

Configuring Tivoli Storage Manager for Mirapoint NDMP Backup

TSM Configuration Overview

Tivoli Storage Manager can be used to backup a Mirapoint /usr/store using the Network Data Management Protocol (NDMP). The Mirapoint data is backed up to an autochanger (tape library) attached to the Mirapoint appliance. (Standalone drives are not supported.) No TSM software needs to be installed on the Mirapoint appliance.

You need to configure TSM to register your Mirapoint appliance as a network-attached storage (NAS) node and map your autochanger and tape drives to TSM storage objects. You can do this from a Web browser through the TSM administrative Web interface.

TSM treats the Mirapoint appliance as a file server and communicates with the appliance using NDMP to perform backup and restore operations. You define a TSM data mover to enable NDMP operations between TSM and your Mirapoint appliance.

In TSM, backup files are stored in groups of volumes that are called storage pools. A storage pool is a named collection of volumes that have the same media type. Each storage pool belongs to a device class that represents the type of storage device being used. For NDMP backups, the device type is always NAS.

The autochanger itself is mapped to a library object that represents the collection of drives in the changer. Each drive mechanism within the changer is represented by a separate drive object (see [Figure 1](#) on page 2).

Only SCSI libraries are supported for Mirapoint backups, but the library may contain drives that use different tape technologies-for example, LTO and DLT. For information about approved tape devices, see [Approved Local Tape and Library Devices](#).

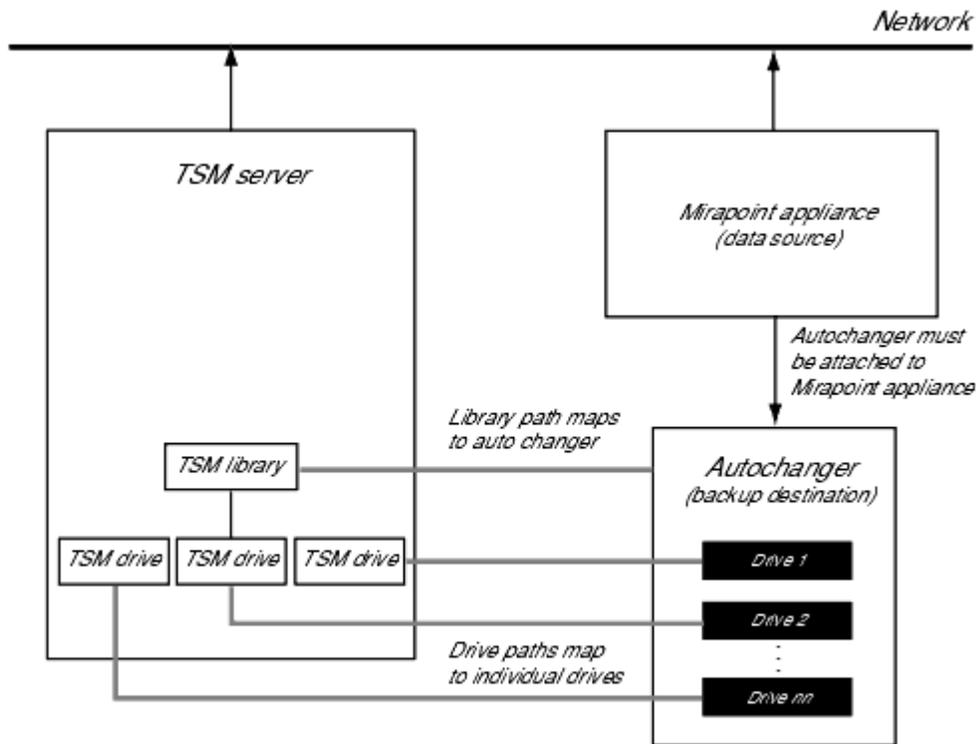


Figure 1 NDMP Backup Configuration

Overview of the Configuration Process

To set up NDMP backups from your Mirapoint appliance to an autochanger using TSM, you need to:

1. Prepare your Mirapoint Appliance for NDMP backups by verifying your autochanger and enabling the Mirapoint NDMP service. You also need to query your autochanger and drives for information needed for the TSM configuration.
2. Prepare your TSM server by registering the required licenses and setting up a TSM node for the server.
3. Configure TSM by registering a NAS node for the Mirapoint appliance and defining the necessary TSM storage objects, a TSM policy for NDMP operations, and the paths to your autochanger and tape drives.

Each of these steps is described in detail in the following sections.

Preparing Your Mirapoint Appliance for TSM Backups

Before you begin configuring TSM for Mirapoint backups, you need to install your autochanger (tape library) and:

1. Verify that your autochanger is recognized by your Mirapoint appliance.
2. Query the autochanger for its name and address information.
3. Query the autochanger for the names and element numbers of the drives it contains.
4. Enable the Mirapoint NDMP service.

Each of these steps is described in detail in the following sections.

Verifying an Autochanger

To verify that your autochanger and drives are recognized by the Mirapoint appliance:

1. Open a telnet window and log into the Mirapoint CLI as an administrator.
2. Run the Diag Changer Inquiry command. For example:

```
Diag Changer Inquiry "" "" ""
```

The Mirapoint appliance displays information on the manufacturer, model number, firmware version, and serial number of the autochanger. For example:

```
"HP " "C7200 " "1520" "US0MF00014"
```

```
OK Completed
```

3. Run the Diag Tape Inquiry command. For example:

```
Diag Tape Inquiry "" "" ""
```

The Mirapoint appliance displays information on the manufacturer, model number, firmware version, and serial number of the tape drives in the library. For example:

```
"HP " "Ultrium 1-SCSI" "E12V" "THX1138"
```

```
OK Completed
```

If no information is returned, then the autochanger is either not attached, not attached correctly, or was attached while the appliance was live and the appliance must be rebooted for the autochanger to be recognized.

If you are certain your autochanger is correctly installed, but it is not recognized by the Mirapoint appliance, see [Troubleshooting a Tape Drive or Media Changer Connection](#) for instructions on how to use the CLI **Diag** commands to resolve the problem.

Once you have verified that the autochanger is available, retrieve the identifying information for the autochanger and the drives you want to use for backup. You need this information to configure TSM.

Getting the Name of an Autochanger

You need the device name of your autochanger to configure TSM. To retrieve the autochanger device name:

1. Open a telnet window and log into the Mirapoint CLI as an administrator.
2. Run the **Diag Get Changeraddress** command to query the autochanger:

```
Diag Get Changeraddress
```

The Mirapoint appliance displays an output string that includes the SCSI controller ID, target number, logical unit number, and device name. For example:

```
Controller 1, Target 1, LUN 0, Device /dev/ch0  
OK Completed
```

3. Record the device name provided in the output string. The device name is the last parameter reported-in this example, /dev/ch0.

Getting Drive Names and Element Numbers

You need the device name and element number of each drive in your autochanger that you want to use for backup. To retrieve the drive information:

1. Open a telnet window and log into the Mirapoint CLI as an administrator.
2. Run the **Diag Get Tapeaddress** command to retrieve the device names for the drives in the changer:

```
Diag Get Tapeaddress
```

The Mirapoint appliance displays an output string that includes the SCSI controller ID, target number, logical unit number, and device name of each drive in the changer. For example:

```
Controller 1, Target 2, LUN 0, Device /dev/nrsa0  
OK Completed
```

3. Record the device name of each drive you plan to use for backups. The device name is the last parameter reported-in this example, /dev/nrsa0.
4. Run the **Diag Get Dataxferelementaddr** command to retrieve the element numbers of the drives in the changer:

```
Diag Get Dataxferelementaddr
```

The Mirapoint appliance displays an output string that includes the element number of each drive. For example:

```
0 1 "HP ..."  
OK Completed
```

5. Record the element numbers of the drives you plan to use for backups. The second integer in the output is the drive element number-in this example, the drive is element number 1.

Enabling and Starting Mirapoint's NDMP Service

To enable and start NDMP on the Mirapoint appliance, run the following commands:

```
Service Enable Ndm  
Service Start Ndm
```

To verify that the NDMP service has been enabled and started, you can run the **Service Started** command:

```
Service Started Ndmf
```

The Mirapoint appliance should display:

```
yes
```

```
Ok Completed
```

Getting Ready to Configure TSM

If you are installing Tivoli Storage Manager (TSM) for the first time, you need to register your TSM licenses and set up a node for the TSM server before you can configure the TSM for Mirapoint backups. For detailed information about installing and configuring TSM, refer to “Installing IBM Tivoli Storage Manager” in the *IBM Tivoli Storage Manager Quick Start* document.

Setting up the TSM Server Node

When you first run TSM, you need to use the command line interface to set the TSM server name and define a node that represents the server itself.

To perform the initial server set up:

1. Start the TSM server by running the **dsmserv** command from the `tsm/server/bin` directory. For example:

```
./dsmserv
```

2. Run the **dsmadm** command from the `/tsm/client/ba/bin/dsmserv` directory to start the TSM admin client.

3. Use the **set server name** and **register node** commands to configure the TSM servername and server node. For example:

```
set servername TSMServer1
register node TSMServer1 password
```

4. Edit the TSM client systems options file **dsm.sys** and set the **SERVERNAME** to match the name set through the TSM admin client and the **TCPSERVERADDRESS** to the TSM server's IP address or fully-qualified name.
5. Edit your client user options file **dsm.opt** and set the **SERVERNAME** to match the name set through the TSM admin client.
6. Halt and restart TSM for the options file changes to take effect. For example, run the **halt** command from the **dsmserv** prompt to shut down the server:

```
halt
```

Registering TSM Licenses

When you install IBM Tivoli Storage Manager, your TSM system is licensed for the base support. You need to explicitly register any additional Tivoli Storage Manager licensed functions that you have purchased.

You must have an NDMP license to use TSM to perform NDMP backups. This license, `ndmp.lic`, should be in your `tsm/server/bin` directory with the rest of your

TSM licenses. (NDMP support is included in the IBM Tivoli Storage Manager Extended Edition.)

To register your licenses:

1. If it is not already running, start the TSM server by running the **dsmserv** command from the `tsm/server/bin` directory.
2. Run the **dsmadm** command from the `tsm/server/bin/dsmserv` directory to start the command line interface.
3. Use the TSM **register license** command to register your licenses. For example, to register all of licenses in your `tsm/server/bin` directory and set the number of licenses to 25:

```
register license file=*.lic number=25
```

Configuring TSM for Mirapoint Backups

To configure Tivoli Storage Manager to back up a Mirapoint appliance to an autochanger (tape library) using NDMP, you need to use the TSM admin client to:

1. Define a TSM library that maps to your autochanger.
2. Define a device class that describes the drives in your changer.
3. Define a storage pool for your NDMP backups.
4. Prepare a disk volume for the NDMP backup table of contents.
5. Define TSM policies for your NDMP operations.
6. Register the Mirapoint appliance as a NAS node.
7. Define a data mover for the Mirapoint node.
8. Set the path of your TSM library to map to the location of your autochanger.
9. Define TSM drives that correspond to the individual drives in your autochanger and set the drive paths.

Each of these steps is described in detail in the following sections. You must complete these steps in sequence, as many of the later steps rely on objects created in earlier ones.

The following sections describe each step in this process as it applies to setting up TSM for Mirapoint backups. If you are using TSM for other purposes, your configuration may differ significantly from the basic configuration outlined in this document. For detailed information about configuring Tivoli Storage Manager for NDMP operations, see “Using NDMP for Operations with NAS File Servers” in the *IBM Tivoli Storage Manager Administrator's Guide*.

Accessing the TSM Admin Client

TSM provides both a command line interface (CLI) and Web interface for administering the TSM server. This document describes how to use the administrative Web interface to configure TSM for Mirapoint backups.

To access the TSM administrative Web interface:

1. If it is not already running, start the TSM server by running the `dsmserv` command from the `/opt/tivoli/tsm/server/bin` directory. For example:


```
./dsmserv
```
2. Use your Web browser to load `http://server_name:1580`, where `server_name` is the host name or IP address of your TSM server and 1580 is the HTTP port used to access the TSM administrative interface.

1580 is the default port for HTTP access to TSM. If you specified a different HTTP port in your TSM server options file, you need to specify that port number to access the administrative interface.
3. Log in using the TSM administrator user ID and password. By default, the user name and password are both set to `admin` when TSM is installed.

When you log in, the TSM administrative Web interface displays a navigation tree that provides access to all of TSM's administrative functions (see [Figure 2](#) on page 7).

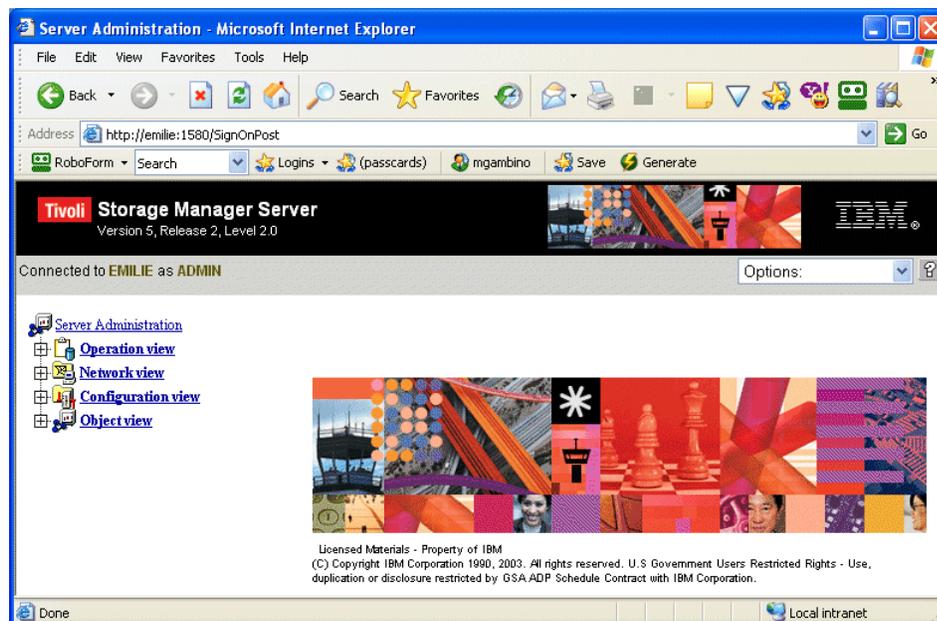


Figure 2 TSM Administrative Interface

Defining a TSM Library for an Autochanger

To define your autochanger (tape library) to TSM, you create a library object in your storage hierarchy. When you create a library object, you specify the name and type of the library. The name can be whatever logical name you want to assign to the library. For Mirapoint backups, the type is always SCSI.

