



Image Services

Restore Guide for Windows® Server

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About This Manual

This document provides instructions to restore FileNet datasets and information to restore the Windows Server file system for **FileNet-controlled RDBMS databases ONLY**.

Note For Site-controlled RDBMS databases, refer to the appropriate administration guide (provided with your RDBMS software) for restore instructions.

This manual does not contain procedures to restore the Windows Server operating system. Use Windows Server guidelines and procedures to back up and restore the Windows operating system.

Audience

This manual is directed to FileNet support personnel. We assume that you are familiar with the backup procedures for FileNet datasets and the Windows Server file system. We also assume that you are familiar with your operating system environment and workstation operations. If you are not familiar with Windows Server system concepts, we suggest that you familiarize yourself with the system, its procedures and commands.

We recommend that you have a working knowledge of your Oracle or Microsoft® SQL Server™ Relational Database Management System (RDBMS). If you are restoring an Oracle database, we recommend that you have a strong Oracle background and use caution. Refer to the SQL Server Books Online documentation provided by Microsoft for information on restoring SQL Server databases.

Conventions Used in this Manual

The following paragraphs discuss the ways in which we call your attention to information throughout this document.

Typing Instructions

To indicate commands, values, or other information you enter at your keyboard, we use the following indentation and typeface:

```
help [CSM_exim]
```

Console Displays

Information you see displayed at your console is shown in this document in the following manner:

```
Surface '3176' : 1 document processed
Local doc_id = '2235007' Original doc_id = '2235007'
Original ssn = '8502'
Primary copy. No tranlog copy exists.
* document successfully deleted from databases. *
* Purging pages from disk... *
* This document has been successfully purged. *
```


Cautions, Important Notes, Notes, and Tips

Important information and warnings appear in cautions, important notes, notes, and tips: Be sure to read these items carefully:

- | | |
|-------------------|---|
| CAUTION | A caution points out a situation that could cause damage to the software or loss of data. The information in this format is crucial to the integrity of the system software. |
| Important! | This heading gives added emphasis to notes that contain particularly vital information that must not be skipped over. While all the information in each section is important, these notes are especially important. |
| Note | A note calls out relevant information that can affect the outcome of the procedure or affect some other part of the system. Be sure to read all notes. |
| Tip | A tip offers hints, unique solutions, or workarounds that might make your work easier. |

Command Syntax

Command syntax definitions are indented:

```
ddexim -e > <filename>
```

Optional Parameters

Optional parameters and keywords are within square brackets:

```
ddexim [-e] > <filename>
```

Required Parameters

Parameters that require you to provide information are shown within angle brackets (< >).

For example, for the following command:

```
ddexim -e > <filename>
```

you must substitute the name of a command for the parameter in angle brackets, such as:

```
ddexim -e > myfile
```

FileNet Education

FileNet provides various forms of instruction. Please visit Global Learning Services on FileNet's Web site at: www.filenet.com.

Comments and Suggestions

FileNet invites all customers to communicate with the Documentation group on any question or comment related to FileNet manuals and on-line help. Send email to docs@filenet.com. We will make every effort to respond within one week. Your suggestions help us improve the products we deliver.

Introduction

This document provides instructions to restore FileNet datasets and information to restore the Windows Server file system for **FileNet-controlled RDBMS databases ONLY**.

Note For Site-controlled RDBMS databases, refer to the appropriate administration guide (provided with your RDBMS software) for restore instructions.

The restore procedures in this manual, when successfully executed, return a corrupted file system or dataset to its proper state in Image Services for Windows Server.

Restore Methods Available

FileNet recommends the Windows Server Backup program as the primary tool to restore the FileNet Image Services. Use the FileNet Cache Export/Import application or the CSM_exim utility to restore cache objects if you backed up cache with these programs.

Windows Server Backup Program

The Windows Server Backup program is part of the standard Windows System Administrator interface. If your databases are not extremely large, we recommend that you use the Windows Server Backup program to back up and restore your entire system. In addition to being feature-rich, Windows Server Backup is a natural and efficient vehicle to back up and restore the Windows Server system.

Windows Server Backup is accessed by choosing the Backup icon from the System Tools folder. e.g. Programs>Accessories>System Tools.

Cache Backup

The FileNet Cache Backup program is actually called the “Cache Export/Import” program, and is for specific users only. Many users who back up their entire system, including caches, daily with the Windows Server Backup utility do not use the Cache Export/Import program to backup or restore.

You may want to use the FileNet Cache Export/Import program regularly if you use deferred committal or have a cache-only system. In this case, you may have numerous large objects in your magnetic disk caches that are not protected against disk failure.

Cache Export/Import is accessed from the Application Executive (Xapex) Application menu, or by choosing the Cache Export Import icon in the FileNet Image Services, Server Applications folder. As an alternative, a compatible version of Cache Export/Import can also be accessed from a command line using CSM_exim.

Image Services Restore Tasks

The Image Services for Windows Server restore consists of the following tasks:

- Restore of the FileNet databases using Windows Server Backup.
- Restore of the index database using Windows Server Backup.
- Restore of the Windows Registry using Windows Server Backup.
- Restore of new, uncommitted objects stored in cache using one of the following methods:
 - Windows Server Backup
 - FileNet Cache Backup (Cache Export/Import program)
 - CSM_exim, executed from the command line and compatible with the Cache Export/Import program
- Restore of the directory \fnsw_loc, which contains Oracle control files and site-specific data (configuration files and log files), using the Windows Server Backup program.
- Restore of the \fnsw directories containing data files, such as \fnsw\dev\1, using the Windows Server Backup program. The \fnsw\dev\1 directory contains the databases, cache, MKF recovery logs, and RDBMS redo/transaction logs.

The \fnsw\bin directory, which contains FileNet-generated files, can be restored easily by reinstalling the Image Services software.

See [**“Appendix A – FileNet Image Services Structures” on page 52**](#) for definitions of FileNet datasets and directories used in the backup and restore procedures.

Related Documents

We suggest you familiarize yourself with both backup and restore procedures and commands before attempting a restore.

Refer to the following documents for more information:

- **[System Administrator's Handbook](#)**

If you are new to the FileNet system, read the “Introduction” chapter in your *System Administrator's Handbook* as well as manuals that describe workstation operations.

- **[System Administrator's Companion for Windows Server](#)**

In addition to reading this manual before performing a restore, you should be thoroughly familiar with the chapter “Backup” in the *System Administrator's Companion for Windows Server*.

- **[Enterprise Backup and Restore User's Guide](#)**

The FileNet Image Services Enterprise Backup and Restore (EBR) utility provides an alternative for backing up and restoring an Oracle relational database and cache. (Microsoft SQL relational databases are not supported with EBR.) If you think you may want to use this alternative, refer to the *Enterprise Backup and Restore User's Guide* for more information.

Note

For information on Oracle or MSSQL products, refer to the documentation that came with your software.

