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Many schools and organizations make the mistake of not preparing for potential crisis situations in advance. As a result, schools and organizations often make erroneous decisions, waste critical time and allow the crisis to control them and/or spiral out of control. Being fully prepared ahead of time can be the difference between keeping your business up and running or going out of business. This project takes a look at the Information Technology (IT) infrastructure of the School of Information and Library Science, documents all IT related procedures, machines, and processes, which are needed to keep the school functioning. This disaster recovery plan is an ongoing process that should be evaluated and re-examined every semester in order to update critical services.

Headings:

Security - Business Continuity

Policies – Information Technology Recovery

THE SCHOOL OF INFORMATION AND LIBRARY SCIENCE
INFORMATION TECHNOLOGY RECOVERY PLAN

By
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A Master's paper submitted to the faculty
of the School of Information and Library Science
of the University of North Carolina at Chapel Hill
in partial fulfillment of the requirements
for the degree of Master of Science in
Information Science.

Chapel Hill, North Carolina

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Approved by:

Advisor

Table of Contents

1.	Introduction - Purpose, Methodology and Analytical Approach	5
2.	Recovery Team and Responsibilities	11
2.1	Steps for an Orderly Shutdown when Time Permits	11
2.2	Emergency Notification List	12
2.3	Team Management Responsibilities	13
2.4	Team Members Addresses and Telephone Numbers	13
2.5	Damage Assessment Checklist	13
2.6	Alphabetical List of All Employee Names, Addresses	14
2.7	Customer Contacts for Recovery	16
2.7.1	Campus Services	16
2.7.2	Students Information Applications	17
2.7.3	Financial Systems	19
2.7.4	Health Services	20
2.7.5	Human Resources and Payroll	20
2.7.6	Telecommunications	20
2.8	Team Headquarters	21
3.	Equipment	22
3.1	Computers in the Lab	22
3.2	Tape Library and Tape Management Systems	22
	The Backup Server Library	22
	How to start the Networker Administrator Program	22
	Backup Process	22
	How to Configure a Schedule Backup	23
	How to Start a Backup Immediately	23
	How to perform a manual backup initiated from the client	23
	How to recover Networker servers	23
	How to Recover Bootstrap Data from Another Server's Tapes Using mmrecov (Unix to Unix or Win to Win)	25
	Backup Schedule for Machines at SILS	
	How to Label and Mount a DLT	26
3.3	Office Equipment	26
3.4	Vendor Contact List for Equipment	27
3.5	Vendor Contact List for Service	28

3.6	Potential Backup Installations	28
3.7	Lab PCs applications and specifications	29
3.8	Laptop applications and specifications	34
3.9	Applications that are running on all Lab machines and Laptops	35
3.10	Servers and Services	37
	Falcon	37
	Phoenix	38
	Miles	39
	Ella	39
	Guinea	40
	Pelican	41
	Kiwi	42
	Duck	42
	Ils-ghost	42
	Owl	43
4.	Functional operations in the office	44
	Shawn Jackson	44
	Susan Thomas	44
	Angie Heinisch	45
	Lucia Zonn	46
	Marcia Tauber	47
	Cheryl Lytle	47
	Rebecca Varga	49
5.	Backup Server Recovery (Disaster) – Server/Image	51
	The Backup Server and Library	51
	Backup Process	51
	Backup Schedule for Machines at SILS	53
	Onyx	53
	Groups	54
	Pool	54
	Indexes	54
	Backup types explained	54
	Schedules	55
	Legato Software Management GUI	55
	How to create a pool	55
	How to create a group	56
	How to schedule a group	57
	How to Start Groups Immediately	57
	How to Create Clients	57
	How to Label and Mount a DLT	58
	L1000 or jukebox	59
	Control Panel Uses	59
	To Turn the Library On	59

To Turn the Library Off	60
To Manually Eject a Cartridge	60
Performing an Inventory	61
Data Backup and Recovery	61
Manual Data Backups	61
How to Manually Back Up Data	62
Data Recovery	63
How to Recover Data	63
How to Recover Data from a Previous Backup Time	65
How to Relocate Recovered Data	65
How to Resolve Recovered Data Conflicts	66
Recovery Options	67
How to Search for a Recoverable File	67
How to View Details of Recoverable Files	67
How to View the Version Details of Backed-Up Data	68
How to View Volumes Required for Data Recovery	68
Disaster Recovery	68
Uses of Directed Recovery	69
Access Requirements for Directed Recoveries of UNIX Clients	69
How to Grant Administrative Rights for a NetWorker Server	70
How to Grant Administrative Rights to a Remote NetWorker Server's Client	70
How to Grant a Network Connection to a Destination Client	72
How to Gain Remote Access to a NetWorker Client	72
How to Perform a Directed Recovery Between UNIX Clients	73
Directed Recovery of Specific Files and Directories	74
How to Restore a Save Set Entry in the Online Indexes	74
Client File Index Only	74
Client File Index and Media Database	75
How to Recover One File Directly from a Volume	75
Recovering Client File Indexes	76
How to Recover a Client's Current File Index	76
How to Recover Client File Indexes for a Specific Time and Date	76
Relocating Recovered Online Indexes	77
NetWorker Release 6.0 Software	77
Type II – Server and Client Failure	77
How to Recover the UNIX Operating System	77
How to Recover a UNIX NetWorker Server	79
6. Application/Data Recovery – Server/Client	86

	Installing Client Software – Linux	86
	Disaster	
	Type I – Client Failure Only	87
	How to Recover Windows NT 4.0/UNIX Client or Storage Node Data	87
7.	Updating/Testing of Plan	91
8.	Supplies	92
	Appendix A	93

1. **Introduction**

Purpose

The School of Information and Library Science (SILS) is a professional school that seeks to prepare students for careers in Information and Library Science. The school also encourages both faculty and students to take part in and to submit scholarly research. SILS faculty, staff, and students rely on servers that are housed in Manning Hall to keep their data, papers, research, and personal documents. What would happen if a disaster strikes SILS?

We live in a time where we must be prepared for almost anything. Many schools and organizations make the mistake of not preparing for potential crisis situations in advance. As a result, schools and organizations often make erroneous decisions, waste critical time and allow the crisis to control them and/or spiral out of control. An actual crisis is not the time to try to figure out what actions to take, whom to contact or how to communicate with your various employees, staff, and students. Being fully prepared ahead of time can be the difference between keeping your business up and running or going out of business.

The threat of terrorist attacks has certainly been elevated since September 11, but continuity planners at educational institutions have other concerns as well.

Many universities rely on their stellar reputations in particular fields of study to boost enrollment. These reputations are built around strong research programs, which take years of demonstrative continuity and discipline to achieve. In addition, research may be funded by grants from private or government entities such as the National Institute of Health (NIH). By accepting those grants, colleges and universities commit to the responsible and prudent management of funds and compliance with regulatory guidelines. If you have grants, and a disaster impacts your lab environment and you can't continue the research, you potentially will lose grant money, and the reputation of the entire research program could suffer. It is very important for universities to maintain their reputations. In addition, research data is significant and must be protected.

Methodology

Before the project can even start, I must have the total support from the higher-ups in the school. I met with Dean Marshall to define and agree on the scope of the project. I sent her an email stating the information that would be required from each member of staff. This information gave me a general understanding of each staff member's responsibility and IT requirements.

It was recommended that I establish a planning team to develop the recovery procedures, however, since it is a small school with a few business functions, I think that with the help of the staff named in Step1 (below), I could do a good

job. I made sure all employees, and staff were aware of the plan and its contents

1. Identify business representatives.

Business unit plans should identify a business representative authorized to determine recovery requirements. This person should also have the power to approve funding. From my knowledge both Ms. Lucia Zonn and Ms. Angie Heinisch would be good sources from the business aspect of the school while Mr. Scott Adams would represent the technology infrastructure.

2. Establish client participation and user acceptance.

The recovery team will consist of individuals who are currently assigned to the day-to-day support of the IT infrastructure. This team should also run quarterly drills and update the procedures when it is needed. Client participation in plan development and user acceptance testing is required in order to obtain successful results.

3. Locate vulnerabilities in the technology infrastructure.

In the past, the words "risk analysis" have meant the process of identifying and minimizing exposure to certain threats that an organization may experience. Traditionally, this process would not include vulnerabilities in the technology infrastructure. With today's businesses relying on technology, a good risk analysis is fundamental to a successful business continuity program.

Scott Adams and Cheryl Lytle were my contacts for this part of the project. I requested manuals or procedural documentations. I analyzed the steps and put into place procedures for when the “what if” happens.

4. Identify technology requirements.

The technology requirements for a successful recovery must include hardware and software equivalents to production. I interviewed Mr. Adams to gain an understanding of all machines and servers and the services that were provided.

6. Develop a recovery strategy.

The school needs will dictate the recovery strategies and recovery time objectives (RTO). RTO is defined by the business as the amount of down time their application can endure. The recovery time requirements of interdependent applications must be taken into consideration. Two key components to any contingency program should include a strategy to back up and restore vital records.

Any down time in SILS, depending on the time of the semester, could be detrimental. Most students and faculty store critical information on the servers such as Kiwi and Ruby. For those who are doing research, downtime or lost data could have serious impacts, not to mention the frustration of duplicating efforts and lost time.

7. Create vital records and provide offsite storage.

A critical component in plan development is the selection of backup and restoration software capable of storing and successfully retrieving data. Without this, there is no business continuity program. Backup scheduling must include an off-site storage location.

Once the data is carefully backed up, it must be accessible in the event that the facility is not accessible. There are bonded commercial storage vendors that provide security and offsite data storage. However, with finances being a problem, I recommend that SILS and another department, such as Computer Science, use each other's facility as offsite storage.

8. Build the plan.

A critical step in plan development is actually building the plan. This is where the majority of the work was performed. Any group or individual providing a product or service on a day-to-day basis should also be responsible for supporting the service during a contingency event.

9. Obtain user evaluation sign-off.

Users should be asked to provide their views on the testing process, as well as on the results of the test. A copy of the IT Recovery Plan was given to both Ms. Lytle, and Mr. Adams so that they could provide comments, improvements, and modifications that they would like to see.

Analytical Approach

- Conduct contextual interviews with people who play important roles in all the IT functions in the school to understand the processes and procedures, and to find out how each function relates to each other and the overall goals of the school.
- While gathering data, identify the best practices for IT Recovery.
- Analyze the differences between what is practiced and the “best practices”.

2. Recovery Team and Responsibilities

2.1 Steps for an Orderly Shutdown when Time Permits

Sun Machines

- logon as root on a console or remotely (ssh2)

```
# shutdown -i6 -g0 -y
```

Machines

- ruby
- onxy
- pearl
- jade
- tardis

Linux

- logon as root console or remotely (ssh2)

```
# shutdown -h
```

Machines

- ella
- opal
- video
- miles
- idl
- neoref

WinServer

- logon as Admin

Start -> Shutdown -> Shutdown -> Enter/Ok

Machines

- kiwi
- falcon
- guinea
- pelican
- phoenix
- owl
- ils-ghost

NetApps

- logon as root

halt

Machines

- duck

Order of Shutdown

- ruby
- duck
- onxy
- kiwi
- falcon
- pearl
- owl
- jade
- guinea
- pelican
- phoenix
- tardis
- video
- idl
- neoref
- miles
- opal
- ella
- ils-ghost

2.2 Emergency Notification List

Name	Office Phone	Home Phone
Scott Adams Director of Information Technology	(919) 962-0235	(919)-929-0612
Cheryl Lytle Assistant Director for Information Technology	(919) 962-8188	(919) 408-0391
Lucia Zonn Student Services Manager	(919) 962-7601	(919)-942-0628
Joanne Marshall Dean	(919) 962-8363	(919)-929-9162
Roger Patterson Associate Vice Chancellor, Finance	(919) 962-7242	
OTHERS AS NEEDED		
University Police	(919) 962-6565	

Fire, Police, Emergency Medical	911	
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2.3 Team Management and Their Responsibilities

Member	Responsibilities
Scott Adams	Rebuild all Unix and Linux servers
Cheryl Lytle	Rebuild all Windows/NT servers

2.4 Team Members Addresses and Telephone Numbers

Team Members	Address	Telephone Number
Scott Adams	29 North Circle Drive Chapel Hill NC 27516	919-929-0612
Cheryl Lytle	4707 Carlton Crossing Drive Durham NC 27713	919 408-0391

2.5 Damage Assessment Checklist

Item	Required Repair/ Replacement	Person Assigned Responsibility	Planned Completion Time/Date
<i>Building</i>			
<i>Access to Building</i>			
<i>Computer Facilities Power</i>			
Electrical Distribution System			
Cable Controls			
Air Conditioning			
Water Cooling			
Flooring			

<i>Computer Equipment</i>			
<i>Storage</i>			
Tapes			
Library/Jukebox			
<i>Forms</i>			
<i>Documentation On-Site</i>			
<i>Telephone Equipment</i>			
<i>Office Furnishing</i>			

2.6 Alphabetical List of All Employee Names, Addresses

Name	Address/Phone
ADAMS, Scott Director of Information Technology	29 North Circle Drive Chapel Hill NC, 27516
BARREAU, Deborah Assistant Professor	(919)-401-0055
BOYETTE, Beth Assistant Student Services Manager	(919)-854-9916
CARR, David Associate Professor	(919)-968-3383
CHAFFIN, Kristin Instructor	
DANIEL, Evelyn Professor	(919)-929-2237
GOLLOP, Claudia Associate Professor	(919)-493-1159
GRAHAM, Stacy SILS Library Technical Assistant	(919)- 929-6253
GREENBERG, Jane Assistant Professor	(919)- 401-0591
HAAS, Stephanie Associate Professor	(919)- 544-0643

HEINISCH, Angie Assistant to the Dean	4304 New Brighton Drive Apex, NC 27539 919-280-7171
HEMMINGER, Bradley Assistant Professor	(919)- 942-2273
HEWITT, Joe Professor and Associate Provost for Univ. Libraries and Director of Academic Affairs Libraries	
HOLLEY, Edward William Rand Kenan Jr. Professor	
JACKSON, Shawn Director of Development	6724 Eastbrook Drive Raleigh NC 27615 919-844-9066 C - 919-622-5332
JONES, Paul Director of ibiblio.org	(919)- 932-7285
KILGOUR, Frederick Distinguished Research Professor	(919)- 968-4305
LEE, Jonghoon Instructor	(919)- 450-0868
LAMBSON, Ann Student Services & External Affairs Assistant	(919)- 932-3268
LOSEE, Robert Professor	(919)- 929-0370
LYTLE, Cheryl Assistant Dir. For Information Technology	4707 Carlton Crossing Drive Durham, NC 27713 919 408-0391
MARCHIONINI, Gary Cary Boshamer Distinguished Professor	(919)- 929-4072
MORAN, Barbara Professor	(919)- 967-8541
NEWBY, Gregory Assistant Professor	(919)- 563-9947
SAYE, Jerry Professor	(919)- 968-1436
SOLOMON, Paul Associate Professor and Associate Dean	(919)- 933-3893
SONNENWALD, Diane	(919)- 969-7581

Associate Professor	
STURM, Brian Assistant Professor	(919)- 968-8920
TAUBER, Marcia Office Assistant	105 Anglese Court Chapel Hill NC 27516 (919)- 929-6248
THOMAS, Susan Administrative Manager	170 Offset Farm Road Sanford, NC 27332 919-962-0182 (Work) 919-258-6966 (Home)
TIBBO, Helen Associate Professor and Francis Carroll McColl Term Professor	(919)- 929-6248
VARGHA, Rebecca Librarian of SILS	(919)- 544-6045
WILDEMUTH, Barbara Professor and Associate Dean, Undergraduate Studies	(919)- 968-3018
ZONN, Lucia Student Services Manager	104 Stonehill Road Chapel Hill NC 27516 H 919-942-0628

2.7 Customer Contacts for Recovery

2.7.1 Campus Services

Environment, Health and Safety Pete Reinhardt Director, EH&S Work (919) 843-5913 Home (919) 929-1970	Mary Crabtree Workplace Safety Director Work (919) 962-5719 Home (919) 932-1438
UNC One Card Mike Freeman Card Applications Director Work (919) 962-2407 Home (919) 732-7260	Craig Hyatt Manager – Information Technology Work (919) 962-3270 Home (919) 542-5596
Person ID Mike Freeman Card Applications Director Work (919) 962-2407	Megan Keefe PID Administrator Work (919) 962-9561

Home (919) 732-7260	Home (919) 968-0714
Student Stores Retail John Jones Student Stores Director Work (919) 962-5066 Home (919) 489-1972	Jim Powell Controller, Student Stores Work (919) 962-5066 Home (919) 383-1416
Transportation and Parking Connie McPherson Asst. Dir. Administrative Services Work: (919) 962-7145 Home: (336) 376-6566	Todd Arnold Computing Services Manager Work: (919) 962-5027 Home: (919) 967-1201 Pager: (919) 216-1602
Printing Services Susan Anderson Printing Services Director Work: (919) 962-2400	Mike Rosenmarkle Computing Consultant Work: (919) 962-5566 Home: (919) 489-1148
UNC-TV System Delores Campbell Director of Development Work: (919) 549-7128	Arnetta Campbell Supervisor, Contributor Services Work: (919) 549-7134
Electronic Forms Systems Dennis Press Controller (919) 962-5563	
General Alumni Association Director (919) 962-1208	Roger Nelsen Director, Records (919) 962-1208
Carolina Fund Matt Kupec Associate Vice Chancellor for Development (919) 962-1560	Jean Vickery Director of Development Services (919) 962-3429

