FAStT Storage Manager

Demo Guide

Version 9.1

October 13, 2004

Contents

Introduction

Audience

Welcome to the *FAStT Storage Manager Demo Guide*.

The audience for this demo guide are technically-oriented members of the sales community who wish to understand more about how the FAStT Storage Manager works. This guide is also for members of Field Sales wishing to use this tool to demonstrate capabilities of the FAStT Storage Manager.

Goals of this Document

During the sales cycle, the FAStT Storage Manager Demo can be a powerful tool in demonstrating how quickly and easily IBM storage subsystems can solve business problems.

This document fulfills two goals:

- To familiarize you with the workings of the FAStT Storage Manager Demo software. This goal is addressed by the two sections:
  - "Getting Started" on page 3: This section guides you through the process of installing the FAStT Storage Manager Demo software and setting up a baseline environment
  - "FAStT Storage Manager " on page 13: This section further explores the FAStT Storage manager functions, providing tutorials for setting up and using both basic and premium features.
- To enable you to put together a demo of the FAStT Storage Manager product for your prospects, and customers that is tailored to their business needs and storage requirements.

  "Putting Together An Effective Demo" on page 57 addresses this goal through the presentation of a series of typical business and sales scenarios.

New for this Version

New for this version of the demo guide, FSM 9.1 adds support for Remote Mirroring for the FAStT600 Turbo. In addition, Remote Mirroring includes asynchronous mirroring as well as asynchronous mirroring with write order consistency.

Users of Earlier Versions

The basic functions described in this demo guide apply to all versions of the FAStT Storage Manager beginning with 8.0.

Users of FSM versions previous to 8.4 will find that the VolumeCopy premium feature is not supported - it is available only with 8.4 or beyond.

FSM 8.41 adds support for the EXP100 Drive Expansion Unit which supports Serial ATA (SATA) drive technology.

FSM 8.42 adds support for the FAStT100 which offers SATA drive technology.

Getting Started

Background Information

The FAStT Storage Manager (FSM) Demo was originally designed for use in testing environments as a stand-alone simulator of FSM functions. With each revision of FSM, the demo program has been updated with new features.

To prevent accidental access to or corruption of critical data, the FSM Demo does not have the ability to access actual storage subsystems.

Prerequisites

The FSM Demo program runs on Windows 2000 environments. Other environments have not been tested nor are they approved for use.

Loading the software

The FSM Demo program is available from a variety of sources (CD, web, etc.) and comes in the form of a self-contained executable file.

Executing this file creates a folder named in the form of ***SMclientDemo9910G505***. This folder contains all necessary files to install and establish the FSM Demo in a new folder on your system.

In the *SMclientDemo9910G505* folder, run the *setup.exe* program to install the demo. The installation process creates a separate folder for the demo. The new folder is named ***SMDemo***.

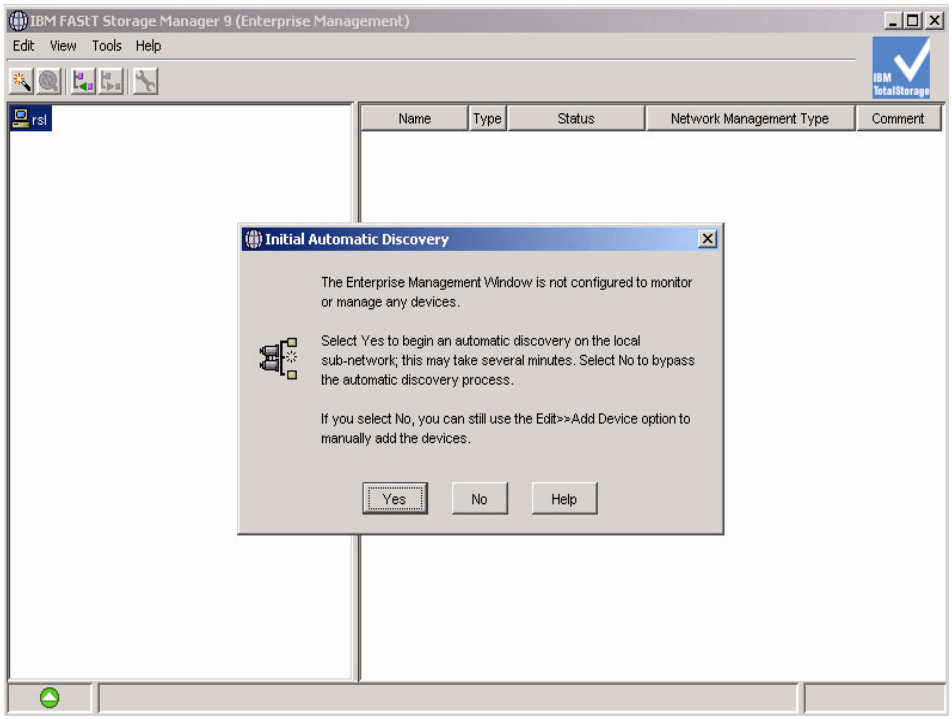
To start using the FSM Demo, simply go to the *SMDemo* folder and execute the batch file named *RunDemo*. *RunDemo* executes a series of commands to start the demo environment.

You're ready to go!

NOTE When the installation of the FSM Demo is completed, it is *not* necessary to reboot your system before executing the *RunDemo* batch file.

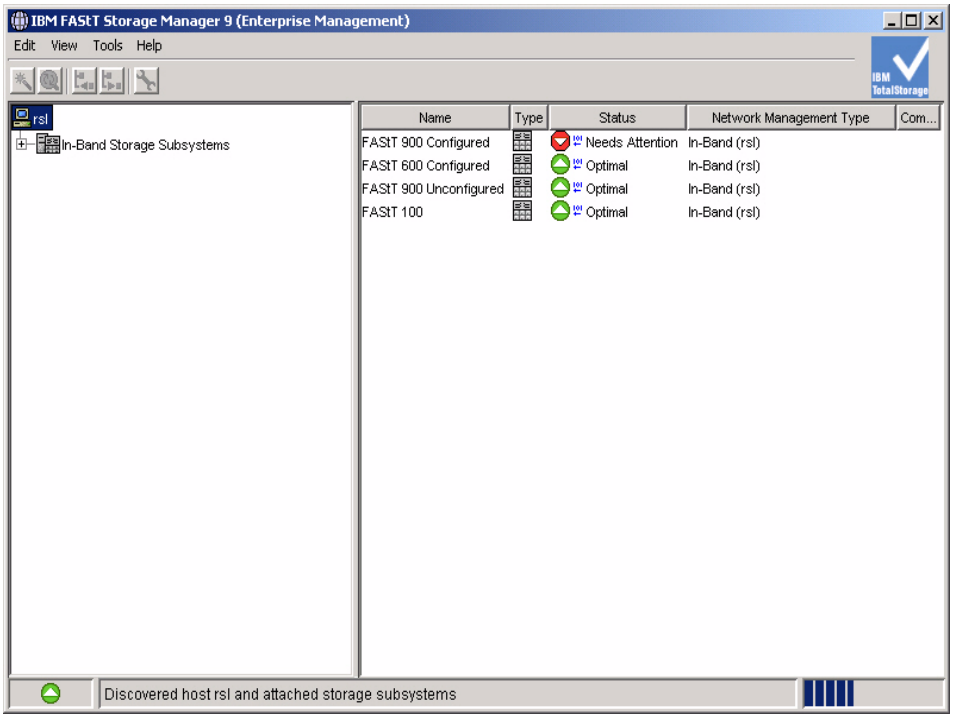
Exploring the FSM Demo Program

Executing SMDemo.bat starts a Java session with the FSM Demo program. You'll see a splash screen identifying the FSM demo followed by the opening screen:



The **Initial Automatic Discovery** dialog box is intended to search for FAStT storage subsystems on the local network. For our demo purposes, the demo program simulates four preconfigured storage subsystems.

Click the **Yes** button to use the four preconfigured storage systems. You will then see the **Enterprise Management** window describing the four configurations:

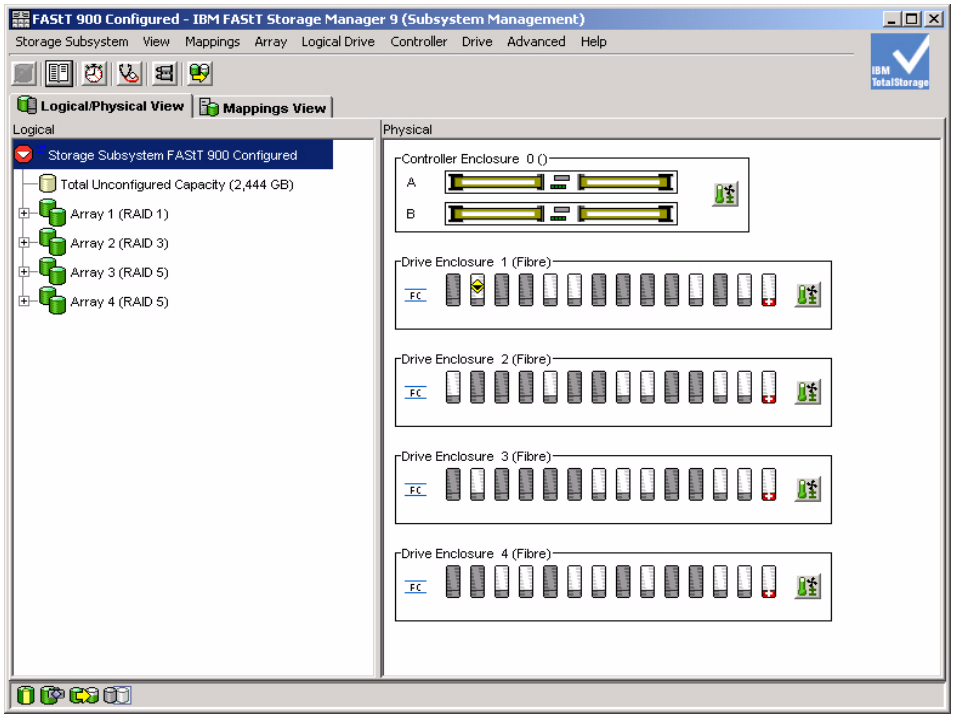


The four storage subsystems are configured as follows:

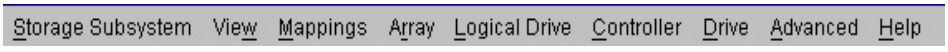
- **FAStT 900 Configured** – four drive enclosures with all of the FSM premium features enabled. There are several storage arrays configured using different RAID levels. Note that the status for this subsystem requires attention and is noted with a red icon.
- **FAStT 600 Configured** – one drive enclosure and four arrays with only the Remote Mirroring premium feature enabled.
- **FAStT 900 Unconfigured** – two drive enclosures, with no defined arrays and no FSM premium features enabled.
- **FAStT 100** - one drive enclosure with one array and no FSM premium features enabled.

For our exploration of the FSM Demo, we'll use the first storage subsystem configuration, ***FAStT 900 Configured***.

Select the ***FAStT 900 Configured*** configuration by double-clicking it in the right panel. This displays the **Subsystem Management** window:



The menu bar of the **Subsystem Management** window provides access to all the components and functions of the FAStT storage subsystem:



where:

- **Storage Subsystem** provides access to:
  - Premium features
  - Remote mirroring
  - Performance monitoring
  - Recovery Guru
- **View** provides access to:
  - Physical view of the system
  - Mapping of logical drives to hosts
  - Event logs
- **Mappings** allows:

    - Defines, moves, and changes to logical drives
- **Array** allows changes to:
    - Create logical drives
    - Add free capacity
    - Initialization
- **Logical Drive** provides the ability to:
    - Create, initialize, delete, rename
    - Volume Copy
    - Remote Mirror
    - Flash Copy
- **Controller** allows changes:
    - Set Online/Offline
    - Run Diagnostics
- **Drive** allows changes:
    - Initialize, reconstruct, revive
    - Hot spare
- **Advanced** allows
    - Firmware downloads
    - Persistent reservation

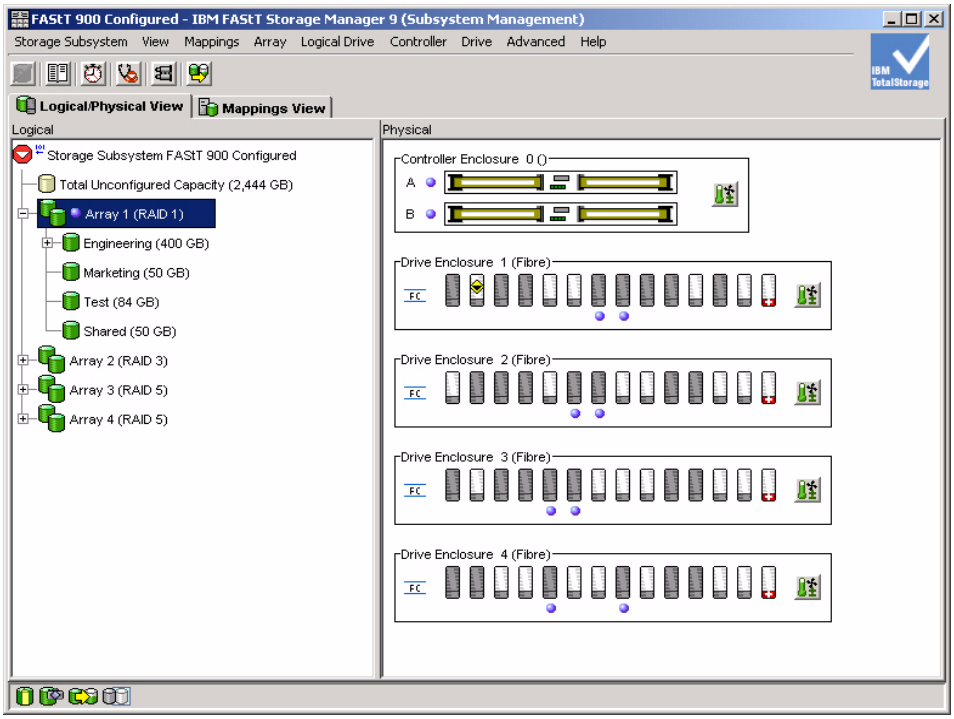
Just below the menu bar are icon shortcuts to more popular options.