Before You Begin

Before you begin the restore operation, read the sections in this chapter to understand file system structures, the databases and cache to be restored, and the restore programs used.

Understanding File Systems

The Image Services for Windows Server is an integrated set of file directories that appear to you as one large file system. The file directories include:

- Windows Server software:
 \WINNT35
 \ (root)
 \tmp
- FileNet software:
 \fnsw
- FileNet data, including site-specific information (configuration files), NCH database, COLD files:
 \fnsw_loc
- Relational Database, for example:
 \usr\oracle
 \fnsw_loc\oracle\control0

Note All of these directory trees may be located on different logical drives.

File System Types

FileNet software resides in the Windows Server File System (NTFS). The NTFS supports Windows Server security, keeps a log of all disk activities, supports file and directory names up to 256 characters, and supports extended file attributes. For information on the advantages and characteristics of the NTFS, refer to your *Windows Server System Guide*.

The Windows Server system contains other file systems, such as File Allocation Table (FAT) and High-Performance File System (HPFS).

Directories and Files

Unless designated otherwise, the FileNet software resides in the default directory and subdirectories of \fnsw. At installation time, the operating system recognizes the FileNet file system by its path.

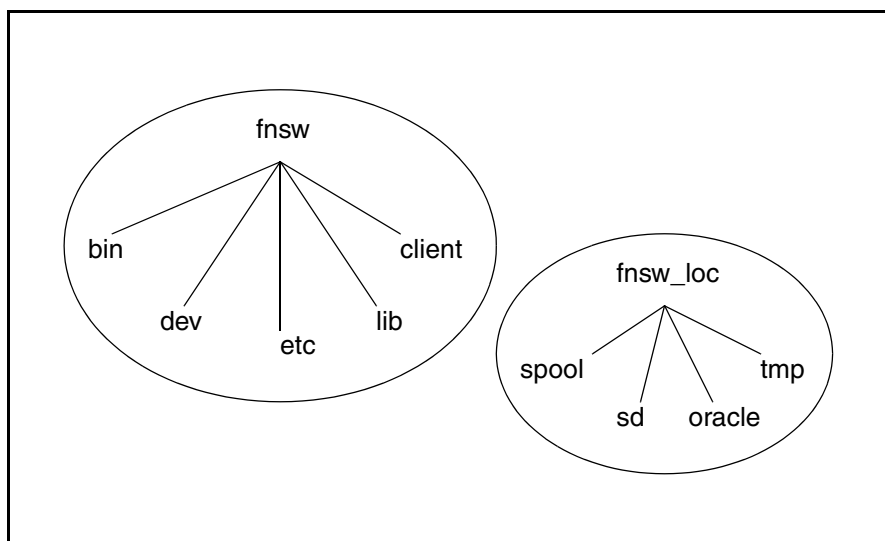
Use the Windows Server File Manager to list directory and file information, including file name, file type, file size, and last modification date.

The directories and subdirectories \fnsw, \fnsw_loc, and \fnsw\dev\1 are the FileNet default directories. FileNet Image Services software is installed in \fnsw. The \fnsw_loc directory contains Oracle control files and site-specific data such as configuration files and log files. Files under the \fnsw\dev\1 subdirectory contain data files residing in cache, the permanent database, transient database, security database, the index database, the MKF recovery logs, and RDBMS redo/transaction logs.

Although FileNet software may be installed in the directory of the user's choice, we recommend that customers use the default directories.

Note Examples in this manual use the default directory names: `\fnsw`, `\fnsw_loc`, and `\fnsw\dev\1`.

The following diagram shows a typical FileNet system directory structure:



FileNet Directory Structure Example

Understanding Databases and Cache

Databases contain datasets which are backed up or restored with the Windows Server Backup program. Cache can be backed up or restored with either Windows Server Backup, FileNet Image Services Cache Backup (Cache Export/Import), or the CSM_exim program. See [“Appendix A – FileNet Image Services Structures” on page 52](#) for descriptions of the databases and cache.

MKF Databases

The MKF databases in a FileNet system, each with their associated recovery logs, include the following:

- Permanent database
- Transient database
- Security database
- NCH database

Index Database

The index database, created and managed by a Relational Database Management System (RDBMS), contains:

- Index tables
- Redo/transaction logs
- Control files (if using the Oracle RDBMS)
- WorkFlo queues
- Visual WorkFlo tables

Cache

Cache is a set of disk files containing batches of documents waiting to be written to storage media. Cache also stores images retrieved from storage media for both display and printing. Systems without storage media store data in page cache.

When using Windows Server Backup to back up and restore cache, you must back up and restore all cache files. If one large cache file exists containing only a few documents, Windows Server Backup still backs up and restores the entire file.

You can use the FileNet Cache Backup (Cache Export/Import program) to selectively back up and restore cache objects.

Windows Server Registry

Windows Server maintains a separate configuration database called the **Registry**. The Registry contains system configuration information, third-party configuration information, security information, and user environment profiles. The Registry is backed up and restored with the Windows Server Backup program. To update the Registry, you must have Windows Server Administrator privileges.

CAUTION The Registry database **must** be backed up and restored with the other databases.

Databases and Cache to Restore

The following table is an overview of databases and cache that should be restored.

Overview of Restoring Databases and Caches

Dataset	Type	Contents	Restore Method
Perm_DB <i>n</i>	MKF Database	Contains address information for each document— <i>n</i> indicates station number.	Windows Server Backup
Trans_DB <i>n</i>	MKF Database	Contains information on system work in progress (such as batch status, read/write and print requests), images in cache, and cache space available— <i>n</i> indicates station number.	Windows Server Backup
Sec_DB1	MKF Database	Contains the security database.	Windows Server Backup
Oracle_DB	Index Database	Contains indexing fields, document classes, document indexing status, folder information, and WorkFlo queues.	Windows Server Backup
Oracle_RL <i>n</i>	Index Database	Oracle redo log. Records changes made to the Oracle RDBMS since the last backup and is used to recover data lost since the last backup.	Windows Server Backup

Overview of Restoring Databases and Caches

Dataset	Type	Contents	Restore Method
Microsoft SQL Server databases	Index Database	Contains indexing fields, document classes, document indexing status, folder information, and WorkFlo queues.	Windows Server Backup
Microsoft SQL Server transaction logs	Index Database	SQL Server transaction log. Records changes made to an SQL Server database. Each database has a transaction log that is used during automatic recovery to recover data lost since the last database backup.	Windows Server Backup
Windows Server Registry	Server System Database	Contains system and third-party configuration information, security information, and user profiles.	Windows Server Backup
Cacherna, Cachernb, etc.	Cache	Contains documents waiting to be written to storage media, images retrieved from storage media, and images in batch cache. <i>n</i> indicates station number; letter a, b, etc. indicates cache file.	Windows Server Backup, Cache Export/Import, or CSM_exim

Restoring an MKF Database

When restoring an MKF backup, the Windows Server Backup program copies the data files from tape to magnetic disk. If you included the MKF database and recovery logs in the backup, you can restore the database to the same point in time as the end of the last backup.

