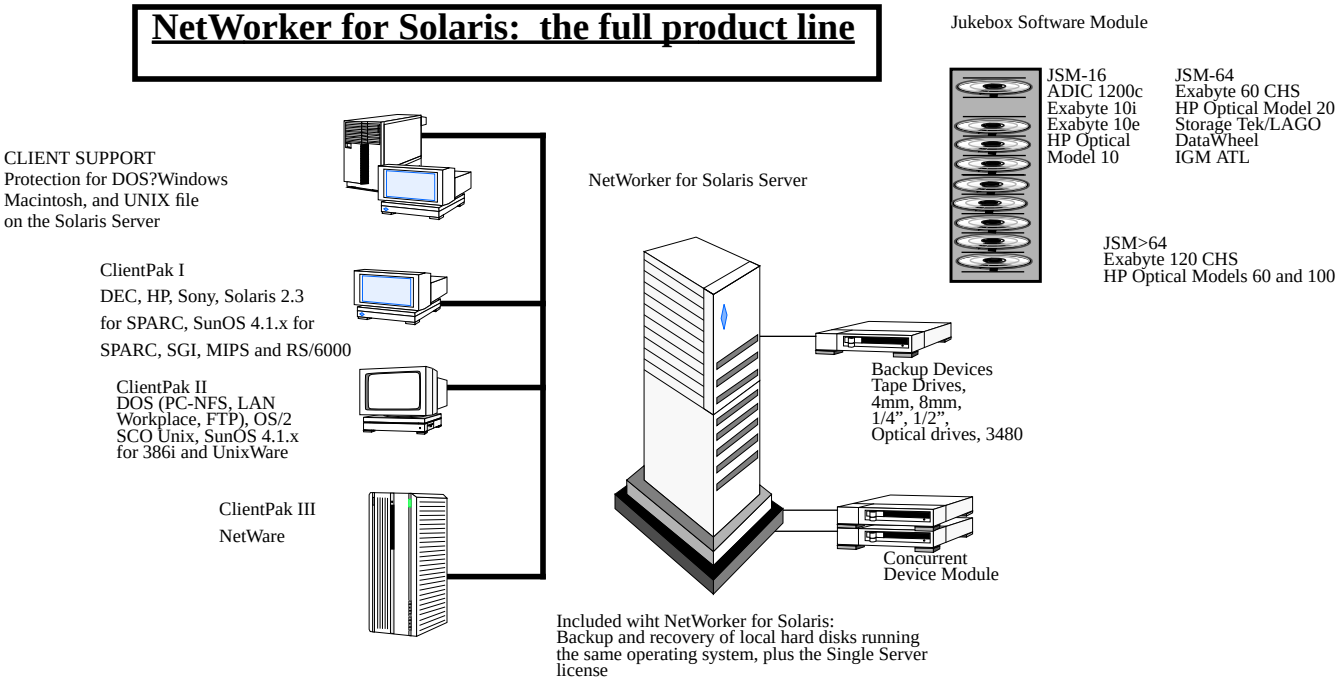
ClientPak Software enables each supported client platform to perform scheduled or ad-hoc backups and recovers.

- **ClientPakI** enables backup of clients for Solaris 2.3 for SPARC, SunOS 4.1.x for SPARC, RS/6000, HP/Apollo, DEC, MIPS, Silicon Graphics and Sony.
- **ClientPakII** enables backup of clients for SunOS 4.1.x for 386i, OS/2, DOS (PC-NFS, LAN Workplace, FTP, UnixWare, and SCO Unix.
- **ClientPakIII** enables backup of clients for NetWare 3.1.x and 4.x servers to a NetWorker for Solaris backup server.



The NetWorker for Solaris Product

Single Server

NetWorker for Solaris, as it comes bundled with the Solaris operating environment workgroup and enterprise servers, allows for free use of the SingleServer module, allowing those workgroup servers with a single backup device complete usage of the product without additional restrictions or fees.

NetWorker

NetWorker for Solaris comes bundled Solaris worgroup and enterprise server software as well as support for up to 10 clients. NetWorker's performance/capacity is well-suited for workgroups with one or two backup devices and no jukeboxes.

NetWorker Advanced

The NetWorker Advanced module provides backup and recovery services, and comes bundled with the Concurrent Device Module, and support for up to 10 clients. Optional jukebox support is available.

Options

Client Enablers increase the number of clients supported by the NetWorker backup server. A maximum of 210 systems can be supported on a single NetWorker for Solaris backup server.

- **10-client enabler** adds support for an additoinal 10 clients on the network.
- **50-client enabler** adds support for an additoinal 50 clients on the network.
- **Concurrent Device Module** provides support for simultaneous operation of multiple backup devices.

Jukebox Software Module enables backup to an automated jukebox and is supported by NetWorker Advanced only.

- **JSM-6 provides support for autoloaders with up to 6 slots.**
- **JSM-16** provides support for autoloaders with up to 16 slots.
- **JSM-64** provides support for autoloaders with up to 64 slots.
- **JSM->64** provides support for autoloaders with greater than 64 slots.

