

Deployment Guide: Implementing FileNet Image Services on AIX Platform with Network Appliance™ Storage Systems

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TR-3571

Abstract

This paper discusses high-level information on deploying IBM's FileNet Image Server product by integrating Network Appliance storage system solutions in UNIX® environments. This paper specifically discusses Oracle® Database server. The objective of this paper is to provide an overview of the prerequisites and general steps required to deploy FileNet Image Services in NetApp storage system environments. This paper discusses the preinstallation and postinstallation task requirements.

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1. Introduction

The need for delivering rapid access to a large number of fixed content objects mandates the company to look for an appropriate software and hardware solution. The solution must address the scalability and performance issues dynamically due to the nature of data growth of enterprise content. Documents, images, rich content, and incoming voice and fax images form the fixed objects. In addition to these stringent requirements, the solution must offer data security. Recent regulations require the data be stored in an immutable way. The solution must also be capable of permanently storing the information for a certain period. Product integration with Network Appliance storage solutions offers significant advantages to FileNet environments. This paper explains the steps involved in deploying FileNet Image Manager Services with NetApp storage systems.

2. Purpose and Scope

This paper describes the steps necessary to integrate FileNet Image Services software with Network Appliance storage systems by taking advantage of unified storage architecture. This report makes an effort to highlight the importance of either using a network attached storage or storage attached network appropriately to manage the Image Services data. The information provided here is intended as a starting point, and customers should consult the appropriate Professional Services teams. Specifically this paper discusses the following topics:

- Overview of FileNet Image Services
- Overview of Operating Systems
- Supported Relational Database Servers
- Overview of NetApp Storage System
- Predeployment Considerations
- Preinstallation Tasks
- Backup and Recovery Options
- High-Availability options
- General Deployment Guidelines
- MSAR
- SSAR

3. Assumptions

The reader is assumed familiar with the operations of Network Appliance storage systems and the concepts of a storage-attached network (SAN) and network attached storage (NAS). Knowledge or access to system administration expertise is required to complete the deployment.

Test environment used in this document had the following infrastructure for completing the installation of Image Services software:

- The name of the NetApp storage system `fas3050c-svl34`
- NetApp system command prompt is shown as `fas3050c-svl34>`
- AIX host name `ibmp630-svl02`
- Operating system users referenced in this document `'fnswh' 'orcl', 'root', 'fnet'`
- Oracle Database user name `orcl`
- FileNet Image Services `IS 4.0 SP4`
- NLS `1.7.0`

Command output displayed in this document is shown in italics with a smaller font.

4. Overview

To be successful with content management solutions, enterprise level customers must be capable of delivering rapid access to fixed content objects, which may run into several millions. Managing an ever-increasing size of content can be a daunting task in enterprise environments. FileNet Image Services offers an effective document management solution to meet the enterprise challenges. FileNet Image Manager offers a vast majority of solutions in an enterprise content management environment. Some of the high-level benefits include:

- Is highly scalable while providing high-performance access to very large number of objects to thousands of users.
- Provides Lifecycle Asset management by capturing all documentation related to an asset including physical description and process information.
- It integrates seamlessly with other enterprise applications and systems. In an enterprise environment, this feature is very useful.
- Ability to store large number of fixed content securely.
- Supports SnapLock® Storage and Retrieval (SSAR) library to store the documents for a specified period.
- Offers robust and highly available configuration options.
- It provides comprehensive image management that helps organizations control, share, and quickly access critical business information.
- Policy based content retention ensuring the data permanence, data integrity and security to meet compliance requirements.
- Enables enterprise customers to streamline and automate their critical processes and connect with their information systems.
- Provides efficient access to data while managing all forms of content throughout a customer environment.

FileNet Image Manager is able to offer enterprise content management solutions by taking advantage of its architecture. FileNet architecture supports different server configurations such as combined server, dual or multiple storage library configurations. Following sections briefly discuss some of these possible configurations.

4.1 Combined Server Configuration

In this type configuration, only one FileNet Image Services server exists, and it hosts all IS services. Combined server configuration is ideal for a developmental environment. In a combined server configuration the index, storage library services, and all additional services reside on the same combined server system.

4.2 Dual or Multiple Storage Library Configuration

Multiple Storage Library Server configuration involves at least two FileNet Image Services servers. In this type of configuration, the first server hosts the root/index services, and the other server hosts the storage library service. Note that the relational database software is installed on the Root/Index server. This means there can be more than one storage library server in a multiple storage library configuration. The major difference between a combined server and this type of configuration is that the storage library server is hosted on a different server(s) from the root server.

4.3 Application Server Configuration

This type of configuration, more than one Image Services server is configured. An application server is a dedicated server to host specific services and must be attached to a combined or dual server.

4.4 Entry Server Configuration

Remote Entry server is configured as a combined server without any storage library devices attached. In this type of configuration, documents are scanned at the remote entry server and sent over network to a system with storage capabilities.

4.5 Directory Structure on UNIX Platform

FileNet Image Services software resides in unique directories on both UNIX and Windows® platforms. Actual directory varies depending on platform differences or any installation settings. On a UNIX platform, it is typical to use the following directories while installing FileNet Image Services software:

- /bin
- /fnswh
- /opt
- /sbin
- /tmp
- /usr
- /var

Note that /fnswh directory structure is further spread into subdirectories to install the image services.

4.6 Operating System Overview

FileNet Image manager supports various operating system (OS) platforms. IBM AIX, Sun™ Solaris™, HP-UX, and Red Hat Linux® are supported UNIX and Linux platforms. It also supports Microsoft® Windows platform. In order to install the IS services, each system must have the supported OS version and the required patches applied prior to installing the FileNet Image Services. For supported platform and the required patches information, visit [FileNet customer support web site](#).

4.7 Relational Database Server

FileNet Image Manager requires the relational database installations. On UNIX platforms, supported relational database servers include Oracle and IBM DB2. On Windows platform, Microsoft SQL server and Oracle Database instances support the FileNet Image Services configuration.

4.8 NetApp Storage Systems

The majority of tasks performed by FileNet Image Services rely on intensive read or write requests to the contents stored. Data access is critical to the core functionality of content management. This includes the reading or writing throughput in archival and retrieval scenarios. Ability to search the content plays a critical role in an enterprise content management environment.

While considering the performance, affordability, reliability, scalability, and the ease of storage management, NetApp storage systems deliver the characteristics best suited for enterprise content management environments.

NetApp storage system solutions enable centralized storage of a large volume of contents. NetApp storage systems offer highly available and data consistent environments. FileNet and NetApp solution addresses the full scope of real-world content and data management needs for compliance and corporate governance. NetApp provides unified storage architecture for all types of structured metadata and unstructured content using any storage architecture and any tier of disk, Fibre Channel, or SATA. Unifying content management and data management solutions including compliance storage within a single architecture offers simplified management while providing the operational cost advantage.

Data permanence is provided by NetApp SnapLock write-once, read-many (WORM) functionality. This function allows archived content to be stored in an unalterable state. Corporate regulations may require the content to be preserved in its original state for a specified period. This period is known as retention period.

FileNet Image Services writes the objects to a specified SnapLock volume and sets the WORM feature. SnapLock will allow the data retained in its original state until the end of the retention period. Once the retention period for a specific document expires, NetApp storage systems allow document removal or purge action.

Storage scalability can be achieved with NetApp storage systems by increasing or decreasing the storage availability dynamically. Data ONTAP® software running on NetApp storage systems supports the ability to scale the storage dynamically. Data ONTAP effectively aggregates storage system resources such as disk spindles and capacity through the use FlexVol® feature. FlexVol allows users to dynamically resize volumes that may span multiple disks. This architecture allows taking advantage of multiple disk spindles even for a smaller volume. In a FileNet Image Services environment, storage may be scaled dynamically as data grows. Even in a storage attached network (SAN) environment, size of the LUNs scales dynamically without affecting the running application. The process of storage provisioning for FileNet environments is possible with the FlexVol feature.

NetApp storage system architecture involves the capability to provide high levels of data availability. NetApp storage systems consist of a number of redundant hardware features. This is very important because the underlying storage systems provide additional level data availability. This offers less interruptions or no downtime for FileNet data. NetApp storage systems also offer double disk failure protection by implementing RAID-DP™ configuration.