2.7.2 Students Information Applications

Registrar's Office David Lanier University Registrar (919) 962-8291	Donna Redmon Associate University Registrar (919) 962-3954
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Undergraduate Admissions Jerry Lucido Director, Admissions (919) 966-3990	Herb Davis Asst. Director, Admissions (919) 966-3993
Graduate Admissions Cheryl Thomas Director of Student Records, Graduate School (919) 962-6312	
Student Aid Shirley Ort Director, Student Aid (919) 962-9246	Vincent Amoroso Asst. Director for System Mgmt. Student Aid (919) 962-2191
Student Loans Shirley Ammon Collections Officer, Student Loans (919) 962-9482	
Cashier's Office Angie Davis Director (919) 962-5848	Gwen Norwood Assistant Director (919) 962-5851
Housing Christopher Payne Director (919) 962-5404	
Faculty/Staff Bulletin Tony Harvey Catalog Editor, Records Publications (919) 962-3761	
Athletic Association Janice Hillard Director of Athletic Academics Affairs (919) 966-4102	
Space Utilization Karen Copeland Drafting Technician Planning Office (919) 966-1571	

Institutional Research Lynn Williford Acting Dir., Institutional Research (919) 962-1500	Myron Dunston Research Assoc. (919) 962-1333
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2.7.3 Financial Systems

Financial Accounting System Dennis Press Controller (919) 962-1370	F. John Case Director, Contracts/Grants (919) 966-2542
Accounts Payable System Martha Pendergrass Director Accounts Payable (919) 962-0213	
Petty Cash Monitor System Assistant Controller (919) 962-0036	
Chart of Accounts System Assistant Controller (919) 962-0036	
Cashier's Office Angela Davis University Cashier (919) 962-1368	
Asset Accounting Candi Woody Director of Asset Accounting (919) 962-1382	
General Administration Jeff Davies Assistant VP for Finance (919) 962-1000	
Central Warehouse and Stores Nancy Franusiszin Interim Director, Materials Management (919) 962-5671	Nancy Franusiszin Interim Director, Materials Management (919) 962-5671
Purchasing Phil Chernesky Associate Director, Purchasing (919) 962-3774	Phil Chernesky Associate Director, Purchasing (919) 962-3774
Investment Office Mark Yusko	Accounting Services Carolyn Sturgess

Chief Investment Officer (919) 962-2002	Director (919) 962-5512
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2.7.4 Health Services

UNC P&A System Rick Deese Director of Fiscal Operations UNC Physicians & Associates (919) 966-1591	Tom Sibert, MD Executive Vice President UNC Physicians & Associates (919) 966-1591	Beacham Wray Director of Managed Care UNC Physicians & Associates (919) 966-1591
Wendell Roberts Director of Ambulatory Care Administration UNC Physicians & Associates (919) 966-1591	Jeanne Chamberlin Director of Financial Operations UNC Physicians & Associates (919) 966-1591	

2.7.5 Human Resources and Payroll

UNC-CH Payroll Dennis Press Controller (919) 962-1370	Betsi Snipes Payroll Director (919) 962-0046
Human Resources Laurie Charest Associate Vice Chancellor, Human Resources (919) 962-1554	Sharon Nieves Manager, HRIS (919) 962-2553

2.7.6 Telecommunications

Telecommunications Steve Harward Director, Telecommunications (919) 962-0004	Tom Horne Director of Financial Services, ATN (919) 962-0303
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Facilities Services Systems Edward Mann Systems Accountant, Facilities Services (919) 962-2182	Edward Phillips Director, Business Operations, Facilities Services (919) 962-8069
Mailing System Jim White Supervisor, Printing Services (919) 962-2182	Susan Anderson Manager, Printing Services (919) 962-5566
Campus Directory System Steve Harward Director, Telecommunications (919) 962-0004	Annette Harmon Campus Directory Coordinator (919) 962-1608

2.8 Team Headquarters

To be determined, based on type and severity of disaster

3. Equipment

3.1 **Computers in the Lab**

This information is detailed in Appendix A (pg 93).

3.2 **Tape Library and Tape Management Systems**

The Backup Server and Library

Onyx, the backup server, is a Sun Microsystems Enterprise 250 machine running Solaris 2.8 with version 6 Solstice for Unix, Network edition. The Networker for Unix Network edition came as part of the package; however, it only allowed 10 machines to connect at a time, which is not sufficient for out school. Two extra modules of Networker Client Connection were purchased, each allowing 25 connections giving us a total of 60 connections at a time. In addition, modules for each type of Operating System, that would need to be backed up, were purchased – Client for Linux, Client for Unix, and Client for Windows.

The Library is a Sun Microsystems StorEDGE L1000 and it was made by ATL (Automated Tape Library). It is connected to Onyx via a differential SCSI cable and contains two DLT 7000 drives (it has the capacity to hold four drives) that cost approximately \$5100 each.

How to start the Networker Administrator Program

Enter the following command at the prompt to start the Networker Administrator program:

nwadmin &

Back up Process

The Library stores 30 DLT tapes, which are used to backup the data for SILS. Backup is separated into two groups: Schedback and Schedlaptop. Each group has their own tapes and these tapes can only be used to backup machines from their respective groups, example, DLT C1#### can only be used to back up laptops. In the Library are 27 tapes for Schedback, 2 tapes for Schedlaptop, and a cleaning tape

The Schedlaptop group comprises of faculty and staff's laptops and Schedback has all faculty and staff's desktops. These groups were

devised since different machines are backed up at different times and with different sequences (full backups or incrementals).

Every Friday, the DLTs with the newest data are removed from the Library and stored in racks in Scott's office. It has been Scott's practice to remove 14 tapes with the most recent backups every Friday; this provides enough tapes for a full week of backups. Tapes that were removed two weeks prior, allowing up to 2 weeks to be recovered at all times replace these tapes.

How to Configure a Schedule Backup

1. Select Customize>Groups to open the Groups window
2. Select Enabled in the Autostart attribute, and then click Apply.
Your NetWorker server is now configured

How to Start a Backup Immediately

1. Select Customize>Groups to open the Groups window.
2. Select Start Now in the Autostart attribute, and then click Apply.
Your NetWorker server will back it up immediately.

How to perform a manual backup initiated from the client

Type **nwbackup -s *servername***

This displays the nwbackup program and -s specifies the NetWorker server

How to recover NetWorker servers

Type **nwrecover -c *client* -s *server***

Use the -s server option to specify a particular NetWorker server on the network. Use the -c client option to specify a particular NetWorker client on the network. This command also displays the nwrecover program.

How to Recover Bootstrap Data from Another Server's Tapes Using mmrecov (Unix to Unix or Win to Win)

1. Move the physical media to the recovering sever
2. Run **mmrecov** to recover the media database and resource files.
3. Shut down the NetWorker server and replace the default resource files with those that were recovered by copying or moving them from /nsr/res.R to /nsr/res.
4. Add the recovering server to the old server's remote access' list.

5. Run **nsrck – L7 old_server** to recover the server's indexes.

The command line program mmrecov will now recover the media index and server's resources files independent of the server's file index.

All backups are logged on Onyx, in addition, Onyx sends daily email notifications to Scott showing all the machines that were backed up successful and those that were unsuccessful (the bootstrap notification). Here is a list of Preconfigured Notifications that are available from the NetWorker server

Notification	NetWorker Response
Bootstrap	Prints the bootstrap information on the NetWorker server's default printer.
Cleaning cartridge expired	Sends e-mail to root: replace the expired cleaning cartridge
Cleaning cartridge required	Sends e-mail to root: insert a cleaning cartridge.
Device cleaned	Sends e-mail to root: device cleaning is complete.
Device cleaning required	Sends e-mail to root: clean the device.
Device disabled	Sends e-mail to root: a device has been automatically disabled.
Index size	Sends e-mail to root: check the size of the client file index because it will soon exceed the space available.
Log default	Directs the UNIX syslog facility (/usr/bin/logger) to log information from the /nsr/logs/messages file into the appropriate system log file.
Migration attention	Sends e-mail to root: check the status if a migration operation.
Migration completion	Sends e-mail to root: a migration operation is complete.
Registration	Sends e-mail to root: check the registration status
Savegroup completion	Sends e-mail to root: degree of success in completing scheduled backups, cloning, and archive operations.
SNMP notification request	Sends notification through the configured trap.
Tape mount request 1 Tape mount request 2 Tape mount request 3	Requests media be mounted in a device and: 1. Displays a pending

	<p>message.</p> <ol style="list-style-type: none"> 2. Sends e-mail. 3. Logs a message to syslog.
--	--

Recommendations – Print notifications

Scott is the only person that gets these notifications. If Onyx goes down he can recover these notifications from Ruby but if they both go down recovering the SSIDs on each tape would be exhausting. I suggest that these notifications be printed daily, kept in a folder for a two week period.

To Print Notifications

Type `nsrlpr -P printer_name`

where `printer_name` (printer name cannot contain spaces) is the name of the selected printer. Select Customize>Notifications and select the notification you want to print.

Other notifications such as Savegroup completion and messages generated by the NetWorker server daemons (`nsrd`, `nsrindexd`, `nsrmmdbd`, and `nsrmmmd`), which are contained in the NetWorker messages log and `daemon.log` file (`/nsr/logs`), should also be printed

NetWorker Server Statistics and Diagnostics Reports should be monitored weekly for warning and error conditions and notices of lost connections (`/nsr/logs/messages`).

Backup Schedule for Machines at SILS

Type of Machine		Full Backup	Incrementals
PCs	Faculty	Wednesdays at 7:30 pm. (Including PHD machines and Library 1,2,3)	Everyday
	Staff	Fridays at 4:00 am	Everyday
Win Servers		Sundays at 12:01 am (Falcon, Kiwi, Pelican, Guinea, Hawk, Owl – only <code>c:\inetpub</code>)	
Sun		Fridays at 10:00 pm (except Pearl and Jade – full backups on Tuesday) all partitions are backed up. All	
Linux		Mondays at 2 am	Everyday
Laptops (Professors)		Thursdays at 6:00 pm	No incrementals

Onyx (Linux)

Onyx needs to have these five processes running for it to be considered “up and running”, and they are nsrd (manages main processes), nsrmmdbd (keeps track of tape), nsrexed (client), nsrindexd (keeps track of data), and nsrmmmd.

To start all services – logged in as root type /etc/rc3d/S95networker start

To stop all services – logged in as root type nsr_shutdown

From home – log into Onyx and type nsrwatch

Win

To recover data from local client -> Programs -> Accessories -> Networker Group

Unix

Type nwadmin

How to Label and Mount a DLT

1. Apply the bar code on DLT
2. Insert an unlabeled or recyclable tape in the Library
3. Select the appropriate device (DLT) in the Devices list of the NetWorker Administrator program.
4. Select Media>Label or click the Label toolbar button to open the Label Window.
5. Check the Mount After Labeling attribute and click OK.

The NetWorker server automatically labels the volume and then mounts the volume into the device.

3.3 Office Equipment

Manuals	- For Equipment - Third Party Administrative Books
Licenses	- File Cabinet
Software	- File Cabinet
Records	- Purchasing - Operations - Letters
Backup Tapes	- Current
Supplies	- Bulbs - Backup Tapes (DLT IV- AIT II)

Media	-	Microphones
	-	Keyboards
	-	External Hard Drive
VCON	-	Video Conferencing Camera
Vigo	-	Web Camera

Recommendations:

All software licenses, records should be photocopied and kept offsite and all new software should be copied to another cd and also kept offsite.

3.4 Vendor Contact List for Equipment

Vendor	Note	Telephone
CDWG (Nora)	Nora Weeks – verbal contract: we have an agreement with them and all you need is the K number from ITP in order to place order.	1-866-339-6940
Student Stores	Sue Wexler – Software Purchases	919-962-3760
Triangle Office Equipment	Trey Jones - Furniture	(cell) 919-291-1998 (w) 919-929-4203
OneCard Office - Auxiliary Services	Jim Clinton – Contact for money for printing on students cards	919-962-2410
Memory 4 Less	Sandy	1-800-821-3354 ext. 1218
MCI	Brett Kelchener - Projectors and class room visual display stuff	919-462-9300
Dell	Kelley Carter	1-800-274-7799 ext. 68237
Dell	Sam Lucchese	919-785-9099
Microsoft MSDN	AA # 055868666439421 http://www.msndaa.net	(fax) 661-775-6475
Oracle OAI	CSI # 3584819 Email: oaiteam_us@oracle.com	(fax) 650-633-1034
Network Appliance	Eric Melvin System id for Filer:	919-993-5634 (support) 919-

	0033603449	941-7713
UNC Contract Equipment/Software	Suzi Conti – much have a facs id. in order to use ITP system	
Staples	Marsha Tauber	
SUN (Alphanumeric)	Rob Vanderberry	(p) 919.376.4495 (c) 919.696.3500 (f) 919.872.1440

3.5 Vendor Contact List for Service

Vendor	Note	Telephone
Sony Parts		1-800-488-7669
Sun Support		1-800-872-4786
Electronic Shop	List of people who would get noticed when the alarm goes off	919-966-5582

3.6 Potential Backup Installations

ATN has a service called ATN/Systems Enterprise Recovery Group. Their mission is to use these Data Backup Procedures to provide all ATN/Systems with efficient, reliable backup of their critical data. They accomplish this by using Tivoli Storage Manager (TSM). TSM is an automated, enterprise-wide storage management application for the network. This application has two components: a central server and a free client (that is gui or text managed). This client software package will, when correctly installed, send daily backups over the network to the TSM servers. These backups are performed using an incremental-forever backup structure. The client package also provides the user with the capability to perform manual backups and restores.

TSM will backup either all disk local to the system, or data as defined in the user's option file. All files backed up from your client node are governed by the 90 days management class. The current version, and up to four previous versions, of a file will be kept in data storage when the file exists on the client node. If the file no longer exists on the client node, it and its four previous versions remain in data storage. Deleted and previous versions are being retained for at least 90 days.

3.7 Lab PCs applications and specs.

<i>Laptop Name</i>	<i>Processor Count</i>	<i>RAM</i>	<i>Manufacturer</i>	<i>MAC Address</i>	<i>Serial No.</i>
<i>PC1</i>	<i>Genuine Intel Pentium 4 MMX 1300 Mhz</i>	<i>256 MB total</i>	<i>Dell 8100</i>	<i>00B0D014E5B D</i>	<i>2Q34B01</i>
<i>PC2</i>	<i>Genuine Intel Pentium 4 MMX 1285 Mhz</i>	<i>256 MB total</i>	<i>Dell 8100</i>	<i>00B0D016330A</i>	<i>9744B01</i>
<i>PC3</i>	<i>Genuine Intel Pentium 4 MMX 1285 Mhz</i>	<i>256 MB</i>	<i>Dell 8100</i>	<i>00B0D0164965</i>	<i>1Q34B01</i>
<i>PC4</i>	<i>Genuine Intel Pentium 4 MMX 1285 Mhz</i>	<i>256 MB total</i>	<i>Dell 8100</i>	<i>00B0D016331C</i>	<i>8644B01</i>

PC5	<i>Genuine Intel Pentium 4 MMX 1300 Mhz</i>	<i>256 MB total</i>	Dell 8100	00B0D0163260	G644B01
PC6	Genuine Intel Pentium 4 MMX 1300 Mhz	256 MB total	Dell 8100	00B0D01640C1	1T34B01
PC7	Genuine Intel Pentium 4 MMX 1300 Mhz	256 MB total	Dell 8100	00B0D01641A1	7Q34B01
PC8	Genuine Intel Pentium 4 MMX 1300 Mhz	256 MB total	Dell 8100	00B0D0161DBD	3844B01
PC9	Genuine Intel Pentium 4 MMX 1300 Mhz	256 MB total	Dell 8100	00B0D01640CB	C844B01
PC10	Genuine Intel Pentium 4 MMX 1300 Mhz	256 MB total	Dell 8100	00B0D01632B6	G744B01
PC11	Genuine Intel Pentium 4 MMX 1300 Mhz	256 MB total	Dell 8100	00B0D01640DA	2T34B01
PC12	Genuine Intel Pentium 4 MMX 1300 Mhz	256 MB total	Dell 8100	00B0D01632F3	6244B01
PC13	Genuine Intel Pentium 4 MMX 1300 Mhz	256 MB total	Dell 8100	00B0D0163269	2744B01
PC14	Genuine	256	Dell 8100	00B0D0164081	HP34B01