Once you've registered your Mirapoint appliance as a NAS node and created a NAS data mover, you'll need to set the library path to tell TSM where to access the library, see [Setting the Library Path](#) on page 28 for details.

To create a TSM library:

1. Select **Object View > Server Storage > Libraries and Drives > Automated Libraries** from the web interface tree.
2. Select **Define Automated Library** from the **Operations** menu.

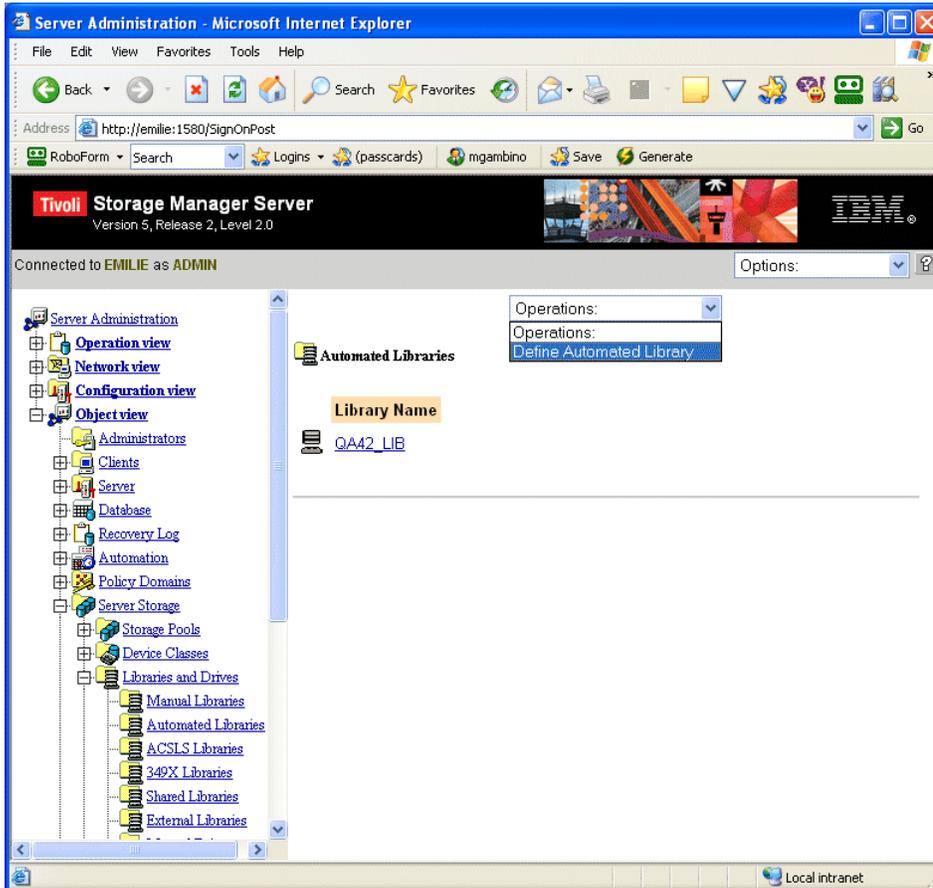


Figure 3 Define Automated Library

3. On the **Define Automated Library** page, specify a name for the library and click the **Finish** button.

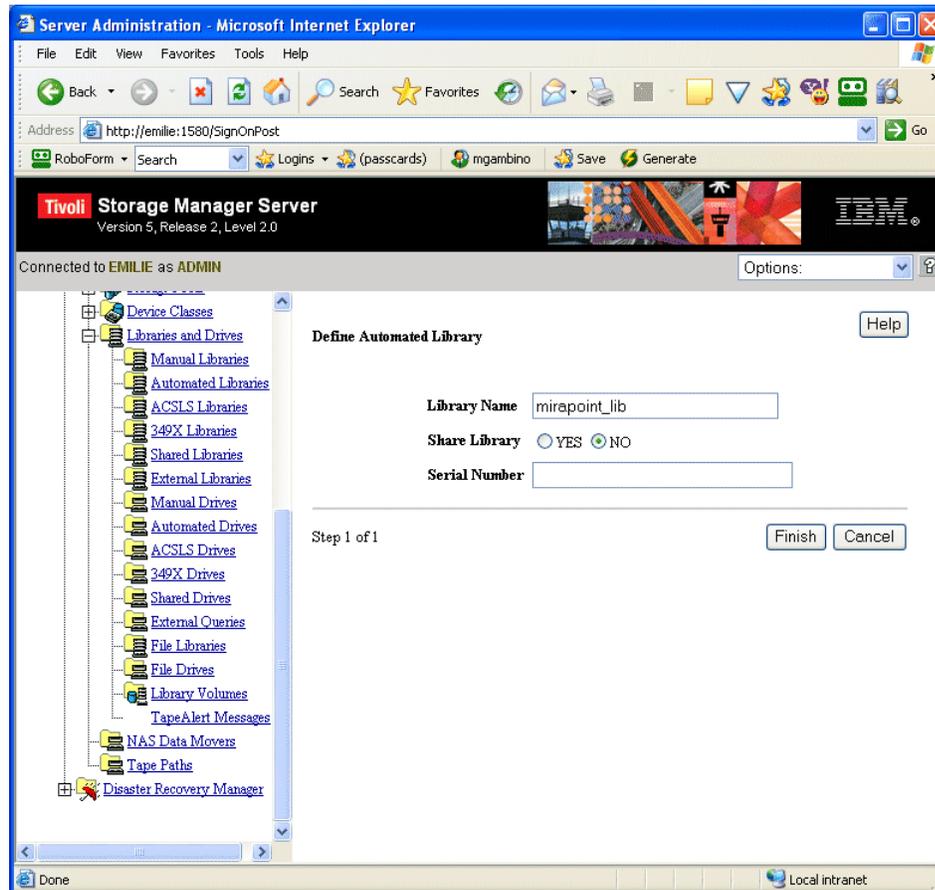


Figure 4 Setting Library Options

Defining an NDMP Device Class

You need to create a **device class** that describes the drives in your autochanger. The device class specifies a device type, the library that contains the drives in this class, and media management information, such as the mount wait period, recording format, estimated capacity, and labeling prefixes. The **device type** for this device class must be set to **NAS**. The **mount retention** value must be set to **0** and the **mount wait** value should be set according to your site specifications. (The mount wait value is the maximum number of minutes to wait for a volume to be mounted.) The **estimated capacity** should be set to the typical capacity of an individual volume.

To create an NDMP device class:

1. Select **Object View > Server Storage > Device Classes > NAS Device Classes** from the web interface tree.
2. Select **Define Device Class** from the **Operations** menu.

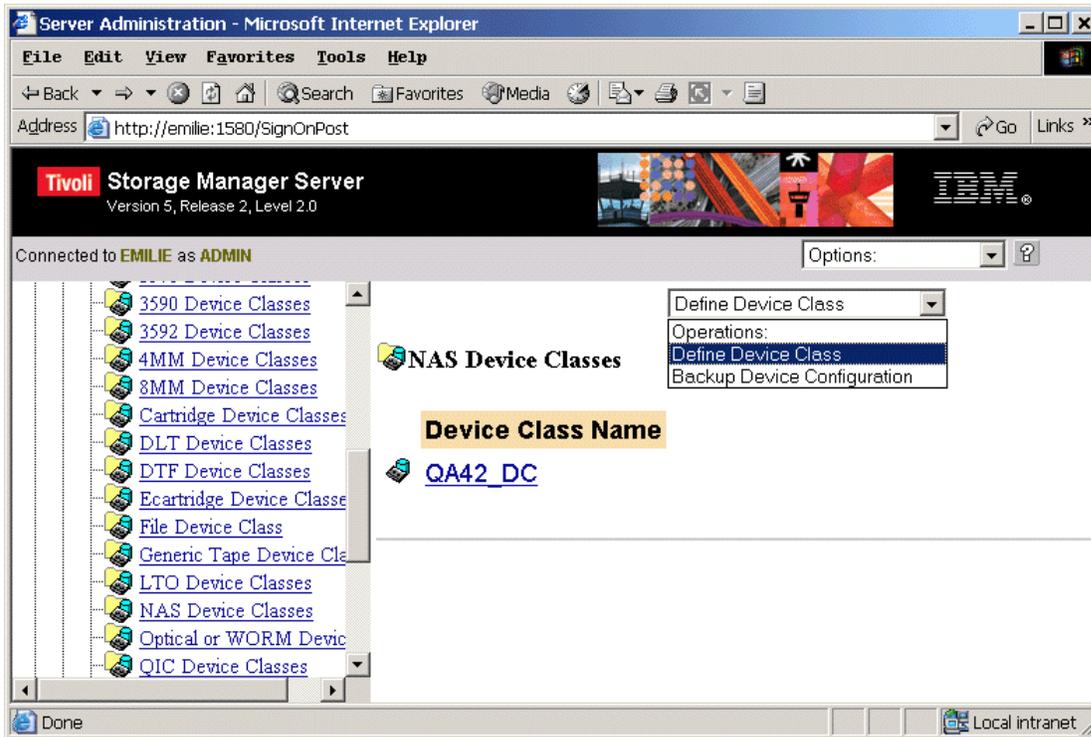


Figure 5 Define Device Class

3. On the **Define Device Class** page, specify a name for the NDMP device class, select the name of your library, set the estimated capacity to the capacity of an individual volume in the library, and then click the **Finish** button.

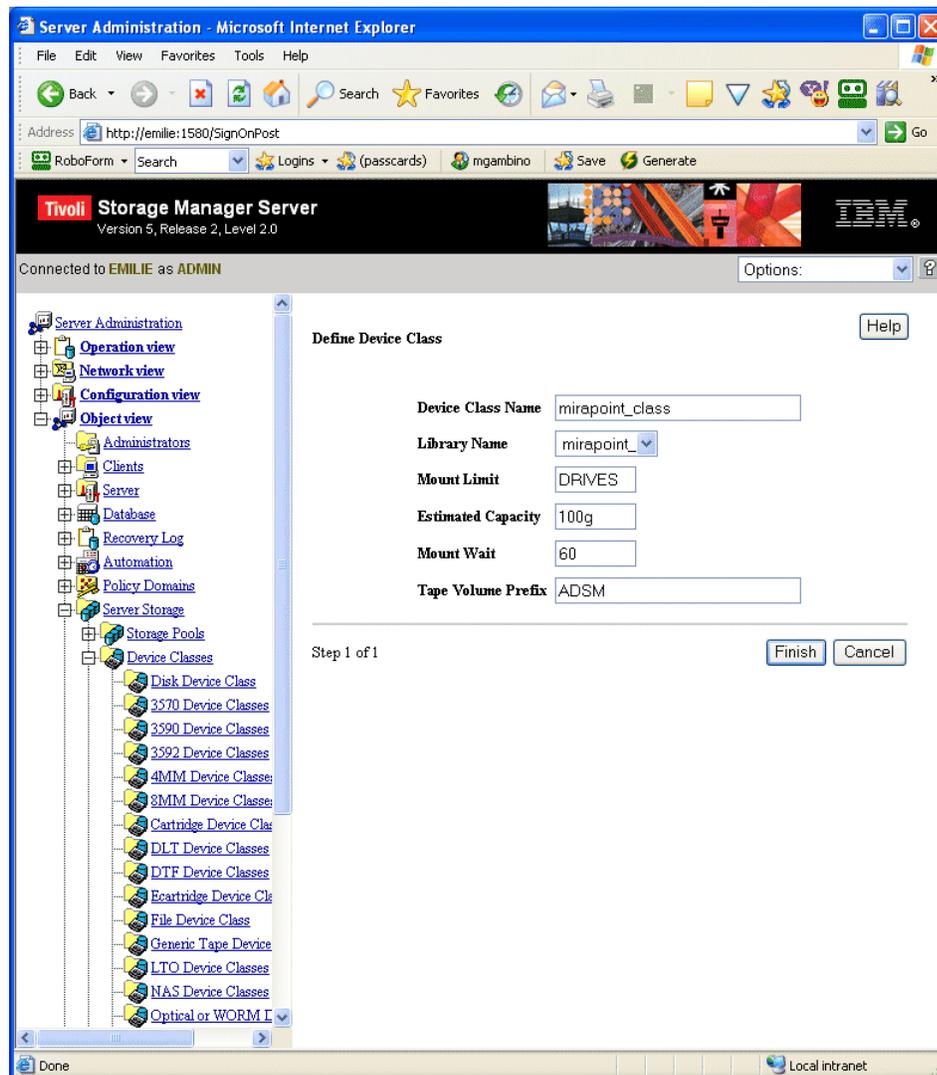


Figure 6 Setting Device Class Options

Defining a Storage Pool for NDMP Backups

You need to add a **storage pool** to your storage hierarchy for the volumes that will contain your backup files. A storage pool is simply a named set of storage volumes that represents the location where TSM stores client data such as backup files.