The recovery logs contain copies of all changes made to the MKF database itself. To be of use, the recovery logs must reside on a different disk than the MKF database. If you lose the database, but the disk that contains the recovery logs is still intact, you may be able to recover data up to the point in time of the crash.

First restore the MKF database from your backup tapes, using Windows Server Backup. MKF database software will then notice, the next time it opens the database, that the recovery logs are more recent than

the database. MKF will then “splice in” all of the changes from the recovery logs which are not in the database. MKF does this automatically, without your having to take any action to cause the recovery logs to be used.

MKF may not always be able to splice in the changes from your recovery log. The recovery logs must be large enough to hold all of the changes that occur between successive backups. If the recovery logs are not large enough, then some of those changes will be lost if the database itself is lost.

It is important that you do not restore the recovery logs from backup tape when you restore the MKF database. You want the recovery logs (on disk) that contain all the changes up to the moment of the crash, not the changes that correspond to the same point in time as the end of your backup.

An essential part of completing a restore is to make a **full backup immediately** after the restore. One important reason is that performing a full backup clears the MKF recovery logs on magnetic disk. After the MKF recovery logs are cleared, subsequent database changes made since the restore can be newly recorded.

Related Backup Issues

MKF recovery logs are not archived when filled. When one log is full, recording continues on the next available log. When the available logs are full, recording wraps to the first log—overwriting the contents of the first log.

To avoid losing data, configure recovery logs large enough to cover two times the amount of data normally generated between backups, and back up regularly and on schedule.

Note We recommend that you write MKF recovery logs to a different disk other than the disk that contains the related database.

Restoring the Index Database

The Windows Server Backup program can be used to restore the index database.

Oracle Index Database

If you have an Oracle index database, the Oracle control files must correspond to the state of the database. Determining whether or not to restore an Oracle control file depends on the state of the current control file, the current redo logs, the archived logs, and the data files. Refer to your Oracle documentation for more information.

If you need Oracle redo logs to bring the database up to date, you can apply the logs that were created between the last backup and the present.

If you apply redo logs, be familiar with Oracle database recovery techniques described in the *Oracle9i Server Administrator's Guide* or *Oracle9i Parallel Server Concepts and Administration*. You must execute Oracle sqlplus and the appropriate recover database command. Restore the database to a specific time within a redo log by applying archived or current redo logs.

Use the Windows Server Backup program to back up the index database to tape with the system offline.

The Oracle control files are located in the `\fnsw_loc` directory. Whether you restore Oracle control files depends on whether you need the current control files or the control files from the time of the backup.

Make a full backup of the index database before and after an upgrade and after a restore.

SQL Server Index Database

After restoring an SQL Server database, you can load or apply an SQL Server transaction log to bring the database up to date. Loading a transaction log applies the changes in the log and rolls back any transactions that were uncommitted when the transaction log was backed up. Refer to the SQL Server Books Online documentation for more information, for example, “Restoring a Database” or “Applying a Transaction Log.”

Use the Windows Server Backup program to back up the index database to tape with the system offline.

Make a full backup of the index database before and after an upgrade and after a restore.

Recommendations

We recommend archiving **Oracle** database redo logs or **SQL Server** transaction logs, if you wish to recover data up to the moment of the system failure.

We also recommend that you back up archived redo logs with your daily backup. If you choose to back up your archived Oracle redo logs individually, refer to “Maintenance Program for Archived Oracle Redo

Logs” in the [***System Administrator’s Companion for Windows Server***](#).

CAUTION

The permanent database is tightly coupled with the index database. To maintain synchronization between the two databases, they should be backed up simultaneously and restored simultaneously.

Understanding the Windows Server Backup Program

The Windows Server Backup program is used to both back up and restore. Access Windows Server Backup, part of the standard Windows Server System Administrator interface, by choosing the Backup icon in the System Tools folder (Programs>Accessories>System Tools). Then select the Restore tab from the Windows 2000 Backup and Recovery Tools window.

Restoring with Windows Server Backup can only be performed when FileNet software, including the RDBMS software, is shut down. Use the Task Manager application in the FileNet Image Services, Applications folder, to shut down FileNet software.

Note

FileNet recommends that you use the Windows Server disk mirroring capability or the disk striping with parity capability. These capabilities greatly reduce the need for restores. Please refer to your *Windows Server System Guide* for disk mirroring information.

If databases are not extremely large, we recommend that customers use the Windows Server Backup program to perform daily backups for the entire system. Using only the Windows Server Backup program and not using the FileNet Cache Export/Import program results in only one backup tape to restore.

If you have incremental backup tapes, restore the last **full** backup tape. Then restore each successive incremental tape from the full backup to the most current.

Windows Server Backup is also used to restore the critical Windows Server Registry. The Registry contains system configuration information, third-party configuration information, security information, and user-environment profiles.

What to Restore

Windows Server Backup restores the files and directories that you select or the entire tape. Generally, the \fnsw directory contains FileNet Image Services software and need not be restored through the Windows Server Backup program. The \fnsw directory can be restored by reinstalling the Image Services software. However, depending on content, the \fnsw subdirectories, such as \fnsw\dev\1, may need to be restored. The \fnsw\dev\1 directory typically contains data files residing in cache, the MKF databases (permanent database, transient database, and security database), and the index database.

Note You may choose to reinstall the Image Services software instead of restoring the \fnsw directory. However reinstalling the Image Services software will not restore any *SS fixes or patches or the WAL or Visual WorkFlow (VW) software which were installed after the base Image Services software was installed.

The \fnsw_loc directory typically contains Oracle control files and site-specific data, such as configuration files and log files. The \fnsw_loc directory needs to be restored.

Depending on what has been lost, your restore may include:

- MKF databases
- Index database

Restore the raw partition where you have placed the system tablespace if you placed it in its own raw partition (/fnsw/dev/1/oracle_sys0) separately from where the FileNet data (/fnsw/dev/1/oracle_db0) resides.

- **Oracle** (online) redo logs, if necessary

Whether you restore Oracle redo logs depends on whether you need the current logs or the logs from the time of the backup. Refer to your RDBMS documentation for more information.

- **Oracle** control files, if necessary

Whether you restore Oracle control files depends on whether you need the current control files or the control files from the time of the backup. Refer to your RDBMS documentation for more information.

- **Oracle** archived logs (if you have archiving turned on)
- **Microsoft SQL Server** transaction logs
- **Microsoft SQL Server** archived transaction logs
- Cache
- Windows Server Registry

See [**“Overview of Restoring Databases and Caches” on page 20**](#) for a list of databases and cache and restore methods.