	Intel Pentium 4 MMX 1300 Mhz	MB total			
PC15	Genuine Intel Pentium 4 MMX 1300 Mhz	256 MB total	Dell 8100	00B0D0163340	9244B01
PC16	Genuine Intel Pentium 4 MMX 1285 Mhz	256 MB total	Dell 8100	00B0D016335E	2644B01
PC17	Genuine Intel Pentium 4 MMX 1300 Mhz	256 MB total	Dell 8100	00B0D01640AD	4Q34B01
PC18	Genuine Intel Pentium 4 MMX 1285 Mhz	256 MB total	Dell 8100	00B0D016330B	D644B01
PC19	Genuine Intel Pentium 4 MMX 1300 Mhz	256 MB total	Dell 8100	00B0D0163331	4644B01
PC20	Genuine Intel Pentium 4 MMX 1300 Mhz	256 MB total	Dell 8100	00B0D01632E0	6744B01
PC21	Genuine Intel Pentium 4 MMX 1300 Mhz	256 MB total	Dell 8100	00B0D01632BB	7544B01
PC22	Genuine Intel Pentium 4 MMX 1300 Mhz	256 MB total	Dell 8100	00B0D01632A0	8844B01
PC23	Genuine Intel	256 MB	Dell 8100	00B0D0164808	3Q34B01

	Pentium 4 MMX 1300 Mhz	total			
PC24	Genuine Intel Pentium 4 MMX 1300 Mhz	256 MB total	Dell 8100	00B0D01632C4	1844B01
PC25	Genuine Intel Pentium 4 MMX 1300 Mhz	256 MB total	Dell 8100	00B0D01640BA	2944B01
PC26	Genuine Intel Pentium 4 MMX 1300 Mhz	256 MB total	Dell 8100	00B0D01632EC	C544B01
PC27	Genuine Intel Pentium 4 MMX 1300 Mhz	256 MB total	Dell 8100	00B0D01632AA	9644B01
PC28	Genuine Intel Pentium 4 MMX 1300 Mhz	256 MB total	Dell 8100	00B0D016336B	D244B01
PC29	Genuine Intel Pentium 4 MMX 1300 Mhz	256 MB total	Dell 8100	00B0D01632F1	F744B01
PC30	Genuine Intel Pentium 4 MMX 1300 Mhz	256 MB total	Dell 8100	00B0D01641C5	HS34B01
PC31	Genuine Intel Pentium 4 MMX 1300 Mhz	256 MB total	Dell 8100	00B0D0163358	G544B01
PC32	Genuine Intel Pentium	256 MB total	Dell 8100	00B0D0163358	G544B01

	4 MMX 1300 Mhz				
PC40	Genuine Intel Pentium 4 MMX 1285 Mhz	256 MB total	Dell 8100	00B0D01641AA	5Q34B01
PC41	Genuine Intel Pentium 4 MMX 1794 Mhz	256 MB total	Dell 8200	0008A11E9345	CNDFD11
PC42	Genuine Intel Pentium 4 MMX 1794 Mhz	256 MB total	Dell 8200	0008A11033D95	5WRFD11
PC43	Genuine Intel Pentium 4 MMX 1794 Mhz	256 MB total	Dell 8200	0008A10331FE	CVRFD11
PC44	Genuine Intel Pentium 4 MMX 1794 Mhz	256 MB total	Dell 8200	0008A1032C6B	JTRFD11
PC45	Genuine Intel Pentium 4 MMX 1794 Mhz	256 MB total	Dell 8200	0008A10B8342	BDZMD11
PC46	Genuine Intel Pentium 4 MMX 1300 Mhz	256 MB total	Dell 8100	00B0D01641B3	8Q34B01
PC47	Genuine Intel Pentium 4 MMX 1285 Mhz	256 MB total	Dell 8100	00B0D0163210	6844B01
PC48	Genuine Intel Pentium 4 MMX	256 MB total	Dell 8100	00B0D016334D	5544B01

	1300 Mhz				
PC49	Genuine Intel Pentium 4 MMX 1300 Mhz	256 MB total	Dell 8100	00B0D01640D8	7T34B01
PC58	Genuine Intel Pentium III MMX 600 Mhz	320 MB total	OptiPlex GX110	00C04F09B966	GUD28

3.8 Laptop applications and specs.

SILS has 9 laptops, which students may borrow on a first come first serve basis. They are named laptop1 through laptop9. Like most machines in SILS, you can log in as yourself or use the generic logon - the laptop would automatically boot up and log in as the laptop2 for example, this depends on the name of the laptop that you borrowed.

Laptop Name	Processor/ Count	RAM	Man./ Model	Product Name	MAC Address	Serial No.
Laptop3	Genuine Intel Pentium III MMX 800 Mhz/1	128 MB total	IBM/ A22	2628UN5	0003478E10BF	78LDGAW
Laptop4	Genuine Intel Pentium III MMX 900 Mhz/1	256 MB total	IBM/ T22	2647UN5	0040965014CC	783RX1P
Laptop5	Genuine Intel Pentium III MMX 209 Mhz/1	256 MB	IBM/ T22	2647UN5	0003478F1751	783TH1H
Laptop6	Genuine Intel Pentium III MMX 900 Mhz/1	256 MB total	IBM/ T22	2647UN5	0003478F175C	783TH0Y

Laptop7	Genuine Intel Pentium III MMX 900 Mhz/1	256 MB total	IBM/ T22	2647UN5	000943BDD09B	783TH1K
Laptop8	Genuine Intel Pentium III MMX 700 Mhz/1	256 MB total	IBM/ T22	2647UN5	00409650399E	783TH2F
Laptop9	Genuine Intel Pentium 4 MMX 1800 Mhz/1	512 MB total	IBM/ T30	2366FS7	00053C0403BA	78XMM67

3.9 Applications that are running on all Lab machines and Laptops

- Applications
- ActivePerl 5.6.1 Build
 - AddressBook
 - Adobe Acrobat 5.0
 - Adobe Illustrator 10
 - Adobe Photoshop 7.0
 - Adobe Product/Adobe Studio Update 10/2001
 - Adobe SVG Viewer 3.0
 - Aladdin Expander 5.0
 - Books In Print On Disc – SUser
 - Branding
 - ConfigSafe
 - Connection Manager
 - Corporate Time 6.0
 - Crimson Editor
 - Dialog OnDisc
 - DialogLink 3.0
 - DirectAnimation
 - DirectDrawEx
 - DVDExpress
 - DXM_Runtime
 - Expinst
 - Fontcore
 - Gsview and Aladdin Ghostscript
 - HP LaserJet 8000 Printing System
 - IBM Thinkpad On Screen Sisplay
 - IBM TrackPoint Support
 - IBM Update Connector
 - ICW
 - IE 4Data

- IE5BAKEX
- IE Data
- IE README
- iGrafix FlowCharter 2000 Professional
- InstallShield Uninstall Information
- Intel SpeedStep technology Applet
- Intel PRO Ethernet Adapter and Software
- Java 2 Runtime Environment Standard Edition v1.3
- Java 2 Runtime Environment Standard Edition v1.3_02
- Java 2 SDK, Standard Edition v1.3
- Java 2 SDK, Standard Edition v1.3.1
- Java 2 SDK, SE v.1.3.1, Forte for Java, CE 2.0
- JRE 1.3.1
- LISA – SUser
- LiveUpdate 1.7 (Symantec Corporation)
- Macromedia Dreamweaver MX
- Macromedia Extension Manager
- Macromedia Fireworks MX
- Macromedia Flash MX
- Macromedia HomeSite++
- Microsoft FrontPage 2000 SR-1
- Microsoft Image Composer 1.5
- Microsoft Internet Explorer 6
- Microsoft NetShow Player 2.0
- Microsoft Office 2000 SR-1 Disc 2
- Microsoft Office 2000 SR-1 Professional
- Microsoft Visio Professional 2002 SR-1
- Mjuice Components
- MobileOptionPack
- Mozilla 1.0
- Mplayer2
- MsJavaVM
- MSN Messenger 4.5
- Mulberry
- Multicast Viewer
- NetMeting
- Netscape Communicator 4.79
- Norton AntiVirus Corporate Edition
- OpenAFS for Windows
- OutlookExpress
- PCFriendly
- PHAROS 4.70
- ProCite 5
- Quick Time
- Ready to Program with Java Technology
- RealJukebox 1.0

- RealPlayer 1.0
- S3 Gamma Utility
- S3DuoVue Utility
- SchedulingAgent
- Shockwave
- ShockwaveFlash
- SIRS Researcher
- SmartForce Player
- SocketWatch
- SPSS 11.0.1 for Windows
- ThinkPad Assistant
- ThinkPad Configuration
- TopStyle Lite (Version 2)
- Turbo XML Version 2.2
- Tweak UI
- Ulrich's On Disc
- Uninstall mail Switch Application
- Van Dyke Technologies SecureCRT 3.4
- VPN Client
- WebFldrs
- Winamp
- Windows 2000 Service Pack
- Windows Media Player 7.1
- WinZip
- X-Win32 5.3

3.10 Servers and services

Falcon

Falcon is the Domain Controller with IP address 152.2.81.18, serial number JV1VZ11, EOSC tag M68026, and UNC tag 390268. This machine provides user and computer management for SILS Windows domain.

- PowerEdge 2650, 2.2GHz/512K Cache
- 2nd Processor 2.2GHz/512K Cache
- 4 GB DDR, 200MHz, 4X1GB DIMMS
- 36GB, U160, SCSI, 1in 15K
- Raid on Motherboard, PERC3-DI 128MB
- Windows 2000 Server, 5 Client Access Licenses, English, 4GB Partition
- Dual On-Board NICS ONLY
- 24X IDE Internal CD-ROM, Black, for Dell PowerEdge
- Bezel Option for Dell
- 5 Bay SCSI Hard Drive Backplane, 2+3, (1 in only)
- Front Keyboard Mouse Y-cable

- 36GB, U160, SCSI, 1in 15Km, for PowerEdge 2650
- MR1R5, ROMB RAID 1/RAID 5, C12 for Dell PowerEdge 2650
- 73GB 10K RPM Ultra 160 SCSI Hard Drive
- 73GB 10K RPM Ultra 160 SCSI Hard Drive
- 73GB 10K RPM Ultra 160 SCSI Hard Drive
- Type 2 Contract (starting 10/22/02) – Same Day 4-Hour 7x24
Parts and Labor On-Site Response, Initial Year
- Premier Enterprise Support – Gold – Advanced Software
Support Quantity 3 Resolutions
- Premier Enterprise Support – Gold – Premium Services, 2YR
Extended
- Premier Enterprise Support – Gold – Premium Services, Initial
Year
- Type 2 Contract (starting 10/22/02) – Same Day 4-Hour 7x24
Parts and Labor On-Site Response, 2YR Extended
- On-site Installation Declined
- Intel Pro 1000XT, Cu-GB Network Interface Card

Phoenix

Phoenix is a Domain Controller (backup for Falcon) with IP address 152.2.81.19, serial number 1FJND21, and EOSC tag M68601. This machine provides user and computer management for SILS Windows domain.

- PowerEdge 2650, 2.6GHz/512K Cache
- 1 GB DDR, 200MHz, 2X512 DIMMS
- 36GB 10K RPM Ultra 320 SCSI Hard Drive
- Raid on Motherboard, PERC3-DI 128MB 128MB, with Doc, for
Dell PowerEdge 2650
- 1.44 MB, 3.5 in, Floppy Drive Dell PowerEdge Servers
- Microsoft Windows 2000 Server, Service Pack3, Academic Edition
- Dual On-Board NICS ONLY
- 24X IDE Internal CD-ROM, Black, for Dell PowerEdge
- Bezel Option for Dell
- 5 Bay SCSI Hard Drive Backplane, 2+3, (1 in only)
- 36GB 10K RPM Ultra 320 SCSI Hard Drive
- MR0R0, ROMB RAID 0/RAID 0, C11 for Dell PowerEdge 2650
- 36GB 10K RPM Ultra 320 SCSI Hard Drive
- Type 2 Contract (starting 2/13/03) – Same Day 4-Hour 7x24 Parts
and Labor On-Site Response, Initial Year
- Premier Enterprise Support – Gold – Advanced Software
Support Quantity 3 Resolutions
- Type 2 Contract (starting 2/13/03) – Same Day 4-Hour 7x24 Parts
and Labor On-Site Response, 2YR Extended
- On-site Installation Declined
- CFI, Information, Hard Drive, Install Increasing Order, Factory Install

- CFI, Information, Validator, 910477, Order Ready, Factory Install
- CFI Titan Code for CFI FIDA of Bypass SI
- CFI Routing SKU, Factory Install
- CFI, Information, RAID1, RAID0, Factory Install

Miles

Miles is the Distance Education server with IP address 152.2.81.174

- PowerEdge 2650, 2.6GHz/512K Cache
- 1 GB DDR, 200MHz, 2X512 DIMMS
- 73GB 10K RPM Ultra 320 SCSI Hard Drive
- Raid on Motherboard, PERC3-DI 128MB 128MB, with Doc, for Dell PowerEdge 2650
- 1.44 MB, 3.5 in, Floppy Drive Dell PowerEdge Servers
- Red Hat Linux 7.3 FI with Docs
- Dual On-Board NICS ONLY
- 24X IDE Internal CD-ROM, Black, for Dell PowerEdge
- Bezel Option for Dell
- 5 Bay SCSI Hard Drive Backplane, 2+3, (1 in only)
- 73GB 10K RPM Ultra 320 SCSI Hard Drive
- MR0R0, ROMB RAID 0/RAID 0, C11 for Dell PowerEdge 2650
- 73GB 10K RPM Ultra 320 SCSI Hard Drive
- Type 2 Contract (starting 2/13/03) – Same Day 4-Hour 7x24 Parts and Labor On-Site Response, Initial Year
- Premier Enterprise Support – Gold – Advanced Software Support Quantity 3 Resolutions
- Type 2 Contract (starting 2/13/03) – Same Day 4-Hour 7x24 Parts and Labor On-Site Response, 2YR Extended
- On-site Installation Declined
- CFI, Information, Hard Drive, Install Increasing Order, Factory Install
- CFI, Information, Validator, 910477, Order Ready, Factory Install
- CFI Titan Code for CFI FIDA of Bypass SI
- CFI Routing SKU, Factory Install
- CFI, Information, RAID1, RAID0, Factory Install

Ella

Ella, in the near future, will take over the functionality of Ruby. It has a serial number JNFTZ11, EOCS tag M68027, and an IP address of 152.2.81.15

- PowerEdge 2650, 2.2GHz/512K Cache
- 2nd Processor 2.2GHz/512K Cache
- 4 GB DDR, 200MHz, 4X1GB DIMMS

- 36GB, U160, SCSI, 1in 15K
 - Raid on Motherboard, PERC3-DI 128MB
 - Red Hat Linux 7.3 FI with Docs
 - Dual On-Board NICS ONLY
 - 24X IDE Internal CD-ROM, Black, for Dell PowerEdge
 - Bezel Option for Dell
 - 5 Bay SCSI Hard Drive Backplane, 2+3, (1 in only)
 - Front Keyboard Mouse Y-cable
 - 36GB, U160, SCSI, 1in 15Km, for PowerEdge 2650
 - MR1R5, ROMB RAID 1/RAID 5, C12 for Dell PowerEdge 2650
 - 73GB 10K RPM Ultra 160 SCSI Hard Drive
 - 73GB 10K RPM Ultra 160 SCSI Hard Drive
 - 73GB 10K RPM Ultra 160 SCSI Hard Drive
 - Type 2 Contract (starting 10/22/02) – Same Day 4-Hour 7x24
Parts and Labor On-Site Response, Initial Year
 - Premier Enterprise Support – Gold – Advanced Software
Support Quantity 3 Resolutions
 - Premier Enterprise Support – Gold – Premium Services, 2YR
Extended
 - Premier Enterprise Support – Gold – Premium Services, Initial
Year
 - Type 2 Contract (starting 10/22/02) – Same Day 4-Hour 7x24
Parts and Labor On-Site Response, 2YR Extended
 - On-site Installation Declined
 - Intel Pro 1000XT, Cu-GB Network Interface Card
- Guinea

Guinea is the server that stores all of SILS Windows's domain user's profiles. It is also the printer server and its IP address is 152.2.81.16.

- PowerEdge 2550, Pentium III, 1.13GHz/512K Cache
- 2nd Processor, Pentium III, 1.13GHz/512K Cache
- 4 GB DDR, 133MHz, 4X1GB DIMMS
- 36GB 10K RPM Ultra 160 SCSI Hard Drive
- 1.44 MB, 3.5 in, Floppy Drive Dell PowerEdge Servers, Factory
Installed
- Microsoft Windows 2000 Server F5,ACAD, Service Pack2
- Dual On-Board NICS ONLY
- Dell Remote Assistant Card V 2.0 w/56K PCMCIA Modem, for
Dell PowerEdge 2450, Factory Installed
- 24X IDE Internal CD-ROM, Black, for Dell PowerEdge
- 4 Bay HD Split Backplane, (1.0 in Only), PowerEdge 2550
- Electronic Documentation on CD
- 36GB 10K RPM Ultra 160 SCSI Hard Drive
- C10, MSMS, MB SCSI, for Dell PowerEdge
- 73GB 10K RPM Ultra 160 SCSI Hard Drive

- 73GB 10K RPM Ultra 160 SCSI Hard Drive
- 73GB 10K RPM Ultra 160 SCSI Hard Drive with Media Cage
- Power Supply, 330W, 2 Units, DOM, Redundant, for Dell
- Type 2 Contract (starting 5/1/02) – Same Day 4-Hour 7x24 Parts and Labor On-Site Response, Initial Year
- Type 2 Contract (starting 5/1/02) – Same Day 4-Hour 7x24 Parts and Labor On-Site Response, 2YR Extended
- On-site Installation Declined
- Premier Enterprise Support – Gold – Advanced Software Support
- Premier Enterprise Support – Gold – Advanced Software, Extended
- Premier Enterprise Support – Gold – Advanced Software, Initial
COMMENT: SCOTT ADAMS ADAMS@ILS.UNC.EDU

Pelican

Pelican is the application server and it has an IP address 152.2.81.7.