From left to right, the icons are:

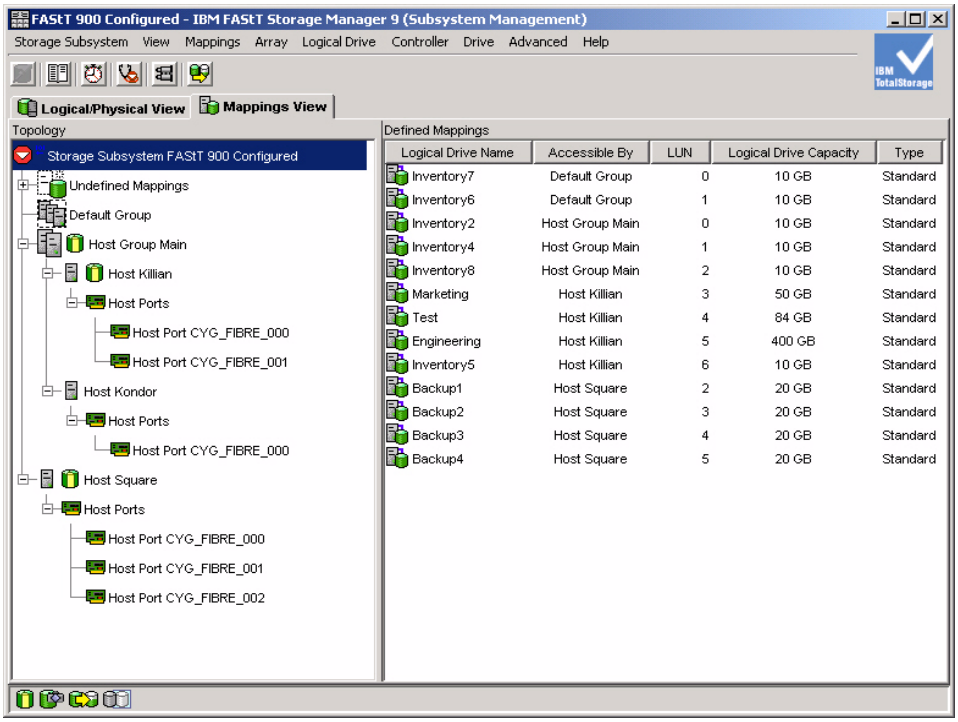
- **Create** new logical drives
- **View** diagnostic event log
- **Monitor** performance
- **Recover** from failures
- **Find node** in tree
- **Launch** Copy Manager

Below the icon shortcuts are the tabbed views for **Logical/Physical View** and **Mappings View**.

The first tab, **Logical/Physical View**, provides a visual display of the arrays: where the drives are located and the logical drives created from these arrays.



The second tab, **Mappings View**, provides a view of how each logical drive is mapped to a host:

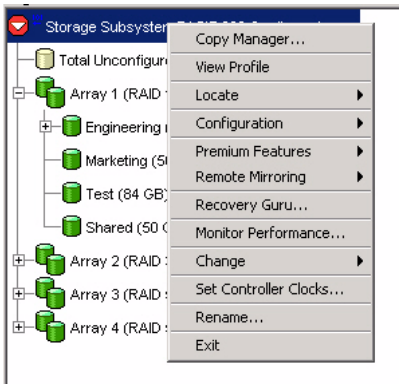


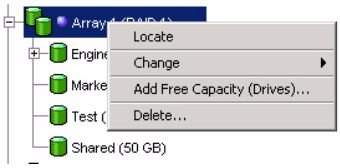
Returning to the **Physical View**, clicking on any of the array icons displays the logical drives defined for that particular array. In this example **Array1** has four logical drives – **Engineering**, **Marketing**, **Test**, and **Shared**:

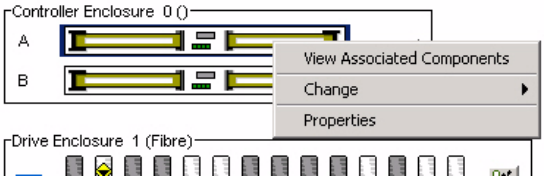
In the right panel are the controller and the drive enclosure objects. Clicking on an item within the respective objects enables access and control of the specific device or controller.

In general, selecting an object (array, logical drive, controller, drive) and right-clicking pops up a list of commands associated with the object. The same control is also achieved by using the equivalent menu selection item. For example, right-clicking a **logical drive** in **array1** is the same as clicking on the **Logical Drive** menu option.

The examples below show that right-clicking of a storage object pops up a list of allowed functions for that object:


Copy Manager...
View Profile
Locate
Configuration
Premium Features
Remote Mirroring
Recovery Guru...
Monitor Performance...
Change
Set Controller Clocks...
Rename...
Exit
Total Unconfigur
Array 1 (RAID
Engineering
Marketing (5
Test (84 GB)
Shared (50
Array 2 (RAID
Array 3 (RAID
Array 4 (RAID


Locate
Change
Add Free Capacity (Drives)...
Delete...
Engine
Marke
Test (
Shared (50 GB)


Controller Enclosure 0 ()
A
B
View Associated Components
Change
Properties
Drive Enclosure 1 (Fibre)

Setting up a Demo Environment

The FAStT Storage Manager Demo is self-contained and runs on virtually any Windows 2000 system.

With the four pre-configured storage subsystems, you can select the appropriate storage subsystem as the basis to demonstrate features. For a simple but comprehensive walk-through of the FAStT environment, the ***FAStT 900 Configured*** storage subsystem is ideal. It contains several drive enclosures, a number of logical drives, and all of the premium features are enabled.

The second pre-configured storage subsystem, ***FAStT 600 Configured***, is ideal for demonstrating the FAStT600 Storage Server.

The ***FAStT 900 Unconfigured*** storage subsystem is suitable for any in-depth exploration of the FAStT Storage Manager feature set. Nothing is defined for the subsystem, so it can serve as a basis for developing all the arrays, logical drives, and enabling premium features that the ***FAStT 900 Configured*** storage subsystem contains.

The fourth configuration, ***FAStT100***, showcases the new SATA FAStT Storage Server. There is a single array with two logical drives and free capacity.

In consideration of the kind of demo environment you wish to set up, be sure to read the following section, “FAStT Storage Manager ”, to familiarize yourself with the manner in which the basic and premium features are accessed and defined.

You may also wish to read “Putting Together An Effective Demo” on page 57 to see how to customize the demo for your customer’s business needs and storage requirements.

FAStT Storage Manager

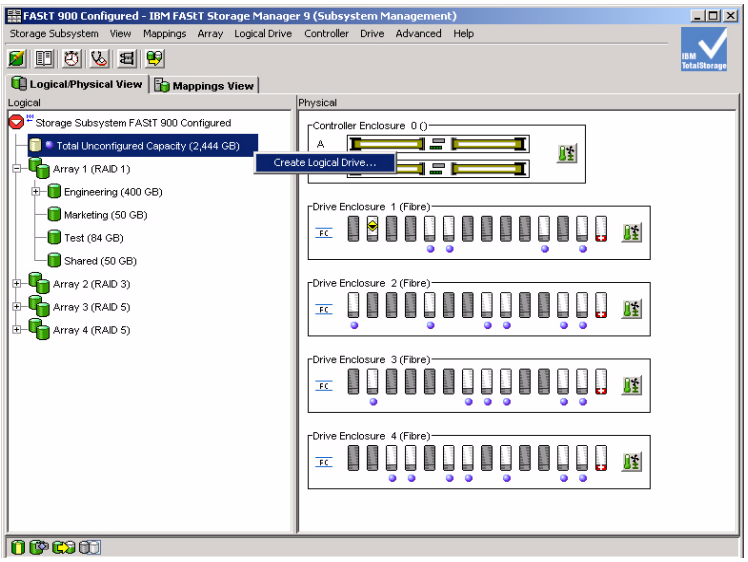
This section covers both basic and premium features of the FAStT Storage Manager (FSM):

- Basic Features
  - Logical Drive Creation
  - Dynamic Array Expansion
  - Dynamic RAID Migration
  - Performance Tuning
- Premium Features
  - FlashCopy
  - VolumeCopy
  - Remote Mirroring

NOTE The examples shown in this section are based on the ***FAStT 900 Configured*** storage subsystem described in "Getting Started" on page 3.

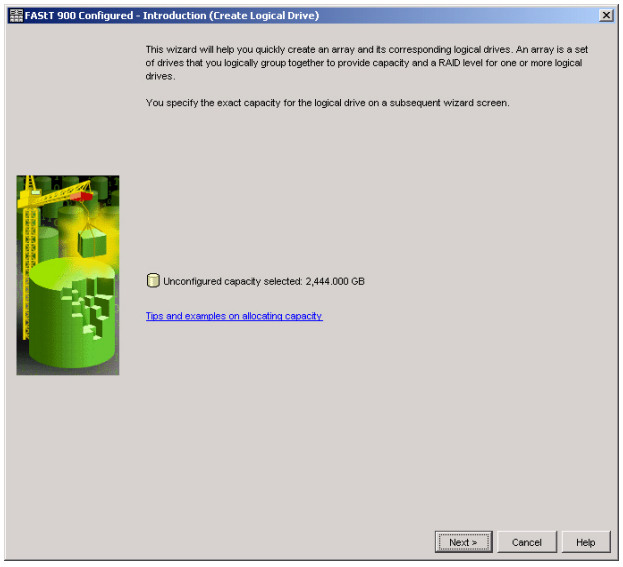
Logical Drive Creation (Basic Feature)

The FAStT Storage Manager provides an easy-to-use wizard for creating a logical drive of any size.

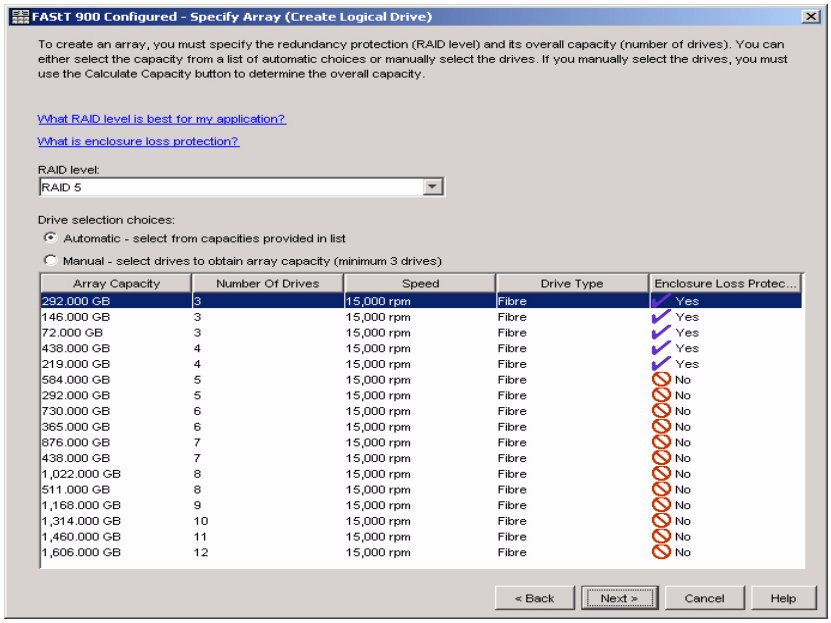


This wizard will assist you in creating a new array and within this new array, a new logical drive. Of course, you can create a new logical drive from an existing array with available unconfigured capacity.