Because the location of each database is user-configurable, the path of your directories and files may differ from the following list, which illustrates the `\fns\dev\1` default directory. Based on how your caches and index database are configured, you may have additional database files and cache files.

```
\fns\dev\1\permanent_db0
\fns\dev\1\sec_db0
\fns\dev\1\sec_r10
\fns\dev\1\ttransient_db0
\fns\dev\1\ttransient_r10
\fns\dev\1\oracle_db0
\fns\dev\1\oracle_sys0
\fns\dev\1\oracle_r10
\fns\dev\1\ms_db0.mdf
\fns\dev\1\ms_db1.mdf
\fns\dev\1\ms_r10.mdf
\fns\dev\1\ms_r11.mdf
\fns\dev\1\ms_tmp0.mdf
\fns\dev\1\cache0
```

Obtaining Dataset Location Information

Before restoring, use the following method to obtain magnetic disk location information for individual databases and logs. Click the **Configuration Editor** icon or run the `fn_edit` tool from the command line.

- Check **Read Only** on the main screen, and click **OK**.
- Click **Datasets** to view the location of caches, databases, recovery and redo logs.

Be sure to scroll to the right of the output screens to view all available information.

Understanding Cache Backup

Caches are stored in large files in the Windows Server file system. Each cache file may contain multiple caches and each cache contains different cache objects. Each cache object is usually one page of a document that has been committed to the customer's system. Cache objects may also contain system objects or user-defined objects that are not committed documents. Each logical cache contains one type of object. A print cache, for example, contains copies of document pages that are queued for printing.

Reasons for Using Cache Backup (Cache Export/Import Program)

Users may want to use the FileNet Cache Export/Import program regularly if they use deferred committal or have a system without storage media. In this case, they may have numerous large objects in their magnetic disk caches that are not protected against disk failure.

Back up and restore cache with the Cache Export/Import program if:

- You use the deferred committal option.
- You use a system without storage media.
- You have extremely large caches.
- You are **not** using the Windows disk mirroring capability to mirror cache.

Perform these two types of backups daily:

- Selective backup of cache objects with the FileNet Cache Export/Import program.
- Backup of databases, recovery logs, Oracle control files, and configuration files with the Windows Server Backup program.

Restore Tapes

Because you used both Cache Export/Import backup and Windows Server Backup, you will have **two** backup tapes to restore.

You cannot append the Cache Export/Import backup to the Windows Server Backup or vice versa. However, a method to combine both backups on one tape is described in “Including a Cache Backup on the Windows Server Backup Tape” in the [***System Administrator’s Companion for Windows Server***](#).

Cache Backup (Cache Export/Import Program)

You can access the Cache Export/Import application in one of the following ways.

- Choose Cache Export Import in the FileNet Image Services, Server Applications folder. e.g. Programs>FileNet Image Services>Server Applications.
- Open the FileNet Image Services Application Executive, and choose Cache Export/Import from the Applications menu drop-down list.

Note To access the Cache Export/Import program from the command line, use **CSM_exim**. CSM_exim uses the same format and is compatible with the Cache Export/Import program. Refer to the “Commands” chapter in the [***System Administrator’s Handbook***](#) for instructions to use CSM_exim.

To restore, Cache Export/Import must be run with the Image Services software in **Restore Mode** (selected from the Task Manager application in the FileNet Image Services Server Applications folder). Restore

Mode shuts down the FileNet software and initiates a minimal and secure environment to run a cache restore.

CAUTION

To restore successfully, the transient database backup must be synchronized with the cache backup. This means that the transient database must be backed up immediately before or after Cache Backup is performed.

The Cache Backup program creates restore and backup directory files, restore and backup data files, and restore and backup log files as described in the table below.

Files Created by the Cache Backup Program

Type of File	Description of File	Default File Name
Backup directory file Restore directory file	One directory file per cache backup or restore that lists all caches and all cache objects contained on the backup or restore. You may choose a unique prefix for the directory file instead of using the default.	\fnsw_loc\tmp\cbmmdyyy_yn.dir \fnsw_loc\tmp\crmmddy_yn.dir
Backup data file Restore data file	One data file per cache backed up or restored to tape or disk. You may choose a unique prefix for the data file instead of using the default.	\fnsw_loc\tmp\cbmmdyyy_yn.<cache_id> \fnsw_loc\tmp\crmmddy_yn.<cache_id>
Backup log file Restore log file	One log file that lists backup or restore activity. The log file is always written to disk. A new log file is created for each backup or restore. We recommend that log files be manually deleted periodically. Archive them before deletion if there is important information in the log file.	\fnsw_loc\tmp\cbmmdyyy_yn.log \fnsw_loc\tmp\ crmmddy_yn.log

Cache Backup assigns default names for the restore directory files, the restore data files, and the restore log files. The default file naming for these files is as follows:

- cr represents the cache restore directory, data, or log file.
- cb represents the cache backup directory, data, or log file.
- mmddyyyy is the date of the restore.
- nn represents the number of restores done on a given day.

For example, cb050197_01 is the name of the first restore file done on May 1, 1997. Subsequent restores done on that same day will be differentiated by the nn, for example, 02 for the second restore of the day, up to 99. If more than 99 restores are done in a single day, the number wraps around. If you have not removed any of the restore files corresponding to the first 99 restores, then you will not be able to do another restore that day.

After selecting cache, the Cache Backup program locates each cache file, caches within a file, and objects within a cache. One data file is kept for each cache that is restored. Each restore consists of a restore directory and the cache data files.

Restoring Your System

This chapter provides information for restoring your system using the Windows Server Backup and Cache backup programs.

Using Windows Server Backup to Restore

This section describes using the Windows Server Backup program to restore your FileNet system. This procedure may be performed only after you have shut down the FileNet software and RDBMS software.

Note You cannot run the Windows Server Backup program from the command line to perform a restore.

Checklist

Address the following items **before** beginning restore operations:

- Obtain all full backup tapes (and incremental backup tapes if applicable) from the system administrator.
- Set the write protect tab on all tapes.
- Verify the readability of all tapes to be used in the restore process.
- Select your restore method.
- Have the appropriate manuals available.

Restore Procedures

The procedures assume you have **FileNet-controlled** databases. Where a procedure differs due to a **site-controlled** RDBMS database, that procedure will be called to your attention.

- 1 Log on to Windows Server as a member of the Administrators group and as a member of the fnadmin and fnusr groups.

To restore RDBMS software, such as Oracle control files, you need read and write permissions on RDBMS files. You must be a member of the dba group.

- 2 Shut down the FileNet software using the steps appropriate for your server configuration.

All FileNet processes are killed and the MKF databases are shut down. The RDBMS database is also shut down.

CAUTION

For FileNet-controlled databases, always use the Task Manager to shut down both FileNet software and the RDBMS database. Also **do not** use the **Microsoft SQL Service Manager** to stop the RDBMS. If you do, an error displays because the Microsoft SQL Service is dependent on the IS ControlService.