Summary

Most organizations today have a large number of administrators using a combination of different products and procedures to back up files across workgroup networks. The result is a patchwork of protection. Some systems are well protected against the inevitable disaster while others are not. The solution to this problem is a centralized, enterprise wide approach to network backup and recovery. As you gradually standardize the backup solutions in use throughout the organization, consolidate backup operations and finally achieve an enterprise wide solution utilizing the power, strengths and benefits of SunSoft's NetWorker for Solaris, you will benefit by:

- Increased consistency in backup practice.
- Improved monitoring of problems that arise during daily backup activity.
- Reduced need to train administrators on backup.
- Improved workgroup productivity as part-time administrators no longer have to spend time on backup and recovery.
- Improved ability to test your disaster recovery.

And most important of all, you will have greatly improved your ability to recover your valuable files when a disaster strikes.

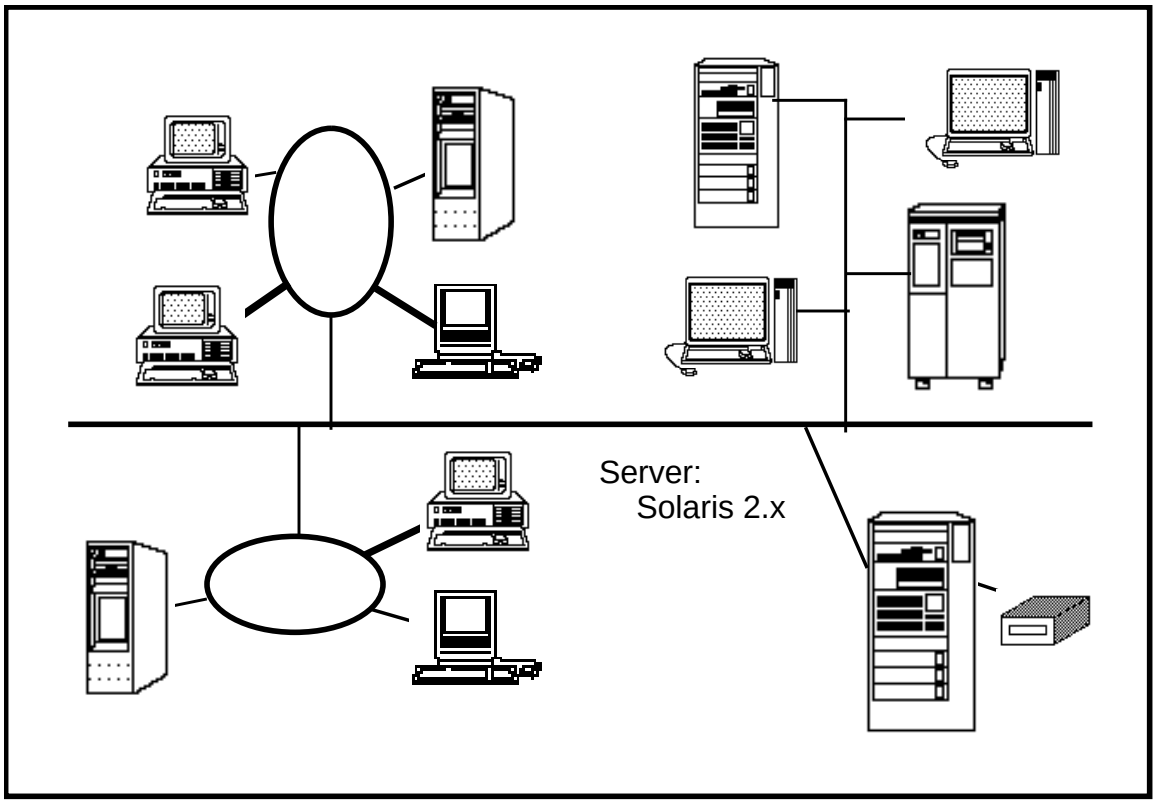
tems across the network are backup clients (regardless of whether they are small desktop systems or multi-gigabyte file servers). Software on each client reads the entire filesystem and sends the appropriate files across the network to the backup server. The client software contains all intelligence about the details of the various filesystems, leaving the backup server to focus on its job of storing files onto tape.

A client/server architecture is highly flexible over time. As new types of systems come to market, new client software can be quickly developed and added to an existing installation without modifying either the backup server or the other clients' software. And many features, performance improvements, and new backup devices can be added to the server without changing the client software.

The Role of End Users

Backup and recovery is usually considered an administrative task that should be kept in the hands of someone trained to carry it out properly. This view deserves to be updated. Daily backups and disaster recovery are properly administrative activities that should happen as much in the background (from a user's perspective) as possible. But occasionally a user wants to protect an important file he just finished editing or recover an individual file. And with backup and recovery centralized in some remote corner of the building, it can be very frustrating to try to track down an administrator just when you need him.

The solution: user initiated ad hoc file recovery and back up via NetWorker for Solaris. Once a user initiates a backup or recovery, an administrator (or jukebox) loads the required tapes in response to a prompt from the software. Overall responsiveness to the users' needs increases without appreciably adding to the administrator's load.



A centralized, enterprise-wide solution uses a single backup server to backup and recover files across a variety of network-based systems.