NDMP operations require storage pools with a data format that matches the data source and the backup method to be used. For Mirapoint backups, you should specify **NDMPDUMP** as the data format.

To define an NDMP storage pool:

1. Select **Object View > Server Storage > Storage Pools > Sequential Access Storage** from the web interface tree.
2. Select **Define Sequential Access Storage Pool** from the Operations menu.

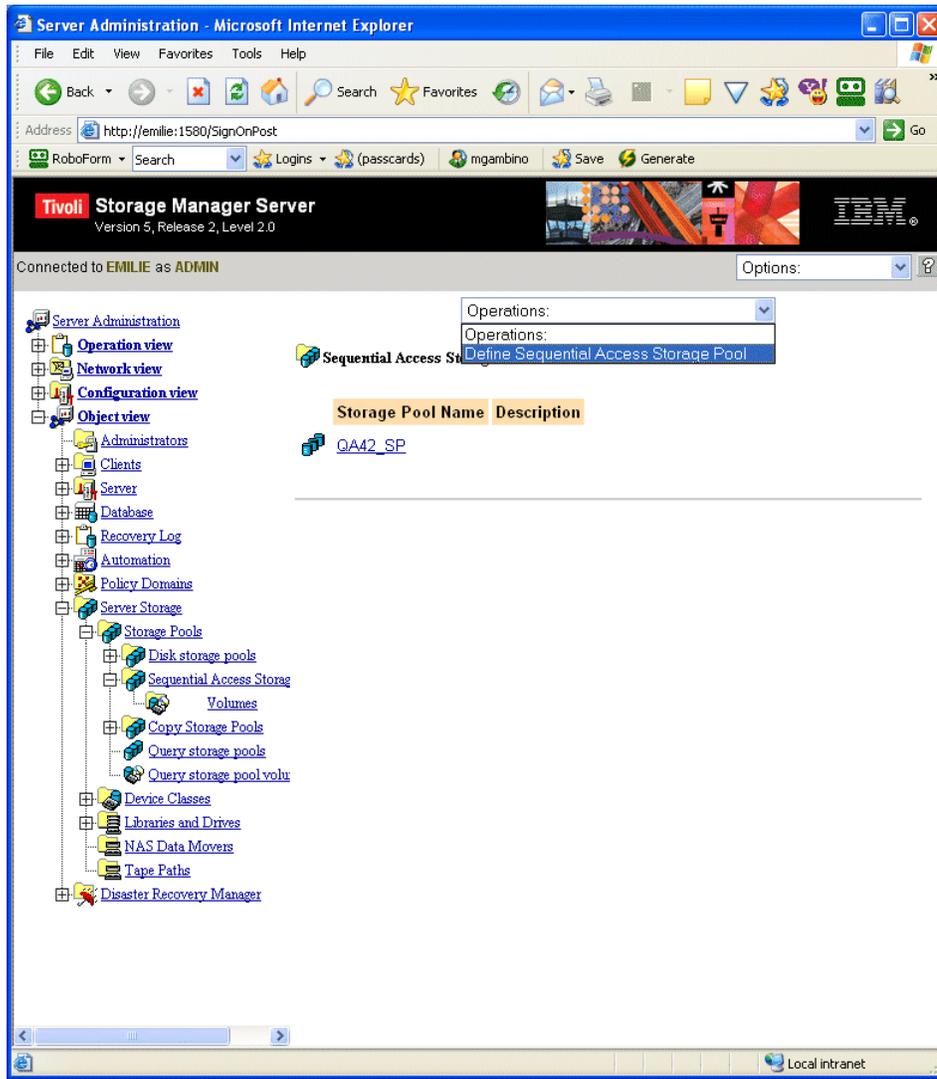


Figure 7 Define Storage Pool

3. On the **Define Sequential Access Storage Pool** page, specify a name for the storage pool, select your NDMP device class, and select **NDMPDUMP** as the storage pool format.

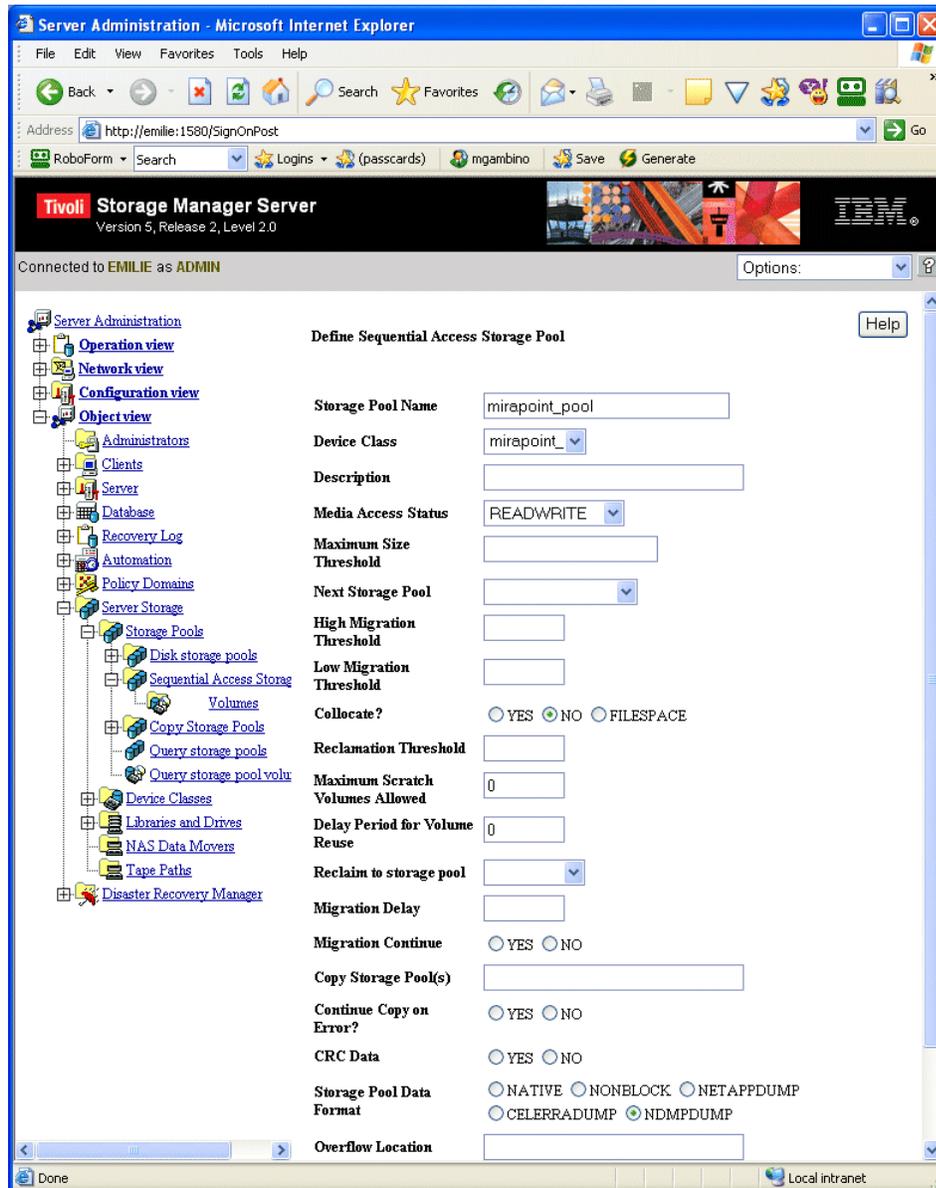


Figure 8 Setting Storage Pool Options

Preparing a Volume for the Backup Table of Contents

When a table of contents is generated during backup, you can restore individual files from the backup image. This table of contents is stored in a disk storage pool. You can use the default storage pool **BACKUPPOOL** for the table of contents, or create a new disk storage pool. You then need to prepare a volume for use in the pool by creating a directory to contain the volume and defining the volume to TSM. The volume definition includes the name of your backup storage pool, the path to the directory that contains the volume, and the size of the volume.

To prepare a volume for the backup TOC:

1. Create a directory for the volume on your TSM server. Enough space must be available to store a table of contents that lists all of the messages in the Mirapoint /usr/store.
2. Define the volume to TSM:
 - a. Select **Object View > Server Storage > Storage Pools > Disk Storage Pool** from the web interface tree.
 - b. Select **Define a Disk Storage Pool Volume** from the **Operations** menu.

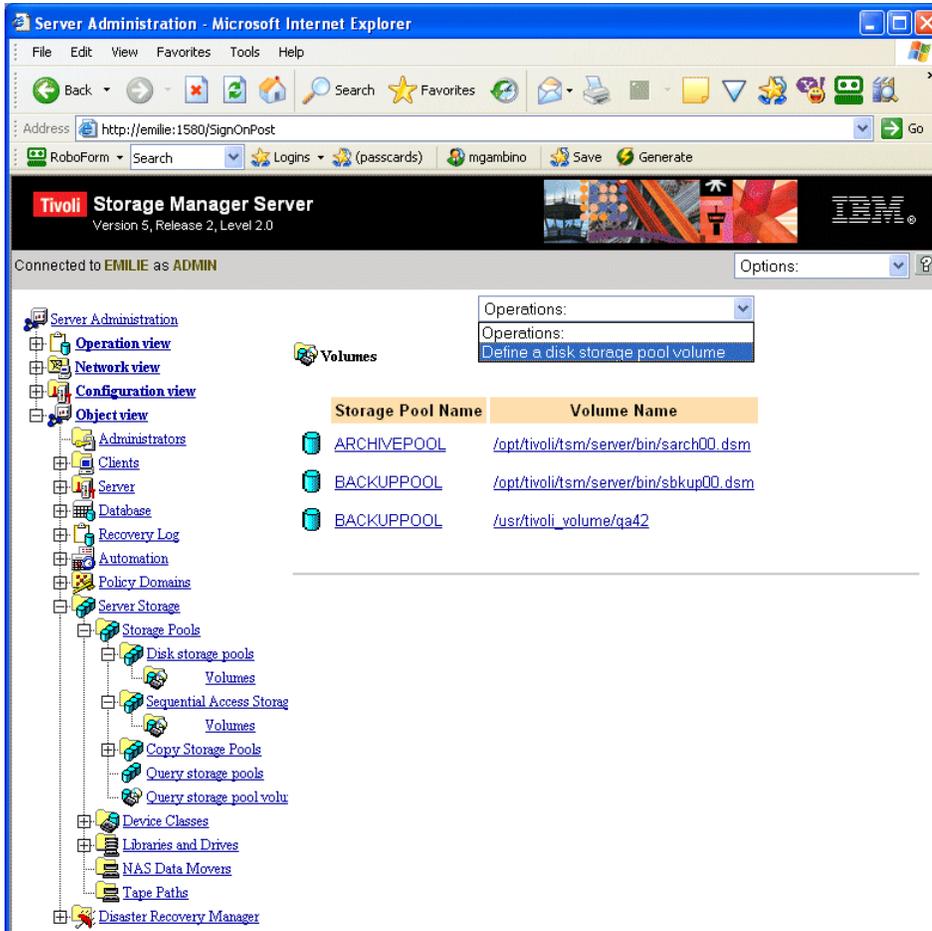


Figure 9 Define Disk Storage Pool Volume

- c. On the **Define a Disk Storage Pool Volume** page, select the name of the disk storage pool you'll use for the backup table of contents, specify a name for the volume, and click the **Finish** button.

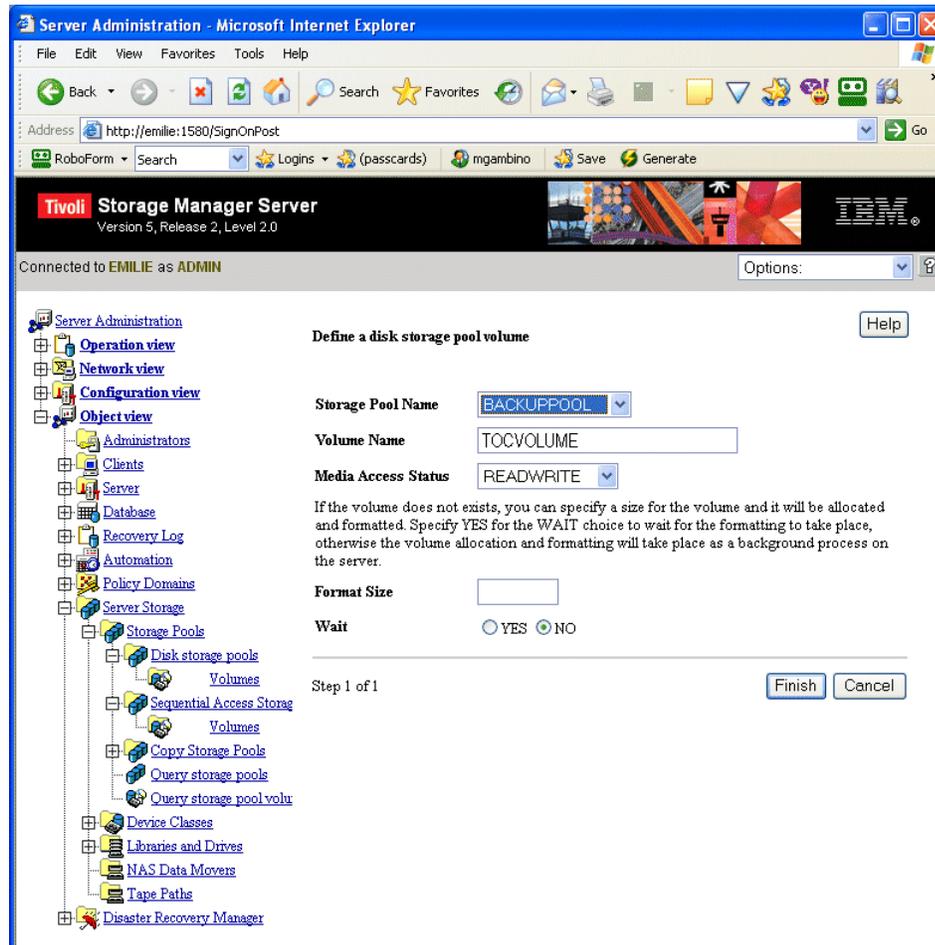


Figure 10 Setting TOC Volume Options

Defining TSM Policies for NDMP Operations

You define a TSM policy to manage the number and retention time of NDMP image backup versions. Your policy preferences are specified within the backup copy group that belongs to the default management class in the policy set associated with a policy domain for NAS nodes.