Servers must be shut down in a certain order based on server type. Choose one of the procedures in the following table.

Combined Server	Dual or Multi-Server
<ol style="list-style-type: none"> 1 Click on the Task Manager icon in the FileNet Image Services Applications folder. 2 Select the Task Manager Stop button. 3 Click yes to confirm. 	<ol style="list-style-type: none"> 1 On each non-root server in this order: application server, then storage library server. <ol style="list-style-type: none"> a) Click on the Task Manager icon in the FileNet Image Services Applications folder. b) Select the Stop button. c) Click yes to confirm. 2 On the root/index server: <ol style="list-style-type: none"> a) Click on the Task Manager icon in the FileNet Image Services Applications folder. b) Select the Stop button. c) Click yes to confirm.

Note If you have a site-controlled RDBMS database, you must shut down the RDBMS software **after** you have shut down the FileNet software.

- 3 Select the **Backup** icon in the System Tools folder (Programs>Accessories>System Tools) to execute Windows Server Backup for a restore.
 - a Insert a tape and double click the displayed **Tape** icon to access the catalog of each backup set on the tape.

Select volumes, directories, and files to restore, or select all in the catalog. (You may also click on the check boxes to enable drives, files, and directories.)
 - b Select the **Restore** command from the **Operations** menu.
 - c If appropriate, specify an alternate path and drive to which you want to restore.
 - d Check the **Verify After Restore** check box.
 - e Check the **Restore File Permissions** check box if you want to retain the previous file permissions.

Otherwise, the files will take on permissions associated with their location.
 - f Check the **Restore Local Registry** check box to restore the Registry database.

This box is grayed if you are not on the drive where the Backup Registry is located.
 - g Specify the log file name and level of log detail.

The default is C:\WINNT\BACKUP.LOG. You may wish to rename (or delete) the log file **before** the restore, so the new log file will not be appended to a lengthy older file.
 - h Start the restore process by clicking the OK button.

- 4 When the restore completes, exit Windows Server Backup.
- 5 Unload the tape, verify that it is write-protected, and store it in a safe place.

CAUTION

If the tape drive does not eject the cartridge after a reasonable period of time (15 to 30 seconds after all tape movement has stopped), contact your tape support representative. Do not try to forcibly remove a cartridge. Refer to your tape drive operator's guide for instructions to load and unload the tapes.

- 6 Apply redo or transaction logs if needed.

Oracle

If you restored an Oracle index database, your database is restored to the point at which the backup began. If you wish to roll forward and apply current Oracle redo logs (or archived redo logs), you can restore the Oracle database to its latest state.

If you know Oracle well, you can execute Oracle sqlplus. Use the appropriate command to recover the database to a redo log file boundary or to a specific time within a redo log by applying archived and/or current redo logs.

Microsoft SQL Server

If you restored a Microsoft SQL Server index database, the database is restored to the point at which you created the backup. You can then apply or load any of the archived transaction logs to recover the database to a specific point in time.

For more information, see the SQL Server Books Online.

- 7 After applying the appropriate redo or transaction logs, perform a full backup.

Note Restoring an MKF or Oracle dataset causes a discontinuity in its history. The next backup following the restore must be a **full** backup. If you continue working on the system without backing up, you risk losing all work done after the last restore.

- 8 If you have restored the permanent database, run the SNT_update program to ensure that your scalar numbers are current. See [“Appendix B – Scalar Numbers Table” on page 58](#) for more information.
- 9 Do this step if you have changed your FileNet configuration database (CDB) file since the last backup, especially if the change was significant. Your system state and the current CDB file should be consistent.

You should copy the restored CDB file into the next highest numbered CDB file because the restored system state will not match the current CDB file used by the Configuration Editor. The CDB file number is advanced to the next highest number each time you update your FileNet system configuration. (Older files are not automatically deleted.) When you restart your system after a full restore, the Configuration Editor uses the highest numbered CDB file in the directory.

For example, at the time you performed the last full backup, the CDB file number was 10 (IMS_10.cdb). Later you updated the configuration to add extents and datasets and the current CDB file is 11 (IMS_11.cdb). After a full restore, the CDB file that correctly corresponds to the backup date is IMS_10.cdb, **not** IMS_11.cdb. Copy IMS_10.cdb into the next highest numbered file, IMS_12.cdb.

The CDB file is found in:

```
<drive>:\fnsw_loc\sd\conf_db\IMS_nnn.cdb
```

After copying the restored CDB file to the next highest numbered file, use the Configuration Editor and re-enter changes made to the configuration since the last backup. Significant changes include adding new datasets or partitions. Other changes include adding system devices such as optical devices, printers, tape drives and changing tuning parameters such as memory buffers and disk space allocations. For example, the last backup was done when IMS_10.cdb was created. A dataset was added in IMS_11.cdb. When the user copies IMS_10.cdb to IMS_12.cdb, the new dataset configuration change is lost and must be re-entered.

- 10** Start the FileNet software using the steps appropriate for your server configuration.

Note Start the RDBMS database first, if you have a site-controlled RDBMS database, **before** starting FileNet software.

Servers must be started in a certain order by server type. Choose one of the procedures in the following table.

Combined Server	Dual or Multi-Server
<ol style="list-style-type: none"> 1 Click on the Task Manager icon in the FileNet Image Services Applications folder. 2 Select the Task Manager Start button. 	<p>On the root server or on each non-root server in this order: storage library server, then application server:</p> <ol style="list-style-type: none"> 1 Click on the Task Manager icon in the FileNet Image Services Applications folder. 2 Select the Start button. 3 Click yes to confirm.

In general, application servers are stopped first and restarted last. However, depending on the IS services running on your application server, you may need to change the sequence slightly. For example, if you run index services on an application server, restart that application server immediately after restarting the root/index server.

Using Cache Backup to Restore

This section describes how to use the Cache Backup program (Cache Export/Import) to restore cache objects.

Note If you choose, you can use the CSM_exim program to restore a backup tape made with Cache Export/Import. The backup tape formats of both CSM_exim and Cache Export/Import are interchangeable. Refer to the “Commands” chapter in the *[System Administrator’s Handbook](#)* for more information on CSM_exim.

CAUTION To restore cache objects successfully, the transient database must be **synchronized** (that is, updated to the same point in time) with cache. You must restore the transient database immediately before or after cache is restored.

Follow these steps to restore your cache objects:

- 1 Log on to Windows Server as the Administrator and as a user belonging to the fadmin and fnusr groups.

Note A Cache Backup restore must be performed with the Image Services software in **Restore Mode**. The Cache Backup program requires that MKF transient and security databases are started up. Restore Mode shuts down the FileNet software and initiates a minimal and secure environment in which to restore a Cache Backup.