Client Systems Across the Network

While the basic task of backing up and recovering systems is the same from system to system, there are some important details that are different across different platforms. For example, you must back up a NetWare server's bindery and trustee rights. Without this vital information you can not fully recover a NetWare server after a disaster. For backup purposes, a NetWare server can be a Solaris client, by using NetWorker for Solaris.

A client/server architecture offers the best approach for properly handling these differences. The job of the backup server was discussed above. The remaining sys-

The consolidation step focuses on combining similar workgroup environments. But there is no reason to stop there — the task of backup and recovery is basically the same across all types of systems. Like most organizations, your workgroups have probably adopted a combination of Solaris systems, UNIX systems, NetWare servers, PCs, Macintoshes, and more. An enterprise-wide backup and recovery solution encompasses all these systems in a consistent, uniform manner.

The Central Backup Server

A centralized, enterprise wide backup and recovery solution is depicted in the diagram on the next page. The backup server is the Solaris system equipped with the tape drive. It receives files from the systems across the organization and stores them on tape. The backup server may be a dedicated machine, or it may act as a file server, compute server, or database server .

One of the primary tasks of the backup server is to manage the backup media — usually tapes. Centralized tape management has a number of benefits:

- Reduces the number of tape drives that are needed for backup of a large number of systems across the organization.
- Makes it easy for a single person to load and unload tapes as needed during backup and recovery activity. Also, automatic and robotic capabilities, supporting tape jukeboxes.
- Creates a single, centralized tape library for all backups. This simplifies off-site tape rotation, security, and organization.

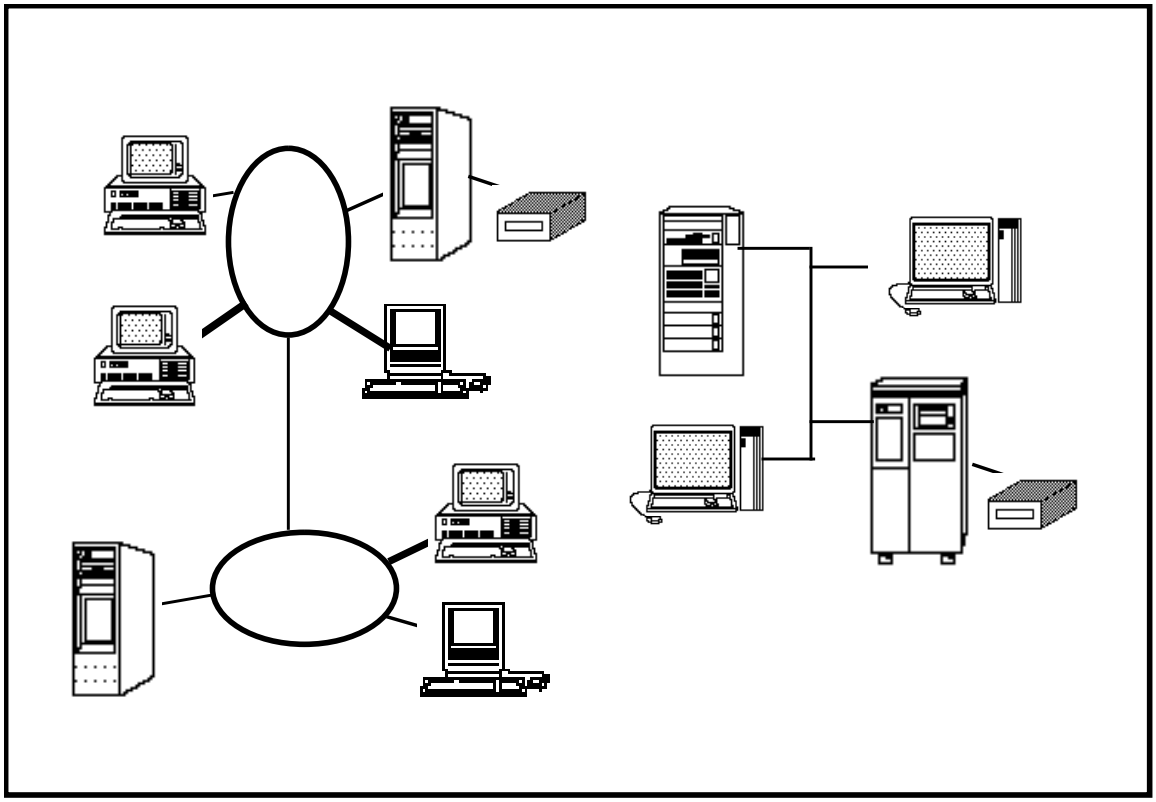
In addition to tape management, the backup server also initiates backups, reports on backup status and recovers files when needed. To accomplish all of this requires sophisticated backup software designed to support not only a networked environment, but also a heterogeneous environment.

Consolidation should be approached in a gradual fashion. Start by combining workgroups that are geographically close (so the workgroup administrators can easily work together during the start-up phase). Also, focus on combining those networks that have similar configurations. For example, combine several NetWare environments and then combine several UNIX-based networks. This will keep training issues and problems to a minimum.

Consolidation also provides an opportunity to reduce or eliminate manual tape shuffling with a jukebox. Under the control of software, a jukebox can automatically fetch needed tapes for backup and recovery operations for weeks at a time without intervention. Jukeboxes with a capacity of up to 100 GB are available on the market for less than $25,000. This expenditure can often be justified by freeing several part-time administrators to concentrate on their regular, full-time jobs. In addition an automated jukebox can reduce errors and speed backup and recovery operation.