- PowerEdge 2550, Pentium III, 1.13GHz/512K Cache
- 2nd Processor, Pentium III, 1.13GHz/512K Cache
- 4 GB DDR, 133MHz, 4X1GB DIMMS
- 36GB 10K RPM Ultra 160 SCSI Hard Drive
- 1.44 MB, 3.5 in, Floppy Drive Dell PowerEdge Servers, Factory Installed
- Microsoft Windows 2000 Server F5,ACAD, Service Pack2
- Dual On-Board NICS ONLY
- Dell Remote Assistant Card V 2.0 w/56K PCMCIA Modem, for Dell PowerEdge 2450, Factory Installed
- 24X IDE Internal CD-ROM, Black, for Dell PowerEdge
- 4 Bay HD Split Backplane, (1.0 in Only), PowerEdge 2550
- Electronic Documentation on CD
- 36GB 10K RPM Ultra 160 SCSI Hard Drive
- C10, MSMS, MB SCSI, for Dell PowerEdge
- 73GB 10K RPM Ultra 160 SCSI Hard Drive
- 73GB 10K RPM Ultra 160 SCSI Hard Drive
- 73GB 10K RPM Ultra 160 SCSI Hard Drive with Media Cage
- Power Supply, 330W, 2 Units, DOM, Redundant, for Dell
- Type 2 Contract (starting 5/1/02) – Same Day 4-Hour 7x24 Parts and Labor On-Site Response, Initial Year
- Type 2 Contract (starting 5/1/02) – Same Day 4-Hour 7x24 Parts and Labor On-Site Response, 2YR Extended
- On-site Installation Declined
- Premier Enterprise Support – Gold – Advanced Software Support
- Premier Enterprise Support – Gold – Advanced Software, Extended

- Premier Enterprise Support – Gold – Advanced Software, Initial
COMMENT: SCOTT ADAMS ADAMS@ILS.UNC.EDU

Kiwi

Kiwi is currently the server that stores the home directories for all Windows users and it is a file server. It is going to be replaced by Duck.

Duck

Duck is a NetApp F810 Filer System with IP address 152.2.81.2, and in the near future it is going to be the home directory for all SILS users.

- F810 512MB/128 NO PROTOCOL
- SW DataONTAP F8XXEA
- NFS Software F810
- CIFS Software F810
- ADPTR, PWA QLA2200/33, HSSDC, Cu
- Base DS14 w/AC Pwr Supplies
- DS14 LS Module Cu-Cu Ports
- TERMINATOR FC-AL
- 36(34)GB FC DISK FOR DS14
- STRG, CARR, SUBASSY-SHORT, DS14
- Quad 10/100Base-T Adapter
- LVD/SE 2-Chnl SCSI Adapter
- AC CORD W FERRITE N. AMERICA
- F810 Install
- NetApp HDW Support, F810 SN ON LINE 1
- SW Sub F810

Ils-ghost

Ils-ghost is the server that has SILS deployment solution software called Altiris for Windows and Linux clients. Its IP address is 152.2.81.17

- Microsoft Windows 2000 Advance Server
- Version 5.0.2195 Service Pack 3 Build 2195
- Gateway E-4600 x86-based PC
- X86 Family 15 Model 0 Stepping 7 Genuine Intel ~ 1396 Mhz
- Bios Version 11/17/00
- Total Physical Memory 261, 424 KB
- Available Physical Memory 115,588 KB
- Total Virtual Memory 894,072 KB
- Available Virtual Memory 470,368 KB
- Page File Space 632,648 KB

Owl

Owl is the server that runs Cold Fusion, IIS, and a Ftp server. Its IP address is 152.2.81.9

- Microsoft Windows 2000 Server
- Version 5.0.2195 Service Pack 3 Build 2195
- Dell Dimension 8200 x86-based PC
- X86 Family 15 Model 1 Stepping 2 Genuine Intel ~ 1794 Mhz
- Bios Version 12/7/01
- Total Physical Memory 261,136 KB
- Available Physical Memory 59,512 KB
- Total Virtual Memory 893,140 KB
- Available Virtual Memory 419,280 KB
- Page File Space 632,004 KB

4. Functional operations in the office

Shawn Jackson

Applications: Microsoft Word, Excel, Mulberry, and the Internet.

Occasionally: PowerPoint, Corporate Calendar.

Services: ADVISE (University database)

Storage: saves all files to G: drive

Job responsibilities:

Director of Development - She manages Alumni, Corporate and Foundation Relations for SILS. Building relationships with these audiences and soliciting gifts (of money and services/equipment) is another responsibility of hers. She interacts with students (student organizations and individuals) on projects/events and with faculty or funding for research and service projects/events.

Contact Information:

Home - 6724 EASTBROOK DRIVE
RALEIGH, NC 27615
H - 919-844-9066
C - 919-622-5332

Work - Shawn D. Jackson
Director of Development
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University of North Carolina at Chapel Hill
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Susan Thomas

Applications: Microsoft Outlook (for email), Excel (internal account databases), Internet Explorer (university sites)

Occasional Applications: Microsoft Publisher

Services:

Finance Central - Used for check requests, deposits, electronic account reports, Information Technology Purchasing System, Financier

ADP - (Hummingbird Host Explorer) Used to do budget revisions, check account balances, process personnel transactions, BD-119 salary increase system, EPA position control, access payroll check register.

PR Assist - System used to do online purchase orders

HRIS (Human Resource Information System) - Used for all SPA, student and temp personnel transactions.

Job Responsibilities:

Administrative Manager - purchasing, payment of all invoices, personnel and payroll, and budgets

Contact Information:

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Administrative Manger
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Chapel Hill, NC 27599-3360
(919) 962-0182
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thomas@ils.unc.edu

Angie Heinisch

Applications: Email, MS Office, Corporate Time, Facility Services
- <http://www.fac.unc.edu/>

Occasionally: Adobe Acrobat, Photoshop, Dreamweaver, FTP,
Classroom reservations
http://www.ils.unc.edu/html/4_resource_res.shtml

Services: HRIS, ADVISE, ADP

Contact Information:

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 Chapel Hill, NC 27599
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 (919) 962-8071 (fax)
heinish@ils.unc.edu

Lucia Zonn

Applications: Microsoft Word, ACCESS Database, Microsoft Outlook, Student Information System (UNC student data base), Faculty/Staff Central (web interface to UNC student database), OWL? ORACLE? (SILS graduate application)

Occasionally: EXCEL

Storage: Saves Word and Excel to D drive. Saves Access to G, Owl to G.

Job Responsibilities:

Student Services Manager - Oversees student services, including graduate admissions, enrollment, registration, comprehensive exams, master's papers and graduation.

Contact Information:

Home – 104 Stonehill Road
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Work – Lucia Zonn
 Student Services Manager
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 Chapel Hill, NC 27599-3360
 919-962-7601
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zonn@ils.unc.edu

Marcia Tauber

Applications: Microsoft Word, Excel, and the Internet.

Storage: saves all files in D: drive

Job responsibilities:

Office Assistant – Responsible for helping faculty members in a variety of tasks, i.e., ordering textbooks, keeping copies of syllabi, helping with mailings, etc. I'm responsible for following through on the AAIRB process for students and making sure that they meet university guidelines. I keep the office copy of the alumni directory updated, as well as the job opportunity book in the SILS library. I monitor, order and distribute office supplies for SILS and am responsible for typing and following up on all travel vouchers for faculty, adjuncts and teaching assistants. I've also been handling the SIR II evaluations for all faculty members.

Contact Information:

Home: 105 Anglese Court,
Chapel Hill
NC 27516

Work: Office Assistant,
School of Information and Library Science,
University of NC at Chapel Hill,
CB# 3360
100 Manning Hall
Chapel Hill NC 27599-3360
919 962-8367.

Cheryl Lytle

Applications: SILS lab supported apps,
<http://ils.unc.edu/ils/silslab/html/sw.shtml>, UNC supported
Apps; <https://shareware.unc.edu/software.html>

Storage: All types of media,
http://ils.unc.edu/ils/silslab/html/how_to_backup.shtml

Job Responsibilities:

Principal Functions:

- Fosters and advocates the incorporation of leading-edge technology into the school's curriculum by supervising the implementation of technologies such as Internet instruction tools, Internet collaboration tools, ubiquitous computing, and multimedia applications.
- Teaches formal and informal courses as necessary in the area of IT.
- Supports faculty and students by offering individualized consultation, lab demonstration sessions, and short courses on specific software applications.
- Instructs and assists faculty with the incorporation of information technologies into their courses.
- Plays a key role in the computing infrastructure for the school's undergraduate minor in Information Systems and in the computing support of all undergraduates using the computing labs.
- Develops curriculum and computer lab support materials and documentation such as web pages, demonstrations, and exercises.
- Insures reliable and functional operation of Unix and NT based systems and components and supervises system changes and updates as necessary.
- Oversees the daily operation of the school's student computing laboratories including training and supervision of student lab assistants and student lab managers, and the integration of student laptops into the School's computing infrastructure.
- Supervises the development of appropriate policies and procedures for systems and facility management including security,

backup, and resource allocation for Unix and Windows computing environment.

- Remains aware of current trends and changes in information technology and works with faculty to insure that the curriculum reflects those trends and changes.
- Recommends hardware and software purchases from an annual budget of approximately \$200,000 for academic technology to the school's Director of Information Technology.
- Participates in departmental and campus wide computing forums and committees.
- Executes special projects and assignments at the discretion of the Director of Information Technology.

Contact information:

Home - 4707 Carlton Crossing Drive
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Rebecca Varga

Applications: MS Office (Word, Access, Excel, Outlook), Web editors-Dreamweaver, Email-Outlook and Mulberry, Photoshop, Adobe Acrobat

Storage: D, G, L drives, Ruby, Kiwi, Owl (Master's Papers Database), Shared H Drive (Davis Library), Library Systems (through Davis Library), DRA, INNOPAC LARS, E-databases and indexes (there are over 500 databases), i.e. OCLC WorldCat,
<http://eresources.lib.unc.edu/eid/>

Job responsibilities:

SILS Librarian: The SILS Librarian is responsible for overall management of the library, including collection development and management, liaison with departmental faculty and the central library, facilities and equipment planning, and reference and research assistance. The SILS Librarian oversees the work of one paraprofessional staff member, a research assistant, and several student assistants. The librarian serves on library-wide committees and task forces and reports to the Associate University Librarian for Public Services.

Contact Information:

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5. Backup Server Recovery (Disaster) – Server/Image

The Backup Server and Library

Onyx, the backup server, is a Sun Microsystems Enterprise 250 machine running Solaris 2.8 with version 6 Solstice for Unix, Network edition. The Networker for Unix Network edition came as part of the package; however, it only allowed 10 machines to connect at a time, which is not sufficient for our school. Two extra modules of Networker Client Connection were purchased, each allowing 25 connections giving us a total of 60 connections at a time. In addition, modules for each type of Operating System, that would need to be backed up, were purchased – Client for Linux, Client for Unix, and Client for Windows.

The Library is a Sun Microsystems StorEDGE L1000 and it was made by ATL (Automated Tape Library). It is connected to Onyx via a differential SCSI cable and contains two DLT 7000 drives (it has the capacity to hold four drives) that cost approximately \$5100 each.

Back up Process

The Library stores 30 DLT tapes, which are used to backup the data for SILS. Backup is separated into two groups: Schedback and Schedlaptop. Each group has their own tapes and these tapes can only be used to backup machines from their respective groups, example, DLT C##### can only be used to back up laptops. In the Library are 27 tapes for Schedback, 2 tapes for Schedlaptop, and a cleaning tape

The Schedlaptop group comprises of faculty and staff's laptops and Schedback has all faculty and staff's desktops. These groups were devised since different machines are backed up at different times and with different sequences (full backups or incrementals). Every Friday, the DLTs with the newest data are removed from the Library and stored in racks in Scott's office. It has been Scott's practice to remove 14 tapes with the most recent backups every Friday; this provides enough tapes for a full week of backups. Tapes that were removed two weeks prior, allowing up to 2 weeks to be recovered at all times replace these tapes.

All backups are logged on Onyx, in addition, Onyx send daily email notifications to Scott showing all the machines that were backed up successful and those that were unsuccessful (the

bootstrap notification). Here is a list of Preconfigured Notifications that are available from the NetWorker server

Notification	NetWorker Response
Bootstrap	Prints the bootstrap information on the NetWorker server's default printer.
Cleaning cartridge expired	Sends e-mail to root: replace the expired cleaning cartridge
Cleaning cartridge required	Sends e-mail to root: insert a cleaning cartridge.
Device cleaned	Sends e-mail to root: device cleaning is complete.
Device cleaning required	Sends e-mail to root: clean the device.
Device disabled	Sends e-mail to root: a device has been automatically disabled.
Index size	Sends e-mail to root: check the size of the client file index because it will soon exceed the space available.
Log default	Directs the UNIX syslog facility (/usr/bin/logger) to log information from the /nsr/logs/messages file into the appropriate system log file.
Migration attention	Sends e-mail to root: check the status if a migration operation.
Migration completion	Sends e-mail to root: a migration operation is complete.
Registration	Sends e-mail to root: check the registration status
Savegroup completion	Sends e-mail to root: degree of success in completing scheduled backups, cloning, and archive operations.
SNMP notification request	Sends notification through the configured trap.
Tape mount request 1	Requests media be mounted in a device and:
Tape mount request 2	4 Displays a pending message.
Tape mount request 3	5 Sends e-mail.
	6 Logs a message to syslog.

Backup Schedule for Machines at SILS

Type of Machine		Full Backup	Incrementals
PCs	Faculty	Wednesdays at 7:30 pm. (Including PHD machines and Library 1,2,3)	Everyday
	Staff	Fridays at 4:00 am	Everyday
Win Servers		Sundays at 12:01 am (Falcon, Kiwi, Pelican, Guinea, Hawk, Owl – only c:\inetpub)	
Sun		Fridays at 10:00 pm (except Pearl and Jade – full backups on Tuesday) all partitions are backed up. All	
Linux		Mondays at 2 am	Everyday
Laptops (Professors)		Thursdays at 6:00 pm	No incrementals

Onyx

Onyx needs to have these five process running for it to be considered “up and running”, and they are **nsrd**, **nsrmmdbd**, **nsrexed**, **nsrindexd**, and **nsrmmd**.

Daemon/Program	Function
nsrd	This daemon provides an RPC-based save and recover service to NetWorker clients; master NetWorker daemon.
nsrmmdbd	This daemon provides media and save set database management services to the local nsrd and nsrmmd daemons and records entries in the media database; media management database daemon.
nsrexed	
nsrindexd	This daemon provides a method for inserting entries in the client file index based on information passed by the save program

nsrmmmd	This daemon provides device support, generates mount requests, and multiplexes save set data during a multicient backup (nsrd can start several nsrmmmd daemons, up to the number specified in the device's Target Sessions attribute); media multiplexor daemon.
---------	--

To start all services – logged in as root type

/etc/rc3d/S95networker start

To stop all services – logged in as root type nsr_shutdown

From home – log into Onyx and type nsrwatch

Groups:

The Group resource, also known as backup groups, is a resource that specifies a specific time of the day when a backup occurs. Typically backup times are scheduled after regular work hours, such as late evenings and on the weekends. These times are preferred so that the heavy network traffic load associated with backups does not interfere with regular work activities. Any client assigned to a specific group will have its specified save sets backed up during that time.

Pool:

A pool is a specific collection of media to which the NetWorker server writes data. The NetWorker server uses pools to sort and store data. The configuration settings for each pool act as filters that tell the server which volumes should receive specific data. Pools are used in conjunction with label templates to keep track of which data is on which specific volume.

Indexes:

Every time the NetWorker server backs up a file to media (for example, magnetic tape), it creates an entry for the file in an index. The NetWorker server uses this index to map the backed-up files to volumes

Backup types explained:

- Full backup backs up all files, regardless of whether or not they have changed.
- Incremental backup backs up files that have changed since the last backup, regardless of level.

- Level [1-9] backup backs up files that have changed since the last lower numbered backup. For example, a level 1 backup backs up the files that have changed since the last full backup (considered a level zero). A level 3 backup backs up all the files that have changed since the last level 2 backup, level 1 backup, or full backup. A level 9 backs up all the files that have changed since the last level, 8,7,6,5,4,3,2,1, or full (0) backup.