To set your NDMP policies:

1. Create a policy domain for NAS nodes.
2. Create a policy set in that domain.
3. Define a management class, and then assign the management class as the default for the policy set.
4. Define a backup copy group in the default management class.
5. Activate the policy set.

Each of these steps is described in detail in the following sections. You must complete these steps in sequence, as later steps rely on objects created in earlier ones.

Creating a Policy Domain

A **policy domain** is a policy object that contains the policy sets, management classes, and copy groups for a group of client nodes. To define your policies for NDMP backups, you create a separate policy domain specifically for NAS nodes.

To create a policy domain:

1. Select **Object View > Policy Domains** from the web interface tree.
2. Select **Define Policy Domain** from the **Operations** menu.

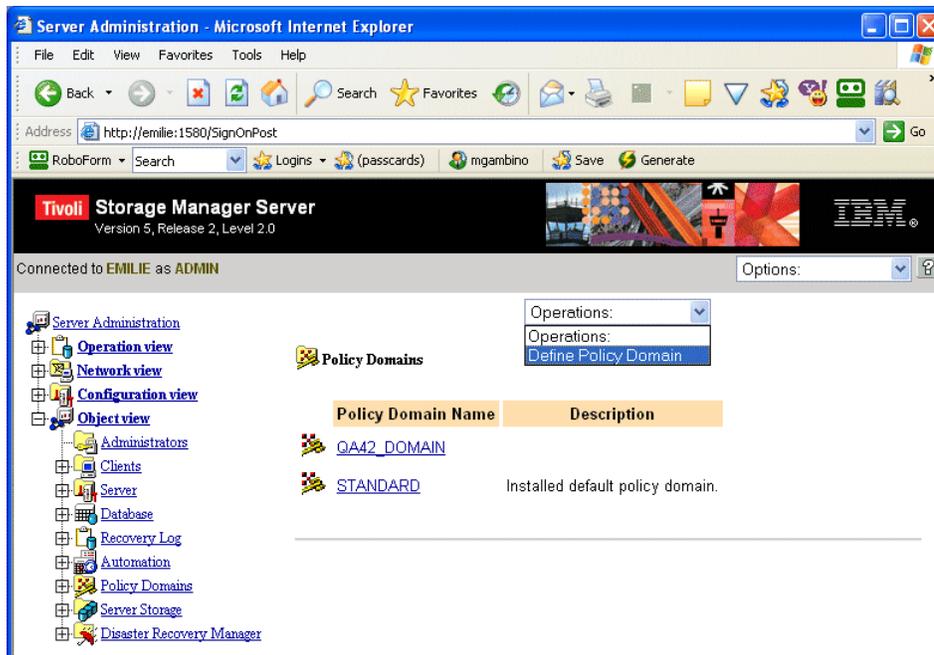


Figure 11 Define Policy Domain

6. On the **Define Policy Domain** page, specify a name for your policy domain, set the backup and archive retention attributes according to your site's backup policies and requirements, and click the **Finish** button.

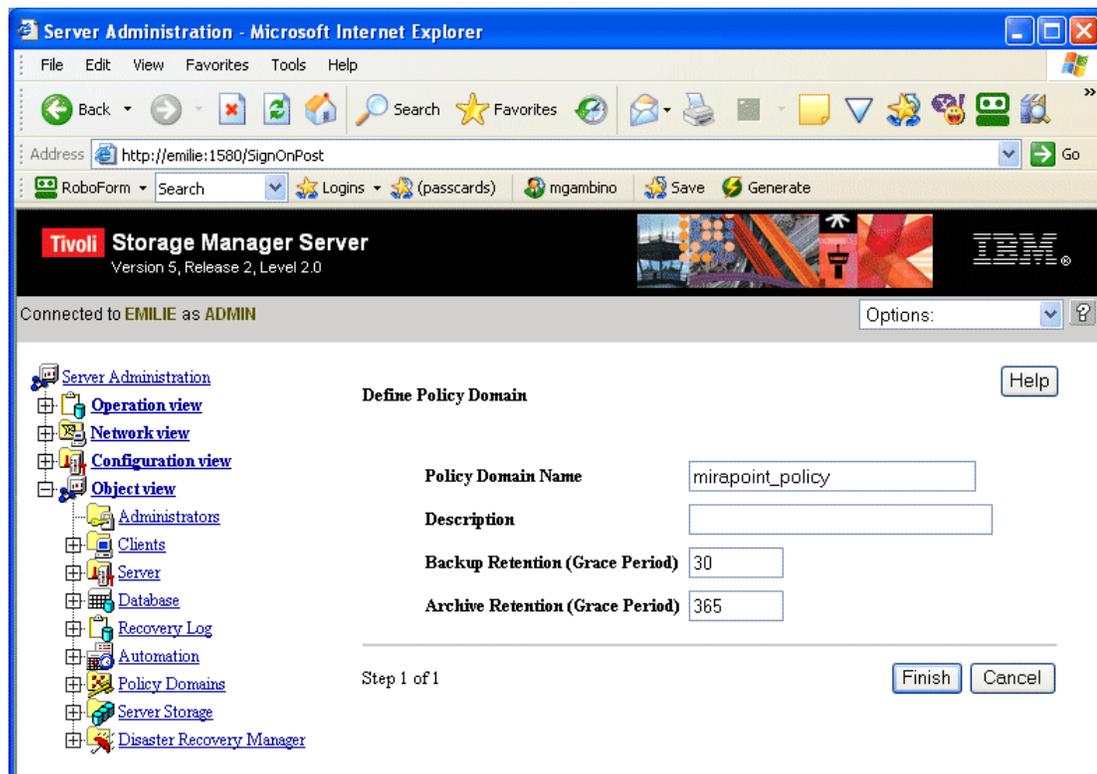


Figure 12 Setting Policy Domain Options

Creating a Policy Set

A policy set is a policy object that contains the management classes defined for a policy domain. Several policy sets can exist within a policy domain but only one policy set is active at a time. When you create a policy set, you specify a name for the policy set and the policy domain to which it belongs.

To create a policy set:

1. Select **Object View > Policy Domains > Policy Sets** from the web interface tree.
2. Select **Define Policy Set** from the **Operations** menu.

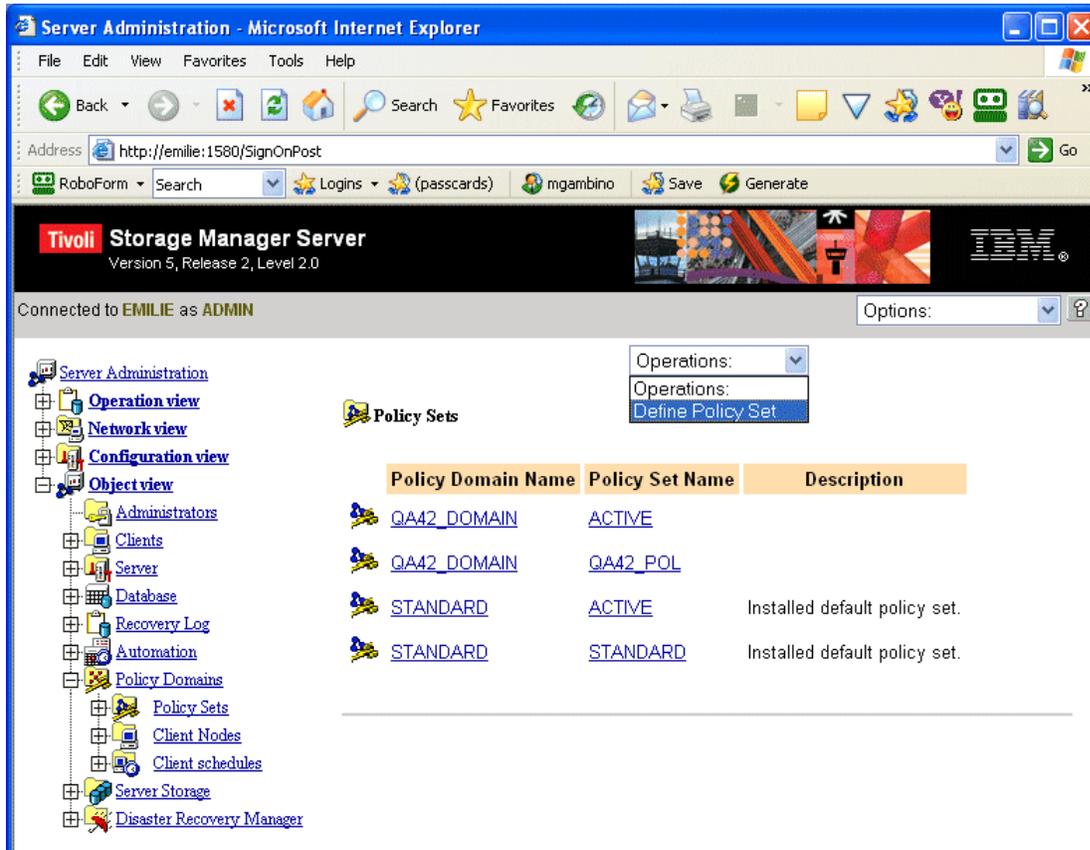


Figure 13 Define Policy Set

3. On the Define Policy Set page, select your policy domain, specify a name for your policy set, and click the Finish button.

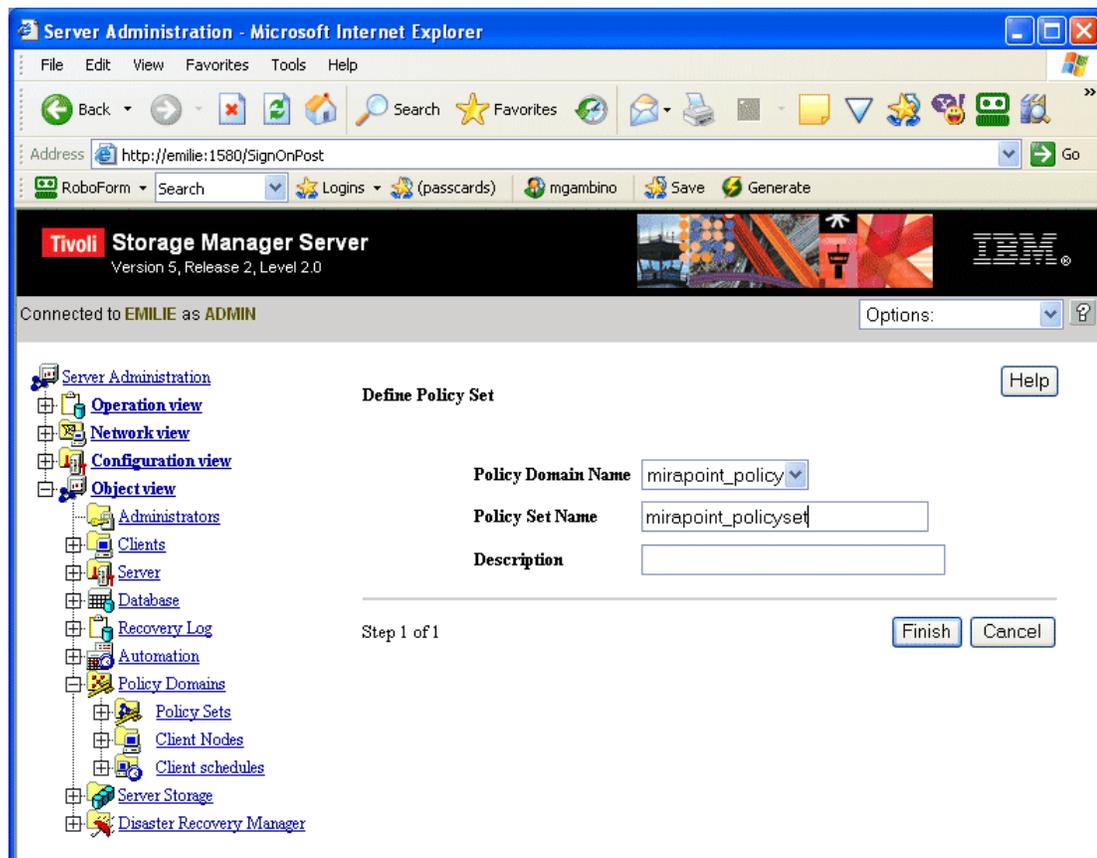


Figure 14 Setting Policy Set Options

Defining a Default Management Class

A **management class** is a policy object that can be bound to a file to tell TSM how to manage it. Multiple management classes can be defined within a policy set. One class is designated as the default management class to be used when a user does not specify a management class for a file.