Begin to Consolidate Operation

One of the primary problems with backup and recovery across the organization is that it involves too many people, some full-time experienced administrators, while others are part-time administrators who also have other jobs to perform within their workgroups. Consolidating backup and recovery operation across similar workgroups allows one administrator to perform this important task while others return to more productive work. Fewer administrators will have to be trained on the backup product, and procedures and consistency are sure to improve as there are fewer "cooks in the kitchen."



Consolidating backup and recovery operation across similar workgroup networks frees some administrators for other tasks.

Above all, look for a product that offers flexibility in the style of operation it supports and in its underlying architecture. As your needs change your backup software must adapt and continue to support you.

Customers of Online:Backup and Backup Copilot should refer to the “Online:-Backup Transition” whitepaper for additional information.

- Off-site rotation of tapes.
- Throwing away tapes after they have been used a certain number of times rather than continuing to reuse them.
- Backup schedule to be used.
- Simulation of disaster recovery on a regular basis.

Selecting The Right Backup Software

Backup procedures often change as your needs change. However, changing the backup software in use can be very difficult. Purchasing a new product if the current one no longer does the job creates retraining and transition issues that could be difficult to address in a short timeframe. Another issue to consider is maintaining the archive files backed up with the prior software and policies. So, the most important decision you have to make at this step in the process of moving to an enterprise wide backup solution is which software to use.

There are many considerations to keep in mind when selecting the enterprise backup software. Begin with the basic requirements for a backup product: reliability, ease of administration, ability to perform unattended backups, ease of recovery, ability to properly backup and recover important files such as the NetWare bindery, etc. Also consider:

- Availability of the product for many of the network-based systems that you have installed (SunOS, Solaris, NetWare, UNIX, DOS, Mac, etc.).
- A consistent user interface for the product across different platforms so that a single administrator can easily backup and recover dissimilar platforms.
- A feature set that can be flexible and scalable enough to backup and recover the environment you will have at least two or three years from now.
- Performance needed to backup the volume of files stored across all your workgroup networks.

A first step towards solving your backup and recovery problem is to reduce the number of solutions — products and procedures — in use. This has several benefits:

- Makes it possible to offer training to workgroup administrators.
- Allows administrators to cover for each other during vacations, illnesses, etc.
- Introduces consistency in the procedures that are used

It is probably not practical to immediately adopt a single backup solution across your entire organization. The many workgroups have different size network environments, and different types of systems to manage and no one solution will easily fit them all. Instead, your goal should be to develop a small set of standard scenarios, write down a solution for each one, and work with the various workgroup administrators to see that these solutions are adopted.

Backup Procedures

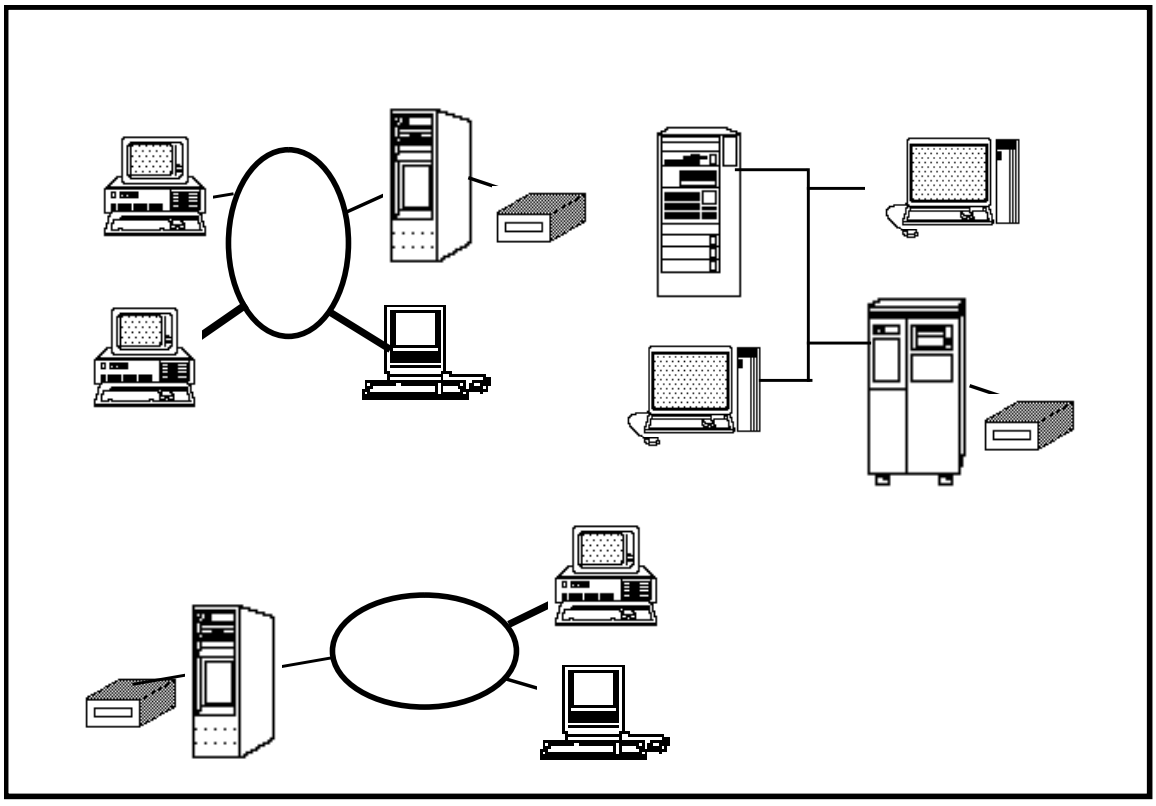
The many different procedures used for backup across your organization contribute at least as much to the degree of inconsistency and potential for problems as the many different products that are in use. For example, failure to regularly clean the tape drive used for backup is one of the leading reasons why files often can not be recovered when needed. Backup procedures do not need to be lengthy or complex, particularly for smaller networks, but they do need to be consistent.