On our test setup environment, we used an IBM AIX 5.2 operating system to prepare for installing FileNet Image Services. On our test setup, we installed Internet protocol Small Computer System Interface (iSCSI) software initiator based application. To complete the installation of iSCSI software on AIX system, download the iSCSI initiator software and uncompress as shown below.

After installing, verify and configure the SCSI target ports as shown below for the NetApp storage system(s). To convert fc-initiator port to target port, execute the `fcadmin` command on the NetApp storage system console. Following is an example to change an initiator port to a target port. Changing to target port requires a system reboot. After the reboot, verify the settings and start the iSCSI (or FCP) service.

```
NetAppsystem>fcadmin config -t target 0c
```

To install SnapDrive® toolkit for storage management, download the necessary software from NetApp support [web site](#) and uncompress the file as shown below.

```
#zcat netapp_aix_SAN_kit_1.1.tar.Z | tar -xv
#cd *1.1
```

On our test environment, we installed SnapDrive tool for iSCSI kit on AIX platform. A sample output is shown below.

```
# ./install
```

Please select one of the following options:

- 1) Install FCP Kit Only.
 - 2) Install iSCSI Kit only.
 - 3) Install both FCP and iSCSI Kits.
- ```
> 2
```

*Installing iSCSI Kit Only.*

*This host is running AIX 5.2 ML6*

*Please check the NetApp iSCSI SAN Support Matrix for OS Compatibility.*

*Please enter the location of the NetApp packages:*

*(if you are installing from CD, you may enter the device name, e.g. /dev/cd0)*

*[default: /mnt/netapp\_aix\_SAN\_kit\_1.1]*

>

*Installing NetApp packages from /mnt/netapp\_aix\_SAN\_kit\_1.1... done.  
Running bosboot to update the boot image... done.  
Installation of the NetApp AIX SAN Kit was successful.  
You MUST reboot the system before accessing your NetApp filer(s).*

*Installation log saved in both /tmp/netapp\_install\_log\_061106141839  
and /opt/NetApp/install\_log  
#*

Reboot the AIX server

Edit a file called /usr/tmp/mountt with the NFS mount command. This will auto-mount the NFS file systems automatically after each reboot.

```
#mount -o bg,rw,hard,intr,rsize=32768,wsize=32768 filer:/vol/vol2 /fnet
```

On IBM server use the `chdev` command to set the initiator name as shown below.

```
'chdev -l iscsi0 -a initiator_name=iqn.1996-04.com.ibm:34'
```

After creating an initiator using `chdev` command, on our test setup we used the following command syntax to list the available iSCSI initiator.

```
lsattr -El iscsi0
disc_filename /etc/iscsi/targets Configuration file False
disc_policy file Discovery Policy True
initiator_name iqn.1996-04.com.ibm:34 iSCSI Initiator Name True
max_targets 16 Maximum Targets Allowed True
num_cmd_elems 200 Maximum number of commands to queue to driver True
```

Use the config manager command '`cfgmgr`' to set up the iSCSI initiator as shown below.

```
#
cfgmgr -l iscsi0
#
```

```
NetAppsystem> Tue Nov 7 15:28:52 PST [iscsi.notice:notice]: ISCSI: New session fr
.1992-08.com.netapp.sn.101178867 at IP addr 172.17.4.95
Tue Nov 7 15:29:00 PST last message repeated 3 times
```

```
NetAppsystem>
```

```
NetAppsystem> Wed Nov 8 14:25:07 PST [iscsi.notice:notice]: ISCSI: New session from initiator iqn
.1992-08.com.ibm:ibmp630-svl02.0a3c8830 at IP addr 172.17.4.95
```

## 5. Predeployment Considerations

This section discusses predeployment considerations such as FileNet Image Server, storage configuration, kernel parameter settings, network configuration, database specific considerations as well as backup and recovery options before installing the FileNet server.

### 5.1 FileNet Image Services Server

A supported UNIX host(s) is required to install the FileNet Image Manager software. In order to set up a SAN configuration, this document assumes that the host server is running IBM AIX 5.2 operating system. The server should have at least one free PCI slot available for installing the Fibre Channel Host Bus Adapter (HBA). The host attach kit (HAK) is provided by NetApp. For details to install the HBA and configure the

block storage, refer to NetApp documents available on the [NetApp customer site](#). Note that this site requires valid authentication. If you do not have access, this paper recommends contacting your local NetApp sales team. Network attached storage configuration works with UNIX and Windows servers. In UNIX environment, note that multikeyed files (MKFs)/cache requires the raw partition. This paper recommends using SAN or IP based SAN configuration to set up the required raw partitions.

## 5.2 Storage Configurations

To connect the server to the SAN, install the software that comes with the HAK. A relational database server such as DB2 or Oracle should be installed and configured before you attempt to start the FileNet Image services software. For installing Oracle Database on UNIX platform, refer to [TR-3129: Oracle9i™ for UNIX: Integrating with a Network Appliance Filer](#). For installing IBM DB2 database on UNIX platform, refer to [TR-3272: DB2 UDB Enterprise Edition V8 for UNIX: Integrating with a NetApp Storage System](#).

Using the UNIX mount options, configure the required file systems by mounting the NetApp storage system volumes. For more information on configuring the AIX platform to address performance in Oracle Database environment, refer to the technical paper [TR-3408: AIX Performance with NFS, iSCSI, and FCP Using an Oracle Database on NetApp Storage](#).

## 5.3 Kernel Parameters

It is important to note that FileNet Image Services is a very resource-intensive application, and the user must tune the operating system parameters to make sure IS services and database server run efficiently. AIX tools such as smit, vmo, ioo, no and chdev allow users to set the kernel tuning parameters. On AIX platform, this paper recommends a change to systemwide limits from the defaults. Change the following limits in /etc/security/limits where -1 represents unlimited.

```
fszize=-1
data=-1
rss = -1
stack=-1
nofiles=2000
```

Change the number of processes allowed per user to a larger number as shown below.

```
chdev -l sys0 -a maxuproc='512'
```

## 5.4 Solaris Platform

On the Solaris platform, edit the /etc/system file to set the kernel tuning parameters such as shared memory, semaphore, and message queues.

## 5.5 Network Configurations:

Network connectivity is required between the database servers/IS server machine and the NetApp storage systems. In a SAN environment, the primary connection for the flow of SCSI block data is over a 2 or 4 Gb per second Fibre Channel link. Out of band communications for management purposes and other NFS-related communications are handled via Ethernet connectivity. Gigabit Ethernet is required to achieve system performance throughput. If NFS is being planned to use FileNet data, a Gigabit Ethernet network connection is required between the IS, database server, storage library server, and the NetApp storage systems.

Configuring the network properly plays an important role in using the FileNet IS services solutions with NetApp storage systems. High-performance access to objects is one of the main business objectives. Setting up a separate Gigabit Ethernet switch using an existing switch's VLAN capabilities will suffice for the purpose. Both Gigabit Ethernet (GigE) and FC connections may eliminate the need to connect to a switch by

a point-to-point connection. It is common to have one or more GigE and FC switches in the FileNet configurations. Using two switches with multipathing can be configured to eliminate any possible single point of failure in the storage network setup.

Since client workstations reside over the intra-network and over network, it may not be feasible to have Gigabit connectivity between the client machines and the IS server. Use the regular network connectivity to establish the link between the client workstations and the IS servers.

## 5.6 Database Specific Considerations

FileNet Image Services supports both Oracle and IBM DB2 databases on UNIX platforms. Both Oracle and DB2 support the NetApp network attached storage configurations. These are tested and certified configurations. Network Appliance external technical library section has several reports explaining the procedure to install the appropriate database software. This includes Oracle and DB2 software on UNIX platforms. Installing on either network mounted file system or SAN configured file system is supported. Install and configure the relational database server prior to installing FileNet Image Services software.

This paper recommends following the best practices while configuring the storage allocation for database data and logs. The recommendations given in the technical reports mentioned in this report should help the reader to understand the best practices while installing the database servers.

