. Meeting. Miami Systems Corporation, Blue Ash, Ohio. April 26, 2003. <<http://www.clug.org>>.
4. Cincinnati Network Professional Association. Meetings. New Horizons Learning Center, Blue Ash. March 5, 2003 and April 2, 2003. <<http://www.cinpa.org>>.
5. Connectix Corporation. "Connectix Virtual PC for Windows". <[http://www.connectix.com/support/vpcw\\_online.html](http://www.connectix.com/support/vpcw_online.html)>. August 5, 2003.
6. Cook, Jason. Cincinnati GNU/Linux Users Group. E-mail. March 18, 2003.
7. Economou, Matthew. Senior Systems Analyst. Cincinnati Children's Hospital Medical Center. Personal Interview. March 5, 2003.
8. etronics.com Electronics Superstore. 2003. <<http://etronics.resultspage.com/display.php?p=Q&ts=dynamic&w=brother+mfc-3100>>. May 21, 2003.
9. Haydon, Jennie Meta. *A History of Beechwood Home*. Cincinnati: Beechwood Home, 1999.
10. ibm.com/developerWorks. "Using Samba as a PDC". <<http://www-1.ibm.com/servers/esdd/tutorials/samba/index.html>>. March 11, 2003.
11. Laptop Outlet, The. "The Laptop Outlet". <<http://www.laptopoutlet.com/index.html>>. November 10, 2002.
12. LinuxPrinting.org. <<http://www.linuxprinting.org>>. May 18, 2003.
13. Microsoft Accessibility Technology for Everyone. "Starting and Using the Accessibility Wizard". June 5, 2002. <<http://www.microsoft.com/enable/training/windows98/wizard.aspx>>. April 1, 2003.
14. Microsoft Tech Net. "Net Use". Microsoft Corporation. 2003. <[http://www.microsoft.com/technet/treeview/default.asp?url=/technet/prodtechnol/winxp/pro/proddocs/net\\_use.asp](http://www.microsoft.com/technet/treeview/default.asp?url=/technet/prodtechnol/winxp/pro/proddocs/net_use.asp)>. April 26, 2003.
15. Microsoft Windows 2000 Server Documentation. "Contents of a user profile".

## Bibliography

Microsoft Corporation. February 28, 2000.

<[http://www.microsoft.com/windows2000/en/server/help/default.asp?url=/windows2000/en/server/help/sag\\_upconcepts\\_5.htm](http://www.microsoft.com/windows2000/en/server/help/default.asp?url=/windows2000/en/server/help/sag_upconcepts_5.htm)>. April 1, 2003.

**16.** Minasi, Mark and Dan York. *Linux for Windows Administrators*. Alameda, CA: Sybex, 2003.

**17.** *Netware 6*. Novell, Inc. <<http://www.novell.com/products/netware/>>. November 30, 2002.

**18.** Petersen, Richard L. *Linux: The Complete Reference, Fifth Edition*. Berkley, CA: Osborne/McGraw-Hill, 2002. <<http://www.libraries.uc.edu:2373/corporate.asp>>. March 20, 2003.

**19.** Red Hat. *Official Red Hat Linux Administrator's Guide*. Indianapolis: Wiley Publishing, 2003.

**20.** *Red Hat Linux Manuals*. Red Hat, Inc. <<http://www.redhat.com/docs/manuals/linux/>>. November 2, 2002.

**21.** *Red Hat Network*. Red Hat, Inc. <<http://www.redhat.com/software/rhn/>>. April 1, 2003.

**22.** Samba Team. "SAMBA Project Documentation". April 1, 2002. <<http://us3.samba.org/samba/docs/Samba-HOWTO-Collection.pdf>>.

**23.** Smith, Lisa. Technology Implementation Specialist, Beechwood Home. Personal interview. November 1, 2002.

**24.** Stanfield, Vicki and Roderick W. Smith. *Linux System Administration, Second Edition*. Alameda, CA: Sybex, 2002. <<http://www.libraries.uc.edu:2373/corporate.asp>>. February 17, 2003.

**25.** Vanel, Laurent and Leonardo Monteiro, et al. *Samba Installation, Configuration, and Sizing Guide*. Mountain View, CA: VERVANTÉ, July 14, 2000. <<http://www.redbooks.ibm.com/redbooks/pdfs/sg246004.pdf>>. April 19, 2003.

**26.** Wilson, Gary. *SAMBA ESSENTIALS FOR WINDOWS ADMINISTRATORS*. Upper Saddle River, NJ: Prentice-Hall, 2002.

**27.** *Windows 2000 Server*. Microsoft Corporation. November 6, 2002. <<http://www.microsoft.com/windows2000/server/default.asp>>. November 2, 2002.