Schedules:

The Schedule resource provides the ability to specify the day of the week and date during the month when the backup occurs. The type and nature of the backup is also specified in this resource. Because scheduled backups are configured in terms of weekly or monthly, the type of backup scheduled for a specific day of the week is in turn duplicated for:

- The same day in each subsequent week.
- The particular day of a particular week once each week.

Legato Software Management GUI

Legato NetWorker provides a solution for network storage management; it protects and helps manage data across an entire network of computers. The NetWorker software saves valuable administrator time by speeding up and simplifying daily operations of storage management. The GUI guides you through administering and configuring your network for storage management. As the NetWorker software manages your data, it creates a database of saved data, making it easy to locate data for recovery.

How to create a pool:

1. Determine a label template for you pool.
2. Select Media>Pools to open the Pools window.
3. Click create.
4. Enter a name for the pool in the Name attribute. This name must match either a label template you created beforehand, or one of the default templates.
5. Select Yes from the Enabled attribute.
6. Select the appropriate pool type from the Pool Type attribute.
7. Select the matching label template in the Label Template attribute.
8. Select the groups associated with this pool in the Groups attribute.
9. Enter the names of clients associated with this pool in the Clients attribute.

10. Enter the save sets associated with this pool in the Save Sets attribute.
11. Select the backup levels associated with this pool in this Levels attribute.
12. Select the devices that are permitted to mount volumes associated with this pool.
13. Select whether or not client file index entries are generated for this pool in the Store Index Entries attribute.
14. Select whether or not automated media verification will be performed while data is written to a volume associated with this pool in the Auto Media Verify attribute.
15. Select whether or not volumes marked as recyclable can be used by other pools in the Recycle to Other Pools attribute.
16. Select whether or not this pool can recycle volumes from other pools in the Recycle from Other Pools attribute.
17. Select a preference for volume type in the Volume Type Preference attribute. The value you state is used as a selection factor when a request is made from a writable volume.
18. Complete any other attributes as necessary, and click Apply. If any of these settings for a new pool match an existing pool, you receive the following warning message: Pool *pool_name* has overlapping selection criteria.

How to create a Group:

1. Select Customize>Groups to open the Groups window.
2. Click Create.
3. Enter the name of the group in the Name attribute. Do not include spaces in a group name.
4. Select Enabled from the Autostart drop-down list.
5. Enter a new time in the Start Time attribute, unless you want to keep the default time of 3:3 a.m. Note: When you select a start time for your different groups, make sure you schedule them far enough apart so that one group has completed backing up before the next group starts.
6. Enter or select a number in the Client Retries attribute. This value specifies the number of times the NetWorker server will attempt to back up a failed client.
7. Select Yes in the Clones attribute to automatically clone the group's backed-up data. If you select No, do not complete the subsequent clone-related tasks in the subsequent steps and skip to step 10.
8. Select the appropriate clone pool for the cloned data in the Clone Pool attribute (requires cloning to be enabled).
9. Select the appropriate migration clone pool in the Migration Clone Pool list (requires cloning to be enabled).

10. Enter the name of the printer on which savegrp will print the bootstrap save set information in the Printer attribute.
11. Complete any other attributes as necessary and click Apply.

How to schedule a group:

1. Select Customize>Groups to open the Groups window.
2. Select View>Details to display the Group resource's hidden attributes.
3. Enter the interval attribute value in hours, using hh:mm format, and click Apply.

How to Start Groups Immediately:

When you start a schedule backup group manually (on demand), the NetWorker server runs the backup at the level of the next scheduled backup, which can be full, level 1-9, consolidated, or incremental.

To start group immediately:

1. Select Server>Group Control or click the Group Control toolbar button to open the Group Control window.
2. Select the name of the group you want to start immediately in the Groups attribute.
3. Click Start to initiate the group backup.

When you start the group in this manner, the NetWorker server overrides the groups' scheduled start time and immediately backs up the clients in the group.

How to Create Clients

Before a client can be backed up by a NetWorker server, the client computer must have the appropriate NetWorker client software installed.

If you choose not to customize the configuration choices, the new NetWorker client is automatically assigned the default configuration. The default setting All for the Save Set attribute means that all the files on the client are backed up during a scheduled or manual backup.

Note: For UNIX clients, setting the Save Set attribute to All will not back up all locally mounted file systems. The only file systems backed up will be those listed in the following locations:

- Solaris and Sequent: /etc/cfstab
- HP-UX, Compaq Tru64, Linux, and SGI: /etc/fstab
- AIX: /etc/filesystems

To create a client:

1. Select Clients>Client Setup to open the Clients window.
2. Click Create
3. Enter the client's new hostname in the Name attribute
4. If you installed the Archive Application, the Archive Services attribute is disabled
5. Select a schedule in the Schedule attribute
6. Select a browse policy in the Browse Policy attribute. A typical default choice is Quarter
7. Select a retention policy in the Retention Policy attribute. A good choice is Year.
8. Select a directive in the Directives attribute
9. Select a group in the Groups attribute to which your client will be added.
10. Enter the save sets that you want backed on this client in the Save Set attribute. If you want all the saves sets backed up, enter All. If you need to back up large client filesystems, you may want to schedule each filesystem to back up separately. For example, you might create two separate clients with the same name, but with different save sets.
11. Enter the user ID or hostnames of other clients that are allowed to back up or recover this client's files in the Remote Access attribute. Leave this attribute blank if you only want this client to have those rights.
12. Enter the user ID of a client to allow remote access and operations on this client in the Remote User attribute. The Password attribute is only used for computers running NetWare. The password entered in this attribute is used to perform remote commands on this client.
13. Enter the **savepnc** command, or the name of a program file you created that includes commands to execute before and after the NetWorker software backs up client data, in the Backup Command attribute.
14. Enter the nickname(s) for the client computers that queries can match in the Aliases attribute. Otherwise, queries match only the client name.

How to Label and Mount a DLT

1. Apply the bar code on DLT
2. Insert an unlabeled or recyclable tape in the Library
3. Select the appropriate device (DLT) in the Devices list of the NetWorker Administrator program.
4. Select Media>Label or click the Label toolbar button to open the Label Window.
5. Check the Mount After Labeling attribute and click OK.

The NetWorker server automatically labels the volume and then amounts the volume into the device.

L1000 or jukebox

The Sun StorEdge L1000 is an automated digital linear tape (DLT) library system consisting of up to four DLT7000 tape drives and 30 tape cartridge bins. The maximum storage capacity of the library is 1050 gigabytes each (up to 70 gigabytes compressed).

Control Panel Uses

- To turn the Library On (44)
- To turn the Library Off (45)
- To place the Library On-line (44)
- To place the Library Off-line (45)
- To Insert Tape Cartridges (45)
- To Open the Library Doors (47)
- To Manually Eject a Cartridge (47)
- Operator Commands
 - To configure Library Attributes (53)
 - To configure Library Options (55)
 - To move a cartridge (57)
 - To perform an Inventory (58)
 - To calibrate the Library (59)
 - To exercise the Library (60)
 - To unload a Drive (61)
 - To unload a load port
- Service Commands
 - Generating Reports (65)
 - Testing the Library (68)
 - To perform a system test (68)
 - Initializing Nonvolatile Information (70)
 - To Execute Nonvolatile Memory Commands (70)
 - To Change a Password (71)

To Turn the Library On

1. Be sure of the following:
 - All internal packaging is removed.
 - The front doors and load port are closed.
 - The library enclosure is installed.
 - All back panel connections are secure.

2. At the front panel, set the AC power switch to the | (on) position. After several second, verify that control panel comes on.

To Turn the Library Off

1. Press the Standby button.
Verify that the library completes the current command and then goes off-line.
2. Make sure the gripper is empty by checking the Overview control panel screen. If the gripper has a tape cartridge, use the Move Cartridge command to move the cartridge to a storage bin or load port.
3. Set the AC power switch to the O (off) position.
Verify that the control panel turns off.

To Manually Eject a Cartridge

Occasionally, you may need to unload and eject a tape cartridge using the controls on the front panel of the tape drive.

1. Open the library doors.
2. Remove the load and bulk from the front of the library.
 - a. Press the latch at the top of either pack.
 - b. Grasp a handle and gently pull the pack while pressing the release latch at the bottom of the pack.
 - c. Repeat Step a and b to remove the other pack.
3. Press the Unload button on the drive and wait for the Operate Handle indicator to light.
Note – When you press Unload, the tape cartridge rewinds. Depending in the tape cartridge position, this may take between 10 to 120 seconds. When the rewind process is completed, the Operator Handle indicator lights.
4. When the Operator Handle indicator lights, raise the insert/release handle to eject the tape cartridge.
5. Pause for two seconds, then grasp the tape cartridge and slowly pull it one-half way out of the drive.
6. Examine the tape cartridges to see whether all of the tape media has been rewound into the tape cartridge.
If the tape cartridge leader failed to detach from the take-up leader, push the tape cartridge all of the way into the drive, press down the insert/release handle, and return to Step 4.
Otherwise, continue to Step 7.

7. Pull the tape cartridge completely out of the drive.
8. Reinstall the load and bulk packs by reversing the removal procedures in Step 2
Be sure to line up the guides on the top and bottom of the load packs with the mounting blocks on the frame.
9. Close and lock the library doors.

Performing an Inventory

The Inventory command records the bar code labels of the cartridge in the tape drives, fixed storage bins, load pack bins, and the load port. Library elements that contain cartridges without labels will be marked full with no label.

- Press the Inventory Tapes button in the Operator screen.

A “Command In Progress” screen appears. The inventory process continues until all storage elements have been checked or you stop the process by pressing the Abort button in the screen.

Data Backup and Recovery

This section describes the method for backing up your data manually, rather than using the scheduled group backup method. It also details the various methods for recovering backed-up data, and how to direct recovered data to the location of your choice.

Manual Data Backups

The NetWorker server backs up your client data regularly using scheduled backups. Scheduled backups are the preferred backup method because they occur automatically, and also because scheduled backups can be recovered more easily.

Manual backups are intended for quick backups of a few files initiated by a user. They do not generate bootstrap files or back up indexes, so they cannot replace scheduled backups. Remember that you can manually start a scheduled backup group at any time by selecting the Start Group command.

There may be times, however, when you want to back up one or more data items to the NetWorker server right away, instead of waiting for the scheduled nightly backup. For example, if you have just finished working on a spreadsheet, you might like to back the

file up right away.

How to Manually Back Up Data

The **nwbackup** program provides a graphical interface through which you can perform manual backups.

The **nwbackup** program is used to perform a manual backup initiated from the client rather than from the server's scheduled group backup (**savegrp**) that includes the client.

To start a manual backup:

1. Start the **nwbackup** program by entering the following command at the prompt:

```
# nwbackup -s server
```

Use the **-s server** option to specify a particular NetWorker server on the network.

The **nwbackup** program displays a representation of the client's filesystem.

2. Mark each directory and/or file for manual backup by selecting it and

performing one of the following tasks:

- Selecting the item and clicking the Mark toolbar button,
- Clicking the “mark” box next to each item listed,
- Selecting Mark>Mark.

When you mark an item for backup, a checkmark appears next to that item.

You can unmark a marked item in a similar way by selecting the item and performing one of the following tasks:

- Selecting it and clicking the Unmark toolbar button.
- Clicking the checked “mark” box next to the item to remove the checkmark.
- Selecting Mark>Unmark.

You can designate the entire filesystem, specific directories, or individual files for manual backup. If you select a directory for backup, all of its nested subdirectories and files are also selected for backup. If you want to exclude certain files from manual backup, you must deselect those items.

3. Select File>Start Backup or click the Start toolbar button to begin the manual backup.

If you do not see the directories and files you requested for

backup appearing in the Manual Backup Status dialog box, or if you receive a message such as the following:

Waiting for Server and there is no apparent backup activity, the NetWorker server might not recognize your client, or there might not be a volume mounted in the storage device. You can end the backup by clicking Cancel.

Important: Sometimes there are bad files or errors on computer disk volumes that the NetWorker server cannot detect during a backup. It simply backs up the bad data. It is a good idea to run diagnostic programs regularly on your computers to correct disk volume errors.

Data Recovery

Recovery of backed-up data is performed using the **nwrecover** program.

Every time the NetWorker server backs up a file to media (for example, magnetic tape), it creates an entry for the file in an index. The NetWorker server uses this index to map the backed-up files to volumes. If your computer has not been backed up yet, you will see an error message when you try to recover data.

Using **nwrecover**, you can browse backed-up files and filesystems from NetWorker clients and recover files as they were at a specific point in time when they were backed up. The versions of files and filesystems available in the **nwrecover** are determined by the time period specified in the browse policy.

If remote access is enabled, users may also be able to recover files from other client computers.

When recovering data onto a filesystem where other versions of the same data already reside, there is the likelihood of a file conflict. You can determine what course of action to take each and every time a conflict occurs during a recovery, or you can instruct the NetWorker server in advance what action to take for all conflicts. You can also simply redirect the recovered data to a different directory where there is no danger of conflicts.

How to Recover Data

To recover data:

1. Start the **nwrecover** program by entering the following command at the prompt:
`# nwrecover -c client -s server`
 Use the **-s server** option to specify a particular NetWorker server on the network. Use the **-c client** option to specify a particular NetWorker client on the network.
 The **nwrecover** program displays a representation of the client's filesystem.
2. Determine how you want the NetWorker server to handle one of these conflicts:
 - a. Cases where there is a conflict between a recovered file and one that already exists on the filesystem of the client receiving the recovered data.
 - b. If you want the recovered data to be relocated to a different directory than the one it originally existed in at the time of the backup.
3. Mark each directory and/or file for manual backup by selecting it and performing one of the following tasks:
 - a. Selecting the item and clicking the Mark toolbar button,
 - b. Clicking the "mark" box next to each item listed,
 - c. Selecting Mark>Mark.

When you mark an item for backup, a checkmark appears next to that item.

You can unmark a marked item in a similar way by selecting the item and performing one of the following tasks:

 - d. Selecting it and clicking the Unmark toolbar button.
 - e. Clicking the checked "mark" box next to the item to remove the checkmark.
 - f. Selecting Mark>Unmark.

You can designate the entire filesystem, specific directories, or individual files for recovery. Note that if you select a directory for backup, all of its nested subdirectories and files are also selected for recovery. If you want to exclude certain files from recovery, you must deselect those items.

Note: if you want to recover data from a scheduled backup other than the most recent one, then you must change the browse time.
4. Select File>Start Backup or click the Start toolbar button to begin the recovery.
 It takes the NetWorker server a few moments to recover your file, depending on file size, network traffic, server load, and tape positioning. During this time, messages appear for each recovered file in the **nwrecover** program, so you can monitor the progress of the recovery.
 If there is a naming conflict with the file you are recovering,

the NetWorker server prompts you to choose one of several workarounds.

If the recovery is successful, the **nwrecover** program will display the following (or a similar) message:

Successfully received 1 file

Recovery completion time: 5-30-97 2:03p

How to Recover Data from a Previous Backup Time

Using the **nwrecover** program, you can browse the entries for each backed-up file listed in the client file index created at any time you specify. Changing the browse time allows you view the entries for your backed-up files for a particular period. You might want to do this if you need to:

- Look for an item that you know you had previously, but is now gone.
- Retrieve an earlier version of an existing item.

Your browse policy determines how long older data is retained and thus, your ability to browse and recover this data. For example, if you would like to recover a lost file that you backed up six months ago, your browse policy must support it.

To recover data from a previous backup time:

1. Select Change>Browse Time to open the Change Browse Time window.
The Change Browse Time window displays a monthly calendar from which you can select the client's backup. Click Previous or Next for earlier or later months.
2. Select the month and day that corresponds to the client data you want to recover.
3. Edit the time and date listed in the Browse Time attribute if you want a browse a time other than the one displayed.
4. Click OK.
5. The Change Browse Time window disappears, the **nwrecover** program now displays your client's file system as it appeared on the day and date you selected. The **nwrecover** program also displays that date in the Browse Time attribute.
6. Select the items you want to recover.

How to Relocate Recovered Data

When you recover data, the NetWorker server copies the data from

the volume to a location on your computer. Unless you relocate the recovered data, the server tries to place the files in the original directory created when the data was last backed up. If an existing data item on your local disk has the same name as the one being recovered, the server will prompt you for instructions on how to recover the data item (rename, overwrite, or discard).

You can instruct the NetWorker server where to relocate the recovered data item in advance of the recovery using the Relocate feature while in the **nwrecover** program. Enter the new recovery destination path in the Relocate

To attribute of the Recover Options dialog box.

To relocate recovered data:

1. Select Options>Relocate to open the Relocate window.
2. Enter the new directory location in the Relocate To attribute and click OK.

You must provide the full pathname of the relocation directory. The recovered data will automatically be relocated to the directory you entered.

How to Resolve Recovered Data Conflicts

By default, when the NetWorker server recovers data it will attempt to return them to their original location, using their original file and directory names. However, if another file or directory with the same name is present in that same location, a file recovery conflict will occur. You can instruct the NetWorker server to respond to these recovery conflicts in several different ways, either on an item-by-item basis, or automatically.

You are prompted to make conflict resolution decisions each time to start a recovery using the **nwrecover** program. When you start the recovery, the Conflict Resolution window appears and asks you if you want to be prompted when a conflict occurs.