To create a management class and set it as the default management class:

1. Select **Object View > Policy Domains > Policy Sets > Management Classes** from the web interface tree.
2. Select **Define Management Class** from the **Operations** menu.

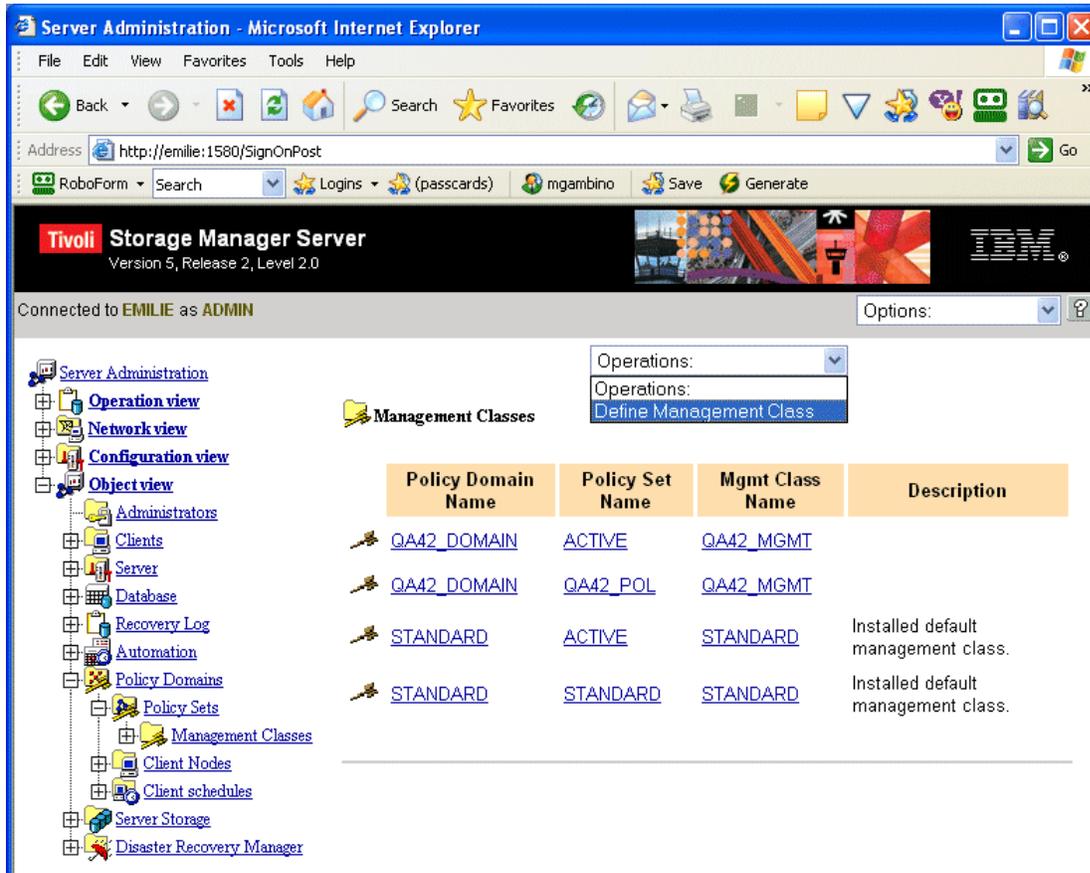


Figure 15 Define Management Class

3. On the **Define Management Class** page, select your policy domain and policy set, specify the management class name, and click the **Finish** button.

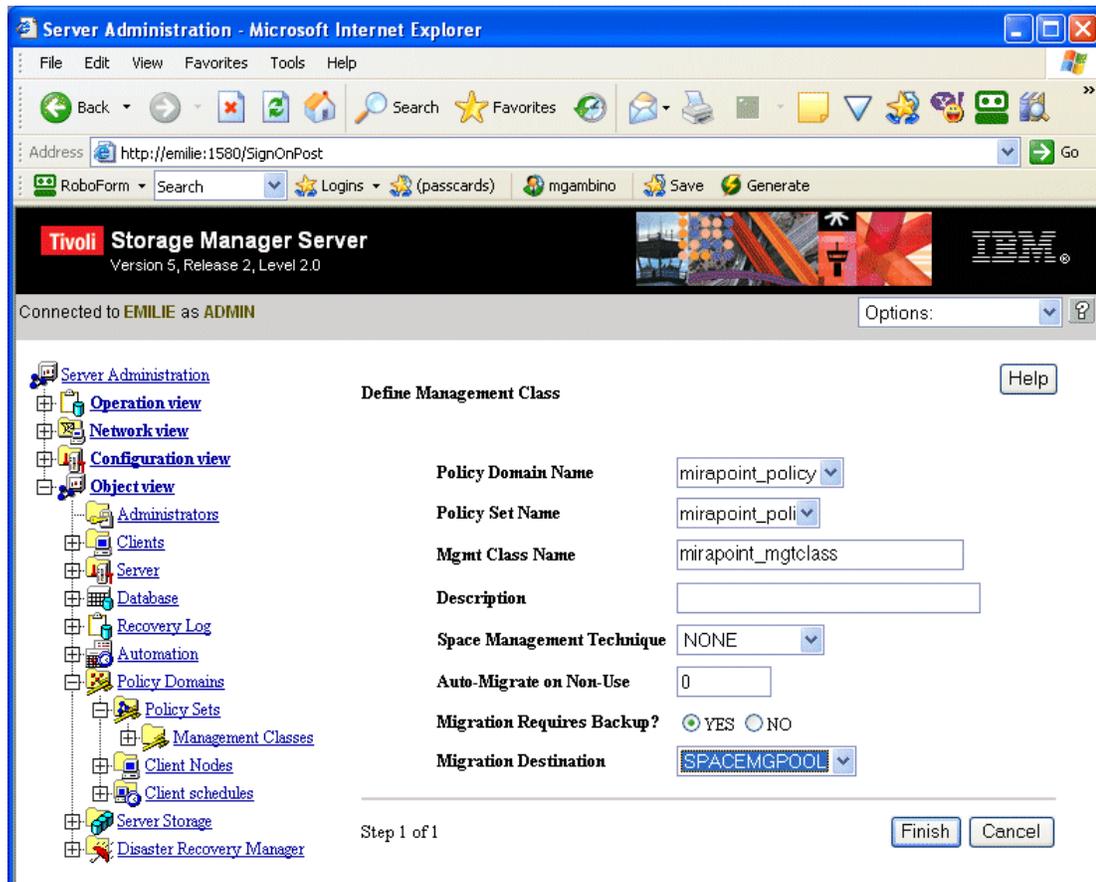


Figure 16 Setting Management Class Options

4. Go to Object View > Policy Domains > Policy Sets > Management Classes and select your new management class.
5. Select Assign Default Management Class from the Operations menu.

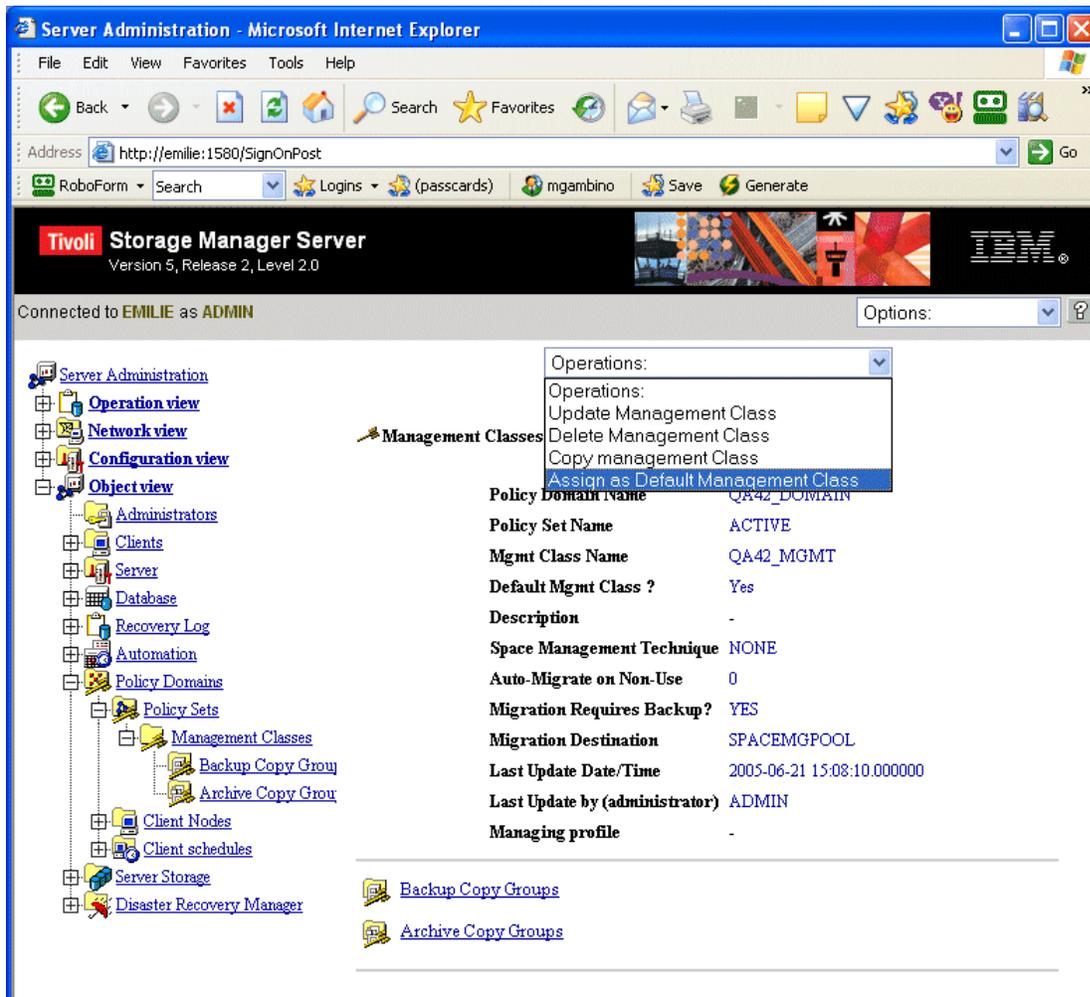


Figure 17 Setting the Default Management Class

Defining a Backup Copy Group

The **backup copy group** specifies how the server should manage backup versions of a file. When you define a backup copy group for NDMP backups, the **copy destination** must be the storage pool you created for backup images, and the **TOC destination** must be the disk pool volume you created for the table of contents.

You need to set the copy frequency and backup version retention attributes according to your site's backup policies and requirements.

To create a backup copy group:

1. Select Object View > Policy Domains > Policy Sets > Management Classes > Backup Copy Group from the web interface tree.
2. Select Define Backup Copy Group from the Operations menu.

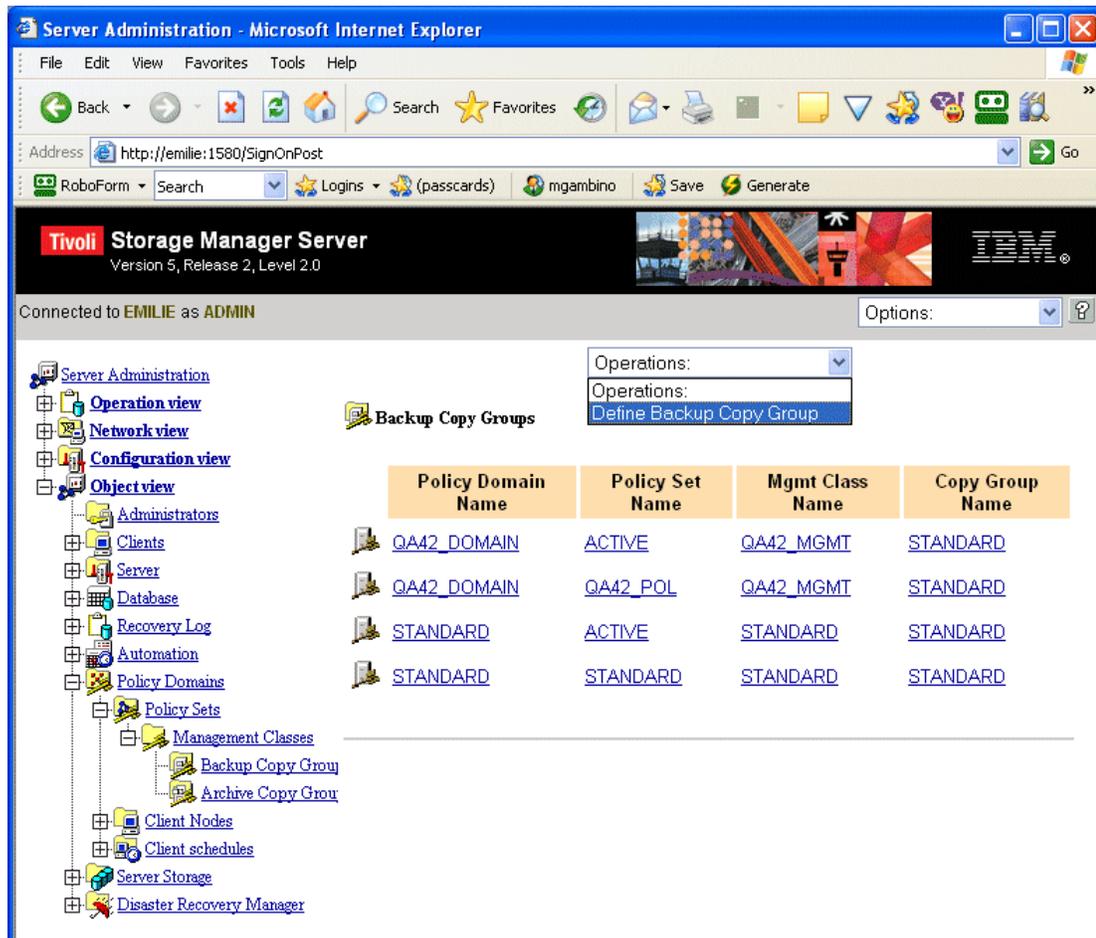


Figure 18 Define Backup Copy Group

3. On the Define Backup Copy Group page, select the policy domain, policy set, and management class for the copy group, set the **Copy Destination** to your backup storage pool, and set the **TOC Destination** to the disk volume you created for the backup TOC.