## 5.7 UNIX Sizing Considerations:

All FileNet Image Services supported UNIX platforms support both 32-bit and 64-bit mode kernels. 64-bit kernel supports the applications built with 32-bit kernel. However, for performance and other reasons, UNIX vendors recommend using 64-bit kernels even to run 32-bit applications. IBM recommends using 64-bit kernels. Solaris supports both asynchronous I/O and forcedirectio to improve performance. Note that network file systems mounted with the 'forcedirectio' option do not support accessing the UNIX binaries. This means only the FileNet data is stored on such file systems. Support for 'concurrent io' (CIO) with AIX 5.3 is not discussed as this paper is focusing on IBM AIX 5.2 platforms. As discussed earlier a high performance storage connection requires a dedicated Ethernet network between the NetApp storage systems and the database/IS server host.

Enabling jumbo frames on each network link may improve database server performance. On AIX platform, enable the jumbo frames using the following command.

```
Aix52> chdev -l 'ent2' -a jumbo_frames='yes'
```

Updating the MTU size on the network interface card using the following command.

```
Aix52> chdev -l 'en2' -a mtu='9000'
```

In addition to setting the jumbo frames and mtu size on the AIX host, it is important to set the same on the NetApp storage system(s). To set the same on the e4 network path, use the following command.

```
NetAppsystem> ifconfig e4 mtusize 9000 up
```

Note that the jumbo frames support should also be enabled on the appropriate switch(es). Save these changes by entering these changes in the appropriate system files such as /etc/rc file on the NetApp storage system.

For mounting the NetApp storage system volumes as a file system, we used the following mount command options.

```
rw,bg,hard,intr,proto=tcp,vers=3,rsize=32768,wsiz=32768
```

## 5.8 Considerations for Backup and Recovery

This section briefly discusses the FileNet Image Services data backup and recovery solutions. It is important to protect the enterprise content. Creating a backup copy and replicating the data to another location are two possible alternatives to protect the data. FileNet Image Services environment involves the relational databases and includes the requirement to protect the database data. The data set types involved while considering the backup operation are MKF, Cache, Partitions, and, Oracle Database.

There are several methods available to protect the data. Image Services Enterprise Backup/Restore (EBR) is a set of scripts and programs designed to automate the backup process.

Protecting the data at storage system level is highly desirable in a FileNet environment. Using NetApp Snapshot™, SnapRestore®, and SnapMirror® technologies helps to achieve an efficient data backup objective. Integrating NetApp storage systems with FileNet Image Services provides disk mirroring and redundant array of independent disks (RAID) data protection. FileNet product manuals also suggest using disk level mirroring along with RAID protection. NetApp storage systems come with a highly optimized file system architecture.

Another option is to consider replicating the transaction logs to a secondary location using SnapMirror. This strategy will avoid physically shipping the tapes of archived transaction logs.

MSAR systems backup is very important. It is important to keep the databases and storage surface files synchronized. EBR allows online backup, provided the MSAR library is in backup mode, and the surface files must be backed up while the EBR online backup is running.

Using NetApp Snapshot, an instant copy of backup may be created, synchronizing the Oracle Database backup using Snapshot. Before creating the Snapshot of FileNet, consider putting the Oracle Database in hot backup mode and coordinate to create the Snapshot copies. Refer to Oracle Database integration papers available in our technical library section for additional details on Oracle Database backup.

EBR supports Exabyte tape library, and the tape library is not available on all platforms and requires the Oracle Database configured with 2KB block size. This could be a weaker point to consider while planning backup strategy. Backup to tapes slows down the recovery option. As tapes have to be physically shipped from one location to another, a delay in obtaining the backed up data could result.

Another option is to EBR tools with NetApp virtual tape library (VTL) option. Using this method, FileNet data is backed up using EBR tool to back up to NetApp virtual tape libraries. These tape libraries work exactly the same as the tape library, while providing the benefits of magnetic media storage compared to tapes.

Two backup and restore approaches are available in FileNet Image Services environment.

- Simple Backup and Restore Method
- Advanced Backup and Restore Method

NetApp Snapshot, SnapRestore, and SnapMirror technologies support a software solution that has the capabilities to back up and restore data sets. If the FileNet data is spread across different volumes or configurations on NetApp storage systems, plan accordingly to back up or restore everything, including the entire data raw disks. It is not necessary to back up and restore individual data sets.

Of all possible ways to back up the FileNet data, Snapshot and SnapMirror technologies offer compelling advantages. Backup will be quick and data replication is efficient, as the incremental backup requires only the changed blocks to be replicated during subsequent backups or replication process. Care must also be taken to keep the data sets and cache synchronized. Rescanning of documents may become a necessity to synchronize the data sets and the cache/MKF. Note that only offline backup and restore procedure is supported with third party backup tools such as Snapshot and SnapMirror. Using an offline mode backup with Snapshot offers practically instant backup copies.

## 5.9 Issues and Concerns

For a successful implementation of FileNet system, a good backup and recovery architecture is necessary. It pays well to put into implementation planning. Evaluate the advantages and disadvantages of all available backup and recovery options. The biggest concern is to maintain the database data, FileNet data sets provide data consistency while synchronizing their Cache/MKF data. If your production environment allows very small windows for creating the instant backup in offline mode, NetApp Snapshot and SnapMirror features offer an efficient alternative to backup of FileNet data.

## 5.10 Considerations for High Availability

Today, global enterprises need to protect and quickly recover data in the event of natural or man-made disasters, operator errors, or technology and application failures. Enterprises need an efficient strategy to distribute data to remote locations. High availability architecture provides a good data protection and distribution strategy.

In this section, we will discuss various options available for implementing FileNet IS high availability configurations. NetApp SnapMirror for replication provides architectural advantages in FileNet IS environments. They include the ability to replicate the data in synchronous or asynchronous mode. SnapMirror allows the ability to replicate in cascading mode. SnapMirror technology is highly suitable for database environments, making an efficient way to replicate the entire FileNet IS data. An additional benefit of replicating the data using SnapMirror is the requirement to replicate only the changed blocks of data from the previously backup status.

The following figure displays a solution to recover the FileNet IS data using the NetApp storage system configuration.

[

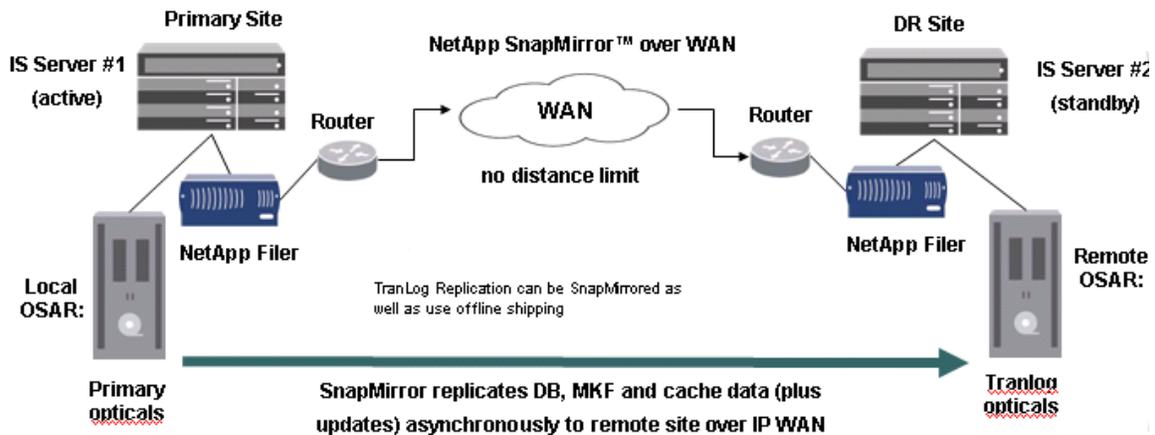
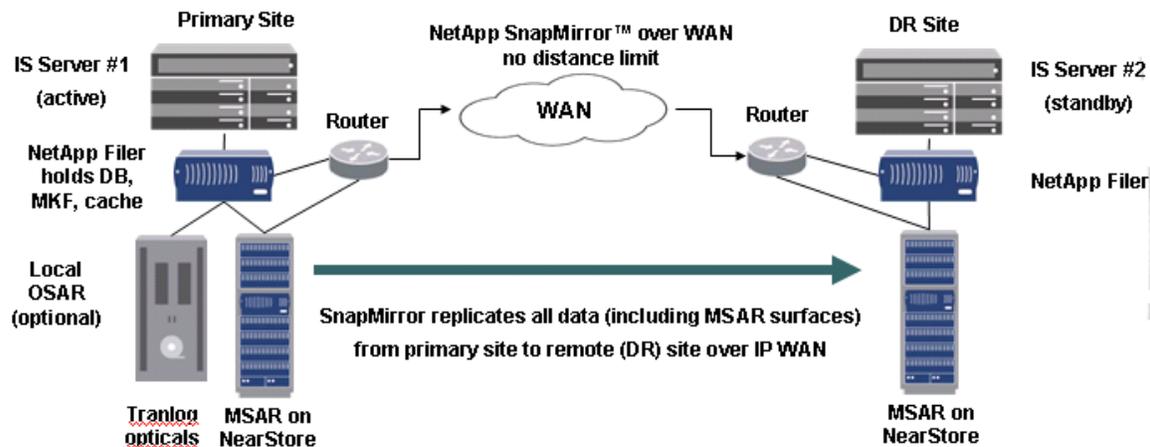


Figure 1) Using SnapMirror to replicate FileNet IS data.