If you select *Yes* in the Conflict Resolution window, then each time there is a conflict, the NetWorker server will prompt you to select a resolution options.

If you select *No* in the Conflict Resolution window, then you must enter an automated conflict resolution option that the server will follow each time there is a conflict during the recovery.

This table lists the conflict resolution options available during a recovery.

Recovery Options

Option	Action
Rename the Recovered File	Renames the recovered files by inventing a unique name that closely resembles the original name. Typically, the new name is the original name prefaced with a tilde (~).
Discard the Recover File	Discards the recovered data in order to prevent NetWorker from recovering the file if there is another file with the same name on your filesystem.
Overwrite the Existing File	Replaces the data on your filesystem with the recovered version.

You can also choose to relocate your recovered data to a different directory where you know there will be no conflicts, or create a new directory using the Relocate feature. However, even if you relocate your recovered data to a new and/or empty directory, the NetWorker server still prompts you to enter your conflict resolution information.

How to Search for a Recoverable File

You can search for a file and directory you want to recover, but cannot locate in the **nwrecover** program, by using the Search feature. The Search feature allows you to enter the name of the item you are seeking, as well as the directory where the search will begin. This is handy if you want to speed the search by limiting the locations to be searched.

To search for a recoverable file:

1. Select View>Search to open the Search window.
2. Enter the name or a partial name of the item you are seeking.
3. Enter a path to designate where the search will begin. The default value is root (/), which will instruct the NetWorker server to search the entire filesystem.

How to View Details of Recoverable Files

You can display the contents and other details of directories listed in the left pane of the **nwrecover** window in the right pane using the File Details feature.

When the File Details feature is enabled, the **nwrecover** program

displays detailed information regarding the files and subdirectories of the selected directory, including the date and time the file was last backed up, the permission of the file, and the date created.

To view details of recoverable files:

1. Select the item whose content's details you want to view.
2. Select View>File Details to display this information.

How to View the Version Details of Backed-Up Data

You can view the back-up details of a directory or file you select in the

nwrecover program using the Version feature. The Versions feature provides a listing of each time the NetWorker server backed up that file, including the day, date, time, and size.

To view the version details of backed-up data:

1. Select the item whose backup version you want to view.
2. Select View>Versions to open the Versions window.

How to View Volumes Required for Data Recovery

You can view a list of the volume(s) needed to recover files and directories you have selected for recovery in the **nwrecover** program using the Volumes feature. The Volumes feature displays a windows providing the name of all volumes the NetWorker server needs to access in order to recovery the data you selected.

To view a list of the volume(s) required for data recovery:

1. Select the item whose volume information requirements you want to view.
2. Select View>Volumes to open the Recover Volumes Required window.

Disaster Recovery

Note: You should keep a printed copy of these documents in a safe, convenient place away from the server.

Directed recovery allows you, from an administering NetWorker client at a remote location, to direct a NetWorker server to perform both of the following:

- Retrieve backed-up data from one of its NetWorker clients (a

- source client)
- Recover that data to a different NetWorker client (a destination client) within your enterprise.

The destination client receiving the recovered data can be the source client itself or any other NetWorker client within the enterprise. Because you do not have to be physically present at either the source client, the destination client, or the NetWorker server itself, you have a high degree of flexibility and convenience in recovering and redirecting data. Directed recovery includes all of the NetWorker server's standard file handling features.

You can use NetWorker for UNIX software to administer directed recoveries between UNIX, NT, and Windows 95/98 NetWorker clients by using the command line recover program. The **nwrecover** program does not support directed recovery tasks.

Uses of Directed Recovery

Directed recovery is very useful when data recovery is required for a shared server or other computer where users cannot recover the data themselves. If you have a NetWorker client installed and the appropriate access rights, the directed recovery feature allows you to perform the recovery from your own computer remotely rather than from the source computer itself.

Directed recovery also permits the recovered data to be directed to other NetWorker client computers besides the requesting client computer. This allows you to share files and information with a broad range of NetWorker client computers.

Access Requirements for Directed Recoveries of UNIX Clients

Directed recovery is an administrator-level function and is typically not accessible for users and other nonadministrators. Performing directed recoveries requires you to have administration access for both the NetWorker server storing the data from the source client, and all destination clients receiving the recovered data. If you anticipate performing directed recoveries on a regular basis, you should establish the required permissions for each NetWorker server and client in your enterprise prior to receiving data recovery requests.

Access requirements to perform directed recoveries of UNIX-based NetWorker clients are as follows:

- All NetWorker clients and servers involved in the directed recovery must have the 6.x release of the software.
- Your username must be included in the administrator's list attribute of the NetWorker server that backs up the source client's data, for example, *username@administration_client*.
- The hostname of the NetWorker client with which you are administrating the directed recovery must be listed in the servers file of the following:
 - The NetWorker server computer
 - Each NetWorker client computer designated as being a potential destination client.
- The user accounts on the NetWorker client administering the directed recovery must be included in the Remote Access attribute of each source Client resource of the NetWorker server. These are the accounts used on the NetWorker client that administrate the directed recovery, and the accounts owning the NetWorker client daemon (**nsrexecd**) on each destination client computer (root). For example, *user@administering_client_hostname* and *root@destination_client_hostname*.

The following sections describe how to set the various server and client administration rights required to enable directed recovery.

How to Grant Administrative Rights for a NetWorker Server

If you are using the NetWorker server to administer the directed recovery, your username needs to be listed as an administrator in that server.

To grant administrative rights for a NetWorker server:

1. Log in as *root* on the NetWorker server.
2. Start the NetWorker Administrator program.
3. Select Server>Server Setup to open the Server window.
4. Enter *user@hostname* in the Administrator attribute and click Apply.

How to Grant Administrative Rights to a Remote NetWorker Server's Client

If you are administering directed recoveries remotely rather than from the NetWorker server, then your user account on the remote

computer needs to be listed as an administrator in the NetWorker server. Your remote computer must also be included in the *server's* file of that NetWorker server to allow your remote client computer to open a network connection to the NetWorker server.

To grant administrative rights to a remote NetWorker server:

1. Log in as *root* on the NetWorker server.
2. Start the NetWorker Administrator program.
3. Select Server>Server Setup to open the Server window.
4. Enter your *user@administering_client_hostname* in the Administrator attribute and click Apply.

Next, you must add the administering NetWorker client computer name to the *server's* file of that NetWorker server.

1. Log in as *root* on the NetWorker server.
2. Open the *servers* file, located in the */nsr/res* directory, using your favorite text editor.
3. Enter the administering NetWorker client computer's name in the *servers* file using the following format style:
mercury.legato.com
4. Save and close the *servers* file.
5. Enter the **nsr_shutdown** command at the shell prompt to shut down the NetWorker daemons. A list of NetWorker daemons that will be shut down appears, along with a prompt that asks whether you want to continue with the **nsr_shutdown** command as follows:

```
# nsr_shutdown
```

```
nsr_shutdown will kill the following processes
```

```
25768 ? S 0:02 /usr/sbin/nsrexecd
25770 ? S 0:01 /usr/sbin/nsrexecd
25771 ? S 0:02 /usr/sbin/nsrd
25783 ? S 0:00 /usr/sbin/nsrmmdbd
25784 ? S 0:00 /usr/sbin/nsrindexd
25785 ? S 0:00 /usr/sbin/nsrmmmd -n 1
Do you want to continue? [Yes]? Y
```

6. Start the NetWorker daemons by entering the appropriate command for your operating system:
 - For Solaris, DYNIX/ptx, and IRIX:
/etc/init.d/networker start
 - For HP-UX:
/sbin/init.d/networker start
 - For AIX and Linux:
nsrexecd

```
# nsrd
- For Tru64 UNIX:
# /sbin/rc3.d/S94NSRstartstop start
```

How to Grant a Network Connection to a Destination Client

The administering NetWorker client computer must have access to the destination client in order to recover files onto it. You must add the administering NetWorker client computer name to the *server's* file of that destination computer.

To gain remote recovery permission to a destination client:

1. Login as *root* on the destination client computer.
2. Open the *servers* file, located in the */nsr/res* directory, using your favorite text editor.
3. Enter the administering NetWorker client computer's name in the *servers* file using the following format style:
mercury.legato.com
4. Save and close the *servers* file.
5. Shut down the NetWorker daemons by entering the following command at the prompt:
nsr_shutdown
A list of NetWorker daemons that are shutting down appears. You are also prompted as to whether you want to continue with the shutdown. Confirm the shutdown in each instance.
6. Start the NetWorker daemons. The commands required to start the NetWorker daemons depend on your operating system.

How to Gain Remote Access to a NetWorker Client

The administering client and the destination client must have remote administration access privileges for any source NetWorker client involved in a directed recovery. This access allows you to browse the source client file index and retrieve its files. You can add your *hostname* or *user@hostname* to the remote access list of any NetWorker client through the NetWorker Administrator program. Note that if you set the default client of a NetWorker server to include your hostname in its remote access attribute, all subsequently added clients will also list you as having remote access.

To gain remote access to a NetWorker client:

1. Log in to the NetWorker server, which includes the NetWorker client to which you want remote access.
2. Start the NetWorker Administrator program.

3. Select Clients>Client Setup to open the Clients window.
4. Select the client to which you want remote access in the Clients attribute.
5. Enter the userid and *user@administering_client_hostname* of the administering client in the Remote Access attribute.
6. Enter the NetWorker client daemon account in the Remote Access attribute (*root@destination_client_hostname*) for every destination client you need or anticipate needing to access this source client resource.

How to Perform a Directed Recovery Between UNIX Clients

You perform directed recoveries between a UNIX source and a UNIX destination client using the **recover** command and various options at the command prompt. You cannot back up data from UNIX-based clients and recover them to Windows NT or other non-UNIX clients, or the reverse. The source and destination client must be of the same platform type.

Also remember that a directed recovery is an interactive process only. Once you invoke the recovery, you still need to interactively select and recover files you choose from the source client index.

recover Command in Directed Recoveries

The **recover** command has a variety of options you can add to modify the basic browse and recover functionality. For performing directed recoveries, here are the following options:

- **-d** The name of the directory where you wish to relocate the recovered files.
- **-s** The name of the source client's backup server.
- **-c** The name of the source client.
- **-R** The name of the destination client.
- **-i (Y,N,R)** The recover option specifying what the NetWorker server should do if recovered files conflict with existing files of the same name. Here is an explanation of each option (these are not case sensitive):
 - **Y** Overwrite the existing file when there is a naming conflict.
 - **N** Skip restoring this file when there is a naming conflict.
 - **R** Rename this file when there is a naming conflict. The NetWorker server automatically appends each conflicted filename with a ".R".
- [*directory_name*] The name of the initial directory in which to begin browsing.

For a complete listing of the **recover** command and all its options, see **recover** in the *Legato Command Reference Guide*.

Example: Directed Recovery Overwriting Existing Files

If the source client's backup server was named *venus*, the source client itself was *mars*, the destination client was *jupiter*, and you wanted the recovered files to overwrite any existing files with the same name, you would enter the following command at the prompt:

```
# recover -s venus -c mars -R jupiter -iY [directory_name]
```

Directed Recovery of Specific Files and Directories

You must specify the items you want to mark for recovery using a set of procedures to mark files and directories for recovery. To perform a directed recovery of files and directories you specified:

1. Enter the command to perform the directed recovery, using the following syntax style:

```
# recover -s server -c source_client -R destination_client -irecover_option [directory_name]
```
2. Navigate to the directory containing file or directory you want to “mark” for directed recovery (if you did not specify the initial directory to browse by including a *directory_name*). For example:

```
# cd /var/adm
```
3. Mark the item for directed recovery by entering the following command at the prompt:

```
# add file_name
```
4. Repeat this procedure for each item you want to mark for directed recovery.
5. View the items you have marked for recovery by entering the following command at the prompt:

```
# list
```
6. Start the directed recovery by entering the following command at the prompt:

```
# recover
```

How to Restore a Save Set Entry in the Online Indexes

The following sections describe the process of restoring save set entries into one or both of the online indexes.

Client File Index Only

If the file is not browsable (which means that the save set's browse policy has expired), but its save set is still tracked by the NetWorker server in the media database (which means that the save set's retention policy has not expired), follow these steps to recover the save set's entry back into the client file index:

1. Run the **mminfo** command by entering the following command:
mminfo -a -v *volume_name*
2. From the **mminfo** output, find the *ssid* that you believe contains the file you want. Make sure it is not the bootstrap *ssid*.
3. Restore the save set entry in the client file index using the **nsrmm** program by entering the following command:
nsrmm -s *ssid* **-t** *retention_time*

Client File Index and Media Database

If the save set that contains the file is not browsable and the save set is not represented in the media database, both the browse and retention policies have expired.

To rebuild the save set's entry in both the client file index and the media database:

1. Run the **scanner** program on the backup volume that you believe contains the file you want by entering the following command:
scanner *device_name*
2. Use the output from the **scanner** program to decide whether to reintroduce the contents of this volume into the client file indexes and whether the save set you want to rebuild is on this volume. (You must locate *all* the volumes that contain this save set ID.)
3. After you have determined which volumes to reintroduce into the online indexes, run the **scanner** command:
scanner -i *device-name*
The **scanner** command prompts for a new volume until you terminate it. To rebuild the indexes completely, you must scan in *all* the volumes that contain the *ssid*.
4. Use the **nwrecover** program to browse the file index for the file you want to recover.

How to Recover One File Directly from a Volume

To recover a single file from a volume, run one of the following commands:

```
# scanner -S save_set_id device_name | uasm -rv filename
```

or

```
# scanner -S save_set_id device_name | uasm -rv -m  
source=dest  
filename
```

The **-m** option of **uasm** maps (relocates) the recovered file from the *source* to the *dest* (destination) directory.

Recovering Client File Indexes

The following sections explain different procedures for recovering the online index.

How to Recover a Client's Current File Index

Unlike regular backed-up data, recoveries of client file index information are performed using the **nsrck** program with the **-L7** option. If you do not specify any time or date information, the current client file index is recovered.

To recover the online index of a client, enter the following command:

```
# nsrck -L7 client_name
```

How to Recover Client File Indexes for a Specific Time and Date

With the NetWorker release 6.0 and later software, it is possible to recover a client file index for a certain time and date, using the **-t "time date"** option with **nsrck**. The time and date formats are in **nsr_getdate** format.

Client file index recovery using the NetWorker product is non-destructive, so when you recover the client file index as of a time and date in the past, **nsrck** will add the entire contents of the index as of that time and date, to the current contents of the index. Generally, this means your client file index will become much larger.

The benefit of recovering the client file index as of a specific time and date is that you can browse save sets that had passed their browse policy but were still recoverable. The save sets referred to by the recovered client file index will be marked as browsable. They will remain browsable for the length of time they were originally browsable.

To recover a client index for a specific date, enter the following command:

```
# nsrck -t "time mm/dd/yyyy" -L7 client_name
```

Example: Recovering a Client File Index for a Specific Time and Date

In this example, you are recovering a client file index to 4 PM, March 2 1999:

```
# nsrck -t "04 pm 03/02/1999" -L7 client_name
```

Relocating Recovered Online Indexes

You can relocate recovered online indexes depending on the release of NetWorker software that performed the backups.

NetWorker Release 6.0 Software

You can recover online indexes to a different directory only if all the backups were made using the NetWorker release 6.0 software.

Type II – Server and Client Failure

How to Recover the UNIX Operating System

This section describes how to recover the UNIX operating system. Use this process to recover the operating system back to the original computer or to a different computer.

You can recover the operating system by performing either a:

- Complete installation. In this instance you perform a complete installation and configuration of the operating system.

Or

- Partial installation. In this instance you install and configure only those files that enable the computer to communicate over the network. Then, recover the remaining operating system and configuration files using NetWorker.

Important: Do not recover the operating system from an X session. Rather, recover the operating system in single-user mode from the system console.

To recover the operating system, follow these procedures, explained in detail in the following sections:

1. Install the operating system.
2. Configure the operating system.
3. Test the operating system and configure the devices.

Task 1: Install the Operating System

To install the operating system:

1. Install the same version and patch level of the UNIX operating system into its original location.
If you want to upgrade the operating system, first recover the operating system as it was previous to the disaster, and then perform the upgrade.
2. Recreate all of the filesystems that were previously on the computer.
The filesystems must be:
 - The same filesystem type.
 - At least the same size as before to hold all of the backed-up data.
 At a minimum, configure the root volume group and kernel parameters, such as asynchronous I/O. If the resources are available, reconstruct non-root volume group filesystems and logical volumes.

Task 2: Configure the Operating System

To configure the operating system:

1. Configure the network exactly as it was configured before the disaster. If you do not, NetWorker will treat the computer as a new computer. If the computer has a different host ID you must reregister the NetWorker software.
2. If you are recovering the operating system to a different computer, assign the same hostname for the new computer. If you do not use the same hostname, you will not be able

to recover the NetWorker indexes associated with the original computer.

3. Configure the date and time as they were configured before, including the time zone.
4. Install any additional UNIX components or services before recovering the computer's data.
5. Reboot the computer.