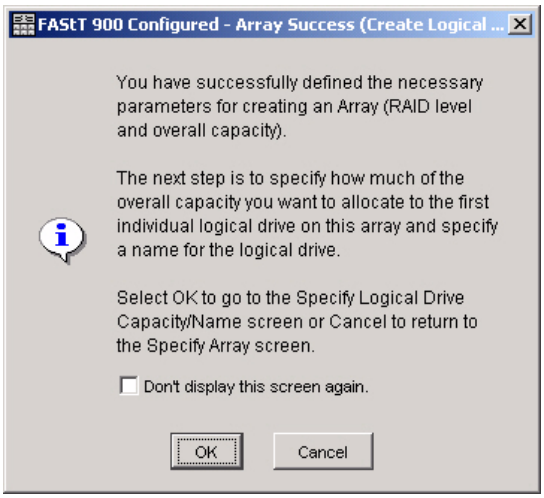
To start the wizard, right-click **Unconfigured Capacity** and select **Create Logical Drive**. The **Create Logical Drive Wizard** walks you through the following screens:



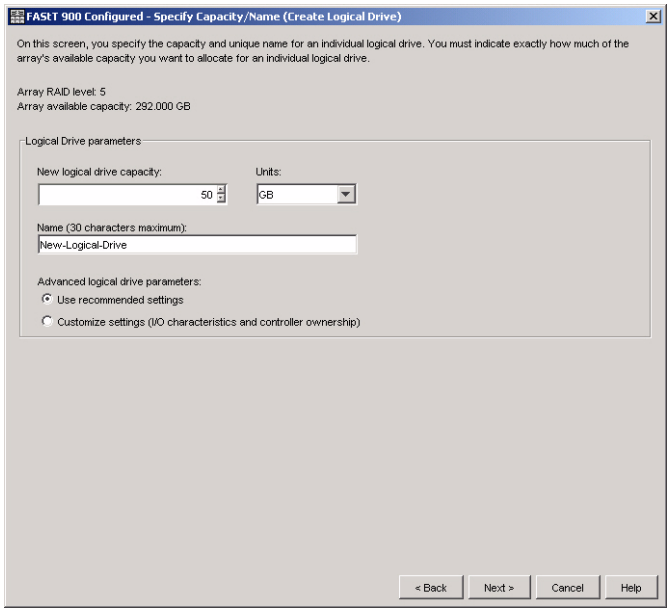
Select the array capacity and RAID level from the following:



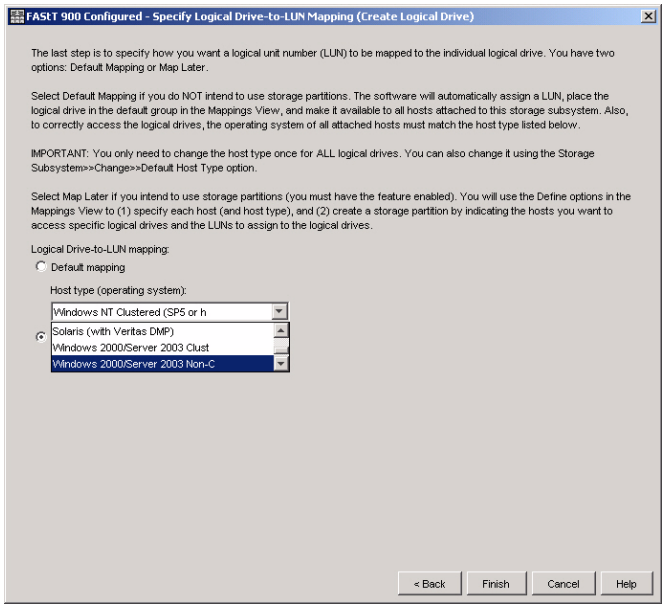
The array is created and the next step is to create the new logical drive.



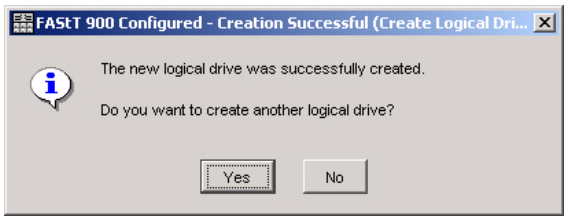
The next screen will ask you for specific parameters for your new logical drive. You can select the required capacity and specify a name for the new logical drive. For our example, we will use ***50GB*** and name the new logical drive ***New-Logical-Drive***:



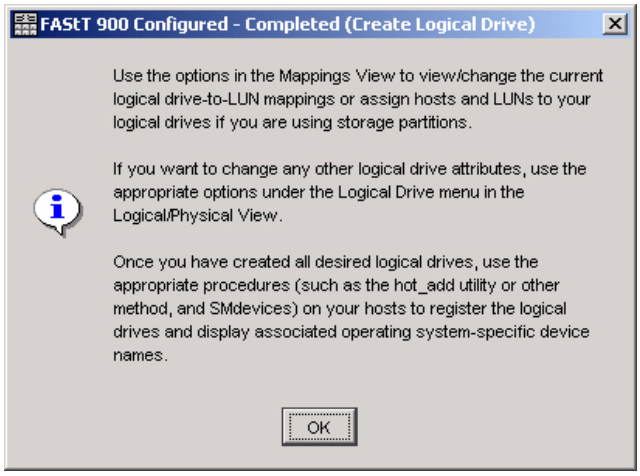
The next screen of the wizard asks you to specify the type of host environment that will be accessing this new logical drive. As shown in the next graphic, the pull-down list supplies a number of host environments from which you can select the required host OS environment:



Your new logical drive is created!



When you click the **Finish** button, the new logical drive is created and a validation message is displayed. If you wish to create another logical drive, you can specify if it is for the same array or a different array, then click **Yes** to perform the process for the new logical drive.

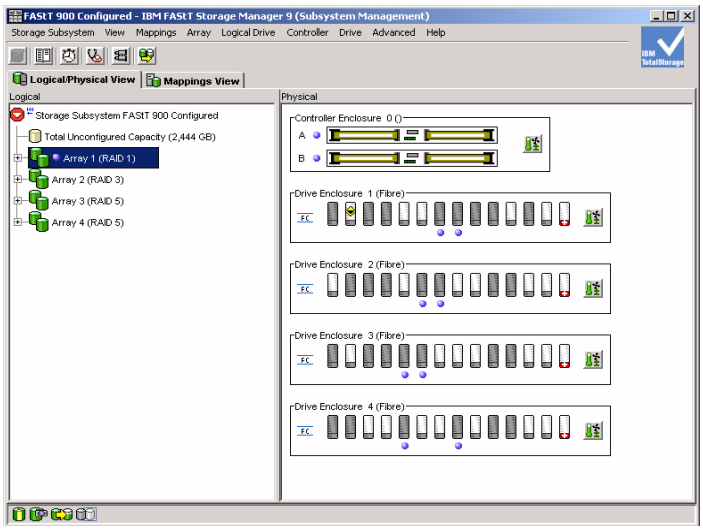


Once you have created all necessary logical drives, you can click **No** button in the validation dialog box and you're done!

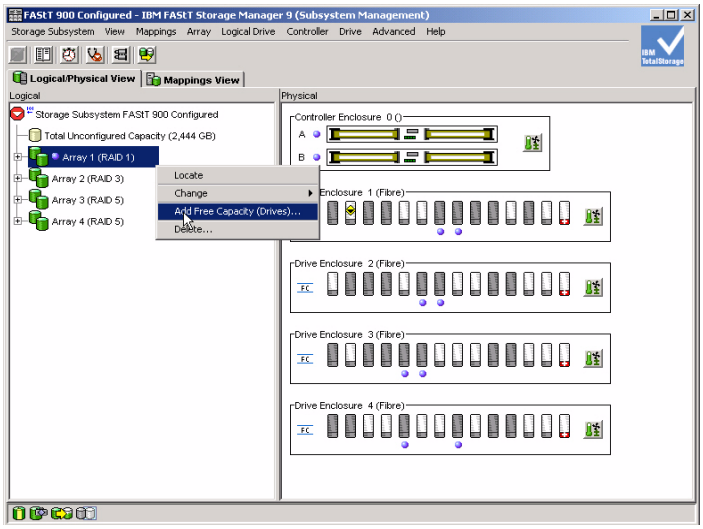
Dynamic Array Expansion (Basic Feature)

The FAStT Storage Manager provides an easy method to expand the capacity of an array by simply adding more drives to it.

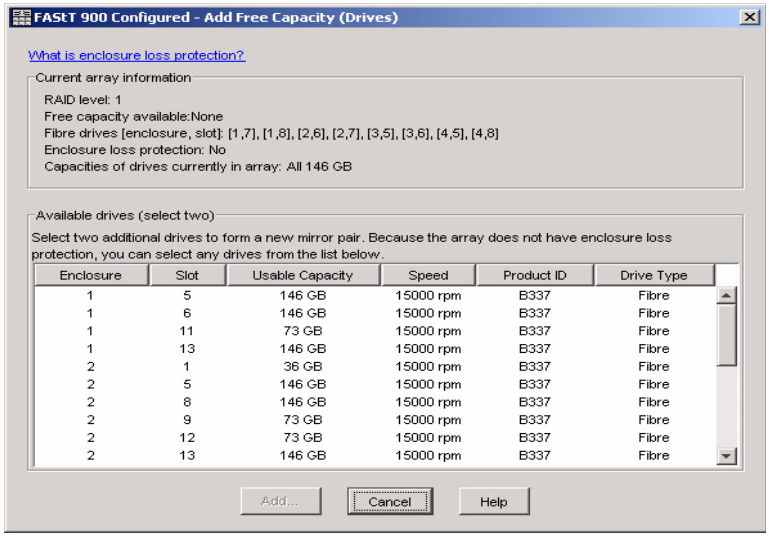
First, select the array that you wish to expand. For this example, select ***array 1***.



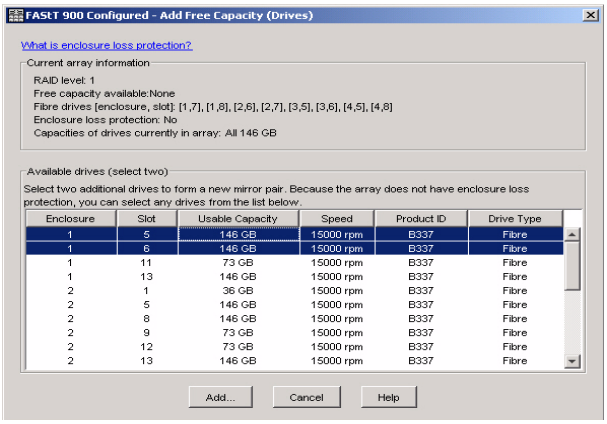
Right-click ***array 1*** and select **Add Free Capacity**.



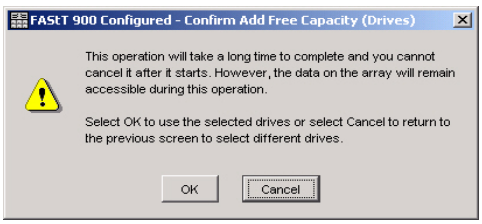
The **Add Free Capacity** dialog window displays, showing all drives that are available (unassigned) for use in dynamic array expansion. The **Array Information** section of the dialog window shows the RAID level and current drive capacities for the selected array. For our example, **Array 1** is shown as being **RAID level 1** and uses all **146GB** drives:



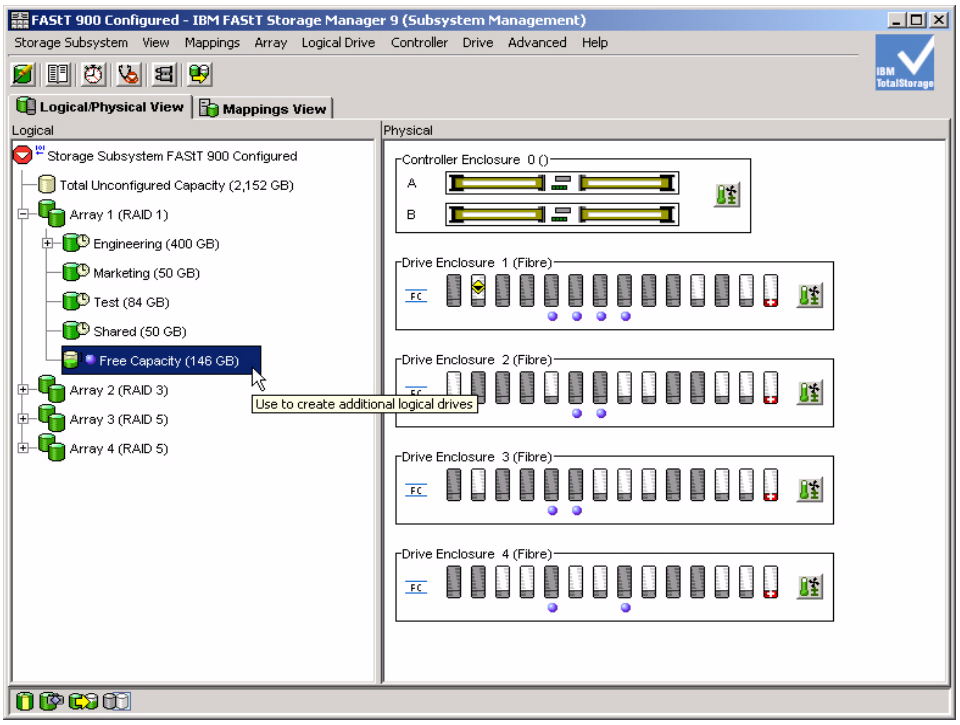
In the list box of **Available Drives**, select the number of drives to add (note that RAID 1 requires the selection of 2 drives):



You will then get a dialog box requesting confirmation of your wish to perform the operation to expand the array capacity:



If you wish to proceed with adding the specified drives, click the **Yes** button. An **In Progress** indicator is displayed until the operation is completed, after which you will see the original array with its new, upgraded capacity.