**Figure 2) Using SnapMirror to replicate FileNet data from NetApp storage to NetApp storage configuration.**

FileNet supports multi synchronous system (MSS) solution to achieve disaster recovery solution. Both MSS and MSC work at the application level and batch replication of transactions. Disadvantage may include the expensive and complex setup. SnapMirror technology with FileNet Image Services offers an effective disaster recovery solution.

### 5.11 Magnetic Storage and Retrieval (MSAR) Storage Library

MSAR surface creation using a NetApp storage library is simple. Its path information is stored in the database with each storage library created. When the existing MSAR storage library is full or nearing its configured size, a new surface can be created. All existing MSAR surfaces remain and data from old MSAR surfaces does not automatically migrate to the newly created surface(s). Moving the data to the newly created surface requires intentional surface data movement. In order to support FileNet data, appropriate synchronous write tests were run on NetApp storage systems to ensure the data consistency while writing to NetApp storage systems by the Image Services application. MSAR is a storage library to which the FileNet Image Services writes all documents into a single surface library as a single large file.

### 5.12 SnapLock Storage and Retrieval (SSAR) Storage Library

SSAR surface library supports write-once and read-many (WORM) capabilities using NetApp SnapLock feature on all supported NetApp storage systems. SSAR is designed for fixed content, files, and objects. It can meet compliance regulations such as SEC-17-a4. SSAR is built in FileNet Image Services integration to archive in compliance mode. Both MSAR and SSAR require licenses from FileNet to connect to the storage media in the FileNet Image Services environment.

### 5.13 FileNet Predeployment Considerations

This section briefly describes the information required to install and configure Image Services in an AIX environment. Installation on UNIX platforms is similar to the one explained in this section. For details, refer to FileNet Image Services documentation.

### 5.13.1 User Account Requirements

FileNet requires certain specific user accounts and user groups in addition to the database user needed to manage the RDBMS server. In our test setup, we used Oracle10g server. Table 1 provides a list of user accounts and their group information given below.

Table 1) User account information.

| Group Name | Members           | Remarks                                                                                                                                                  |
|------------|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| fnusr      | fns, root, oracle | These members can operate any FileNet software. Operators and administrators belong to this group.                                                       |
| dba        | fns, oracle       | These members must also belong to 'dba' group.                                                                                                           |
| fnadmin    | fns,oracle        | Members can administer FileNet software. Administrators must belong to this group. This group can change configurations, backup and recovery operations. |
| fnop       | fns               | Members can start and stop all FileNet software. Administrators also belong to this group.                                                               |

### 5.13.2 Veritas™ Volume Manager

If your configuration requires the Veritas Volume Manager to manage the file systems on the storage area network (SAN) setup, refer to FileNet Image Services Installation Procedure guide for details.

### 5.13.3 Operating System Information

This section provides additional information required for a successful installation of FileNet IS software. Note that several peer systems can be configured, and that is where the FileNet organization and domain name information are important. FileNet Image Services supports both Windows and UNIX platforms such as Sun Solaris, AIX, and HP/UX. Table 2 provides the networking information required in FileNet IS installation setup.

Table 2) Networking information.

| Installation Information | System Information | Remarks                                                                                                         |
|--------------------------|--------------------|-----------------------------------------------------------------------------------------------------------------|
| Server IP Address        |                    | Use the Gigabit Ethernet address. Host name resolution is required.                                             |
| Network Address          |                    | Optional additional network paths.                                                                              |
| System Serial Number     |                    | This is a 10-digit number provided by FileNet. This number allows you to uniquely identify the storage library. |
| Domain Name              |                    | An example would be dom.company.com.                                                                            |
| Organization Name        |                    | An example would be 'FileNet'.                                                                                  |

### 5.13.4 Determining Data Set Space Requirements

Determine in advance the space requirement for FileNet IS data sets. This will allow configuring the NetApp storage system volume(s) according to best practices. This paper recommends considering the additional storage requirement while configuring the LUNs and volume creation process. For additional information, refer to the Image Services Installation Procedure Guide that comes with the Image Services software.

After considering the data set sizes, work on the parameter for system cache. This includes the default size, minimum size required, and maximum size available for the configuration. To assist with this decision, refer to FileNet IS product information.

Printer information will help you to configure NCH server name with the printer type and print server IP address. Tune the operating system kernel parameters. Decide the Image server type, such as Root/Index server during a dual server installation. On our test setup, we chose to install a combined server, and we used the soft link file called 'filenet.links' to create a soft link for the required files.

#### 5.14 Oracle Database Installation

FileNet IS installation supports only site-controlled Oracle installation. Preinstallation requirements include the supported Oracle Database release for the particular type of UNIX platform and the configured NetApp storage system(s) setup. This includes the storage space availability and database installation environment variable setup.

For details to integrate Oracle Databases on NetApp storage system(s), refer to technical reports available in the [technical library](#) section.

To create a new file system on SAN setup, use the following UNIX command:

```
#newfs /dev/rdisk/c1t2d0s6 (verify the correct device)
```

Adding an entry in the appropriate system file such as /etc/vfstab enables automatic mounting of the file system at boot time. To verify the file system is mounted, use 'mount' command. Then log in as the Oracle Database user and verify the file and user group permissions are set correctly. Review the installation summary to make sure all the necessary components are installed and configured properly. Refer to FileNet Image Service Installation Procedure guide and complete the postinstallation database tasks.

It is necessary to start the RDBMS software before attempting to install the FileNet IS software. Oracle server enables all the configured changes to become effective after restarting the services using shutdown and restart of RDBMS server.

- Completion of preinstallation checklist
- Installation overview
- Verifying the storage configuration
- Configuring write-once, read-many storage using SnapLock

#### Oracle Software Related Activity

This section discusses the procedure to configure Oracle Database and prepare to start the Oracle Database server instance. Creating a customized Oracle server instance start file such as 'init.ora' is suggested. Note the control\_files, log\_archive\_dest and other important parameter settings. Even though optional, this paper recommends enabling Oracle archive logging. Oracle archive logging is configured using the following procedural information. File path shown in the following procedure is meant for demonstration purposes only.

- Create a directory for the archival logs such as /dbase/orasite/archive)
- Set the ownership and file access permission
- \$chown oracle:dba /dbase/orasite/archive
- \$chmod 777 /dbase/orasite/archive
- Enable the archive log in the 'init.ora' file
- log\_archive\_start = TRUE
- log\_archive\_dest = /dbase/orasite/archive

Before starting the installation of FileNet software, verify that the Oracle server is up and running. To start the Oracle server instance, we used the following example.

```
$ sqlplus /nolog

SQL*Plus: Release 9.2.0.8.0 - Production on Tue Dec 12 14:35:34 2006

Copyright (c) 1982, 2002, Oracle Corporation. All rights reserved.

SQL>
SQL> conn sys/orcl as sysdba
Connected.
SQL>

Create the FileNet required tablespaces as shown below
SQL> create tablespace fnsys_ts datafile '/dbase/data1/oracle_db0' size 400M autoextend on;

Tablespace created.

SQL> create temporary tablespace fntmp_ts tempfile '/dbase/data1/oracle_tr0' size 800M autoext
end on;

Tablespace created.

SQL> create tablespace fnusr_ts datafile '/dbase/data1/oracle_udb0' size 400M autoextend on;

Tablespace created.

SQL>
```

## 6. Installing FileNet Image Services Software

This section helps to complete the successful installation of FileNet Image Services software. As a preinstallation process, check the appropriate users are created and their permissions set accordingly. To complete the use of the IS services, install the software license access control (SLAC) Add users on the FileNet Image Services server such as 'fnsw'.