It would be beneficial to develop two or perhaps three sets of backup procedures targeted at different sized network environments. The actual tasks to be performed will be the same, but larger sites will need to carry them out more frequently. Recommended tasks include:

- Cleaning of the tape drives used for backup (perhaps quarterly for small sites, monthly for larger sites).
- Verification that the backup completed without errors (ideally the software should send electronic mail or post a message in a log file indicating successful completion).

First Step: Standardize Throughout the NetWork

How many different backup and recovery products and procedures are in use throughout the organization? For many organizations, there are several different solutions which gives rise to inconsistent results.



With local backup a different solution is used for each network. A first improvement is to standardize on a small number of backup solutions.

Moving from a decentralized backup approach to a centralized, enterprise wide backup strategy requires a three step process:

Step 1: Standardize backup throughout the organization.

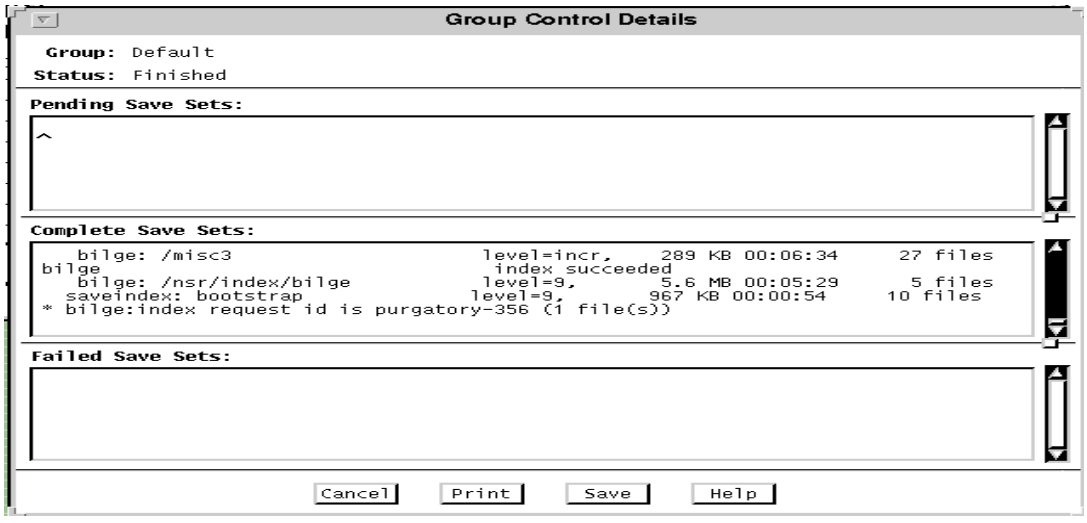
Step 2: Begin to consolidate backup and recovery across similar workgroup networks.

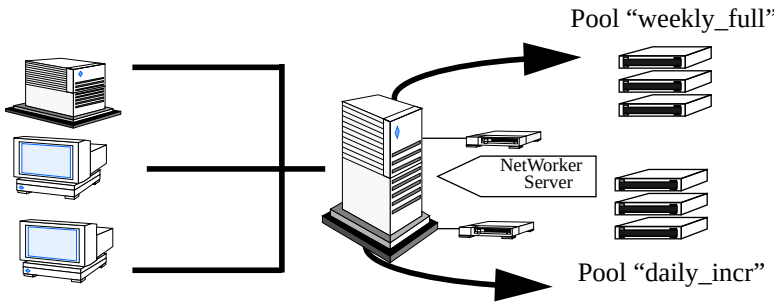
Step 3: Centralize backup and recovery activity across all network-based systems.

The following pages describe each of the three steps in detail.

Benefits of savegroup control

The system administrator has an up-to-the-minute view of all the scheduled backups that are running on a NetWorker server. The savegroup control window (show below) displays the status of all the groups with specifics when the last backup was run and when the next backup will be run. This tool is of immense value since it alerts the system administrator if a individual group has not had a successful backup for a prolonged period of time. For each group, this window also displays the detail of every group - showing specifics about which client's save succeeded and which clients' failed.