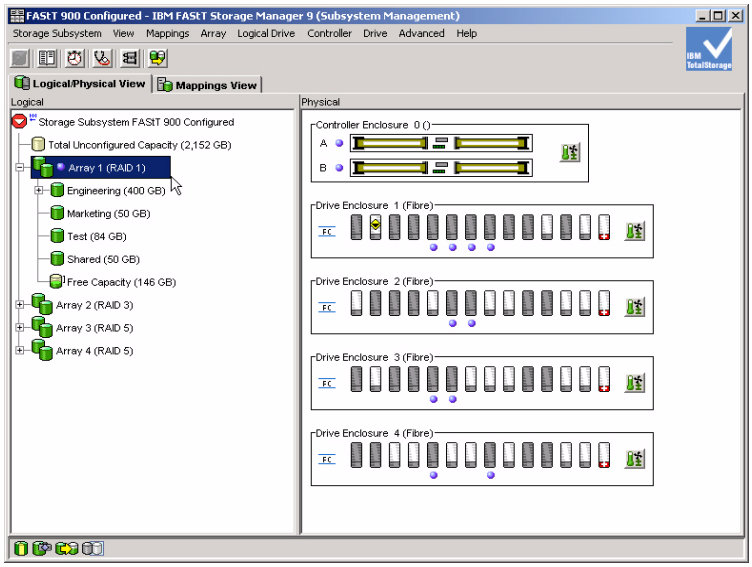


You’re done expanding the capacity of an existing array!

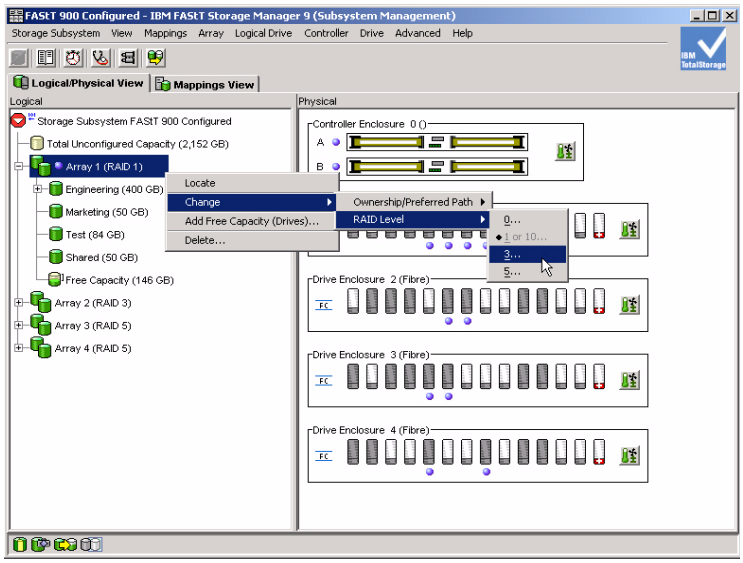
Dynamic RAID Migration (Basic Feature)

Another basic feature of the FAStT Storage Manager is the easy way to dynamically change the RAID level of an array. This feature allows changing the RAID level for more performance or data protection (or both) while continuing to provide access to all the logical drives in the array.

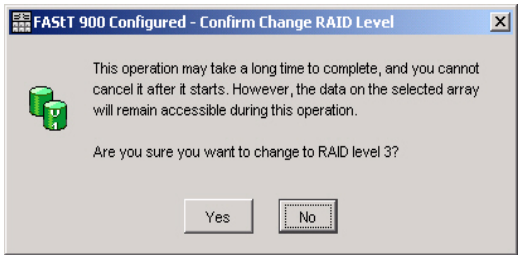
First, select the array for which you wish to change the RAID level. For this example, select ***array 1***. The RAID level for this array is currently RAID 1, but we will change it to RAID 3.



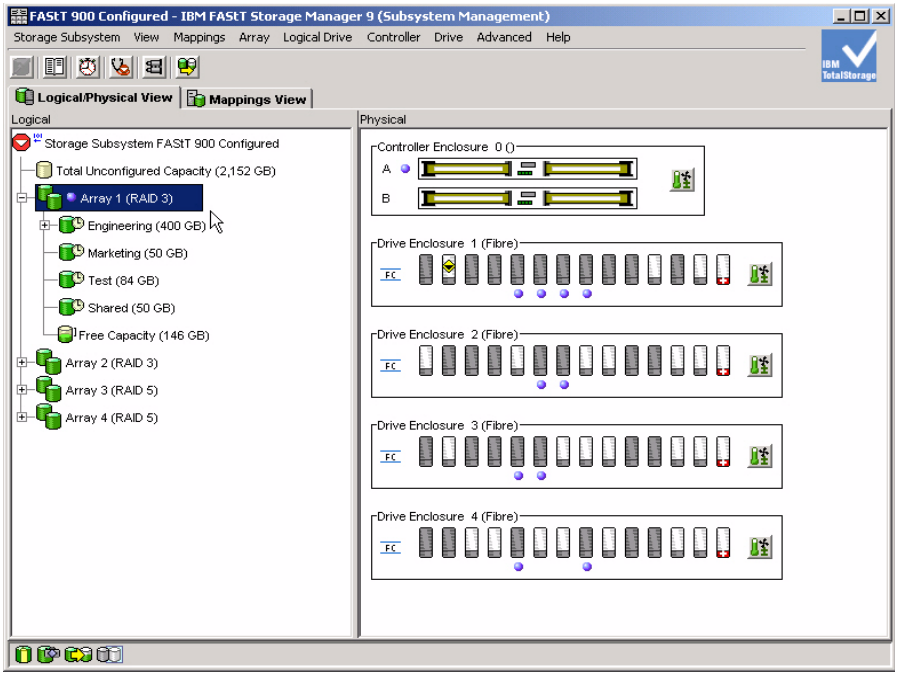
Right-click the selected array and, in the resulting shortcut menus, select **Change**, then **RAID Level,** then select **3**:



This indicates that you want to change the RAID level to RAID 3. Before the operation begins, the **Confirm Change RAID Level** dialog box appears to ask you to confirm your selection:



Click the **Yes** button. When the operation is complete, the **Subsystem Management** screen is updated and displayed to show the new RAID level for the array:



That's it — you've successfully changed the RAID level for your storage array.

Performance Tuning (Basic Feature)

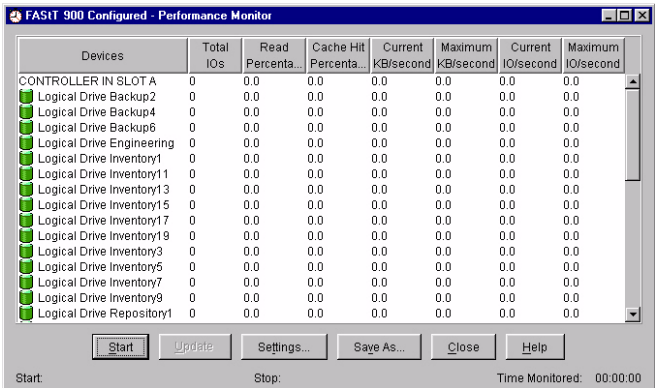
The FAStT Storage Manager also features an easy-to-use performance monitoring tool for FAStT Storage Servers. In addition, there are a number of performance tuning options available to control the storage subsystem cache settings.

We will first look at the basic performance monitoring tool built into the FAStT Storage Manager.

Performance Monitor

To start up the Performance Monitor, click the **Monitor Performance** button

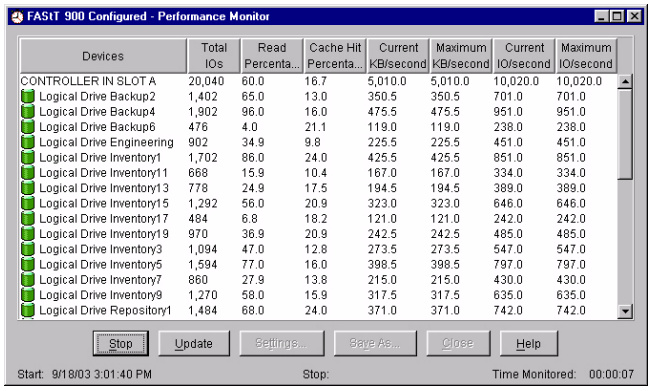
This displays the initial **Performance Monitor** window:



Note that there are no accumulated statistics for any of the logical drives listed.

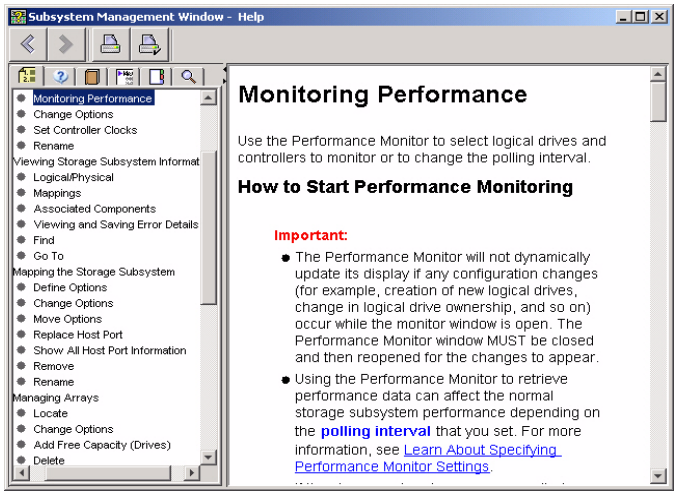
We will begin a performance monitor sample for all the logical drives using a predefined measurement interval. Click the **Start** button to begin.

The window now shows statistics for each of the logical drives:

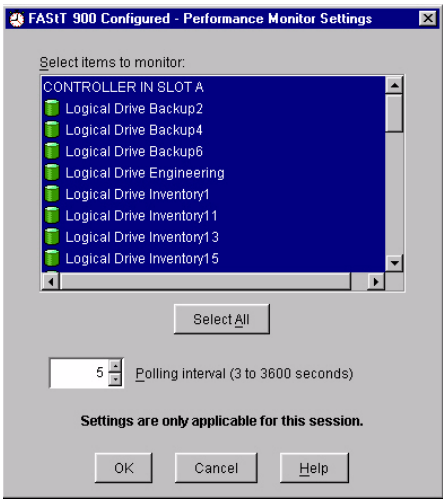


In the **Performance Monitor** window, note that the **Start** button now has changed to the **Stop** button because the performance monitor is now running.

For an explanation of each measurement, click the **Help** button:



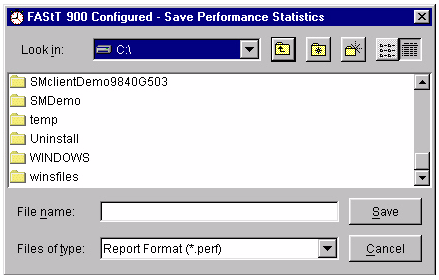
You can set a measurement interval and the performance monitor can also be set up to measure specific logical drives. Both of these options can be performed by clicking the **Stop** button followed by the **Settings** button at the bottom of the **Performance Monitor** screen. This displays the **Performance Monitor Settings** dialog window:



Specify which items are to be monitored, and a desired polling interval, then click **OK** to put these settings into effect and close the dialog screen.

Lastly, to collect statistics for long-term analysis there is the ability to save these measurements in a file on your client system.

On the **Performance Monitor** screen, click the **Save as** button to display the **Save Performance Statistics** dialog box:

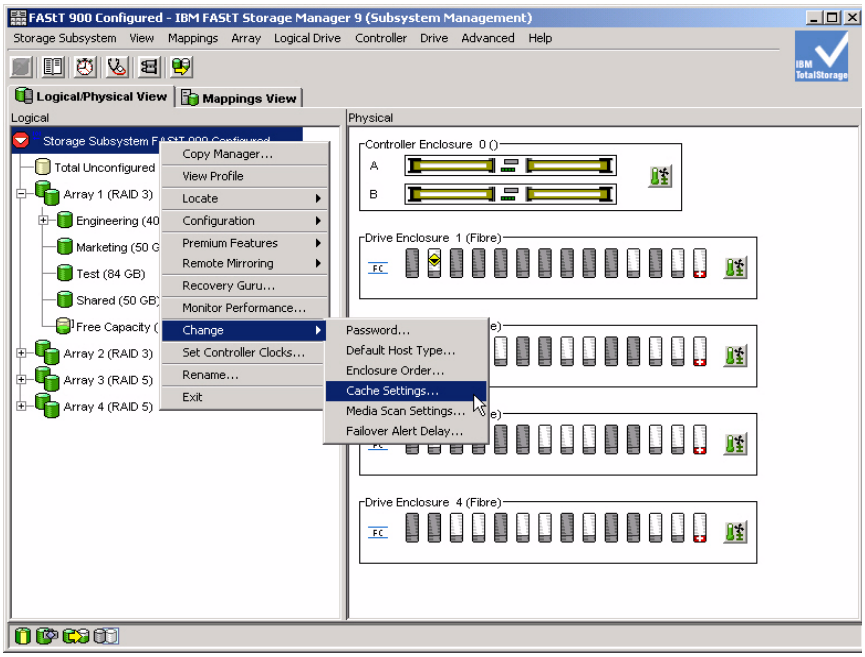


Specify the name of the file in which the statistics are to be saved, then click **Save** to create the file and save the statistics to this file.