- 2 Click on the **Task Manager** icon in the FileNet Image Services, Server Applications, folder and select the **Restore Mode**.

Perform this step on each non-root server first and on the root server last (because Image Services software should be shut down last on the root server).

- 3** Upon selecting the Restore Mode, you will be prompted to verify whether you want to enter Restore Mode.

You are in Restore Mode when you see the following two messages displayed:

- In a Task Manager progress window:
Startup of FileNet software for restore mode has been initiated.
- In a Task Manager Current Status window:
Software State: Software in restore mode since day month time year (for example, Mon Apr 1 11:24:40 1997).

- 4** Select **Application Executive** from the FileNet Image Services Applications folder.
 - a Enter the Image Services User Name and Password with System Administrator capabilities.
 - b Click **OK**.

Tip If you wish to leave the Task Manager running, use Alt+Esc or Control+Esc to switch between active tasks.

- 5** Select **Cache Export/Import** from the FileNet Application Executive, Applications menu.
- 6** Insert the backup tape in the drive.

- 7 From the Restore pull-down menu, select **Restore Objects**.
- 8 In the **Restore Objects Source Specification** window, specify the restore source by selecting the Tape or File button.
 - If you select **Tape**, choose the specific tape device from the drop-down list box.
 - If you select **File**, the default directory path name is displayed.

To find your backup source directory name, click the **Find** button for a list of directory names. Select the appropriate directory.
- 9 Verify your parameter selections on the Restore Objects Source Specification screen. Then you can:
 - Read the selected directory by clicking the **Read Directory** button.
 - or
 - Click the **Close** button to cancel the operation and return to the **Cache Backup** window.
- 10 If you selected the Read Directory button, the **Restore Status** window containing the **Backup Table of Contents** allows you to choose one of the following restore operations:
 - Replace Existing Objects
 - Restore all caches
 - Restore selected caches

Before selecting “Restore selected caches,” you must select the cache you wish to restore from the Backup Table of Contents box, for example, page_cache or fillin_cache.

“Restore all caches” and “Restore selected caches” are mutually exclusive.

- a To begin the restore, click **Begin**.
- b To exit the **Restore Status** window and return to the **Cache Backup** window, click **Close**.

- 11** Cache Backup displays statistics of caches and objects being restored in the Completion Statistics section of the Restore Status screen.

You may terminate the restore in progress by selecting Abort.

The **Summary list box** indicates the current time and objects being restored. If you used tape, the final item in the Summary advises “Rewinding and ejecting tape....”

After the last cache is restored, the tape automatically rewinds and ejects.

The restore is complete when the **Begin** and **Abort** buttons change to inactive and the **Close** button changes to active. The Summary list box will display the following message:

Cache Restore completed successfully on day month time year.

- 12** After the restore is complete and you have viewed the completion results, click **Close**.
- 13** A Cache Backup dialog displays the location of the log. After viewing and recording that information, click **OK**.

- 14 Eject your tape if you used tape and the tape did not automatically eject. QIC (1/4-inch cartridge) tape drives usually do not automatically eject tape.

If tape drive problems occur, Cache Backup presents a dialog defining the problem and asks you to resolve the problem or abort the restore.

CAUTION

If the tape drive does not eject the cartridge after a reasonable period of time (15 to 30 seconds after all tape movement has stopped), contact your tape support representative. Do not try to forcibly remove a cartridge. Refer to your tape drive operator's guide for instructions to load and unload the tapes.

- 15 Exit Cache Backup by selecting Exit from the **File** pull-down menu.
- 16 Return to the **Task Manager**.
- 17 Restart the FileNet software using the steps appropriate for your server configuration. Restart will terminate and start the Image Services software in a single step.

Note

Start the RDBMS database first, if you have a site-controlled RDBMS database, **before** starting FileNet software.

Servers must be restarted in a certain order by server type. Choose one of the methods in the following table.

Combined Server	Dual or Multi-Server
<ol style="list-style-type: none"> 1 Click on the Task Manager icon in the FileNet Image Services Applications folder. 2 Select the Restart button. 3 Click yes to confirm. 	<ol style="list-style-type: none"> 1 On the root server: <ol style="list-style-type: none"> a) Click on the Task Manager icon in the FileNet Image Services Applications folder. b) Select the Restart button. c) Click yes to confirm. 2 On each non-root server in this order: the storage library server and application server: <ol style="list-style-type: none"> a) Click on the Task Manager icon in the FileNet Image Services Applications folder. b) Select the Restart button. c) Click yes to confirm.

In general, application servers are stopped first and restarted last. However, depending on the IS services running on your application server, you may need to change the sequence slightly. For example, if you run index services on an application server, restart that application server immediately after restarting the root/index server.

Additional Information—Oracle and MKF

This section presents additional information on applying Oracle redo logs, Oracle recovery techniques, and using MKF recovery logs.

Applying Oracle Redo Logs

Use this process when the Oracle database is damaged. This procedure assumes that redo logs, archived redo logs and control files (on the hard disk) are intact and control files have not been restored using Windows Server Backup.

At this point, verify that you have copied your archived Oracle redo logs to the directory you specified when you installed (or later configured) and that FileNet software has been shutdown.

- 1 Log on as a user belonging to the dba group.
- 2 If FileNet software is running, click on the Task Manager icon in the FileNet Image Services Applications program group and select Stop.

Note If you have a site-controlled RDBMS database you must shut down the FileNet software first, before you shut down the RDBMS software.

- 3 Start Oracle sqlplus by entering the following command at a Command Prompt:

sqlplus "/as sysdba"

The prompt changes to **SQL>**.

- 4 Start the database mounted in EXCLUSIVE mode, but not opened, with the following command:

```
startup pfile=<drive>:\fnsw_loc\oracle\init.ora mount
```

where <drive> represents the drive, for example c:, where the directory is located.

Oracle sqlplus returns messages similar to the following:

```
Oracle instance started  
Database mounted.
```

- 5 To begin the recovery of the Oracle database, enter:

```
alter database datafile '\fnsw\dev\1\oracle_db0' online;  
recover database;
```

The following appears:

```
ORA-00279: Change 5235 generated at 03/03/94 10:17:17  
needed for thread 1  
ORA-00289: Suggestion: \fnsw_loc\redologs\arch1_15.dbf  
ORA-00280: Change 5235 for thread 1 is in sequence #15  
Specify log: [<RET>=suggested filename|AUTO|FROM-  
logsource|CANCEL]
```

- 6 If the redo log file is correct, accept the name displayed by pressing:

```
Enter
```

```
Example: \fnsw_loc\redologs\arch1_15.dbf
```

The following message appears when the log has been applied successfully:

```
Applying suggested logfile..  
Log applied
```

This step repeats until all appropriate redo logs are applied.