Media in first jukebox contains data from weekly fulls
Media in second jukebox contains data from daily incrementals

Security Across the Network

By default, the NetWorker server uses an rsh or remote shell command for each NetWorker client to initiate a network-wide backup using the savegroup command. For the rsh command to be executed successfully, it is required that the NetWorker server hostname be listed in the clients' ~user/.rhosts file. NetWorker also incorporates a security feature which allows the nightly backups to be initiated by the server without the need for an rhosts table entry. This feature will be a boon to sites that require the highest level of security.

Configuration Reports

NetWorker configuration reports provide quick, easy access to site specific information. Through a new, customizable window, a system administrator can easily review schedules, groups, and policies on a client or server basis. Hard copies of these reports can be produced at the push of a button.

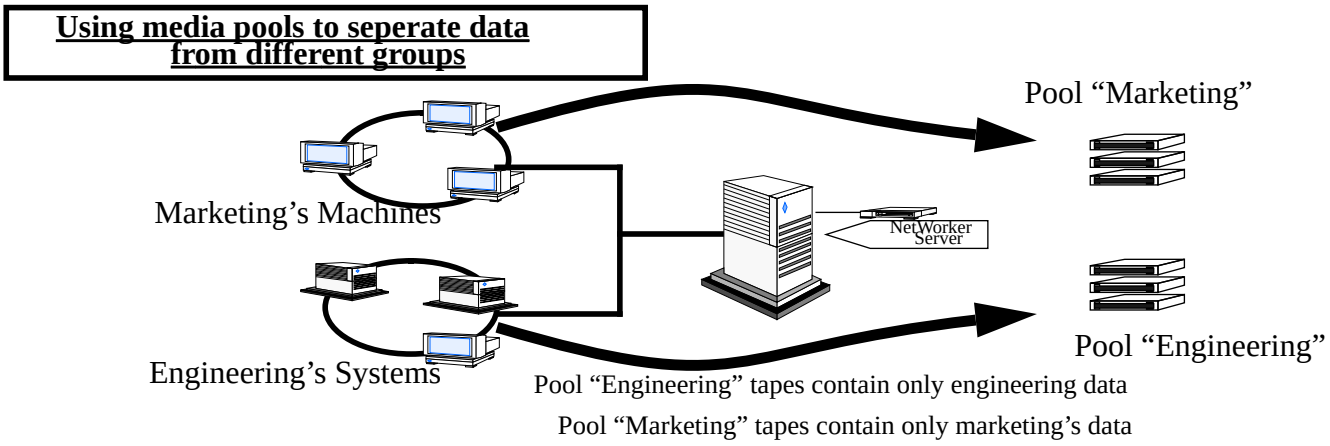
Savegroup Control for Stopping and Restarting Backups

“savegroup” is the NetWorker operation that runs at a specified time daily to protect the data that resides on the network. NetWorker provides system administrators the flexibility to stop an in-progress backup to free up system or network resources and then restart the backup later at the exact point at which it was stopped. This capability allows system administrators to balance the frequently competing demands of users and backup schedules without having to redo any backups.

NetWorker provides you with the ability to segregate or sort the backup data based on previously defined criteria through the Media Pools feature.

A media pool is a collection of backup media (tapes or optical drives). Each media pool contains backup data that fits a specific profile. For example, a media pool "on-site full" contains only data from a full backup, stored on-site.

The NetWorker for Solaris server comes pre-configured with 5 types of media pools. System administrators can add new types of media pools and tailor it to their specific environment.



Benefits of multiple jukebox support with Media Pools

The picture below shows how support for multiple jukeboxes in conjunction with media pools allows NetWorker to provide true "unattended" backup and recovery. In this diagram, the media in the first jukebox belongs to media pool "full" and the media in the second jukebox contains tapes from media pool "incremental". All "full" level backups are directed to the media in the first jukebox and all the incremental backups are directed to the second jukebox.

In addition to these devices, NetWorker for Solaris operates with most popular storage devices via the standard SCSI interface supplied with the Solaris operating environment.

Motif User Interface

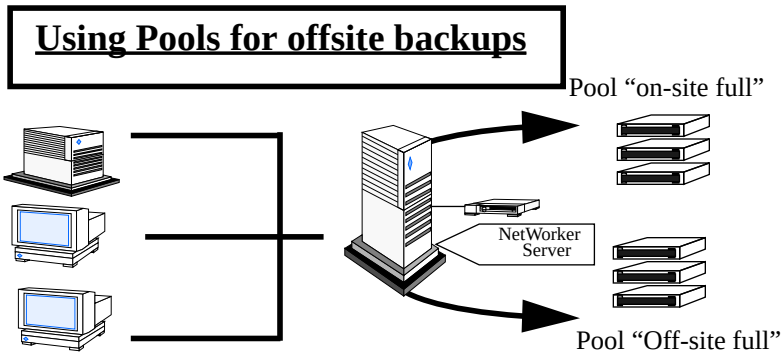
As part of the COSE initiative, SunSoft has endorsed Motif as the graphical user interface standard. With NetWorker for Solaris, SunSoft has included support for the Motif GUI for the SPARC platform on both SunOS 4.1.x and Solaris 2.x.