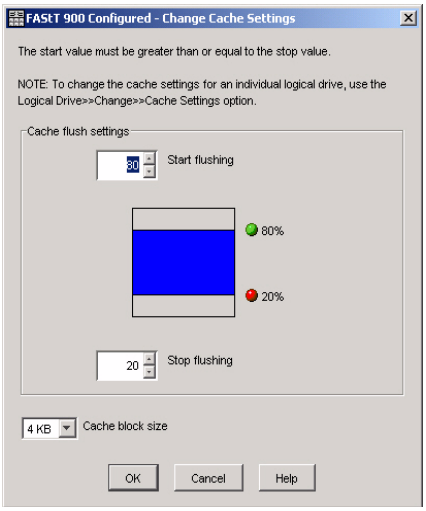
Changing the System Cache Settings

The storage subsystem can also be tuned by adjusting the cache settings for various storage objects.

To change cache settings, display the **Subsystem Management** window.



Right-click **Storage Subsystem FASt 900 Configured** and select **Change** and select **Cache Settings**:



The Change Cache Settings dialog box displays. This dialog box allows you to:

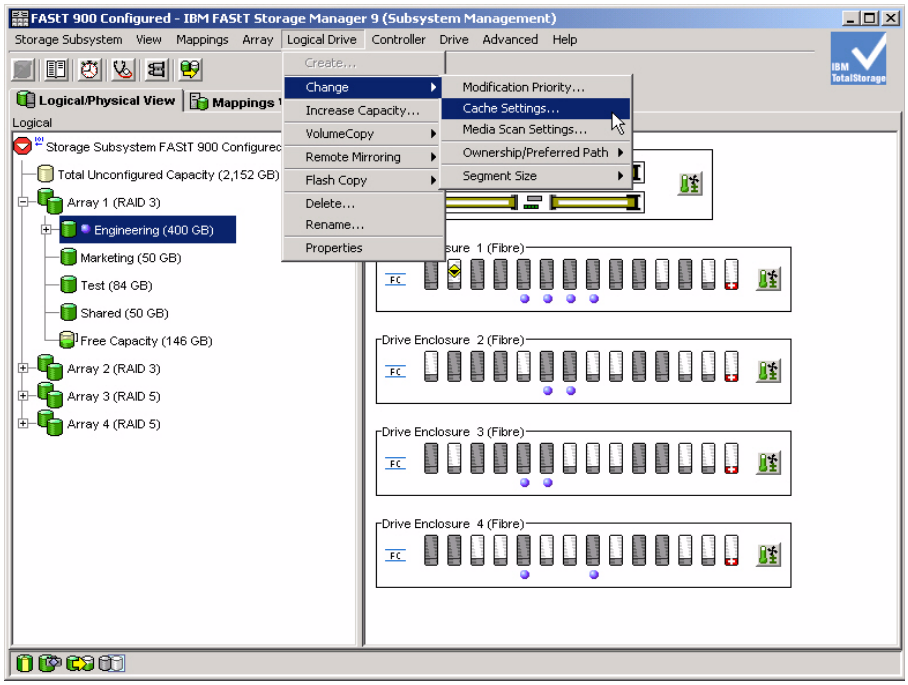
- Change the cache flush algorithm.
- Select when to start flushing the cache (when the cache reaches a certain level of use).
- Determine when to stop flushing the cache (when the amount of used cache is reduced to this level of use)

Logical Drive Cache Settings

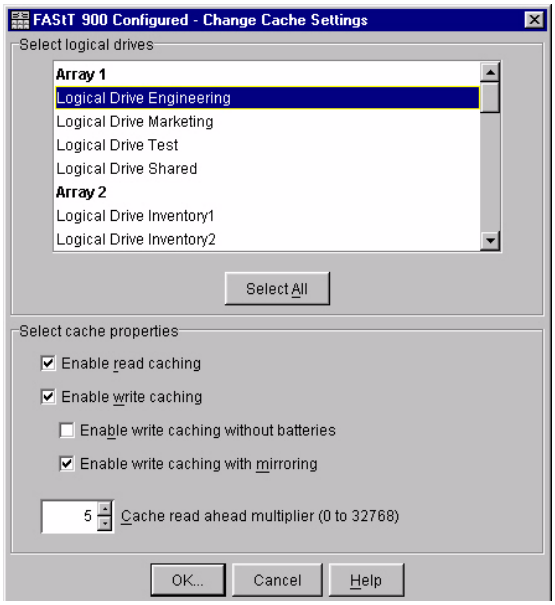
For each logical drive, you can enable or disable caching on reads or writes.

To illustrate this, display the **Subsystem Management** window and select the **Engineering** logical drive.

Right-click the selected drive and, from the resulting menus, select **Logical Drive,** then **Change**, and then **Cache Settings**:

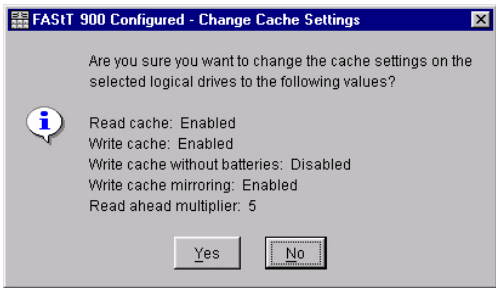


This displays the **Change Cache Settings** dialog box:



You can enable or disable caching on reads or writes. In addition, another option you can set is whether the controller performs write cache mirroring.

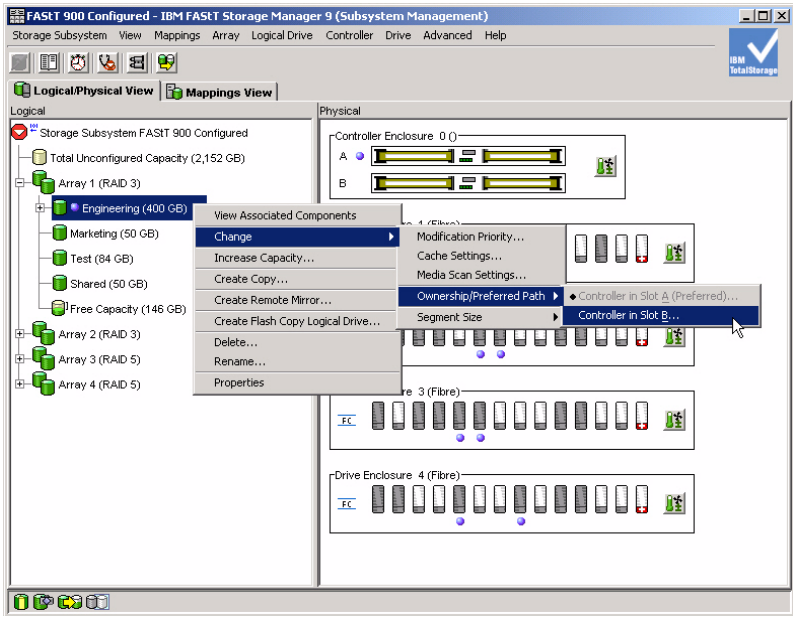
Once these options are set, you will see a dialog box confirming your choices:



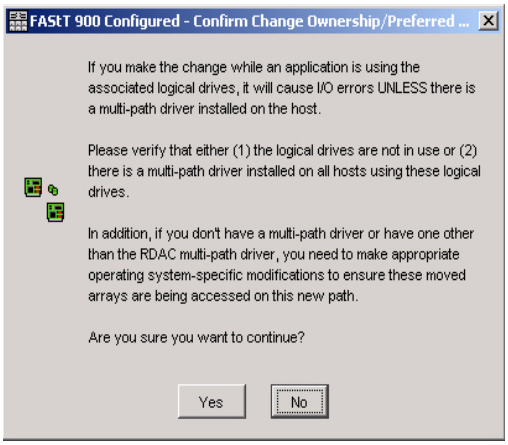
Changing the Logical Drive Preferred path

Logical drives may have their preferred path changed for tuning performance by switching controller access.

In the **Subsystem Management** window, right-click the **Engineering** logical drive and select **Change** then **Ownership/Preferred Path** then **Controller in Slot B**:



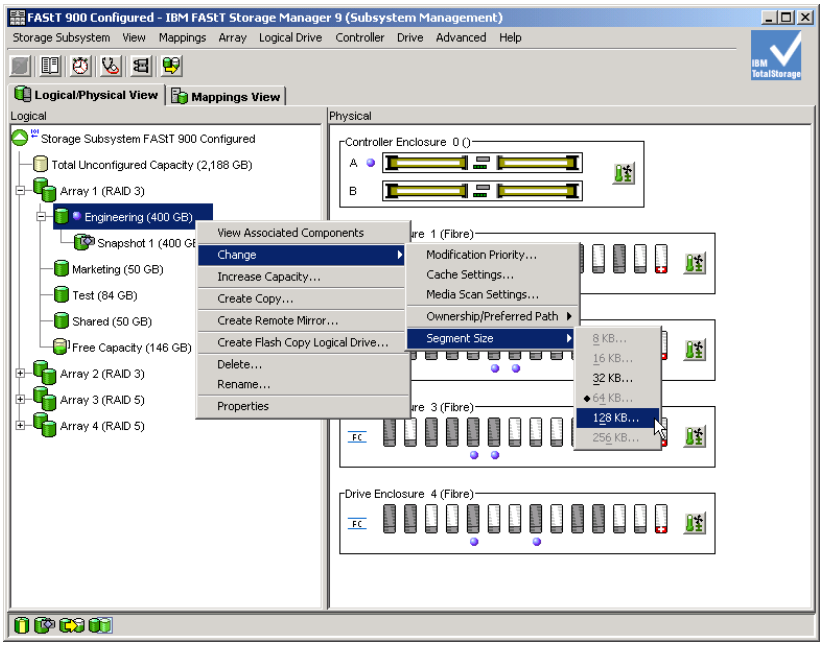
The resulting dialog box asks you to confirm the change from **Controller A** to **Controller B**:



Changing Segment Sizing

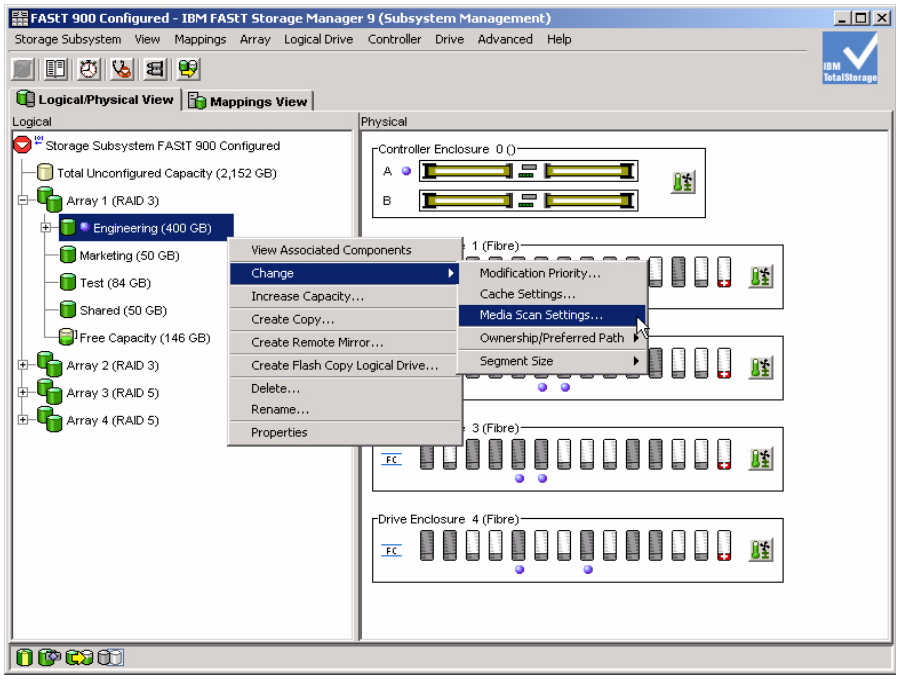
Optimizing the I/O to the storage system may require a change to the segment size. This allows the basic I/O size on the disk to match the size of the server write.

In the **Subsystem Management** window, right-click the **Engineering** logical drive and select **Change**, then **Segment Size**, then the new segment size, **128 KB**:

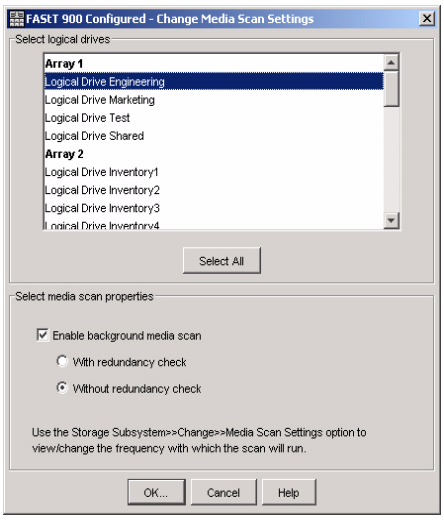


Changing Media Scan Settings

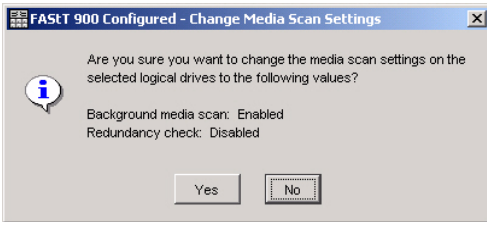
FSM provides the ability to perform a background scan of the media to ensure data integrity. Right-click the **Engineering** logical drive and select **Change** then **Media Scan Settings**:



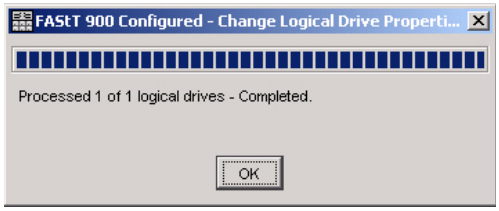
The **Change Media Scan Settings** dialog box allows the selection of one or more logical drives to scan:



When you click **OK** in the dialog box, the box closes and a confirmation dialog box opens and asks you to confirm your changes to the media scan settings of the selected logical drives:



When you click **Yes**, the operation begins and a progress box is displayed as the media scan settings are changed for the selected logical drives.