When the last redo log has been successfully applied, the following message appears:

```
Applying suggested logfile..  
Log applied  
Media recovery complete
```

7 Shut Oracle down and exit Oracle sqlplus as follows:

a From the Oracle sqlplus prompt, enter:

```
shutdown normal
```

The following message confirms the shutdown:

```
Database closed  
Database dismounted.  
Oracle instance shutdown.
```

b Exit Oracle sqlplus with one of the following commands at the SQL> prompt:

```
SQL> exit
```

or

SQL> quit

- 8 Restart FileNet software by clicking on the Restart button in **Task Manager** (in the FileNet Image Services Applications folder).

Note If you have a site-controlled RDBMS database, start the RDBMS database before starting FileNet software.

Oracle Recovery Techniques—An Overview

The *Oracle9i(TM) Server Administrator's Guide* and the *Oracle9i(TM) Server Backup and Recovery Guide* document detail Oracle recovery operations. Use the information in the Oracle documents as a starting point to determine the method of recovery from lost or damaged Oracle files. The following is a brief overview of the information in the Oracle documents.

ARCHIVELOG mode allows two methods of recovery, if archive log mode is enabled: Complete media recovery Incomplete media recovery.

Complete Media Recovery

Complete media recovery techniques include:

- Closed database recovery
- Open database, offline tablespace recovery

Closed database recovery is recommended to complete the restore process.

Incomplete Media Recovery

Incomplete media recovery techniques include:

Cancel-BasedRecovery is canceled when Oracle has applied redo log files up to the file which precedes the damaged file.

Change-BasedRecovery automatically terminates when Oracle has applied a pre-specified number of redo log files.

Time-BasedRecovery automatically terminates at a pre-specified time.

Using MKF Recovery Logs

MKF recovery logs record all changes made to a database. These logs consist of several files. We recommend that MKF recovery logs be located on a magnetic disk other than the one on which the data files are located. The system writes each log in a circular manner. When one log file is full, database changes are recorded in the next sequential log.

MKF log files are **not archived** when filled. When the last available log file is full, database changes are written to the first log file—overwriting the first log. Use care to back up your databases before the log files are overwritten.

The system automatically applies recovery logs when restoring an MKF database. All committed changes are rolled forward and automatically applied to the database.

As a precaution, we recommend that you back up your current recovery logs before doing a restore. Should your first restore fail and you need the recovery logs for a second restore attempt, **do not** immediately restore the standard datasets. First restore your backed-up

recovery logs. Then restart the entire restore procedure from the beginning. You can then apply the current recovery logs as usual.

Appendix A – FileNet Image Services Structures

The Image Services system configuration tools will, by default, group all Image Services datasets on one volume. To maximize recovery, place your recovery logs on a different volume from the one that contains your databases.

Place your index database on a different physical disk than the disk containing your MKF databases and caches to improve performance.

Oracle_DBn

Oracle_DB is an Oracle database that contains information to reference a document (user indexing information) and maintain it (retention information).

Oracle database files have tables that contain information on:

- Indexing fields
- Document classes
- Document indexing and status
- Folders

If you have an application server that contains SQL or WorkFlo Queue Services, the SQL user data and WorkFlo queues reside in another Oracle database on the application server.

The database itself is created when the user runs the following script as part of Image Services installation:

fn_util initrdb

Only one Oracle database can reside on a server. The user configures the Oracle database with the Configuration Editor utility. The init.ora file contains the startup parameters for the database. The init.ora file is automatically created by the system when the fn_build program is run at the time when you start the Image Services.

MS_DBn.mdf, MS_udbn.mdf, MS_tmpn.mdf

These are Microsoft SQL Server databases that are FileNet-created or FileNet-modified. They contain information to reference a document (user indexing information) and maintain it (retention information).

MS_DBn.mdf contains information on indexing fields, document classes, document indexing and status, and folders. MS_udbn.mdf contains tables of user-specific data for full-use customers only. MS_tmpn.mdf is a modified temporary database, that is located on the master device and contains working storage and temporary tables.

If you have an application server that contains SQL or WorkFlo Queue Services, the SQL user data and WorkFlo queues reside in another SQL Server database on the application server.

Perm_DB*n*

Perm_DB*n*, the permanent database, is an MKF database. Located on the Storage Library server, it contains storage media and family information for documents.

Sec_DB1

Sec_DB1, the security database, is an MKF database with the recovery log Sec_rl*n*. This database contains security information.

Trans_DB*n*

Trans_DB*n*, the transient database, is an MKF database containing a directory of the cache and a record of work in progress that must be resumed in the event of a system restart. This includes commit requests, catalog requests, storage media write requests, and print queue requests. The transient database is usually small (1MB or less). If a batch server is configured for the system, a transient database is also on that server.

Cache*n*

Cache is a set of magnetic disk files containing batches of documents waiting to be written to storage media. Cache also stores images retrieved from storage media (for both display and printing). The name *Cache* is followed by an identifier (*n*) that corresponds to the station number. Individual files are labeled with a lowercase letter that is assigned in sequential, ascending order. For example, the name of the first cache file on station 1 is Cache1a. The second cache on station 1 is called cache1b, and so on.

If you are using Windows Server Backup to restore cache, you must restore all of your cache files. If more than one cache file is on the system and you need to restore cache, **all** cache files must be restored. Also, if one large cache file is on the system with only a few documents in it, the Windows Server Backup program still restores the entire file.

Note You can avoid having to restore all cache files by using the FileNet Cache Backup program to selectively restore cache objects not written to storage media.

The system administrator should plan to have everything in cache committed to avoid cache file restores.

FolderView uses cache for a more permanent storage of objects. To facilitate restoring some objects (such as FolderView objects) without restoring the entire cache, use the CSM_exim utility or the Cache Backup program to restore a specified logical area of cache.

Local (\fnsw_loc)

This is a FileNet file system containing site-specific information. It includes:

- **\fnsw_loc\sd** - Site-specific configuration files, including the security file
- **\fnsw_loc\wfl** - WorkFlo procedures and queue definitions
- **\fnsw_loc\sd\nch_db0** - Network Clearinghouse database

Restore the \fnsw_loc directory tree with the Windows Server Backup program.

FileNet Released Software (\fnsw)

This is a set of FileNet file systems including:

- \fnsw\devMKF databases and caches.
- \fnsw\binPrograms (binaries)
- \fnsw\clientWAL binaries

Back up \fnsw after installing a new release on the system or after configuration changes, such as adding more servers.

Each file in \fnsw\dev must be backed up.

As a precaution, the system administrator should retain a current backup of the old release file before upgrading to a new release. A return to the old version is then possible if problems arise.

Restore the \fnsw file system using the Windows Server Backup program.

Tmp (\fnsw_loc\tmp)

Tmp is a directory containing temporary files and data. These can include uncommitted images, performance monitoring files, and system event logs. The event logs can be found in:

\fnsw_loc\tmp\logs\1\el<yymmdd>

The \fnsw_loc\tmp directory is backed up when the \fnsw_loc file system is backed up using the Windows Server Backup program.