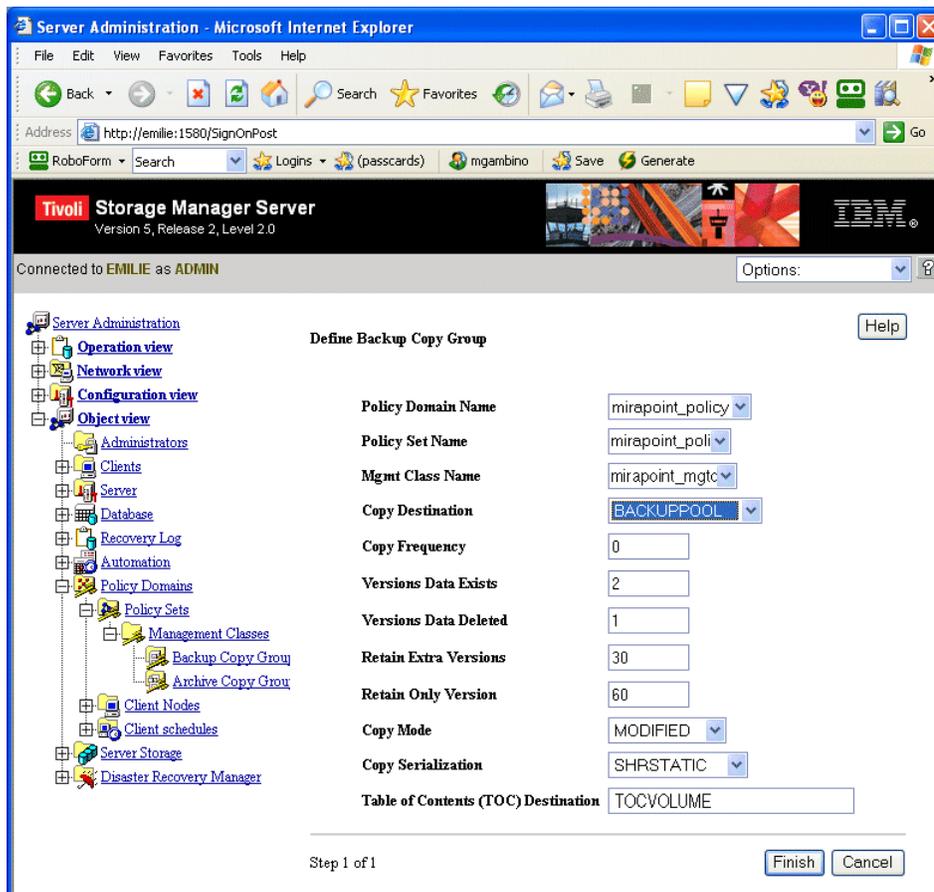


Figure 19 Setting Backup Copy Group Options

4. Set the **copy frequency**, **version retention** attributes, **copy mode**, and **copy serialization** according to your site's backup policies and requirements.
5. Click the **Finish** button to save your changes.

Activating a Policy Set

Once you have defined your policies for NDMP backups, you need to activate your policy set. To activate a policy set:

1. Select **Object View > Policy Domains > Policy Sets** from the web interface tree.
2. If you have multiple policy sets, select your NDMP policy set.
3. Select **Activate Policy Set** from the **Operations** menu.

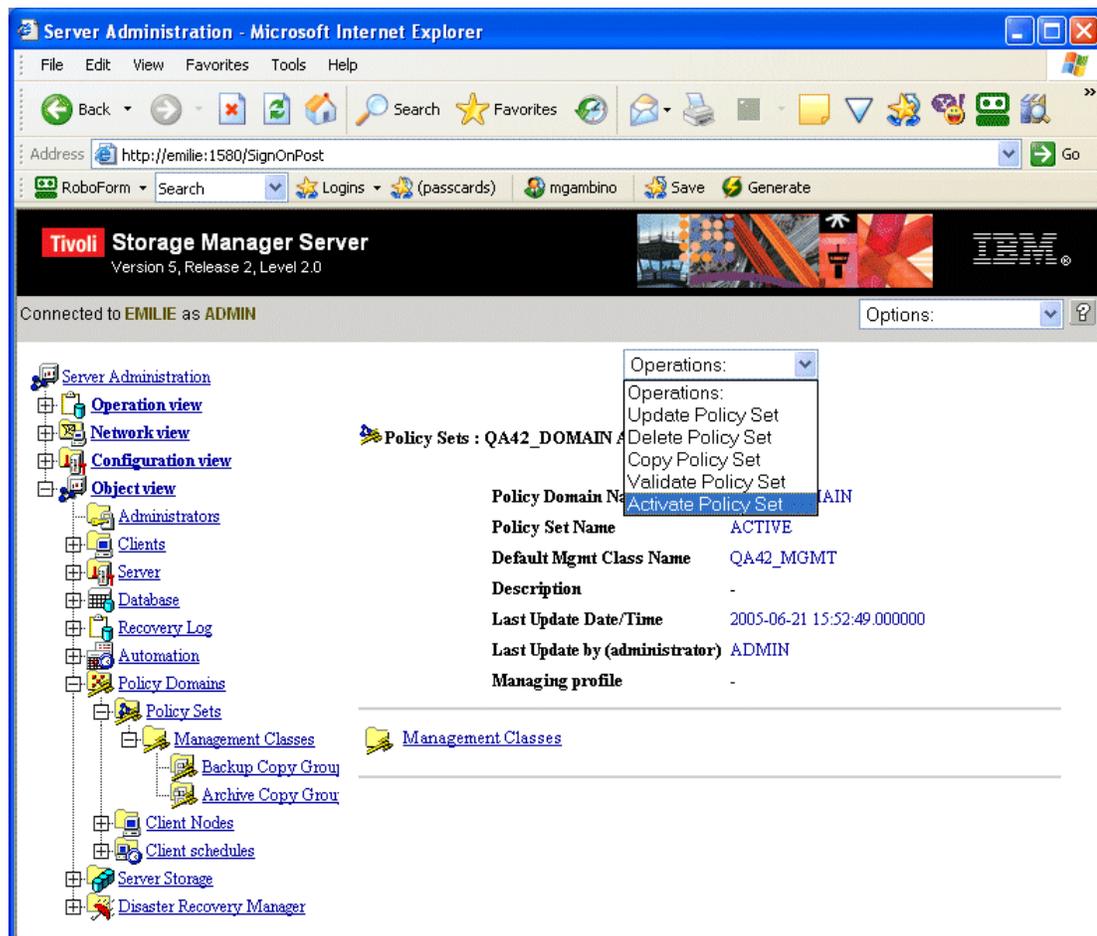


Figure 20 Activate Policy Set

Registering a Mirapoint Appliance as a NAS Node

To perform NDMP backups, you need to register your Mirapoint appliance with TSM as a Network Attached Storage (NAS) node. When you define the node, you specify a name for the node, set the node type to **NAS**, and set its domain to the name of your NAS policy domain. The Mirapoint system name is typically used as the NAS node name.

To register a NAS node for Mirapoint:

1. Select **Object View > Work with Client Nodes > Register a New Node** from the web interface tree.
2. On the **Register a New Node** page, specify a name and password for your Mirapoint NAS node, select your NDMP policy domain, select **NAS** as the node type, and click the **Finish** button.

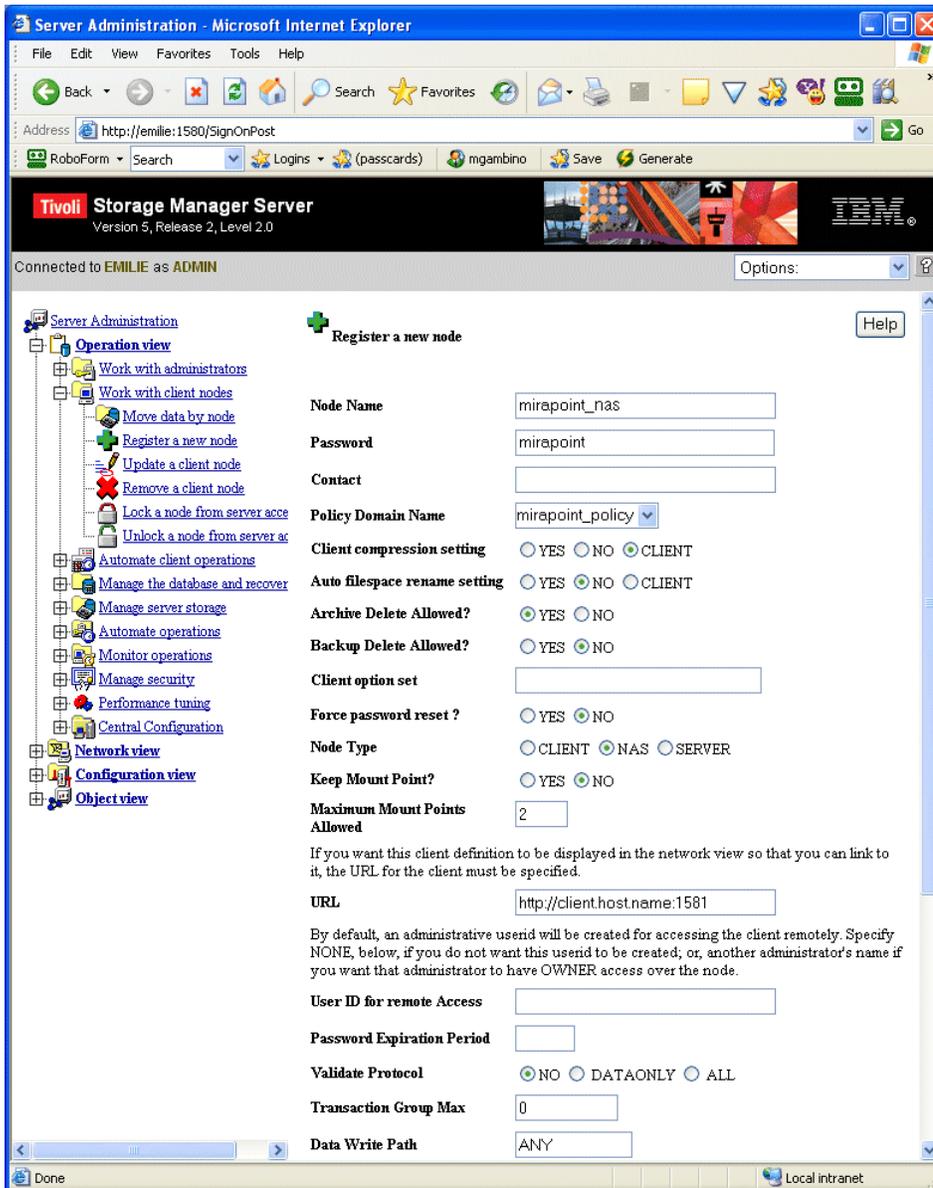


Figure 21 Setting Node Options

Defining a Data Mover for Mirapoint

You create a **data mover** object to designate the Mirapoint appliance as the data mover for your NDMP backups. The data mover provides the appliance's network address, authorization information, and data formats so TSM can initiate NDMP operations. In the data mover definition:

- ◆ The **data mover name** must match the node name that you specified when you registered the Mirapoint appliance as a NAS node.
- ◆ The **IP address** (high-level address) is the address of the Mirapoint appliance, specified as either a numerical IP address or host name.
- ◆ The **TCP/IP port number** (low-level address) is the IP port to be used for NDMP sessions with the Mirapoint appliance. The default is port number 10000.
- ◆ The **user ID** is the admin ID for the Mirapoint appliance.
- ◆ The **password** is the admin password for the Mirapoint appliance.
- ◆ The **data format** is the data format used for Mirapoint backups, NDMPDUMP. (The data format must match the data format of the target storage pool.)

To define a data mover:

1. Select **Object View > Server Storage > NAS Data Movers** from the web interface tree.
2. Select **Define Data Mover** from the **Operations** menu.