Task 3: Test the Operating System and Configure the Devices

To test the operating system and configure the devices:

1. Configure any devices required by NetWorker, for example SCSI pass-through devices for autochangers.
2. Perform a test to verify that the:
 - Name to Address resolution and TCP/IP are functioning properly. This is performed by running ping to communicate with a client or storage node, and then running ping on the client to reach the server.
 - Operating system is functioning properly.
 - Tape drive is functioning properly. This test can be performed using **mt** commands.
 - Devices are recognized by the operating system. If the devices are not recognized by the operating system, you might need to:
 1. Load the SCSI driver.
 2. Install the device driver.
 3. Modify the device configuration files to enable the computer to communicate with the device during recovery.

How to Recover a UNIX NetWorker Server

To recover a NetWorker server, follow these procedures, explained in detail in the following sections:

1. Install NetWorker.
2. Configure NetWorker.
3. Locate the server's bootstrap save set ID.
4. Recover the NetWorker server bootstrap.
5. Rename the NetWorker server configuration files.
6. Recover all indexes for clients on the NetWorker server.
7. Recover the NetWorker server's client data.
8. Complete the server recovery.

Task 1: Install NetWorker

To install NetWorker:

1. Install the same version of NetWorker into its original location.
- If you are using UNIX and you have a NetWorker server that is similar in configuration to the one being recovered, you can access the NetWorker binaries via NFS.
For example:

```

mount venus:/usr/sbin /mnt
/mnt/nsrexecd -s server-name
/mnt/recover -s server -q
recover> add /
recover> force
recover> recover

```

 - If you want to upgrade the NetWorker server, first recover the server to its original state, then perform the upgrade.
 - You do not need to reload the license enablers if the NetWorker configuration files still exist.

Note: Reuse these NetWorker configuration files only if the NetWorker server's hard drive did not crash and you are updating or reinstalling NetWorker.

2. Install any NetWorker patches that were installed prior to the disaster.
3. If you are using UNIX, recreate any links that you had to the NetWorker directories (such as the NetWorker indexes and configuration files).

Task 2: Configure NetWorker

To configure NetWorker:

1. If you want to use an autochanger for the remainder of the recovery process, ensure that the autochanger resource exists. By default, this is located in the /nsr/res directory.
2. Configure the Device resource(s).
If you want to recover your data using an autochanger, add and configure the autochanger using the **jbconfig** command.

If you are using an autochanger, reset the autochanger using the **nsrjb -vHE** command. This command resets the autochanger, ejects backup volumes, reinitializes the element status, and checks each slot for a volume.

If your autochanger does not support the **-E** option, initialize the element status using **sjielm**.

If you are using an autochanger, inventory the autochanger using the **nsrjb -I** command. This will help you determine whether the volumes required to recover the bootstrap are located inside the autochanger.

3. Note: If you are recovering a relocated server's file index from a NetWorker 6.0 or later version backup, then this step is no longer necessary.
 - a. If you are recovering the server's file index from a NetWorker pre-6.x version backup and you relocated the server's file index path to a new location:
 - b. Edit the Index Path attribute in the server's attribute in the server's associated Client resource.
 - c. Shut down and restart the NetWorker services (Windows NT) or daemons (UNIX).

Task 3: Locate the Server's Bootstrap Save Set ID

This section describes how to locate the save set ID for the NetWorker server's latest bootstrap. The bootstrap contains the media database and resource configuration files.

To locate the save set ID of the most recent bootstrap (if you do not already have this information):

1. Insert the most recent media or clone volume(s) used for scheduled backups into the appropriate device.
2. At the system console/command prompt, switch to the directory where the NetWorker binaries and executables are located.
3. If you are using an autochanger, insert the first volume of the bootstrap save set into the first drive of the autochanger using the following command:

```
nsrjb -lnv -S slot -f device-name
```

where *slot* is the slot where the first volume is located and *device-name* is the pathname for the first drive. You can obtain this device-name using the **inquire** command.

4. Use the scanner **-B** command to determine the save set ID of the most recent bootstrap on the media. For example:
UNIX:

```
scanner -B \\.\Tape0
```

If you do not locate the save set ID of the most recent bootstrap on the most recent media, run the scanner **-B**

command on preceding media to locate the save set ID of the most recent bootstrap.

5. When you see the output, record both the bootstrap save set ID and the volume label.

Task 4: Recover the NetWorker Server Bootstrap

This section describes how to recover the NetWorker server bootstrap using the mmrecov command.

Note: In NetWorker 6.0, the mmrecov command is only used to recover the NetWorker server's media database and resource configuration files, the nsrck command is used to recover the server's client indexes.

To recover the NetWorker server bootstrap:

1. Use the volume label from the previous task to determine which pool it belongs to. If the bootstrap was backed up to a pool that is not specified in the Pool resource, create the pool.
2. Use the mmrecov command to recover the NetWorker server's bootstrap. For example:

UNIX:

mmrecov

The following output appears:

```
mmrecov: Using Madrid.spain.com as server
```

3. If the following message appears, enter the name of the device you are using for the recovery (this message only appear if the server has multiple devices configured and enabled).

UNIX:

```
What is the name of the device you plan on using
[/dev/rmt/0hbn]? /dev/rmt/0hbn
```

4. When the following message appears, enter the save set ID for the latest bootstrap. If you are recovering a cloned version of bootstrap, specify the save set ID associated with the clone.
5. When the following message appears, enter the file number to begin the recover. If unknown, press [Enter].
Enter starting file number (if known) [0]: 130
6. When the following message appears, enter the first record number to begin the recovery. If unknown, press [Enter].

```
Enter starting record number (if unknown) [0]: 0
```

7. When the following message appears, follow the prompt:

UNIX:

Please insert the volume on which save set id 20076 started into /dev/rmt/0hbn.

Once you have loaded the appropriate volume, the following message appears:

Scanning /dev/rmt/0hbn for save set 20076; this might take a while...

NetWorker then scans the volume for the appropriate save set and recovers it.

Note: you can use the `nwadmin` program to monitor the recovery of the media database and resource configuration files.

The NetWorker media database and resource configuration files are recovered when the following message appears:

If your resource files were lost, they are now recovered in the 'res.R' directory.

Copy or move them to the 'res' directory, after you have shut down the service. Then restart the service. Otherwise, just restart the service.

If the on-line index for the *server-name* was lost, it can be recovered using the **nsrck** command.

Task 5: Rename the NetWorker Server Configuration Files

Because the configuration files cannot be reliably overwritten while NetWorker is running, **mmrecov** recovered the *res* directory as *res.R* by default. In addition, **mmrecov** might have recovered another server's configuration and NetWorker Backup and Recover Server services/daemons is recommended.

To rename the configuration files in UNIX:

1. Shut down (stop) the daemons by entering the `nsr_shutdown` command at the UNIX command prompt:
nsr_shutdown

2. Rename the existing /nsr/res directory to /nsr/res.orig:
mv res res.orig
3. Rename the recovered /nsr/res.R directory to /nsr/res:
mv res.R res
4. Restart NetWorker by first entering the nsrexecd command; then enter the nsrd command to complete the NetWorker restart:
Nsrexecd
Nsrd
Note: You can also restart NetWorker by running the NetWorker startup script for the appropriate platform.
5. After verifying that the NetWorker configurations are correct, remove the /nsr/res.orig directory.

Task 6: Recover All Indexes for Clients on the NetWorker Server

Once you recover the server's media database and resource configuration files, recover all indexes for clients on the NetWorker server.

To recover all indexes for clients on the NetWorker server:

1. Enter the **nsrck -L7** command:
nsrck -L7 client-name
Note: If you do not supply a client name, the indexes of all clients will be recovered.
2. If you are using a cloned version of the index, NetWorker may prompt you to load an original volume (not the clone volume). To use the clone:
 - a. Enter a [Ctrl]+[c] to exit out of **nsrck** and verify that the pending original volume message has terminated.
 - b. Delete the records of the original volume(s) using the **nsrmm -d volume-name** command. For example: NetWorker requests the original volume *mars.1*. Because this volume is not available, delete the *mars.1* volume from the media database using the following command:
nsrmm -d mars.1
 - c. Restart the NetWorker server services (Windows NT) or daemons (UNIX).
 - d. Enter the **nsrck -L7** command:
nsrck -L7 client-name

Task 7: Recover the NetWorker Server's Client Data

This procedure describes how to recover the remainder of the NetWorker server's data, including the registry, using the NetWorker User program (Windows NT) or the nwrecover program (UNIX).

To recover the NetWorker server data:

1. Log on as Administrator (Windows NT) or as root (UNIX).
2. Load and inventory the devices. This ensures that NetWorker can recognize the location of each volume.

If you load a clone volume, NetWorker uses the clone volume for the remainder of the recovery process.

3. Run the NetWorker User program (Windows NT) or the nwrecover program (UNIX).
4. Select and mark the directories for recovery.
5. Click Start to begin the recovery.

Important: Once the media database and server resource configuration files have been recovered, you may recover the client indexes in any order. It is not necessary to recover the server's own client index before recovering the index of any other client.

If your clients have the NetWorker client installed, you may run on-demand and scheduled saves once the media database and server resource configuration files are recovered; however, you will not be able to browse the saves for a client until you recover the client's file index. You may use save set recover to recover files before client's file index is recovered.

Task 8: Complete the Server Recovery

To complete the server recovery process:

1. Perform a test backup or recover to make sure the server is fully recovered.
2. Verify that the server and its associated clients are included in a scheduled backup.

6. Application/Data Recovery – Server/Client

Installing Client Software – Linux

The installation script removes existing NetWorker client software and man pages when you install this release of NetWorker software.

General Instructions

You can install the NetWorker client software for Linux separately on the NetWorker Server for Linux. You can also install the NetWorker client software for Linux on a different computer as a client only; this requires a separate ClientPak enabler code.

Installing the man pages is also offered as a separate option.

How to install the client software

1. Save the original files described above if you want to keep a copy of your current configuration.
2. Access the Legato NetWorker installation software from the distribution media.
3. Enter the Nwinstall command at the command prompt: # ./Nwinstall
4. At the prompt, enter the corresponding number from the opting to install the lgtocInt package. Installing this package temporarily requires 70 MB of free space on the client computer.
5. (Optional) At the prompt, enter the appropriate number for the option to install the man pages (lgtoman).
6. When you have added all the applicable packages and the prompt is displayed, exit the installation script.
7. If you did not specify a set of NetWorker servers during the NetWorker client installation but you want to limit the server authorized to access the client, you can specify a list of trusted NetWorker servers for your client using the /nsr/res/servers file.

Use the following procedure to change the set of NetWorker servers that are authorized to access this client.

- a. Shut down the NetWorker daemons. For example: #
nsr_shutdown
- b. Edit or create the /nsr/res/servers file and add the set of NetWorker servers, one per line, that you want to grant access to this client. The first entry in this file becomes the default NetWorker server.
- c. Check the NetWorker boot-time startup file for nsrexecd –s arguments. If they exist, delete the –s arguments. The nsrexecd –s argument supercedes the /nsr/res/servers file. For example, delete the arguments for nsrexecd in the file shown below:

- ```
#vi /etc/rc.d/init.d/networker
nsrexecd -s venus -s mars
The nsrexecd daemon named in the file
/etc/rc.d/init.d/networker should appear only as: nsrexecd
```
- d. Use the NetWorker boot-time startup file to restart the NetWorker software.
- ```
# /etc/rc.d/init.d/networker start
```

Disaster

Type I – Client Failure Only

Recovering Client or Storage Node Data

To recover client or storage node data:

- Meet the client or storage node data recovery prerequisites.
- Recover the client or storage node data.

Prerequisites

To recover the client or storage node data, you need the following:

- Version and patch level of NetWorker.
- Location of NetWorker.
- NetWorker ClientPak for your operating system.
- Backup or clone volumes containing the NetWorker client data you wish to recover.

How to Recover Windows NT 4.0/UNIX Client or Storage Node Data

This section describes how to recover client or storage node data.

You can use

this process to recover the client or storage node data either back to the original computer or to a different computer.

Important: If the NetWorker server has failed, it should be fully recovered and functional before attempting to recover client or storage node data.

To recover client or storage node data, follow these procedures, explained in detail in the following sections:

1. Install NetWorker, if necessary.
2. Recover the client or storage node data.
3. Complete the client or storage node data recovery.

Task 1: Install NetWorker

This section describes how to install NetWorker on a client or storage node. Before starting this procedure:

- Determine what Legato backup utility software was installed on the computer prior to the disaster (for example, SmartMedia, ClientPak, NetWorker Module).
- Determine what Legato backup utility patches were installed prior to the disaster.
- Determine whether the Legato backup utility software or patches are actually damaged to the point where they need to be reinstalled.

If the client's or storage node's NetWorker software is not properly installed and running:

1. Install the same version of NetWorker, which had been installed on the computer prior to the disaster, into its original location. If you want to upgrade the client or storage node software, first recover the client or storage node to its original state, and then perform the upgrade.
2. Install any NetWorker backup utility patches that were installed prior to the disaster.
3. From the NetWorker User program (Windows NT) or the nwrecover program (UNIX), perform a test recovery to ensure that the NetWorker recovery process is functioning properly.

Task 2: Recover the Client or Storage Node Data

This section describes how to recover the client or storage node data, including the registry or system state.

Important: (Windows NT) If you receive a message instructing you to reboot the computer, you must reboot prior to recovering the registry (5.5.1 clients) or system state (5.7/6.0 clients).

To recover the client or storage node data:

1. To determine the volumes required to recover the client or

- storage node data, use the **mminfo -avot** command on the server.
2. Start the NetWorker User program (Windows NT) or the nwrecover program (UNIX).
 3. Mark all the drives or filesystems and any operating system specific special backups, such as the registry (5.5.1 clients) or System State (5.7/6.0clients).
 4. If you are recovering a NetWorker server, unmark the following NetWorker directories and files before recovering the remainder of the server data:
 - NetWorker server's client indexes, by default located in the */nsr/index/server-name* directory.
 - NetWorker media database, by default located in the */nsr/mm* directory.
 - NetWorker resource configuration files, by default located in the */nsr/res* directory.
 - Any boot files required for UNIX operating system recovery that you determined should not be overwritten.
 5. For Windows NT only, recover the RepairDisk, if required.

Important: In version 5.5.1, NetWorker does not back up profiles as part of the *%SystemRoot%\profiles* directory; rather, it saves this data with the REGISTRY: saveset. Therefore, the registry must be recovered in its entirety to recover a user profile. In versions 5.7 and 6.0, the profiles are backed up and recovered as part of the SYSTEM STATE: save set.

The SYSTEM STATE can be recovered only to the same server it was created on, or, to another computer with *exactly* the same architecture.

-
6. Set the recover options by selecting the Overwrite Existing File from the Options>Recover Options menu.

Important: If you did not set the recover options, you must select the Overwrite Existing File option when the Naming Conflict dialog box appears during the recovery process. To enable automatic overwriting of files with the same name, select the Suppress Further Prompting option in the Naming Conflict dialog box.

7. Select Start.
For Windows NT, files in the Recycle Bin are not password-protected. When the Password Protection window appears, select Recover>OK to recover these files. NetWorker logs the output of the recovery process to the NetWorker logs directory (*networkr.log*), which is overwritten each time a recovery is performed.
8. Reboot the computer. The computer should now be restored to the state prior to the disaster.

Task 3: Complete the Client or Storage Node Data Recovery

To complete the client or storage node data recovery process:

1. Perform a test recovery using each of the Legato backup utilities incorporated into your backup solution.
2. Recover your data using the Legato backup utility you used to back up the data. Refer to the appropriate *Administrator's Guide* for details.

For Windows NT only, once you have completed the recovery process:

- If you want to use Active Desktop, install it after you have recovered all of the computer's data.
- If the computer is a Backup Domain Controller (BDC), synchronize it with the Primary Domain Controller (PDC).
- If the computer is a Primary Domain Controller (PDC), synchronize it with the domain.

7. Updating/Testing of Plan and Analysis

- Once every semester the procedure to shutdown all machines (2.1) should be tested.
- This document should be updated twice a semester. From my experience, Scott receives new products (software, hardware) approximately every two weeks. It would be quite tedious to update this document every two weeks so I recommend purchasing or designing an asset management software, which would be an easier way of monitoring SILS's products.

Test Dates

Date	Comments
September 15 th	
November 15 th	
February 15 th	
April 15 th	

Analysis of SILS IT Infrastructure

From all my reading and interviews with professional IT managers I have come to the conclusion that prevention should be the most important aspect when considering disasters and how these disasters could affect your IT infrastructure, instead of focusing mainly on recovery. An IT Recovery plan should customize and evaluate your recovery strategies according to application importance, processing-time sensitivity and system type. Hypothetically, if money was not an issue, a multifaceted and functional plan should consist of:

- A separate location to accommodate critical personnel and equipment
- Data storage or application and web servers duplicated in another geographic location
- A documented, up-to-date and tested disaster plan
- A crisis IT team
- An updated recovery and business-resumption plan

However, having limited resources and not being able to have an offsite with duplicate servers, there are other improvements that my reduce the effects of a disaster:

- ATN/System Enterprise Recovery Group provides a network backup service at a cost of \$10/gigabit. SILS could use this service to run a network backup on specific partitions, directories, or files from Onyx. This service could be used in conjunction with our tape backup system or, after doing a feasibility test, it could replace our backup procedure.
- Create or purchase an asset management tool that will take stock of all equipment, hardware and software making it easier to update this IT Recovery plan. Having an up-to-date plan is very important.
- Forming an alliance with another department on campus such as the Computer Science CS department and having an agreement to provide a secure space for each other to use is an inexpensive way of attaining an offsite. SILS will be able to store their most recent backed-up tapes, documentation, licenses, and copies of software for free.