Support for Large Filesystems

NetWorker can backup filesystems that are greater than 4GB. Until recently, most operating systems limited file size to 4GB. However, as more operating systems support advanced disk management, Filesystems sizes will grow larger than 4GB. As end users migrate to 64-bit based operating systems, they can be assured that NetWorker will continue to protect their data regardless of filesystem size.

Media Pools

As the amount of data and the number of machines on the network continues to grow at an explosive rate, system administrators require the ability to segregate or separate the backup data based on certain criteria. The powerful Media Pools feature of NetWorker allows for a wide range of such needs. For example:



NetWorker supports different types of jukeboxes to be attached to a single backup server. For example, you can attach an optical jukebox and a tape jukebox to a single server to provide unattended backup and recovery. To enable support for additional jukeboxes, the end user follows a process that is exactly the same as the procedure that he or she followed for enabling the first jukebox:

- install the device driver software that is included in the server distribution media
- enable the appropriate jukebox module.

Support for Tape Drives and Optical Jukeboxes

NetWorker incorporates support for a variety of tapes and optical jukeboxes. The NetWorker for Solaris server offers support for tape and optical jukebox to provide unattended "lights-out" backup and recovery. Models supported include:

- 4mm DAT Tape Drives
- 8mm Tape Drives
- QIC Drives
- 3480 Tape Drives and Autochangers
- Half-Inch Drives
- 4mm DAT Autochangers
  - ADIC DAT 1200c
- 8mm Autochangers
  - Exabyte EXB10i CHS
  - Exabyte EXB10e CHS
  - Exabyte 60 CHS
  - Exabyte 120 CHS
  - LAGO DataWheel
  - IGM ATL
- Optical Jukebox
  - HP Optical Jukeboxes of varying capacities

Open Architecture

NetWorker for Solaris provides open interfaces to allow other software vendors to browse the on-line indexes, save and recover files, and read or write the tapes.

Supported Clients

Client Enablers increase the number of clients supported by the NetWorker for Solaris backup server. A maximum of 210 systems can be supported on a single NetWorker server. Solaris 2.x and SunOS client support is bundled with Solaris. Additional clients supported by NetWorker for Solaris includes:

- ClientPak I: enables backup of clients for
  - Solaris 2.x for SPARC
  - SunOS 4.1.x for SPARC
  - RS/6000
  - HP/Apollo
  - DEC
  - MIPS
  - SGI
  - Sony
- ClientPak II: enables backup of clients for
  - SunOS 4.1.x for 386i
  - OS/2
  - DOS (PC-NFS, LAN Workplace, FTP)
  - UnixWare
  - SCO Unix
- ClientPak III: enables backup of clients for
  - NetWare 3.1x and 4.x servers to a NetWorker for Solaris backup server

Multiple Jukebox Support

NetWorker for Solaris provides for multiple jukebox support on a single NetWorker server. This feature enables a NetWorker server to support backup and recover operations on multiple jukeboxes simultaneously.

NetWorker for Solaris Feature Highlights

Heterogeneity

NetWorker for Solaris enables computers of different architectures and operating systems to save and recover data from a Solaris or SunOS based backup server. It provides an easily administered way to backup the vast majority of the platforms in the enterprise, including Solaris, SunOS, HP-UX, AIX, MS-DOS, NetWare, and NT as well as other various UNIX clients.

Ease of Use

NetWorker is easy to use for both end users and system administrators. The Graphical User Interface allows for easy, intuitive navigation of the NetWorker feature set.

Unattended Operation

NetWorker for Solaris positions customers for “lights out” operation for both backup and recover, only notifying the operator when there is a problem. The product offers support for a full range of robotic devices, and easy to use end-user recovery tools. In addition, NetWorker provides automatic backup verification.

Personalized Backup Notification

Desktop users no longer need to depend on the system administrator to verify the successful backup of their machine’s files. NetWorker enables the system owners to receive personal notification about their machine's most recent backup. On a daily basis at their desktop console, users can receive confirmation that their files and data are being protected against loss.

Client Retries

NetWorker increases the fault tolerance of the backup operation by including a retry capability that enables system administrators to direct a server to automatically retry establishing contact with a backup client in cases where the initial contact fails. Using this capability, system administrators can increase their confidence that client data will be successfully backed up even in the case of temporary client unavailability.

place throughout your organization today to a centralized, enterprise wide solution requires standardized backup functions throughout the organization. This is accomplished by a consolidation of backup and recovery across similar workgroup networks and centralized backup and recovery activities across all the network-based systems in the enterprise.

You cannot convert the backup practices across your entire organization overnight. But the following pages describe steps you can take toward achieving a centralized enterprise wide backup and recovery strategy:

The right tool for the job: NetWorker for Solaris

The NetWorker for Solaris Advantage

The ability to easily scale to a wide variety of environments is the principle advantage of NetWorker for Solaris. Whether your data backup needs are localized and departmental or enterprise-wide and broadly heterogenous, NetWorker provides the best solution to one of the most important issues a business will face.

Another considerable advantage of NetWorker for Solaris is the commitment that comes with every copy of the product that is sold. SunSoft is one of the leading players in Open Systems solutions, providing world-class customer support twenty-four hours a day, seven days a week, consistently meeting and exceeding the requirements of our customers. For a task as important as data backup and restore, it simply makes sense to choose the best when it comes to support.