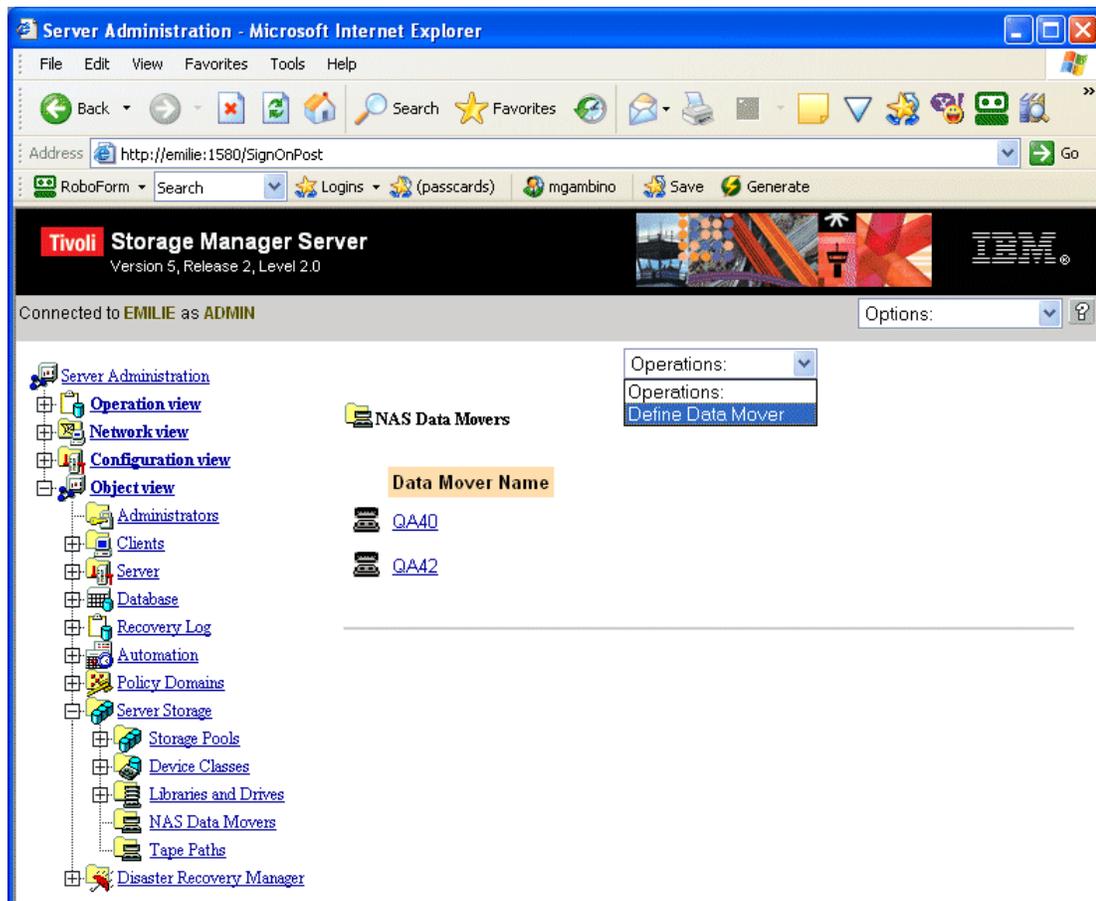


Figure 22 Define Data Mover

- On the **Define Data Mover** page, specify a name for the data mover that is the same as the NAS node created for your Mirapoint appliance, enter the IP address and administrative user name and password for the appliance, select **NDMPDUMP** as the data format, and click the **Finish** button.

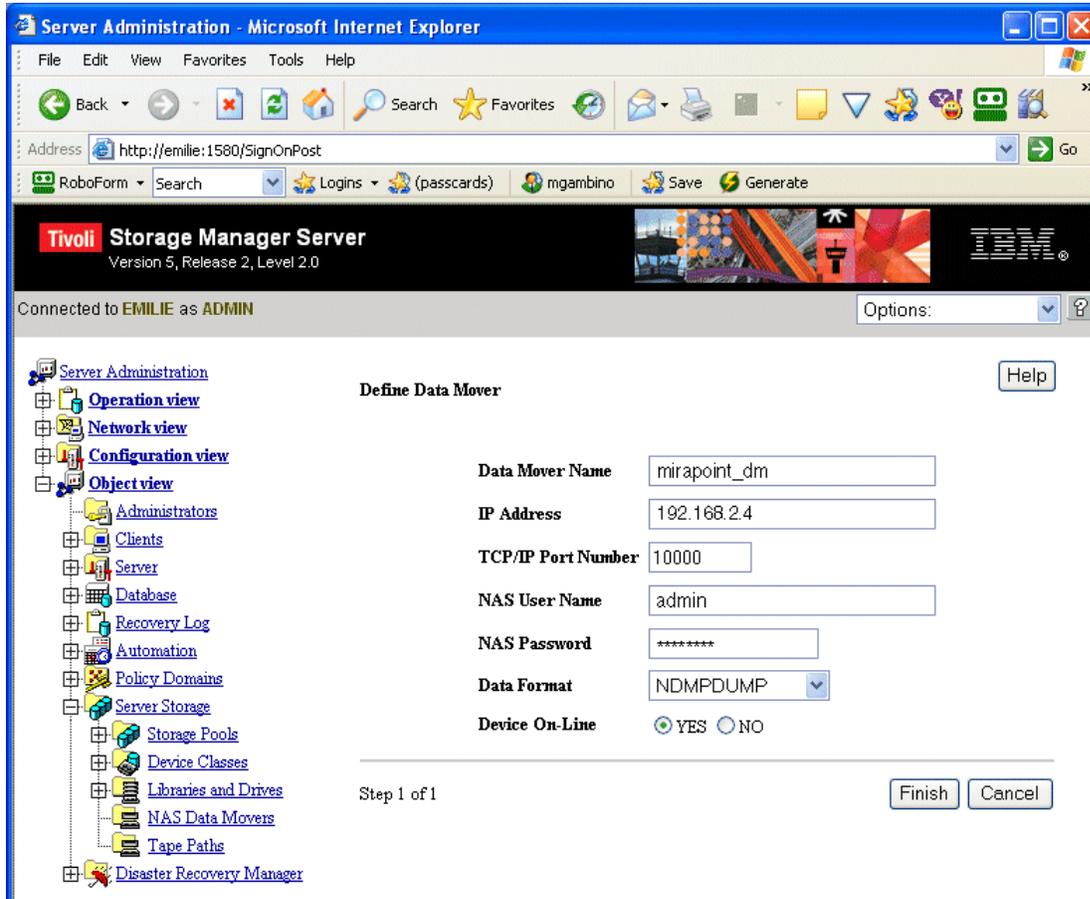


Figure 23 Setting Data Mover Options

Setting the Library Path

To enable TSM to access your autochanger, you need to define a **library path** that indicates where it is located. For Mirapoint backups, the autochanger is always attached to the Mirapoint appliance. In the definition of the library path:

- ◆ The **source** is the name of the NAS node registered for your Mirapoint appliance.
- ◆ The **destination** is the name of the library that corresponds to your autochanger.
- ◆ The **source type** is **DATAMOVER**.
- ◆ The **device** is the device name of your autochanger.

Typically, the autochanger device name is the special device name `/dev/ch0`. You can retrieve the device name of your autochanger by running the Mirapoint Diag Get

Changeraddress command. For more information see [Getting the Name of an Autochanger](#) on page 3.

To set the library path:

1. Select **Object View > Server Storage > Tape Paths** from the web interface tree.
2. Select **Define Library Path** from the **Operations** menu.

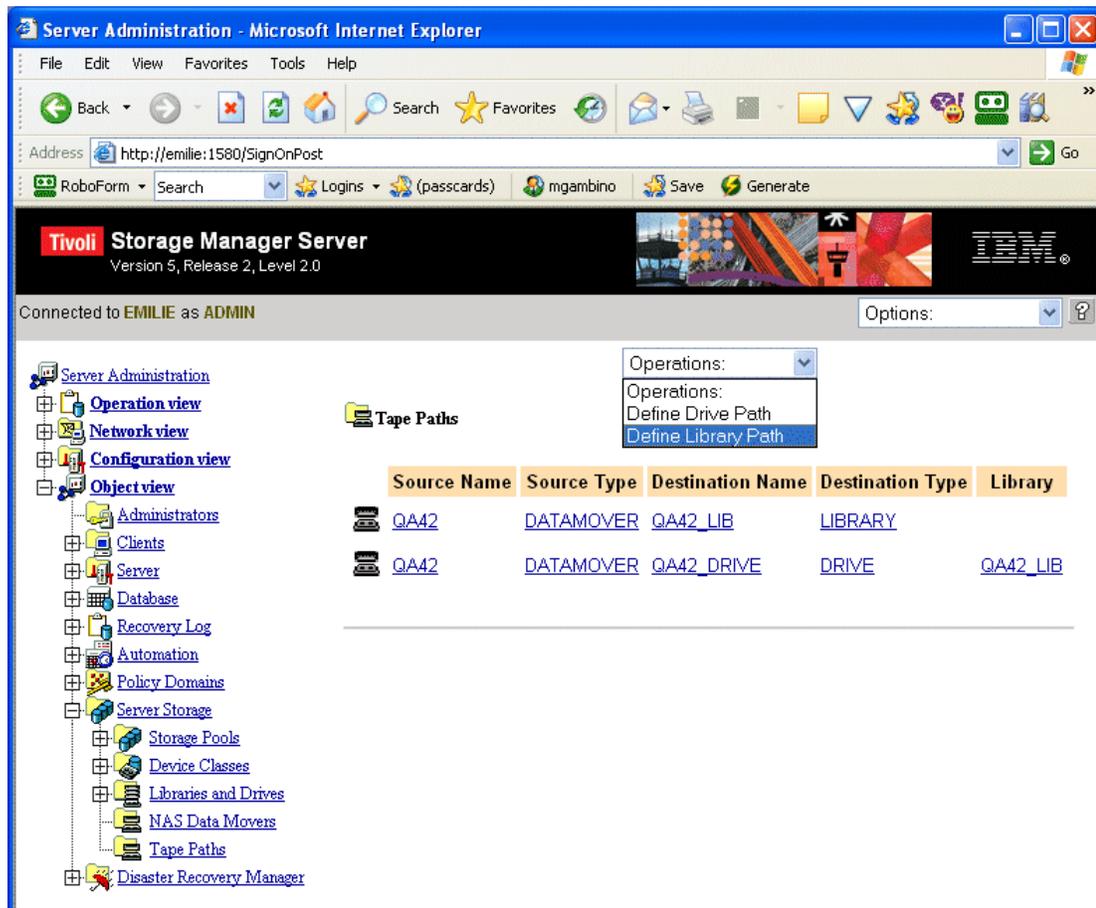


Figure 24 Define Library Path

3. Specify the name of the NAS node you registered for your Mirapoint appliance as the **source**, select the TSM library that corresponds to your autochanger as the **destination**, select **DATAMOVER** as the **source type**, specify the device name of your autochanger as the **device**, and click the **Finish** button.

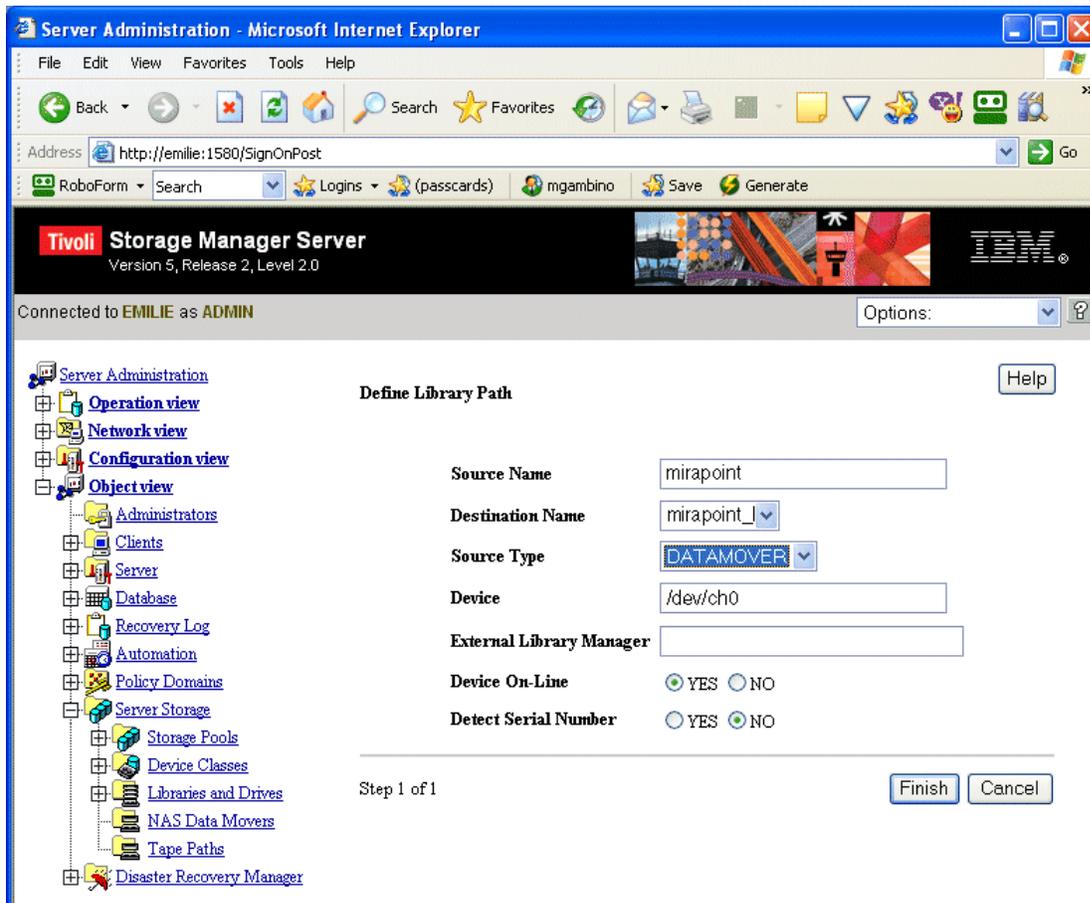


Figure 25 Setting Library Path Options

Defining Drive Objects for Individual Tape Drives

You need to create a unique **drive** object for each individual drive in your autochanger. When you create a drive object, you specify a name for the drive, the name of the library to which it belongs, and the drive element number. You can retrieve the drive element number using the Mirapoint **Diag Get Datatxferlementaddr** command. For more information see [Getting Drive Names and Element Numbers](#) on page 4.