Some versions of FileNet Image Services require the preinstallation fixes installed before installing the FileNet application. Check the FileNet [customer support web site](#) for preinstallation patches requirement. Ensure that the DISPLAY environment set properly. On our test setup, we tested the GUI display by starting the xclock function.

### 6.1 Install IS Software

This section describes the procedure to complete the installation of IS software. On AIX platform, use the SMIT utility to install the IS software. Use the following command to mount the CD media on AIX server.

```
#mount -V cdrfs -o ro /dev/cd0 /cdrom
```

SMIT utility helps to install the FileNet IS software. Verify that the installation procedure integrated FileNet IS tool with the AIX administration tool, smit.

On our test install, a sample installation output is shown below.

*Verifying groups and users*

*No match.*

*Driver (fnsod) removed*

*MP-Efficient Driver NOT FOUND.*

*cp fnsod\_32 to /etc/drivers/fnsod*

*Installed Non-MP Driver*

*cp ./cfgfnsod\_32 to /etc/methods/./cfgfnsod*

*cp ./chgfnsod\_32 to /etc/methods/./chgfnsod*

*cp ./ucfgfnsod\_32 to /etc/methods/./ucfgfnsod*

```
-rwxr-xr-x 1 root sys 14106 Dec 07 11:41 /etc/methods/cfgfnsod
-rwxr-xr-x 1 root sys 14106 Dec 07 11:41 /etc/methods/cfgfnsod
-rwxr-xr-x 1 root sys 7798 Dec 07 11:41 /etc/methods/chgfnsod
-rwxr-xr-x 1 root sys 7798 Dec 07 11:41 /etc/methods/chgfnsod
-rwxr-xr-x 1 root sys 28050 Dec 07 11:41 /etc/methods/poll.fnsod
-rwxr-xr-x 1 root sys 28050 Dec 07 11:41 /etc/methods/poll.fnsod
-rwxr-xr-x 1 root sys 4662 Dec 07 11:41 /etc/methods/ucfgfnsod
-rwxr-xr-x 1 root sys 4662 Dec 07 11:41 /etc/methods/ucfgfnsod
```

*2 entries added.*

*0 entries deleted.*

*0 entries updated.*

*Scsi Adapters on ibm630-svl02*

*scsi0 Available 1S-08 Wide/Ultra-3 SCSI I/O Controller*

*scsi1 Available 1S-09 Wide/Ultra-3 SCSI I/O Controller*

*scsi2 Available 1V-08 Wide/Ultra-3 SCSI I/O Controller*

*scsi3 Available 1V-09 Wide/Ultra-3 SCSI I/O Controller*

*scsi4 Available 1c-08 Wide/Fast-20 SCSI I/O Controller*

*Configuring FileNet Devices*

*FN Devices Available on `fscsi0', Bus 11, Controller 08: [NONE]*

*FN Devices Available on `fscsi1', Bus 1D, Controller 08: [NONE]*

*FN Devices Available on `iscsi0', Bus 1D, Controller 08: [NONE]*

*FN Devices Available on `scsi0', Bus 1S, Controller 08: [NONE]*

*geninstall -l "a -cgNQQwXY -J" -Z -d /cdrom/AIX\_5.1/IS -f File 2>&1*

Installation process continued on our test setup, and partial output from installation is shown below.

```
+-----+
| Pre-installation Verification... |
+-----+
```

*Verifying selections...done*

*Verifying requisites...done*

*Results...*

**SUCSESSES**

-----

*Filesets listed in this section passed pre-installation verification  
and will be installed.*

.  
. .  
. .

**FILESET STATISTICS**

-----

*50 Selected to be installed, of which:*

```

 50 Passed pre-installation verification

 50 Total to be installed

+-----+
| Installing Software... |
+-----+

installp: APPLYING software for:
.
.

Adding FileNet menus to SMIT database.
Filesets processed: 49 of 50 (Total time: 2 mins 52 secs).

installp: APPLYING software for:
 cold.c2 4.0.0.176
.
.

Finished processing all filesets. (Total time: 2 mins 56 secs).

+-----+
| Summaries: |
+-----+

```

Installation Summary

| Name        | Level     | Part | Event | Result  |
|-------------|-----------|------|-------|---------|
| fns.release | 4.0.0.176 | USR  | APPLY | SUCCESS |
| fns.xv      | 4.0.0.176 | USR  | APPLY | SUCCESS |
| fns.xs      | 4.0.0.176 | USR  | APPLY | SUCCESS |

**6.2 Prestartup Fixes Installation Requirement**

FileNet releases certain fixes to its IS software as and when necessary, enabling the successful starting of the software. It is recommended to install only the prestartup fixes and defer other upgrades to a later stage. The objective at this time to bring up the IS server successfully.

Postinstallation tasks for FileNet IS server are explained in this section.

**6.2.1 Configuring the User Templates**

*Configuration:*  
# /fns/etc/inst\_templates

*inst\_templates: This program will copy the templates files from /fns/etc directory to the /home/fns directory.  
The files copied are .login, .profile, .dtprofile, .cshrc, .env, .Xdefaults, .mwmrc, .Xinitrc, .dbxinit, .dt/dtwrmc  
These files are referred to as the target files.  
If any of the target file already exists in the /home/fns*

directory, a copy will be made to a .old file.  
 Do you want to proceed [y] ?y  
 copying /fns/etc/login.template to /home/fns/.login  
  
 inst\_templates: overwrite /home/fns/.profile [n] ? y  
 backing up /home/fns/.profile to /home/fns/.profile.old.0  
 copying /fns/etc/profile.template to /home/fns/.profile  
  
 copying /fns/etc/dtprofile.template to /home/fns/.dtprofile  
  
 copying /fns/etc/cshrc.template to /home/fns/.cshrc  
  
 copying /fns/etc/env.template to /home/fns/.env  
  
 copying /fns/etc/Xdefaults.template to /home/fns/.Xdefaults  
  
 copying /fns/etc/mwmrc.template to /home/fns/.mwmrc  
  
 copying /fns/etc/xinitrc.template to /home/fns/.xinitrc  
  
 copying /fns/etc/dbxinit.template to /home/fns/.dbxinit

inst\_templates: Change RDBMS home in .cshrc and .profile [n] ?y

inst\_templates: Enter the relational database type configured on this server  
 (0=None, 1=Oracle) [0] 1

inst\_templates: Enter the relational database home directory: [/dbase/ora920]

inst\_templates: Enter the Oracle SID: [IDB] orcl

inst\_templates: Changing ORACLE\_HOME in /home/fns/.cshrc

inst\_templates: Changing ORACLE\_HOME in /home/fns/.profile

inst\_templates: done

After installing the user templates, check for the system reboot requirement. If required, reboot the system to continue FileNet Image Services setup.

## 6.2.2 FileNet Image Services Setup

```

/fns/bin/fn_setup
Is this the NCH server (1=yes, 2=no) [1]:
Enter NCH server name []: ntap:NetApp
Enter system serial number [0]: 2006
Enter the relational database type configured on this server (0=None, 1=Oracle) [0]: 1
Enter the relational database home directory [/usr/ora/804]: /dbase/ora920
Enter the relational database user ID [oracle]:
Enter the relational database group ID [dba]:
Enter the relational database ID [IDB]: orcl
 This is the setup configuration:
 NCH server name: ntap:NetApp
 SSN: 2006
 Relational database type: oracle
 Relational database home: /dbase/ora920
 Relational database user ID: oracle
 Relational database group ID: dba
 Relational database ID: orcl
Do you want to continue (y/n) [y]:y
fn_setup: Creating file /fns/local/setup_config
fn_setup: Creating directory /fns/dev