SunSoft also provides valuable training for all integral operating environment products. Our courses are second-to-none is providing in-depth and personalized, hands-on education for our customers' data management professionals.

Advantages of an Enterprise Backup Strategy

Certainly the best approach to right-sizing the backup and restore of valuable corporate data is an enterprise wide strategy. An enterprise-wide backup solution is a combination of hardware, software, and backup procedures that are applied in a centralized, consistent manner across the network-based systems throughout your organization. Think of it as having one administrator back up all your network-based systems to a central "backup server." In contrast to local backup, a centralized, enterprise wide strategy offers a number of advantages:

- Frees individual workgroup administrators from the burden of backup activity.
- Allows a single, consistent procedure to be used to backup all systems.
- Facilitates monitoring of problems that arise during daily backup activity.
- Minimizes the need for on-going backup training.
- Makes it easier to test your ability to recover from a disaster.

Moving from the decentralized, patchwork approach to backup that you have in

Everyone knows about the importance of backing up computer systems to protect from the loss of valuable data. In a networked environment, where the number of files grows as systems are added to the network, the need to protect against loss of data becomes crucial. And as networks become increasingly heterogenous, the problems become even more difficult to manage.

The Backup Solution

NetWorker for Solaris provides a system-level solution to network backup, recovery and data storage management. NetWorker offers many advantages over simple utilities such as dump and tar, like:

- Consistent, reliable data protection
- Simplified backup and administration
- Backup of live file systems
- Faster backup through parallel data streaming
- Unified storage management across multiple platforms
- Media management
- Simplified graphical user interface (GUI) with online index for file recovery
- Multiple client support (Solaris, SunOS, SCO Unix, AIX/6000, PC-NFS, Windows 3.1, HPUX)

NetWorker for Solaris is a software product for the Solaris operating environment that reliably protects files against loss across the enterprise. NetWorker saves valuable administrator time by speeding and simplifying daily backup operations. An easy-to-use graphical user interface guides administrators through configuration and use of the network for scheduled backups. And NetWorker creates a database of backups, making it easy to recover files. As the network and volume of files expands, NetWorker has the capacity and performance to handle the load.

NetWorker for Solaris is an integral part of the Solaris operating environment. The product comes bundled with the workgroup and enterprise server packages and allows for backup to a single tape drive at no additional charge. In additon, NetWorker can easily grow to fit the needs of larger configurations by simply adding feature enablers.

up procedure, and does their best to ensure that files can be recovered if there is a disaster. The result is an unacceptable patchwork.

The Problems of Local Backup

The local backup scenario just described results in varying levels of protection for files across your organization. Some systems are backed up regularly and reliably while others are not. Others associated with local backup and recovery include:

- On-going need for training as local system administrators pass the responsibility to the newest person hired into the department.
- Lost productivity in user workgroups as someone must take time away from their real job to perform administrative tasks.
- Inconsistent backup activity as local administrators are on vacation, out ill, or just too busy to backup.
- Poor attention to tape drive cleaning, tape rotation, and other administrative procedures that are critical to ensuring that files can be recovered in the event of a disaster.

The solution to this problem is an enterprise-wide approach to backup and recovery.

The Problem with Existing Tools

Few people will argue that any task can be completed faster, easier and more cost-effectively with the right tool. Then, why is it that so many system administrators still use antiquated technology for backup and recovery?

Probably the biggest reason is that many currently existing tools, such as dump and tar, are shipped free of charge with the operating system. Considering today's tight economy, that's certainly a valid reason. However, you also have to consider the scope of the task at hand and whether or not such tools are the best tools for protecting one of your organization's most prized possessions -- data. In addition, when you look at the cost of administering the backup and recovery process using tools like dump and tar, especially as the network grows in size and complexity, you soon realize the need for a better solution.

NetWorker for Solaris

Introduction

As the rightsizing trend continues in businesses, the need for effective tools that can help better implement corporate data management policies becomes paramount. NetWorker for Solaris provides backup and restore capability for the Solaris and SunOS operating environments. It is a software product that backs up and recovers files across heterogeneous networks. NetWorker is available is several configurations, to suit the needs of any Solaris or SunOS environment. Whether you have a single fileserver, or a network of hundreds of nodes, NetWorker for Solaris can scale to fit your system requirements.

NetWorker also provides a "hands-off" solution to your backup needs. The NetWorker for Solaris Jukebox Module allows for automatic, unattended network-wide backups.

NetWorker automates the day-to-day process of backup for every computer on the network, thus protecting every system from file loss. NetWorker simplifies the management of backup media, gives notice of NetWorker events, and is easy to operate and administer through a Solaris X Window System user interface.

The Backup Problem

The volume of files stored on network-based systems is tremendous. According to Peripheral Strategies, a Santa Barbara, CA market research firm, network storage capacity nearly quadrupled from 1991 to 1993, growing from just 1 gigabyte (GB) to 3.8 GB, and the trend continues. This explosion leaves a number of problems in its wake. Quick and reliable backup and recovery of the files stored on these network-based systems is one of the most acute problems. The number of networks deployed across an organization is also rapidly increasing. Individual administrators for each network do their best to backup and recover files within their domains. Each procures a tape drive and a software package, devises a back-