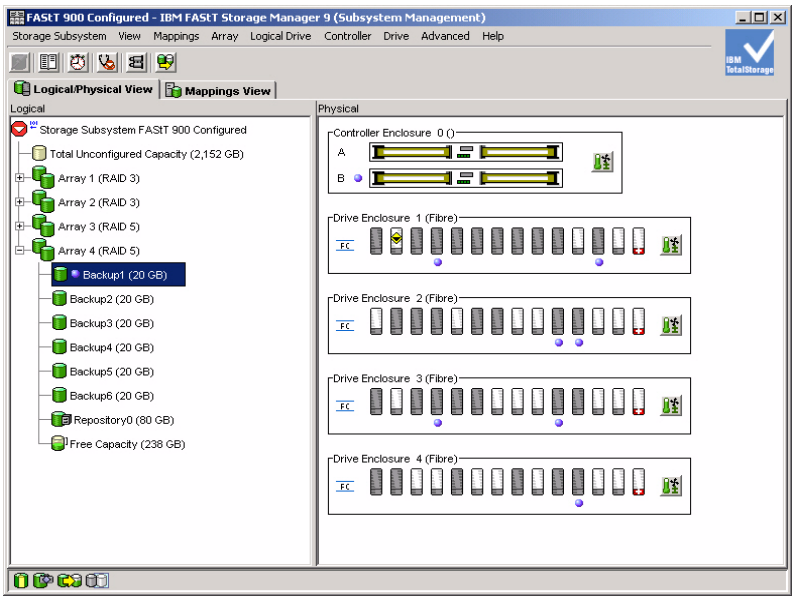


FlashCopy (Premium Feature)

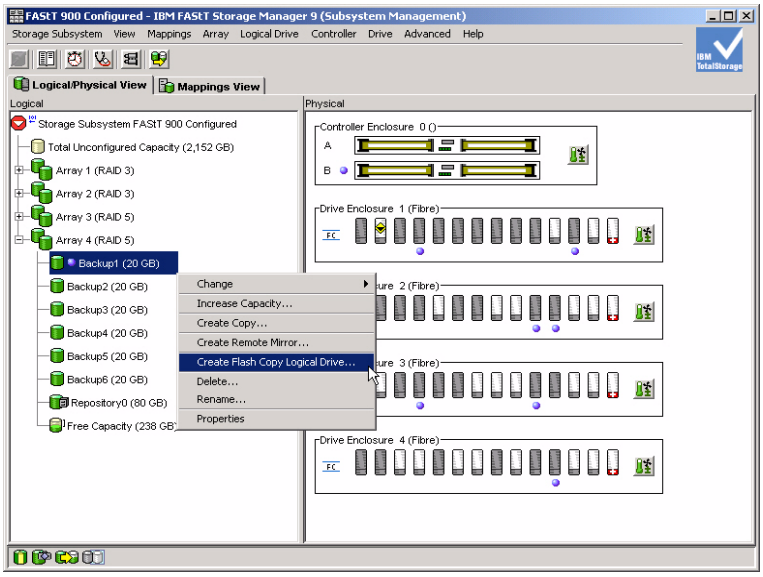
FlashCopy is a premium feature of the FAStT Storage Manager that allows the creation of point-in-time copies of logical drives. Any logical drive may use FlashCopy to create a point-in-time copy at any time. However, there are setup requirements that need to be decided before the first use.

For the selected logical drive, a FlashCopy wizard walks you through the necessary steps to create a repository which is part of the FlashCopy process.

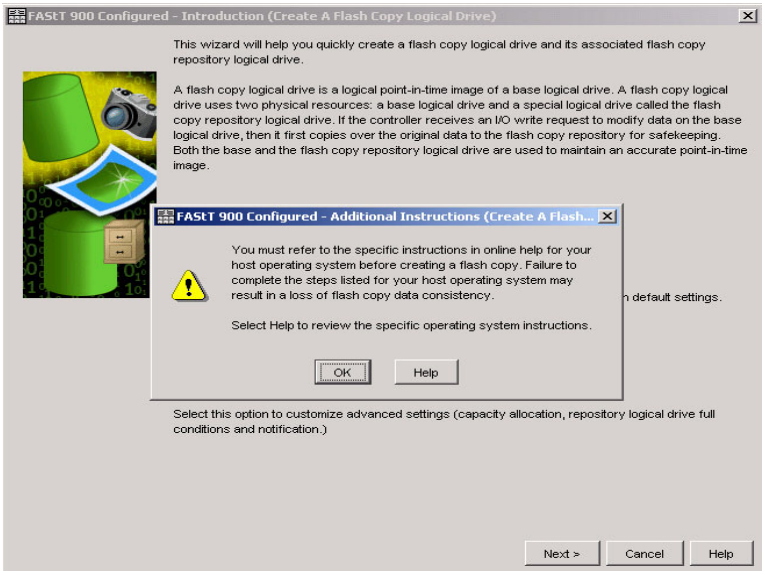
Start by selecting a logical drive in the **Subsystem Management** window. For this example, we use the ***Backup1*** logical drive in ***Array 4***:



To invoke the FlashCopy wizard, right-click ***Backup1***:

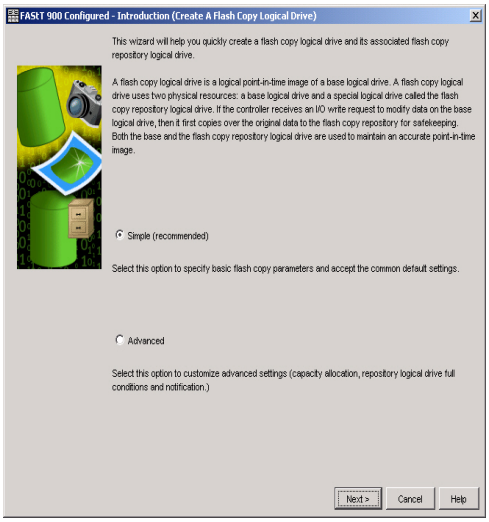


The wizard-assisted process starts up and displays an initial dialog box:



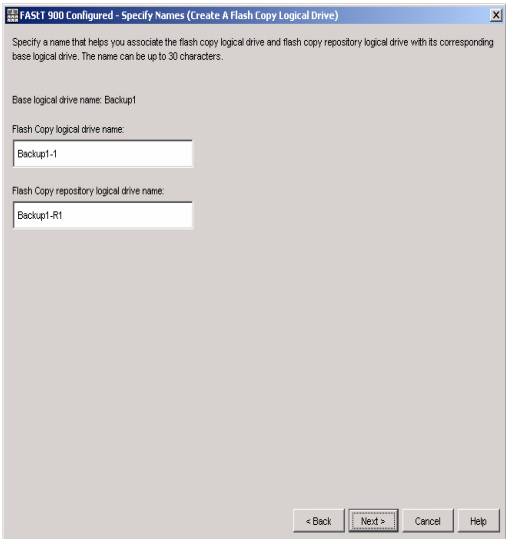
Because FlashCopy point-in-time copies are usually invoked from the server level, this requires an understanding of the host Operating System environment before performing this operation. The dialog box is simply a warning to review the appropriate background material.

Once you click **OK** in the dialog box, the first screen of the FlashCopy wizard looks like this:

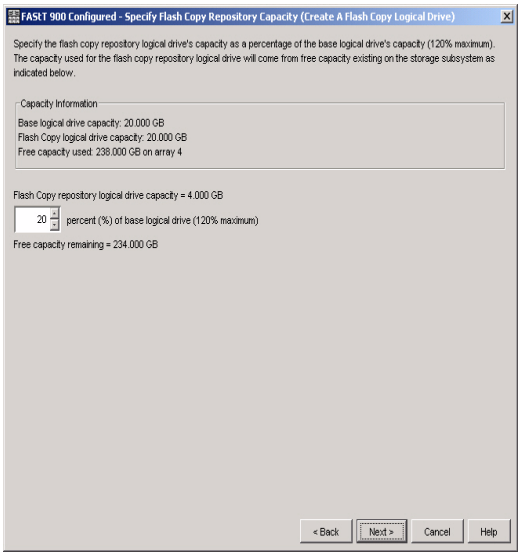


You have the choice of taking the default **Simple** setup or, for more control over the FlashCopy parameters, there's the **Advanced** option.

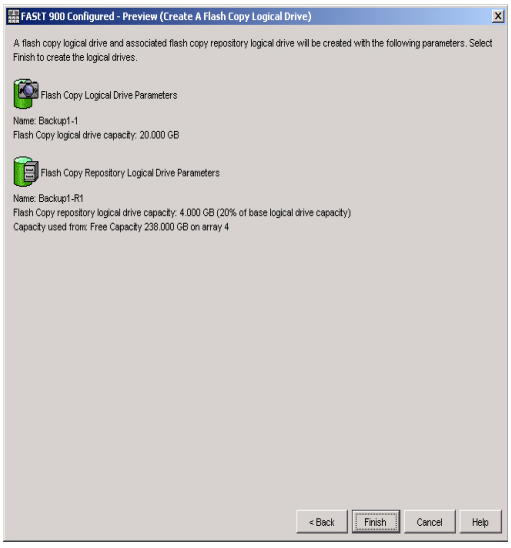
For this example, select the **Simple** option. You will then see the FlashCopy options set:



Once you specify the appropriate names and click **Next**, you select the size of the FlashCopy repository:



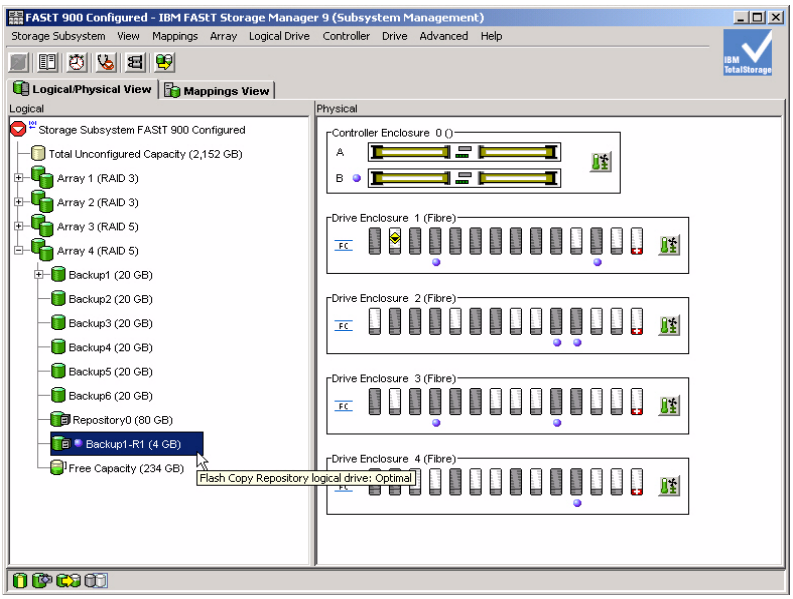
This dialog asks for the percentage of the base logical drive to be used as a size for the repository information. This is simply the amount of changes (writes or updates) to the base logical drive expected during the expected life of the FlashCopy logical drive. For example, a 20% specification allows up to 20% of the original logical drive to change before the repository becomes full. Do note that repository logical drives may be dynamically expanded should they become full.



The wizard continues with the **Summary** screen that shows summary information regarding the logical drive and the FlashCopy point-in-time copy.

Clicking **Finish** in the **Summary** screen displays a screen with a note regarding the FlashCopy operation:

Clicking **OK** closes the dialog screen and performs the operation. The **Susbsytem Management** screen eventually displays, showing the addition of the FlashCopy logical drive, ***Backup1-R1***, in ***array 4***



You're done!