```

```

fn_setup: Creating directory /fnsw/dev/1
fn_setup: Creating directory /fnsw/local/sd
fn_setup: Creating directory /fnsw/local/sd/conf_db
fn_setup: Creating directory /fnsw/local/sd/slac
fn_setup: Creating directory /fnsw/local/sd/1
fn_setup: Creating directory /fnsw/local/wfl
fn_setup: Creating directory /fnsw/local/wfl/imp
fn_setup: Creating directory /fnsw/local/wfl/sys
fn_setup: Creating directory /fnsw/local/wfl/tmp
fn_setup: Creating directory /fnsw/local/oracle
fn_setup: Creating directory /fnsw/local/spool
fn_setup: Creating directory /fnsw/local/tmp/logs
fn_setup: Creating directory /fnsw/local/logs/EBR
fn_setup: Creating directory /fnsw/local/logs/.log
fn_setup: Creating directory /fnsw/local/logs/TM_daemon
fn_setup: Creating directory /fnsw/local/logs/bkglog
fn_setup: Creating directory /fnsw/local/logs/cold
fn_setup: Creating directory /fnsw/local/logs/cor
fn_setup: Creating directory /fnsw/local/logs/csmlog
fn_setup: Creating directory /fnsw/local/logs/dvt_logs
fn_setup: Creating directory /fnsw/local/logs/elogs
fn_setup: Creating directory /fnsw/local/logs/fn_build
fn_setup: Creating directory /fnsw/local/logs/fn_dscon
fn_setup: Creating directory /fnsw/local/logs/fn_util
fn_setup: Creating directory /fnsw/local/logs/gdb_logs
fn_setup: Creating directory /fnsw/local/logs/gti_log
fn_setup: Creating directory /fnsw/local/logs/inx_logs
fn_setup: Creating directory /fnsw/local/logs/mkflog
fn_setup: Creating directory /fnsw/local/logs/perf
fn_setup: Creating directory /fnsw/local/logs/phil_elog
fn_setup: Creating directory /fnsw/local/logs/ppm_log
fn_setup: Creating directory /fnsw/local/logs/prglog
fn_setup: Creating directory /fnsw/spool
fn_setup: Creating file /fnsw/local/sd/root_station
fn_setup: Creating file /fnsw/local/ssn
fn_setup: Creating file /fnsw/local/sd/nch_domain
fn_setup: Changing permission on FileNET IS software and databases
fn_setup: Creating file /fnsw/local/sd/NCH_db0
fn_setup: Running "/fnsw/bin/fn_util initnch"
fn_util: creating NCH database.
fn_setup: Running "/fnsw/bin/nch_update ntap:NetApp"
fn_setup: Changing permission on FileNET IS software and databases
#

```

### 6.2.3. Install License Key

```

ibm630-svl02(fnsw)/home/fnsw> /fnsw/bin/lic_admin -f /fnsw/local/SLAC/uisora.key
Successfully installed license data !
ibm630-svl02(fnsw)/home/fnsw>

```

Verify that Oracle RDBMS has the required patches. On our system Oracle is up to date: 9.2.0.8.

Fn\_edit and make changes to datasets, add msar and rdb object

```

ibm630-svl02(fnsw)/fnsw/bin> fn_build -a
fn_build: START, options = -a

```

```

fn_build: creating temporary files:
/fnsw/local/ssn.new

```

```

/fnsw/local/sd/nch_dbinit.new
 Updating /fnsw/local/sd/nch_dbinit
/fnsw/local/sd/inx_conf.new
 Updating /fnsw/local/sd/inx_conf
/fnsw/local/sd/print_config.new
 Updating /fnsw/local/sd/print_config
/fnsw/local/sd/snmp.conf.new
 Updating /fnsw/local/sd/snmp.conf
/fnsw/local/sd/as_conf.g.new
 Updating /fnsw/local/sd/as_conf.g
/fnsw/local/sd/1/as_conf.s.new
 Updating /fnsw/local/sd/1/as_conf.s
/fnsw/local/sd/1/tapeconfig.new
 Updating /fnsw/local/sd/1/tapeconfig
/fnsw/local/sd/1/nch.ddl.new
/fnsw/local/sd/1/permanent.ddl.new
fn_build: setting max_record_types to 32.
 Warning: If restoring a database with a different value,
 it's necessary to edit the correspondling '.ddl' file.
 Updating /fnsw/local/sd/1/permanent.ddl
/fnsw/local/sd/1/sec.ddl.new
 Updating /fnsw/local/sd/1/sec.ddl
/fnsw/local/sd/1/transient.ddl.new
 Updating /fnsw/local/sd/1/transient.ddl
/fnsw/local/sd/serverGroup.new
 Updating /fnsw/local/sd/serverGroup
/fnsw/local/sd/rdb.init.new
 Updating /fnsw/local/sd/rdb.init
/fnsw/local/sd/1/FNSHMSEGSZ.new
 Updating /fnsw/local/sd/1/FNSHMSEGSZ
fn_build: running nch_tool.

fn_build: DONE
ibm630-sv102(fnsw)/fnsw/bin>

```

Continued FileNet installation output is shown below.

```

/fnsw/local/sd/1/nch.ddl.new
/fnsw/local/sd/1/permanent.ddl.new
 Updating /fnsw/local/sd/1/permanent.ddl
/fnsw/local/sd/1/sec.ddl.new
/fnsw/local/sd/1/transient.ddl.new
 Updating /fnsw/local/sd/1/transient.ddl
/fnsw/local/sd/serverGroup.new
/fnsw/local/sd/rdb.init.new
/fnsw/local/sd/1/FNSHMSEGSZ.new
fn_build: running nch_tool.

fn_build: DONE
killfnsw: All FileNET processes have terminated.
Sucessfully removed 0 of 0 message queues.
 Initializing Security Database

mkf_writer 51602
killfnsw: All FileNET processes have terminated.
Sucessfully removed 7 of 7 message queues.
 Initializing Transient Database

mkf_writer 46474
killfnsw: All FileNET processes have terminated.
Sucessfully removed 7 of 7 message queues.
 Initializing Permanent Database

```

Initializing the FileNet data set on our test setup is shown below.

```
Updating /fnsw/local/sd/1/permanent.ddl
/fnsw/local/sd/1/sec.ddl.new
/fnsw/local/sd/1/transient.ddl.new
Updating /fnsw/local/sd/1/transient.ddl
/fnsw/local/sd/serverGroup.new
/fnsw/local/sd/rdb.init.new
/fnsw/local/sd/1/FNSHMSEGSZ.new
fn_build: running nch_tool.

fn_build: DONE
killfns: All FileNET processes have terminated.
Successfully removed 0 of 0 message queues.
 Initializing Security Database

mkf_writer 51602
killfns: All FileNET processes have terminated.
Successfully removed 7 of 7 message queues.
 Initializing Transient Database

mkf_writer 46474
killfns: All FileNET processes have terminated.
Successfully removed 7 of 7 message queues.
 Initializing Permanent Database

 Initializing Relational Database

fn dataset config: Finished successfully
```

#### 6.2.4 Use smit to Initialize FileNet Data Sets

On AIX platform, FileNet administration tool is integrated with SMIT tool. Use SMIT tool to initialize the FileNet data sets. Knowing in advance the space requirement for the data sets is an advantage in planning the storage configuration. For more information on data sets, refer to the Image Services Installation Procedure Guide that comes with the Image Services documentation media. Printer information will help you to configure NCH server name with the printer type and the printer server IP address. A sample command and a data set screenshot of our test setup is shown below.

```
PATH=/fnsw/bin:./usr/sbin:/usr/bin:/etc:/bin:./usr/bin:/usr/sbin:/usr/bin/X11:/sbin:./usr/sbin
UIDPATH=/fnsw/lib/X11/%L/uid/%U:/fnsw/lib/X11/uid/%U
fn_dataset_config -i
```

| Dataset Name       | Current Size | Modified Size | Copies | Increment | Volun  |
|--------------------|--------------|---------------|--------|-----------|--------|
| Cache              | 0            | 3200          | 1      | 128       | rootvg |
| Permanent Database | 0            | 3200          | 1      | 128       | rootvg |
| Permanent Redologs | 0            | 2048          | 1      | 64        | rootvg |
| Transient Database | 0            | 1504          | 1      | 32        | rootvg |
| Transient Redologs | 0            | 1024          | 1      | 64        | rootvg |
| Security Database  | 0            | 256           | 1      | 32        | fsvg   |
| Security Redologs  | 0            | 128           | 1      | 32        | fsvg   |