Recovery Logs

A recovery log contains a record of changes made to an MKF database since the last backup. If you experience a system failure that requires a restore, the restore procedure uses recovery logs to reconstruct (roll forward) your databases. Rollforward recovery restores the database without losing work since the last backup.

Perm_RLn and Trans_RLn are the recovery log datasets for Perm_DBn and Trans_DBn (both MKF datasets). MKF requires recovery logging for crash recovery; therefore, every system has Perm_RLn and a Trans_RLn dataset. Sec_RLn is the recovery log for the security database.

If you have two available disks, store recovery logs on a magnetic disk other than the one on which the corresponding database resides.

Your MKF log file sizes are determined when your system is configured. When these files fill up with log records, new entries wrap around and write over the old entries. Therefore, if you do not back up frequently enough, the data in these recovery log files will be overwritten. To avoid losing data, configure recovery logs large enough to cover two times the amount of data normally generated between backups and back up regularly and on schedule.

If you do not use recovery logging (to roll forward) on your system, configure Perm_RLn and Trans_RLn as small files.

Appendix B – Scalar Numbers Table

Updating Scalar Numbers Table

You need to update or advance the document ID number in the scalar numbers table if you have restored the permanent database or performed a raw disk restore or a full restore.

Background Information

Whenever a new document is entered into the system, Image Services assigns it a document ID number, in increasing order. The next available document number is stored in and assigned from the scalar numbers table (SNT) in the MKF permanent database. The SNT keeps a record of the next available document ID number, as well as the optical media surface ID number and the background request number (also called background job ID number).

If a disk crash occurs that results in the loss of the permanent database, the SNT is also lost. When the permanent database is restored from the last available backup tape, the restore overwrites the current values in the SNT with old values from the restored system's SNT. In this event, the next available document ID and surface ID in the SNT are a document ID and surface ID that have already been used. Any available transaction logs are then used to roll the database forward to the most current transaction. However, it may not always be possible to roll forward to the exact moment of the crash so the permanent database may become unsynchronized with the index database and documents on optical media.

If this unsynchronized condition occurs, the next available document ID in the SNT will be well below what it should be. The values in the SNT must be greater than the last document ID and surface ID written to optical media. Otherwise, after FileNet software is restarted, the system will assign duplicate document IDs (when you resume scanning of new documents) and duplicate surface IDs on the next new optical media.

You can use the MKF_tool utility to display the current contents of the SNT. Following is an example command to display the entire contents:

```
MKF_tool> select scalar_numbers *
```

After a permanent database restore, you must run the SNT_update program to advance the numbers in the scalar numbers table. The SNT_update program is described in the next section. A checkpoint file is located in \fnsw_loc\sd\snt.chkpt in the file system. The snt.chkpt file contains a backup copy of the critical data from the scalar numbers table.

The snt.chkpt file values include the next available document ID, next optical media surface ID, next background request number, and a number representing the date/time of last update to the snt.chkpt file, as shown in the example below.

```
5018595 3344 98 856828856
```

The snt.chkpt file is updated any time a new surface ID is allocated or background request number is created. The snt.chkpt file is also updated once whenever approximately 1000 new documents have been assigned new document ID numbers. The file may update more frequently than once every 1000 new documents. The file is time-stamped to help you determine how old the checkpoint file is compared to the last restore of the SNT.

Running SNT_update

The SNT_update program updates the contents of the SNT using values from the snt.chkpt file. If the snt.chkpt file survives a magnetic disk crash, but the permanent database does not, you can use the snt.chkpt file to restore the SNT to its current state.

After running the SNT_update utility, the system will not assign duplicate document ID and surface ID numbers. After the SNT numbers are advanced, proceed with document entry of any lost data. After these documents have been rescanned, reindexed, and recommitted, datasets on magnetic disk and optical media will be synchronized.

A raw disk restore or full restore overwrites the current values in snt.chkpt with old values because all of the /fnsw directory was restored. Save a copy of the current checkpoint file before performing a restore. Preserving a copy is also advisable if your third-party software product is not able to exclude the snt.chkpt file during a backup of the /fnsw file system. Do not run SNT_update if the \fnsw_loc partition has been lost or damaged.

Procedures for updating the scalar numbers table with a valid checkpoint file are found in the appropriate restore strategy.

Each time Content Services is started during a start or restart of FileNet software, the initialization routine automatically compares the values in the snt.chkpt file to the values in the SNT of the permanent database.

If any of the snt.chkpt file values is higher than those in the SNT, Content Services terminates and logs the following message to the system log or event log:

```
Severe Error condition: The Scalar Numbers Table is behind the snt.chkpt
file. This should only happen after a Permanent DB restore has been done.
Continuing with this condition may cause multiple documents to be
committed with the same doc ID. To resolve this problem, you must update
the Scalar Numbers Table with the SNT_update program. Doc Services will
not function until this problem is resolved.
```

After you run the SNT_update program, you see the following example display as shown below. The values for surface, job, and document IDs are for illustration only. The values in your display will be different:

```
corona>SNT_update
"The time stamp on your checkpoint is Wed Feb 26 13:45:52 1997
"The SCALAR_NUMBERS table values in the Permanent Database are:
      Next Surface  ID (MKF) = 3344
      Next Job      ID (MKF) = 98
      Next Document ID (MKF) = 520500
The check point file values are:
      Next Surface  ID (checkpoint) = 3344
      Next Job      ID (checkpoint) = 98
      Next Document ID (checkpoint) = 530500

      ===> New Next Document ID will be = 531500

Do you wish to update the Permanent Database Scalar numbers with the
checkpoint values? (y/n):
```

A time stamp displays the date and time of the last update to the `snt.chkpt` file. The time stamp can help you determine how old the `snt.chkpt` file is compared to the values in the restored SNT.

The next document ID number displayed in the above example will be the checkpoint value of 530500 plus 1000 (or 531500). If the checkpoint document ID value is lower than the MKF value by 1000, then `SNT_update` retains the MKF document ID value. In this example, the surface ID and job ID numbers did not require updating. If the surface ID and job ID checkpoint values were higher, they would replace the MKF values.

In the example illustrated, after you enter **y** to update the SNT (MKF) values with the `snt.chkpt` (checkpoint) values, the following confirmation is displayed:

```
Scalar numbers table updated
```

After the update has occurred, you may restart the Image Services software to restart Content Services.

If you enter **n**, `SNT_update` terminates.

If you enter **y** under other circumstances, any one of the following messages may be displayed indicating successful completion or errors that prevent the successful update of the scalar numbers table:

- “Scalar numbers table updated”
- “Update was not necessary
Scalar numbers table already up to date”
- “Scalar numbers table update failed, err=<err_code>”

where <err_code> is a value indicating the type of error encountered. `SNT_update` terminates after displaying this message.

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