To create a drive object:

1. Select **Object View > Server Storage > Libraries and Drives > Automated Drives** from the web interface tree.
2. Select **Define Automated Drive** from the **Operations** menu.

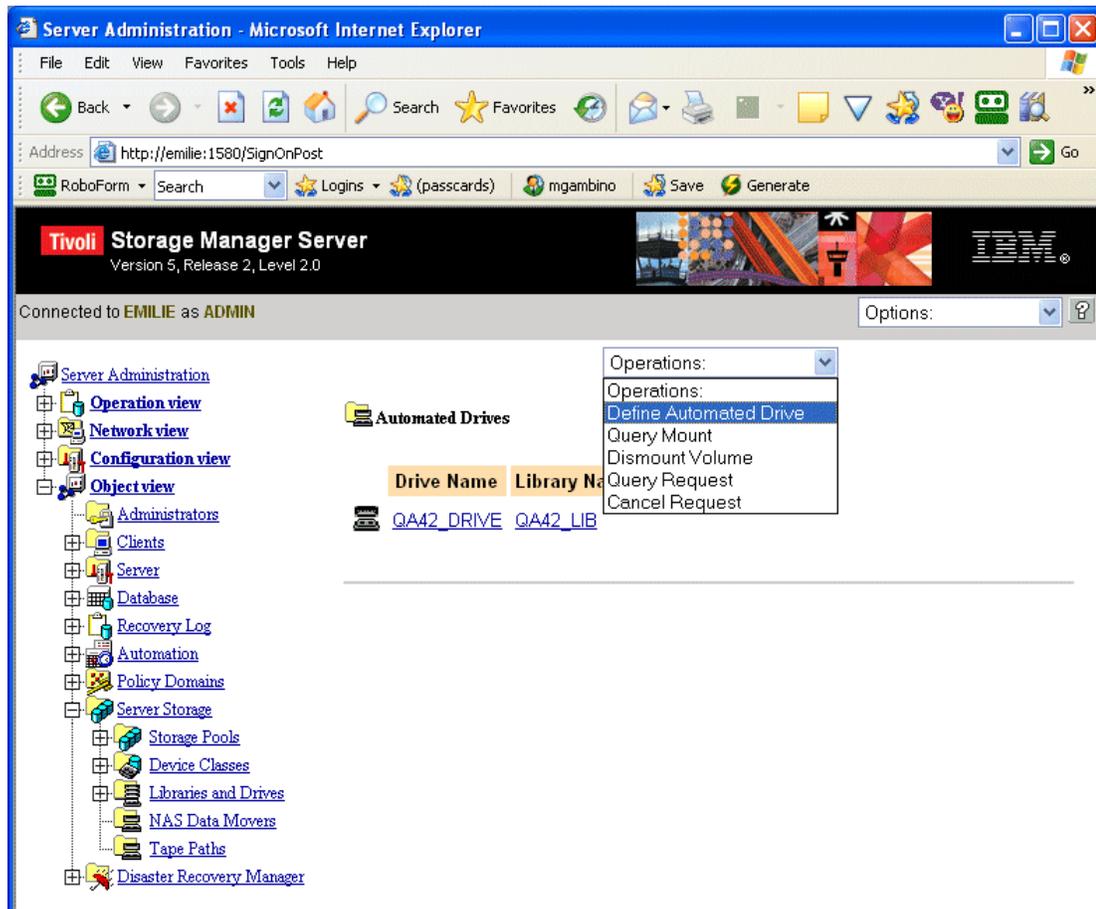


Figure 26 Define Automated Drive

3. Select the name of your tape library, enter a name for the drive, specify the drive element number, and click the **Finish** button.

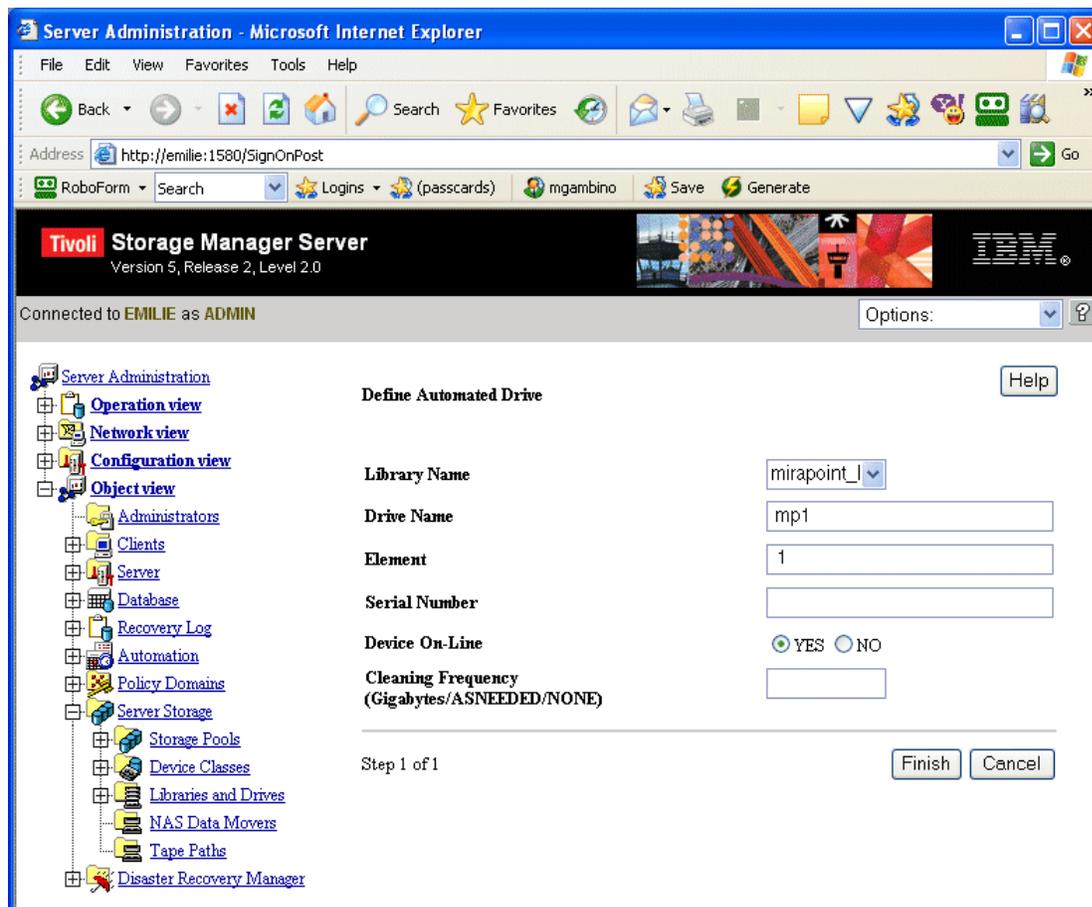


Figure 27 Setting Drive Options

Defining Drive Paths for Individual Tape Drives

Once you've defined a drive object in TSM, you need to set its path to point to the appropriate drive in your autochanger.

In the definition of the drive path:

- ◆ The **source name** is the name of the data mover defined for the NAS node registered for your Mirapoint appliance.
- ◆ The **destination name** is the name of the drive.
- ◆ The **source type** is DATAMOVER.
- ◆ The **device** is the device name of the drive (for example, /dev/nrsa0)

You can retrieve the device names of the drives in your autochanger by running the Mirapoint **Diag Get Tapeaddress** command. For more information, see [Getting Drive Names and Element Numbers](#) on page 4.

To set the drive path:

1. Select **Object View > Server Storage > Tape Paths** from the web interface tree.
2. Select **Define Drive Path** from the **Operations** menu.

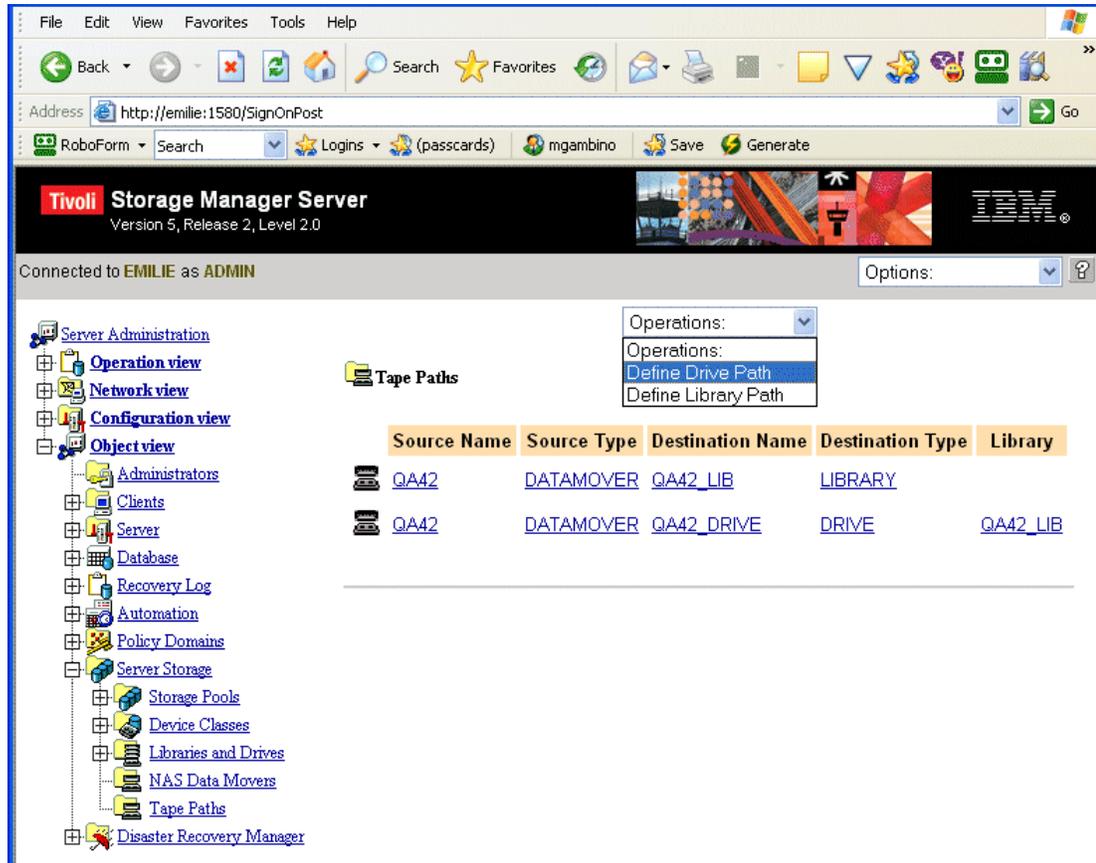


Figure 28 Define Drive Path

3. On the **Define Drive Path** page, enter the name of the data mover for your Mirapoint NAS node as the source name, select the name of the drive, select **DATAMOVER** as the source type, select the name of your tape library, enter the drive's device name, and click the **Finish** button.

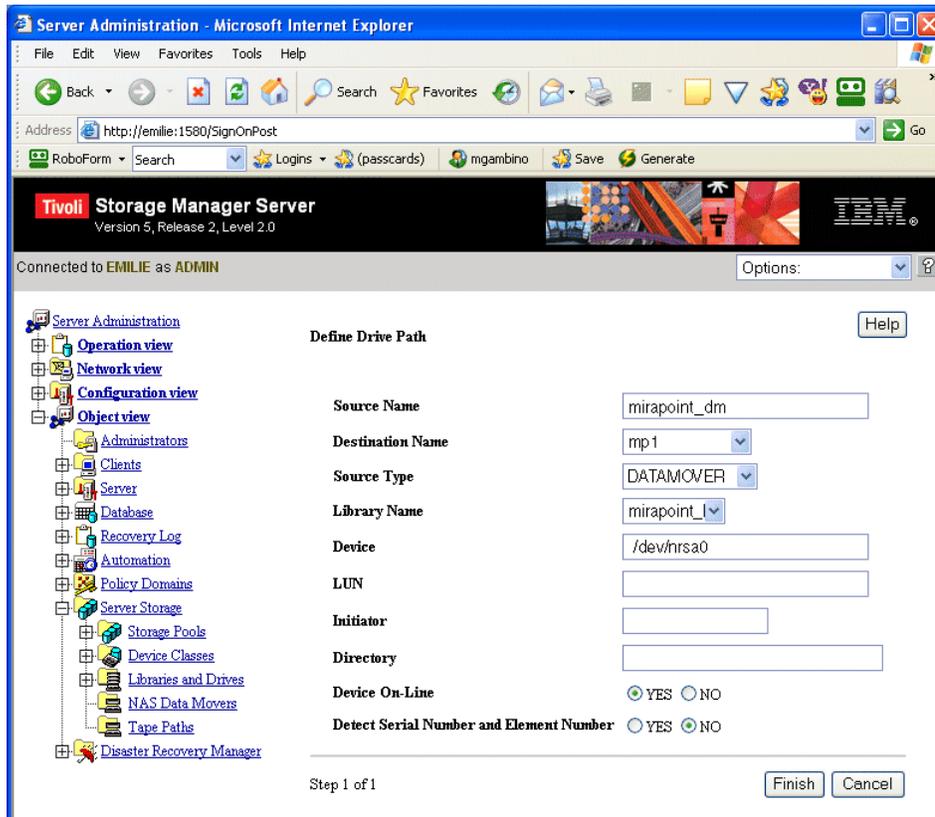


Figure 29 Setting Drive Path Options