**Figure 3) FileNet data sets.**

It is important to observe the fn\_build log output to verify successful completion of the fn\_build task. On our test setup, fn\_build task displayed the following output.

```

fn_build: START, options = -a
fn_build: creating temporary files:
 /fnsf/local/ssn.new
 /fnsf/local/sd/nch_dbinit.new
 Updating /fnsf/local/sd/nch_dbinit
 /fnsf/local/sd/inx_conf.new
 /fnsf/local/sd/print_config.new
 /fnsf/local/sd/snmp.conf.new
 /fnsf/local/sd/as_conf.g.new
 /fnsf/local/sd/1/as_conf.s.new
 Updating /fnsf/local/sd/1/as_conf.s
 /fnsf/local/sd/1/tapeconfig.new
 /fnsf/local/sd/1/nch.ddl.new
 /fnsf/local/sd/1/permanent.ddl.new
 Updating /fnsf/local/sd/1/permanent.ddl
 /fnsf/local/sd/1/sec.ddl.new
 Updating /fnsf/local/sd/1/sec.ddl
 /fnsf/local/sd/1/transient.ddl.new
 Updating /fnsf/local/sd/1/transient.ddl
 /fnsf/local/sd/serverGroup.new
 /fnsf/local/sd/rdb.init.new
 /fnsf/local/sd/1/FNSHMSEGSZ.new
fn_build: running nch_tool.
fn_build: DONE

```

After the fn\_build process, utility will start the data set initialization. Following is the output on our test environment.

---

I

This INITIALIZE option will remove and initialize all FileNET IS logical volumes. IMPORTANT: You will NOT be able to CANCEL out of this procedure once it begins.

Are you sure you want to continue? [n]: y

Stopping FileNET IS  
Termination of FileNET software completed.  
Removing Logical Volumes  
removing fn\_cache0

rmlv: Logical volume fn\_cache0 is removed.  
removing fn\_perm\_db0

rmlv: Logical volume fn\_perm\_db0 is removed.  
removing fn\_perm\_r10

rmlv: Logical volume fn\_perm\_r10 is removed.  
removing fn\_sec\_db0

rmlv: Logical volume fn\_sec\_db0 is removed.  
removing fn\_sec\_r10

rmlv: Logical volume fn\_sec\_r10 is removed.  
removing fn\_trans\_db0

fn\_build: DONE  
killfnsw: All FileNET processes have terminated.  
Successfully removed 0 of 0 message queues.  
Initializing Security Database

mkf\_writer 46488  
killfnsw: All FileNET processes have terminated.  
Successfully removed 7 of 7 message queues.  
Initializing Transient Database

mkf\_writer 50194  
killfnsw: All FileNET processes have terminated.  
Successfully removed 7 of 7 message queues.  
Initializing Permanent Database

Initializing Relational Database

I

fn dataset config: Finished successfully

### 6.3 Using the MSAR Storage Library

MSAR surface creation using NetApp storage systems is simple. It is created in the MSAR creation directory. Its path information is stored in the database with the storage library, which has one creation directory for storing the MSAR surfaces. When an existing MSAR surface is full or near its capacity, create a new MSAR surface. Creating multiple MSAR surfaces is possible in FileNet IS environment. All existing MSAR surfaces will remain and the old MSAR files do not automatically migrate to the new surface libraries. Migration of old content to the newly created surface(s) requires intentional surface movement. FileNet and NetApp have tested synchronous write tests to ensure the data integrity while writing to NetApp storage systems. MSAR surface creation using NetApp is simple. MSAR surface library is created in the MSAR creation directory. Its path information is stored in the database with each storage library, which has one creation directory for storing MSAR surfaces. New MSAR surfaces are created when an existing MSAR surface is full or approaches its configured size. All existing MSAR surfaces will remain and the old MSAR files do not automatically migrate to the new MSAR surface. Migrating them to a newly created surface requires surface data movement. FileNet and NetApp have verified the data consistency by running FileNet developed synchronous write tests to guarantee the data integrity.

### 6.4 FileNet IS Toolkit Installation

IS server requires the installation of FileNet toolkit software. For supported toolkit software and patches, refer to the [FileNet customer service web site](#). Note that the FileNet IS toolkit requires root privileges. On our system, we used the following procedure to prepare for the IS toolkit software installation on AIX server.

Logon as 'root' user.

```
#mount -v cdrfs -o ro /dev/cd0 /cdrom
```

Verify that the CD device is mounted by 'lsdev -C | grep cd'. If /cdrom directory is available and free, a cd0 device availability message appears.

Next is to use AIX administration tool 'smitty' to install IS toolkit software. Provide the input device where the IS toolkit software is available. Select 'software to install' and observe the installation status output.

It is important to configure the FileNet IS toolkit environment including settings of file ownership and permissions. Verify the operating system kernel parameters are set properly. Verify/Update the /etc/services file. Add the following entries to the /etc/services file, if they do not already exist:

```
cor 32769/tcp
nch 32770/udp
```

If you are installing/upgrading on a system already running the FileNet IS, these entries should already exist.

Verify/update the /etc/hosts file.

The /etc/hosts file should contain the name of any host that runs the FileNet IS and the toolkit server it uses to communicate with the IS server. For proper NCH operation to occur when you install/upgrade WAL in a network environment which uses a router with broadcast disabled, add the following to the /etc/hosts file for each target IS:

<IP addr of domain:organization> <domain-organization>-nch-server where <IP addr of domain:organization> is the IP address of the FileNet domain and organization identifying the

target IS system, and <domain-organization> is that same domain and organization in lowercase and separated with a '-' character.

## 6.5 NLS Installation

SSAR configuration requires the installation of near-line storage (NLS) software on the Image services system. After installing the NLS software, configure the NLS settings by editing the appropriate parameter settings in the NLS.cfg file. NLS installation utility places this file under the bin directory of the installation folder. Typically the path will be similar to 'fnsw/bin'. Below is a sample output of an 'nls.cfg' file. Note the logon attribute, working directory, and SnapLock parameter settings.

```
.*****
;
; Logon Information
;*****
LogonAttribute {
 UserName="SysAdmin"
 PassWord="SysAdmin"
 Domain="walrus"
 Organization="NetApp"
}
; General information
PgmAttribute {
; HOME indicates the directory where this config file is located
; Directory used for export of files _ MUST CHANGE for your environment
 WorkingDirectory= /fndata/2350
; LogDirectory={Default=/<HOME>}
; Control for set size
; MaxFetchDocs={Default=1000}
; MaxQueryDocs={Default=1000}
; MaxFetchChildren controls the maximum number of concurrent Add2Q
; processes
; MaxFetchChildren={Default=3, Range 1 - 8}
; MaxArchChildren controls the maximum number of concurrent SDS_Write
; processes
; MaxArchChildren={Default=3, Range 0 - 24}
;
; MinDocId=(Default=10000)
; MaxDocID=(Default=399999999)
; WalkBack=(Default=10000)
; AppMaxDocID=(Default=399999999)
; MinDate=(Default=980101)
;
; MaxErrorsAllowed=<unlimited> <default=65535>
; ErrorDelay=<goes with MaxErrorsAllowed. Interval is seconds
; to count errors. Default = 0 -- unlimited errors.>
;
; CleanCache={Default=False}
; Timing=(Default=False)
;
; The following time based keywords all have a minimum of 1 seconds
; and a maximum of 3600 seconds. If set to zero or a negative number
; it will default to 5 seconds.
; FetchSleep=(in secs, default=600)
; ArchSleep=(in secs, default=600)
; FetchTimeout=(in secs, default=3600)
;
; Display format for the year %Y (default) is 'xxxx', %y is 'xx'.
; This effects displaying of a date only and extends the length of
; file names.
```

```

; YearFmt="%Y"
; Format is Year, month, day. Year can be 2(19xx) or 4 digits
; NOTE: Values that are out of range take on max value for that item
;
;
;
; Network Appliance SnapLock Keyword
; To engage the retention rules the SnapLock keyword must be
; uncommented below and set to one of the following values.
; 0 = No retention (initially set to 5 mins)
; -1 = Infinite Retention Mode
; 1 or greater than 1 = set retention using input value in hours
; SnapLock={Default=0}
; OR a date is valid in the form of "yyyy/mm/dd" or "mm/dd/yyyy"
; SnapLock="2006/12/25"
}
;END OF CONFIGURATION FILE

```

### Startup of FileNet Image Services

Before starting the FileNet Image Services, verify that the Oracle relational database server is up and running. On our test setup, we verified by the commands.

```
ibm630-svl02(fnsw) sqlplus /nolog
```

```
SQL*Plus: Release 9.2.0.8.0 - Production on Fri Dec 15 11:00:48 2006
```

Copyright (c) 1982, 2002, Oracle Corporation. All rights reserved.

```
SQL> conn sys/orcl as sysdba
```

```
Connected.
```

```
SQL>
```

Now the system is ready to start the FileNet Image Services. After starting the Image Services, verify from the FileNet logs for any startup errors.