8. Supplies

Element	Quantity
Monitors	23
Pairs of Speakers	33
100 MB Zip Drives	1 box
Transfer Switches (old)	1 box
Mice	2 boxes
RJ45 (Network Cable)	1 box
IDE ribbon	1 box
Keyboards	43
Print Cartridges	1 box of 5M and 1 box of 6M
PCs	21

Appendix A

Computer Serial No.	Computer Name	Location	Computer Model	Machine Type	IP Address	EOSC Tag
S/N 78-ONG8D	ADAMS	OFFICE115	THINKPAD T30	IBM	152.2.81.250	C16224
C2BWF11	AWAITING_NAME	OFFICE115A	POWEREDGE2550	DELL	none yet	M66791
NEED_DATA	BACKUP JUKEBOX	CLOSET114D	STOREDGE L1000	SUN	NA	M61626
S/N 78-XML82	BARREAU	MOBILE	THINKPAD T30	IBM	152.2.81.203	C20380
GUD27	BARRYM	OFFICE115	OPTIPLEX GX110	DELL	152.2.81.174	M61142
615FO145	BERYL	OFFICE306	ULTRA 1	SUN	152.2.81.13	NA
GUG14	BMH	OFFICE	OPTIPLEX GX110	DELL	152.2.81.220	M61132
GUGHP	CARR	OFFICE202	OPTIPLEX GX110	DELL	152.2.81.234	M61129
C6MH5	CDROM1	LIBRARY	OPTIPLEX GXA	DELL	152.2.81.181	M49634
C6MKB	CDROM2	LIBRARY	OPTIPLEX GXA	DELL	152.2.81.182	M49630
C6MNG	CDROM3	LIBRARY	OPTIPLEX GXA	DELL	152.2.81.183	M49649
C6MJ7	CDROM4	LIBRARY	OPTIPLEX GXA	DELL	152.2.81.184	M49627
2Q1A	CDWRITER	MOBILE	UII-RW32E	BUSLINK	NA	NA
GUG15	DANIEL	OFFICE216	OPTIPLEX GX110	DELL	152.2.81.204	M61114
ENTER7	DEAN-LAPTOP	MOBILE	THINKPAD	IBM	152.2.81.48	NULL
18789	DIGITALCAMCORDER	MOBILE	120X	SONY	NA	NA
343659	DIGITALCAMERA	MOBILE	MVC-CD300	SONY	NA	NA
JV1BZ11	FALCON	SERVER ROOM	POWEREDGE 2650	DELL	152.2.81.18	M68026

284078	FD7DIGITALCAMERA	MOBILE	10XMAVICA	SONY	NA	NA
173663	FD83DIGITALCAMERA	MOBILE	4XMAVICA	SONY	NA	NA
1022642	DUCK	NETWORK LAB	SERVER	NETWORK APP	NA	NA
175V10B	GHOST SERVER	OFFICE115	XPST700R	DELL	152.2.81.100	NA
BUP	GHOSTSERVER	OFFICE115	XPST700R	DELL	152.2.81.100	NA
GUGHZ	GOLLOP	OFFICE204	OPTIPLEX GX110	DELL	152.2.81.218	M61134
GUGHD	GRAHAM	OFFICE116	OPTIPLEX GX110	DELL	152.2.81.216	M61115
GUGHW	GREENBERG	OFFICE207A	OPTIPLEX GX110	DELL	152.2.81.228	M61121
66SHD11	GUINEA	SERVER ROOM	POWEREDGE 2550	DELL	152.2.81.16	M66609
S/N 78-XML65	HAAS	MOBILE	THINKPAD T30	IBM	152.2.81.202	C20497
IQ4A	HARDDRIVE	MOBILE	USB2.0 HARD DRIVE	BUSLINK	NA	NA
S/N 78-XML33	ILS.JACKSON	ADMIN OFFICE	THINKPAD T30	IBM	152.2.81.243	C20325
NEEDDATA300	JADE SERVER	NETWORK LAB	SUN FIRE 280R	SUN	152.2.81.4	M64818
NeedingData9	JANEG-PC1	OFFICE007	NULL	NULL	152.2.81.68	NULL
NeedingData10	JANEG-PC2	OFFICE007	NULL	NULL	152.2.81.69	NULL
G41ZX01	KIWI SERVER	CLOSET114D	POWEREDGE 4400	DELL	152.2.81.10	M61525
2645-UN1 S/N 78-YCF70	LAPTOP1	MOBILE	THINKPAD 600E	IBM	152.2.81.70	C05503
2645-UN1 S/N 78-YCF76	LAPTOP2	MOBILE	THINKPAD 600E	IBM	152.2.81.72	C06097
2626-UN1 S/N AF-173K7	LAPTOP3	MOBILE	THINKPAD 390E	IBM	152.2.81.73	C06135
2647-UN5 S/N 78-3RX1P	LAPTOP4	MOBILE	THINKPAD T22	IBM	152.2.81.74	C16214

2647-UN5 S/N 78-3TH1H	LAPTOP5	MOBILE	THINKPAD T22	IBM	152.2.81.75	C16988
2647-UN5 S/N 78-3THOY	LAPTOP6	MOBILE	THINKPAD T22	IBM	152.2.81.76	C16991
2647-UN5 S/N 78-3TH1K	LAPTOP7	MOBILE	THINKPAD T22	IBM	152.2.81.77	C16990
2647-UN5 S/N 78-3TH2F	LAPTOP8	MOBILE	THINKPAD T22	IBM	152.2.81.78	C16992
2647-UN5 S/N 78-3THOW	LAPTOP9	MOBILE	THINKPAD T22	IBM	152.2.81.79	C16989
FQKMR	LIBRARY1	LIBRARY	OPTIPLEX GX1	DELL	152.2.81.214	NA
75011	LIBRARY2	OFFICE116	DIMXSPRO200n	DELL	152.2.81.215	M40494
FQKNV	LIBRARY3	OFFICE116	OPTIPLEXGX1	DELL	152.2.81.219	NULL
GUGHM	LOSEE	OFFICE302	OPTIPLEX GX110	DELL	152.2.81.200	M61124
GUGHE	MACDONALD	ADMIN OFFICE	OPTIPLEX GX110	DELL	152.2.81.236	M61126
NEED_DATA3	MAIL SERVER	CLOSET114D	POWEREDGE 2300	DELL	152.2.81.17	M54199
AWAITING DATA	MARCHIONINI	OFFICE203	THINKPAD T30	IBM	152.2.81.235	
NOSN1	MICROCASSETTERECORDER1	MOBILE	S724	OLYMPUS	NA	NA
NOSN2	MICROCASSETTERECORDER2	MOBILE	S724	OLYMPUS	NA	NA
GUGHV	MORAN	OFFICE211	OPTIPLEX GX110	DELL	152.2.81.245	M61133
S/N 78-XMM71	NEWBY	MOBILE	THINKPAD T30	IBM	152.2.81.221	C20987
15014072	NONE	NETWORK LAB	TAPE LIBRARY	SUN	NA	NA
0181H2015	NONE	NETWORK LAB	DISK ARRAY	SUN	NA	NA
0181H2016	NONE	NETWORK LAB	DISK ARRAY	SUN	NA	NA
122C047D	NONE	NETWORK LAB	SERVER 280R	SUN	NA	NA

122C047F	NONE	NETWORK LAB	SERVER 280R	SUN	NA	NA
12KX02842	NONE	OFFICE116	COPIER	KONICA	NA	NA
2G04094	NONE	S2 STORAGE	RS/6000	SUN	NA	NA
7069	NONE	NETWORK LAB	DISK SUBSYSTEM	MICROWAY	NA	NA
9CJJG	NONE	S2 STORAGE	POWEREDGE 4100	DELL	NA	NA
ABUG20400066	NONE	CLASSROOM117	PROJECTOR	PROXIMA	NA	NA
G8Y01662	NONE	S2 STORAGE	PROJECTOR	PROXIMA	NA	NA
NQG07678	NONE	OFFICE106	COPIER	CANNON	NA	NA
QB0036313888	NONE	OFFICE306	COMPUTER	MICROWAY	NA	NA
UNK1	NONE	OFFICE300A	X5516A	SUN	NA	NA
UNK2	NONE	CLASSROOM214	PROJECTOR	PROXIMA	NA	NA
UNK3	NONE	CLASSROOM215	PROJECTOR	PROXIMA	NA	NA
UNK4	NONE	CLASSROOM208	PROJECTOR	PROXIMA	NA	NA
UNK5	NONE	CLASSROOM304	PROJECTOR	PROXIMA	NA	NA
UNK6	NONE	OFFICE115A	PORTABLE PROJECTOR	PROXIMA	NA	NA
804K9	NTSERV	CLOSET114D	POWEREDGE 4100/200	DELL	152.2.81.15	M40915
017H35E5	ONYX SERVER	CLOSET114D	ENTERPRISE250	SUN	152.2.81.3	M61627
610F1258	OPAL	OFFICE206	ULTRA 1 MODEL 170E	SUN	152.2.81.11	NA
2Q34B01	PC1	LAB CLASSRM	DIM8100	DELL	152.2.81.101	M65501
G744B01	PC10	LAB CLASSRM	DIM8100	DELL	152.2.81.110	M65502

2T34B01	PC11	LAB CLASSRM	DIM8100	DELL	152.2.81.111	M65503
6244B01	PC12	LAB CLASSRM	DIM8100	DELL	152.2.81.112	M65504
2744B01	PC13	LAB CLASSRM	DIM8100	DELL	152.2.81.113	M65505
HP34B01	PC14	LAB CLASSRM	DIM8100	DELL	152.2.81.114	M65506
9244B01	PC15	LAB CLASSRM	DIM8100	DELL	152.2.81.115	M65507
2644B01	PC16	LAB CLASSRM	DIM8100	DELL	152.2.81.116	M65508
4Q34B01	PC17	LAB CLASSRM	DIM8100	DELL	152.2.81.117	M65509
D644B01	PC18	LAB CLASSRM	DIM8100	DELL	152.2.81.118	M65510
4644B01	PC19	LAB CLASSRM	DIM8100	DELL	152.2.81.119	M65511
9744B01	PC2	LAB CLASSRM	DIM8100	DELL	152.2.81.102	M65512
6744B01	PC20	LAB CLASSRM	DIM8100	DELL	152.2.81.120	M65515
7544B01	PC21	LAB CLASSRM	DIM8100	DELL	152.2.81.121	M65516
8844B01	PC22	LAB CLASSRM	DIM8100	DELL	152.2.81.122	M65517
3Q34B01	PC23	LAB CLASSRM	DIM8100	DELL	152.2.81.123	M65503
1844B01	PC24	LAB CLASSRM	DIM8100	DELL	152.2.81.124	M65519
2944B01	PC25	LAB CLASSRM	DIM8100	DELL	152.2.81.125	M65520
C544B01	PC26	LAB CLASSRM	DIM8100	DELL	152.2.81.126	M65521
9644B01	PC27	LAB CLASSRM	DIM8100	DELL	152.2.81.127	M65522
D244B01	PC28	LAB CLASSRM	DIM8100	DELL	152.2.81.128	M65523
F744B01	PC29	LAB CLASSRM	DIM8100	DELL	152.2.81.129	M65524

1Q34B01	PC3	LAB CLASSRM	DIM8100	DELL	152.2.81.103	M65525
HS34B01	PC30	LAB CLASSRM	DIM8100	DELL	152.2.81.130	M65526
G544B01	PC31	LAB CLASSRM	DIM8100	DELL	152.2.81.131	M65527
8644B01	PC4	LAB CLASSROOM	DIM8100	DELL	152.2.81.104	M65529
CNDFD11	PC41	OUTER LAB	DIM8200	DELL	152.2.81.141	M65598
5WRFD11	PC42	OUTER LAB	DIM8200	DELL	152.2.81.142	M66610
CVRFD11	PC43	OUTER LAB	DIM8200	DELL	152.2.81.143	M66611
JTRFD11	PC44	OUTER LAB	DIM8200	DELL	152.2.81.144	M66614
BDZMD11	PC45	OUTER LAB	DIM8200	DELL	152.2.81.145	M66608
8Q34B01	PC46	OUTER LAB	DIM8100	DELL	152.2.81.146	M65530
6844B01	PC47	OUTER LAB	DIM8100	DELL	152.2.81.147	M65531
5544B01	PC48	OUTER LAB	DIM8100	DELL	152.2.81.148	M65532
7T34B01	PC49	OUTER LAB	DIM8100	DELL	152.2.81.149	M65533
G644B01	PC5	LAB CLASSRM	DIM8100	DELL	152.2.81.105	M65534
GUD28	PC58	OUTER LAB	OPTIPLEX GX110	DELL	152.2.81.158	M61145
1T34B01	PC6	LAB CLASSRM	DIM8100	DELL	152.2.81.106	M65576
7Q34B01	PC7	LAB CLASSRM	DIM8100	DELL	152.2.81.107	M65536
3844B01	PC8	LAB CLASSRM	DIM8100	DELL	152.2.81.108	M65537
C844B01	PC9	LAB CLASSRM	DIM8100	DELL	152.2.81.109	M65538
NeedData20	PEARL SERVER	NETWORK LAB	SUN FIRE 280R	SUN	152.2.81.5	M65503

C2BWF11	PELICAN SERVER	SERVER ROOM	POWEREDGE 2550	DELL	152.2.81.7	M66791
FQKND	PR-COMM	ADMIN OFFICE	GX1	DELL	152.2.81.237	M65503
FQKMT	PR-COMM2	ADMIN OFFICE	GX1	DELL	152.2.81.239	M65503
GUGHB	RECEPTION	ADMIN OFFICE	OPTIPLEX GX110	DELL	152.2.81.248	M61130
BTRFD11	RND-0	PHD OFFICE	DIM8200	DELL	152.2.81.190	M65503
4NDFD11	RND-1	PHD OFFICE	DIM8200	DELL	152.2.81.191	M65503
9VRFD11	RND-2	PHD OFFICE	DIM8200	DELL	152.2.81.192	M65503
5MDFD11	RND-3	PHD OFFICE	DIM8200	DELL	152.2.81.193	M65503
2VRFD11	RND-4	PHD OFFICE	DIM8200	DELL	152.2.81.194	M65503
3TRFD11	RND-5	PHD OFFICE	DIM8200	DELL	152.2.81.195	M65503
FQKN8	RND-6	PHD OFFICE	OPTIPLEX GX1	DELL	152.2.81.196	M65503
GUGI2	ROOM208	CLASSROOM208	OPTIPLEX GX110	DELL	152.2.81.80	M65503
GUGHI	ROOM214	CLASSROOM214	OPTIPLEX GX110	DELL	152.2.81.84	M65503
GUGHT	ROOM304	CLASSROOM304	OPTIPLEX GX110	DELL	152.2.81.86	M65503
GUGHB	ROOM307	CLASSROOM307	OPTIPLEX GX110	DELL	152.2.81.87	M65503
NEED_DATA1	RUBY SERVER	CLOSET114D	ULTRAENTERPRISE	SUN	152.2.81.1	M53466
GUGHU	SAYE	OFFICE200	OPTIPLEX GX110	DELL	152.2.81.213	M61116
GUGH8	SOLOMON	OFFICE212	OPTIPLEX GX110	DELL	152.2.81.227	M65503
GUGHK	SONNENWALD	OFFICE	OPTIPLEX GX110	DELL	152.2.81.231	M65503
FICC2	SS2	ADMIN OFFICE	OPTIPLEX GX1	DELL	152.2.81.244	M65503
ENTER5	STURMLAPTOP	MOBILE	THINKPAD	IBM	152.2.81.46	M65503

GUGHT	TAUBER	ADMIN OFFICE	OPTIPLEX GX110	DELL	152.2.81.249	M61122
GUGHI	THOMAS	ADMIN OFFICE	OPTIPLEX GX110	DELL	152.2.81.223	M61118
ENTER8	TIBBO-LAPTOP	MOBILE	THINKPAD 600X	IBM	152.2.81.50	M65503
UNK	TOPAZ	OFFICE306	ULTRA 2 MODEL 2200	SUN	152.2.81.12	M65503
G4GHF	VARGA	OFFICE115B	OPTIPLEXGX110	DELL	152.2.81.217	M65503
295309	VIDEOCAMERARECORDER	MOBILE	Hi8HANDYCAM	SONY	NA	M65503
GUGI1	WILDEMUTH	OFFICE210	OPTIPLEX GX110	DELL	152.2.81.201	M65503
FICBG	ZONN	ADMIN OFFICE	OPTIPLEX GX1	DELL	152.2.81.242	M65503