## 7. Backup Using Snapshot

Due to hardware, software, and other external reasons such as user intervention, FileNet IS platform system is prone to failure and data corruption or data loss in a production environment. This leads to a nonoperational or seriously degraded environment. A backup copy of data helps to recover the system from failure or data corruption. Time taken to restore the data from backup before being able to bring the FileNet IS system is critical in enterprise environments. When the storage solutions from NetApp are integrated with the FileNet IS platform system, efficient backup and recovery options will be available. NetApp Snapshot provides almost instant backup copies of FileNet IS.. SnapManager® for SQL (SMSQL) is a NetApp provided application suite to manage the database backup and recovery for MSSQL server. With this strategy, entire data of a FileNet IS system can be restored quickly on all affected servers. This type of backup and restore configuration offers compelling enterprisewide backup and restore solutions. For details about Snapshot and SnapRestore, refer to [the Snapshot technology brochure](#) available on our web site. Snapshot copies of the content services are created by using a snapshot create syntax similar to one shown below.

```
snap create [-A | -V] <vol-name> <snapshot-name>
```

It is also important to be able to restore the data from the backup copy. Joint solution configuration of NetApp storage system and FileNet P8 platform solutions allows restoring the data from backup copy using Snapshot and SnapRestore features. It is required to close the FileNet P8 applications before restoring the data using SnapRestore command. This approach will help to bring the FileNet P8 system services successfully. FileNet P8 data restored by using a SnapRestore create syntax similar to one shown below.

```

snap restore [-A | -V] [-f] [-t vol | file] [-s <snapshot-name>] [-r <restore-as-path>] <vol-name> |
<restore-from-path>

```

Today, global enterprises need to protect and quickly recover data in the event of natural or man-made disasters, operator errors, or technology and application failures. They also need an efficient way to distribute data to remote locations. Without an effective data protection and distribution strategy, operations can be brought to a standstill, resulting in loss of revenue. SnapMirror technology mirrors data to one or more network storage systems. It continually updates the mirrored data to keep it current and available for disaster recovery, offloading tape backup, read-only data distribution, testing on nonproduction storage systems, online data migration, and more. With SnapMirror implemented, architecture FileNet IS system can be effectively replicated between sites to quickly start the IS server at a disaster location. For details on SnapMirror, refer to the [SnapMirror best practices](#) technical report.

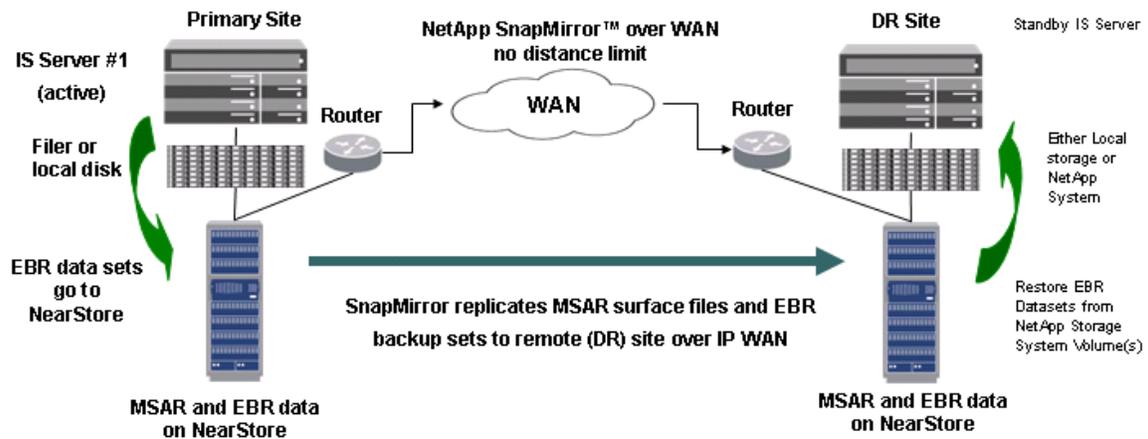


Figure 4) Using SnapMirror for FileNet IS backup requirements.

## 8. Summary

Corporate customers are in need of robust ECM solutions that integrate easily with their existing information systems. FileNet provides solutions to manage the content generated throughout the organization. It is important to provide access to the content generated to those needs immediately. FileNet IS architecture provides enterprise-level scalability to address the challenges of enterprise content management. FileNet IS architecture enhances the content and process management across an enterprise.

FileNet P8 platform customers are required to plan for an efficient backup and recovery strategy. In addition to backup and recovery, they need to plan for high data availability along with the ability to address huge data growth. Corporate regulations have been forced to protect the content generated within the organization. These are some of the challenges encountered by FileNet P8 platform customers. Backing up

of SQL databases could take a significant amount of time and resources. An effective database backup and recovery strategy is also required. Data replication could take a significant amount of time and resources.

NetApp storage solutions effectively address the shortcomings explained previously. FileNet IS server and NetApp product joint solutions offer highly available and exceptional performance at very low total cost of ownership in the industry.

NetApp and FileNet are committed to providing FileNet platform users with improved solutions designed to meet their business objectives. NetApp storage system solutions ensure protection of FileNet IS system high availability.

NetApp offers a complete solution for FileNet IS environments. SnapManager for SQL (SMSQL) allows a transparent method for consistent and quick backup copying of SQL databases. SMSQL also allows restoring the database backup from Snapshot copies. SnapDrive for UNIX and Windows platform provides an efficient and easy way of data storage management on Windows server. In conclusion, the recommendations made in this paper are intended to be an overview of best practices for most environments. This paper serves as a starting guide when designing and deploying FileNet IS server in NetApp storage system(s) environments. To ensure a supported and stable environment, become familiar with the configuration and setup plans. For details and helps to design and implement FileNet IS server using NetApp storage system configurations, contact the Professional Services teams in NetApp and FileNet.

## 9. Caveat

NetApp has not tested all possible combinations of hardware, storage architecture, and software solutions. If you use a different Windows Server OS or a different version of FileNet software, then significant differences in your configurations could exist. These differences could alter the procedures necessary to achieve the objectives outlined in this document. If you find that any of these procedures do not work or found any errors, we suggest contacting the [author](#) immediately.  Additional questions or requests for information should be directed only to the web administrator of Network Appliance, Inc[bezm1]. Do not attempt to seek help from NetApp Global Support team for the content accuracy or the procedures listed in this document.

## 10. Appendix

This section provides additional information that helps provide successful installation and configuration of FileNet IS server components on AIX server.

### 10.1 Operating System Required Patches

The section lists the hot fixes that must be installed before the NetApp storage system is configured using Fibre Channel Protocol and SnapDrive software. IBM support team provides these patches directly to its customers.

If you are installing and configuring local drives using SnapDrive in a Fibre Channel Protocol environment, refer to appropriate product manuals and release notes.

### 10.2 Preinstallation Checklist

It is important to refer to FileNet product release document to complete operating system requirements including the storage configurations. Section 5 of this paper discusses the predeployment considerations for installing FileNet Image Services. Preinstallation tasks include the following sections.

- IBM AIX Server 5.2
- Create FileNet IS users and groups
- Install database server
- Create appropriate tablespaces

### 10.3 References

Following technical reports and system manuals were referenced while developing this paper. For detailed procedures, read the appropriate product documents.

- [“Integrating FileNet Image Services with NetApp Unified Storage for Windows Platform”](#)
- [“Integrating FileNet Image Services Connector for SnapLock with NetApp Storage”](#)
- [“WORM Storage on Magnetic Disks Using SnapLock Compliance and SnapLock Enterprise”](#)
- [“Multiprotocol Data Access: NFS, CIFS, and HTTP”](#)
- [“Simple Disaster Recovery of FileNet on Windows: Image Services Using SnapMirror Technology”](#)

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