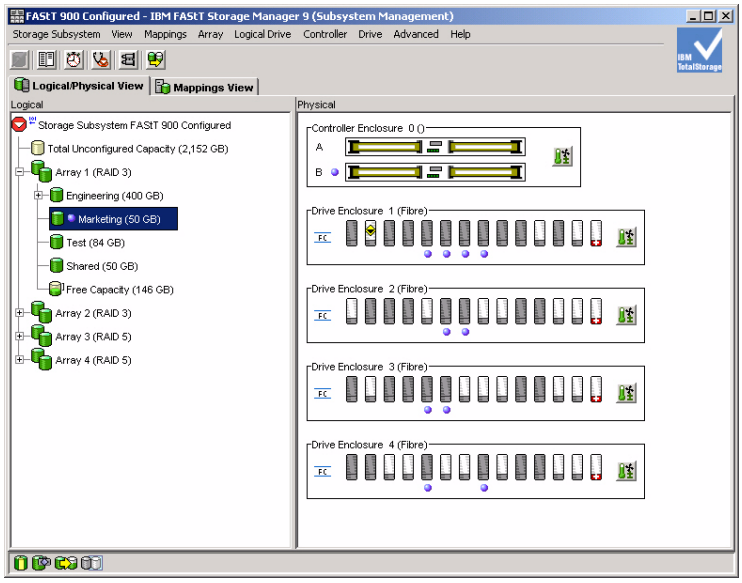
VolumeCopy (Premium Feature)

Another premium feature of the FAStT Storage Manager is the VolumeCopy capability that allows the copying of logical drives. This feature is used in conjunction with FlashCopy to provide an independent copy of a point-in-time FlashCopy logical drive.

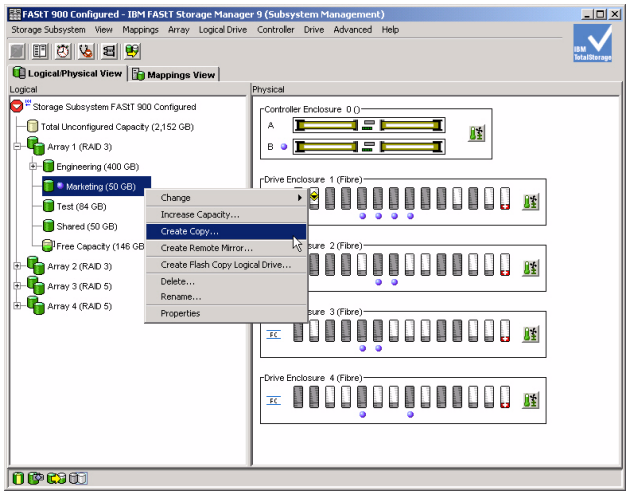
Any logical drive may use the combination of FlashCopy and VolumeCopy to create a full point-in-time copy at any time. However, as with FlashCopy, there are setup requirements that need to be decided before the first use of VolumeCopy.

For the selected logical drive, a VolumeCopy wizard walks you through the necessary steps.

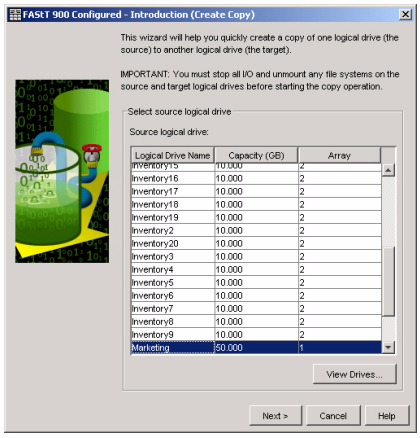
Start by selecting a logical drive. For this example, use the **Marketing** logical drive in **Array 1**:



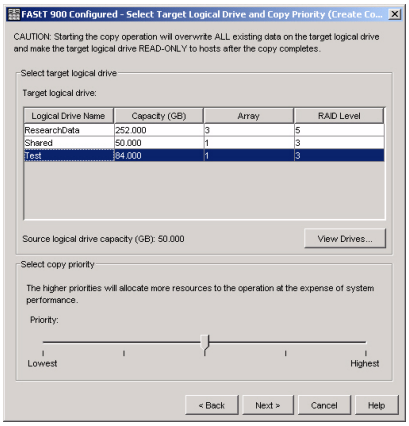
Right-click **Marketing** and select **Create Copy**:



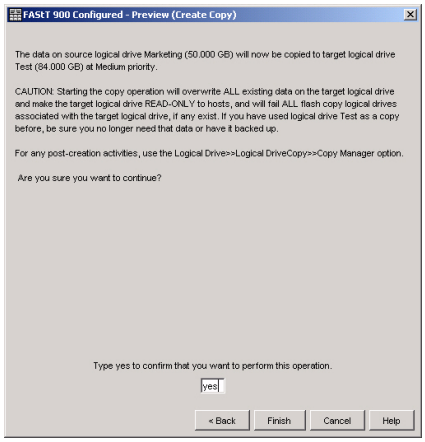
The VolumeCopy wizard starts and you see the ***Marketing*** logical drive selected:



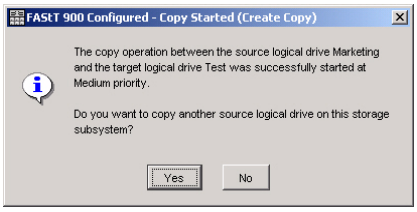
Now you select a target logical drive for the VolumeCopy. Continuing with the example, select and use the ***Test*** logical drive:



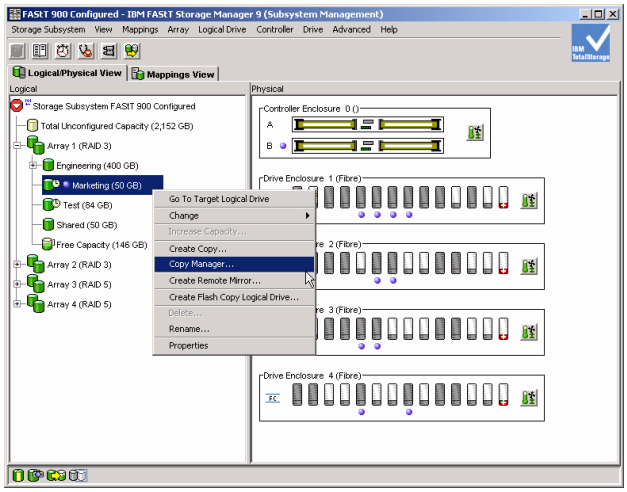
The **Preview** dialog asks you to confirm the start of the VolumeCopy:



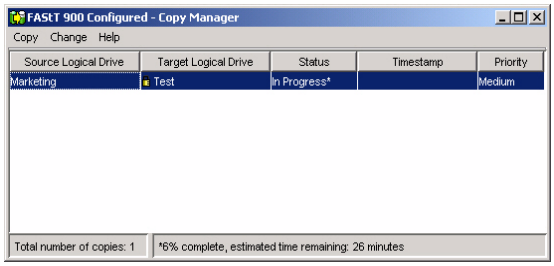
When you click **Finish** in the **Preview** dialog, a new dialog displays to indicate that VolumeCopy has started:



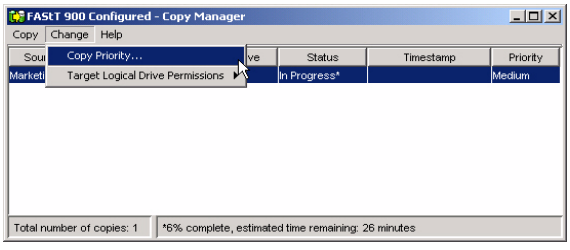
While it's running you can watch its progress by right-clicking the ***Marketing*** logical drive in the **Subsystem Management** window and selecting **Copy Manager**:



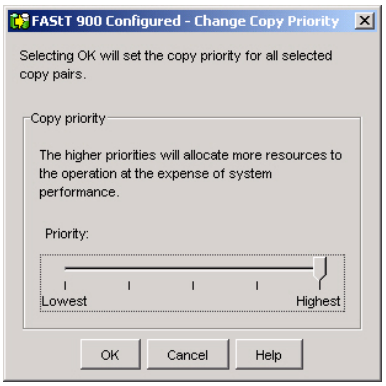
You will see the **Copy Manager** with a VolumeCopy of the **Marketing** logical drive in progress:



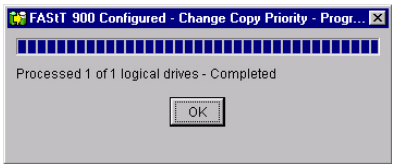
The Copy Manager provides the ability to change the copy priority. Click the **Change** menu item and select **Copy Priority**:



The **Change Copy Priority** dialog box displays with a selectable priority bar. Move the **Priority** bar to **Highest**:



The VolumeCopy finishes in a short period of time:



You’re done!

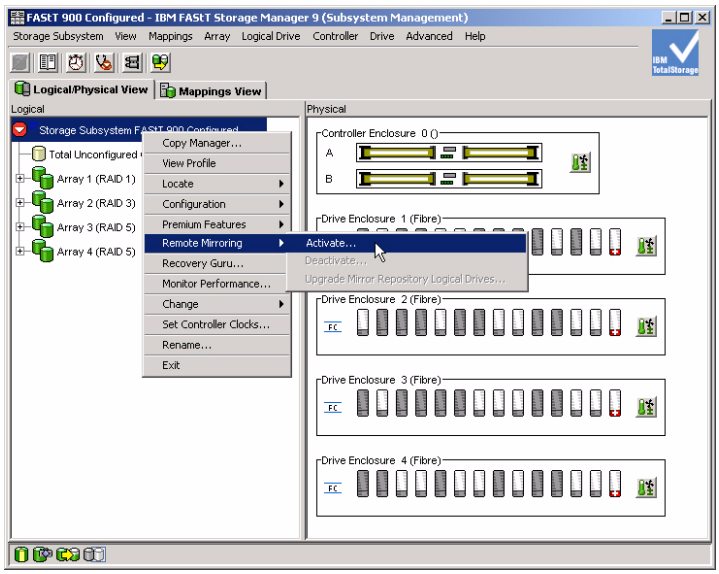
Remote Mirroring (Premium Feature)

Remote Mirroring is a premium feature of the FAStT Storage Manager that provides the ability to mirror logical drives from one storage subsystem to another. Any logical drive may have a logical drive mirror on another storage subsystem. The Remote Mirroring option ensures that each write to the primary logical drive has a corresponding write to the secondary logical drive on the other storage subsystem. New for FSM version 9.1 is the addition of asynchronous mirroring as well as asynchronous mirroring with write consistency.

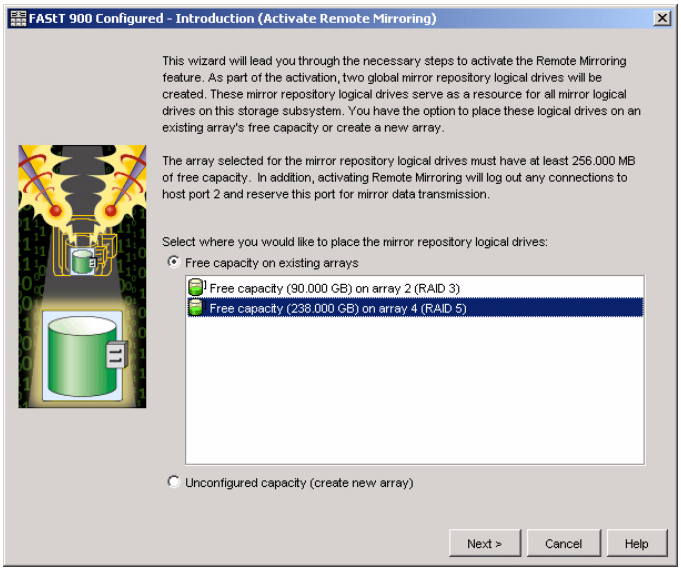
In this section we will activate the Remote Mirroring feature on two storage subsystems and establish a mirroring relationship between a primary logical drive on one storage subsystem and a mirror on another storage subsystem. The steps we will follow are as follows:

- Activate Remote Mirroring for ***FAStT 900 Configured***
- Activate Remote Mirroring for ***FAStT 600 Configured***
- Select a logical drive on ***FAStT 900 Configured*** to mirror to ***FAStT 600 Configured***
- Suspend and resume mirroring

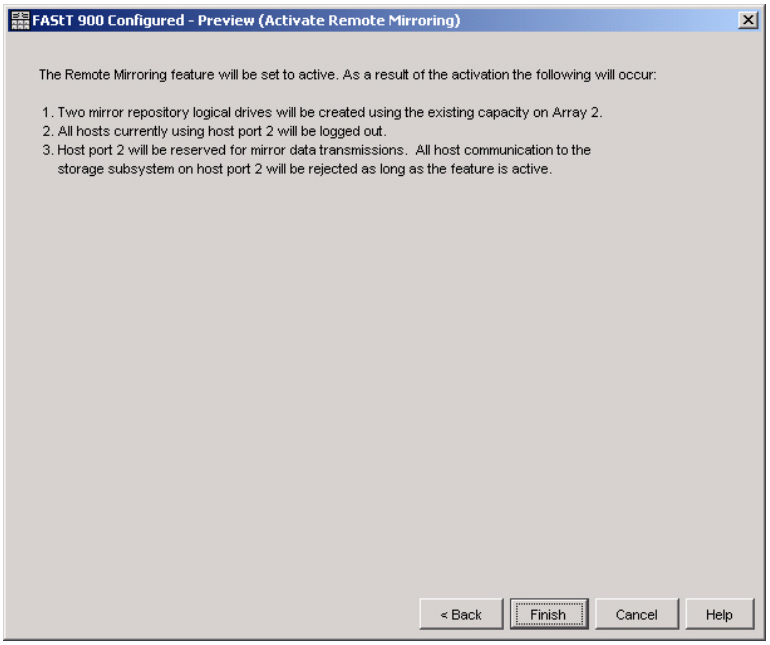
We will start with the ***FAStT 900 Configured*** **Subsystem Managment** window and right click the **Storage Subsystem** object and select **Remote Mirroring** and the **Activate** option:



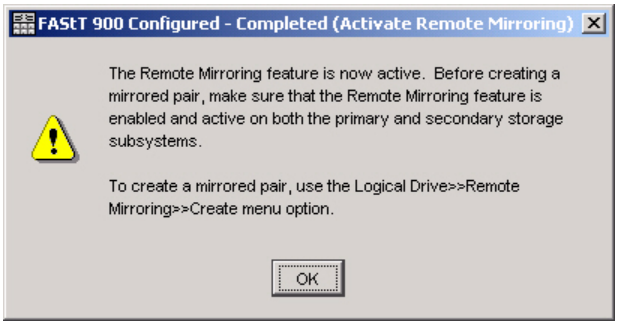
This will activate the Remote Mirroring wizard which will walk you through the process. The first step will to create the Remote Mirroring repositories. Select **Array 4**:



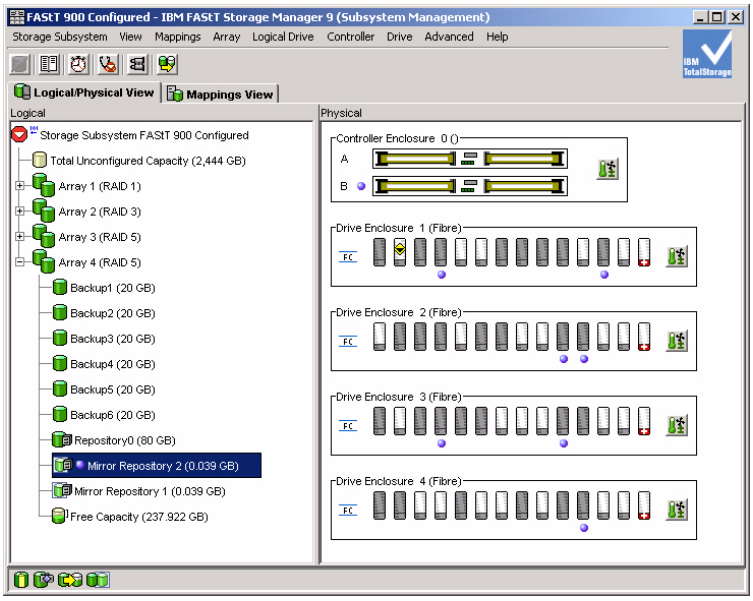
The following indicates the reservation of host ports for use by Remote Mirroring and the creation of the repositories:



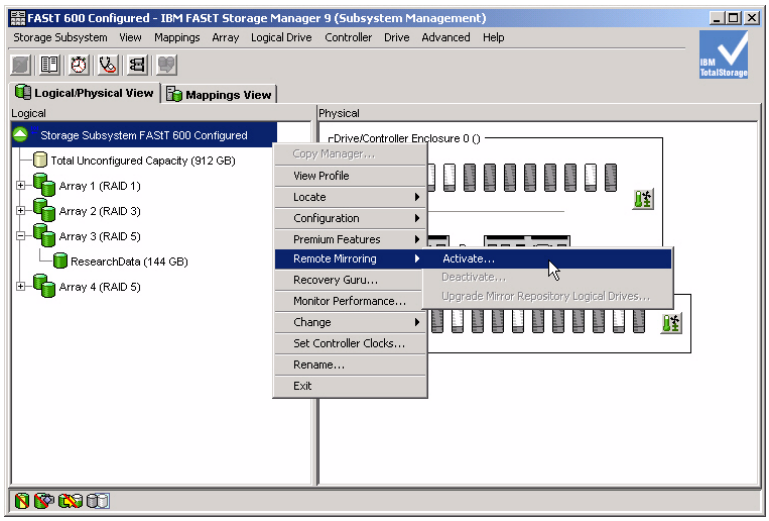
Remote Mirroring for the ***FAStT 900 Configured*** is now active:



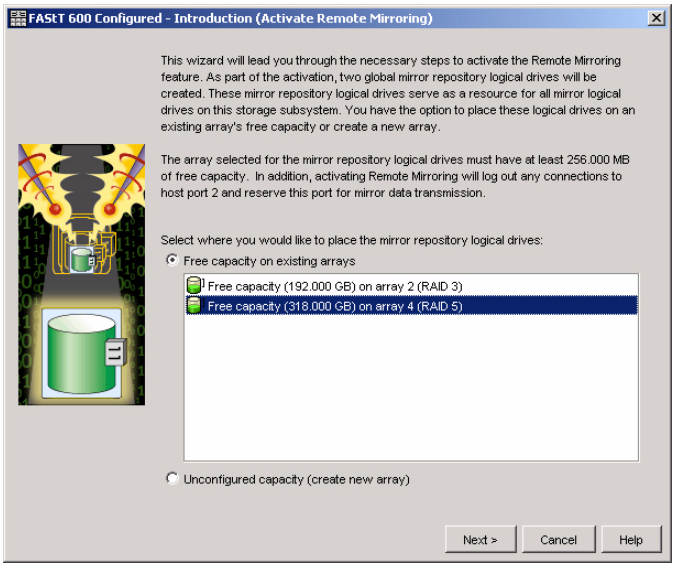
Note that for Array 4 there are two mirror repository logical drives that will support Remote Mirroring for the ***FAStT 900 Configured***:



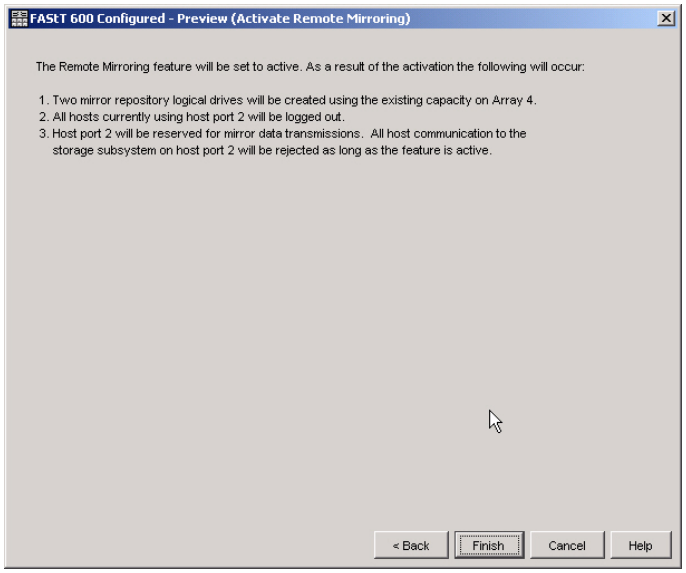
Now we will activate Remote Mirroring for the ***FAStT 600 Configured***. From the **Enterprise Management** window double-click the ***FAStT 600 Configured*** object if it is not already active. From the ***FAStT 600 Configured*** **Subsystem Management** window right click the **Storage Subsystem** object and select **Remote Mirroring** and the **Activate** option:



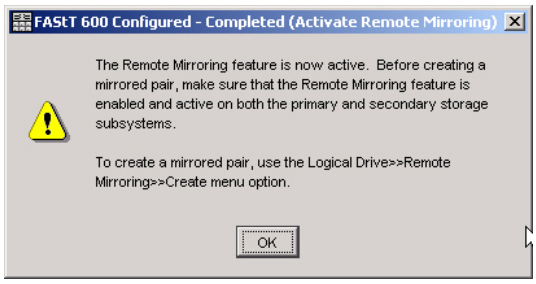
This will activate the Remote Mirroring wizard which will walk you through the process. The first step will to create the Remote Mirroring repositories. Select **Array 4**:



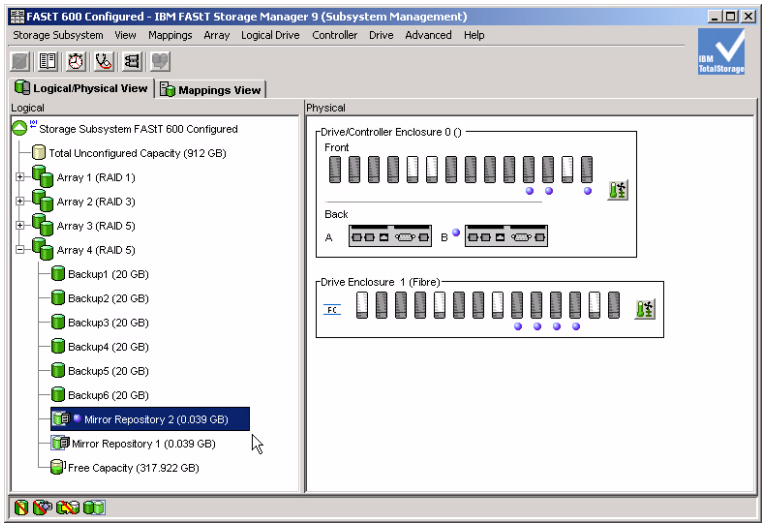
The following indicates the reservation of host ports for use by Remote Mirroring and the creation of the repositories:



Remote Mirroring for the ***FAStT 600 Configured*** is now active:

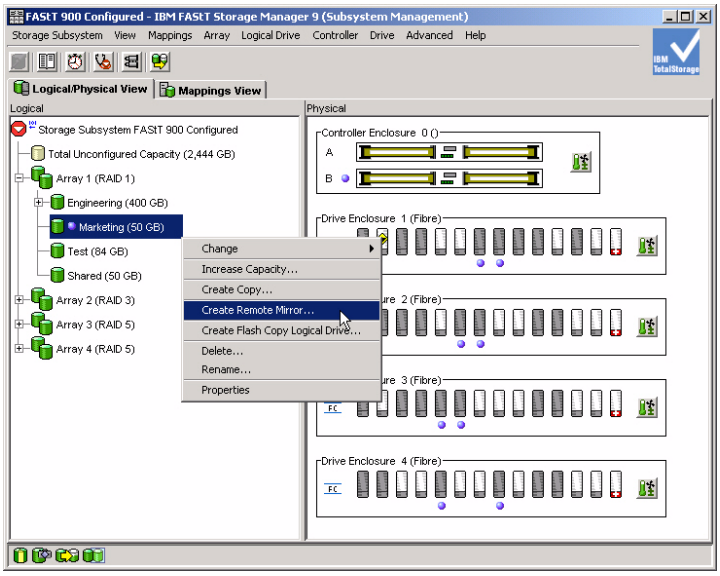


Note that for Array 4 there are two mirror repository logical drives that will support Remote Mirroring for the ***FAStT 600 Configured***:

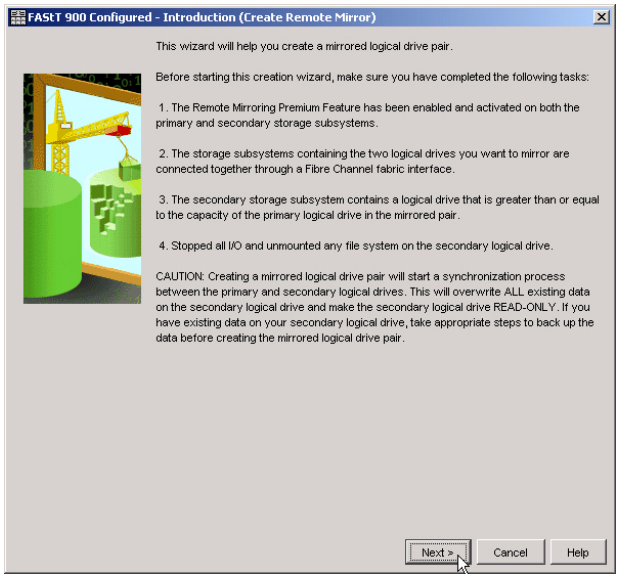


We will now go back to the ***FAStT 900 Configured*** storage subsystem to select a logical drive for remote mirroring to the secondary ***FAStT 600 Configured*** storage subsystem.

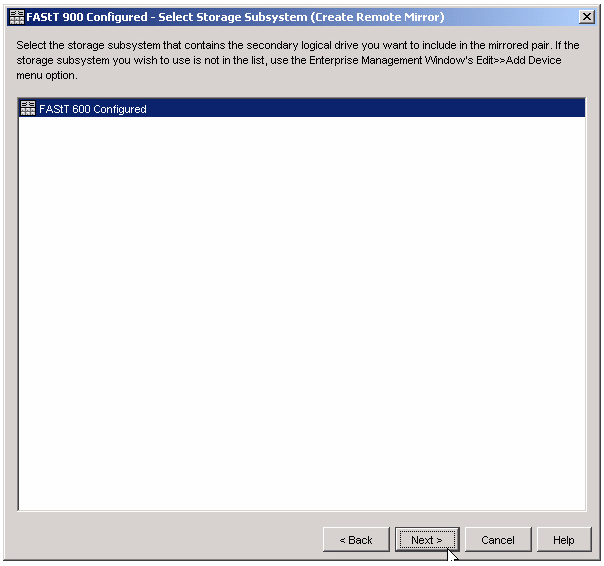
We'll select the **Marketing** logical drive and use the **Create Remote Mirror** option:



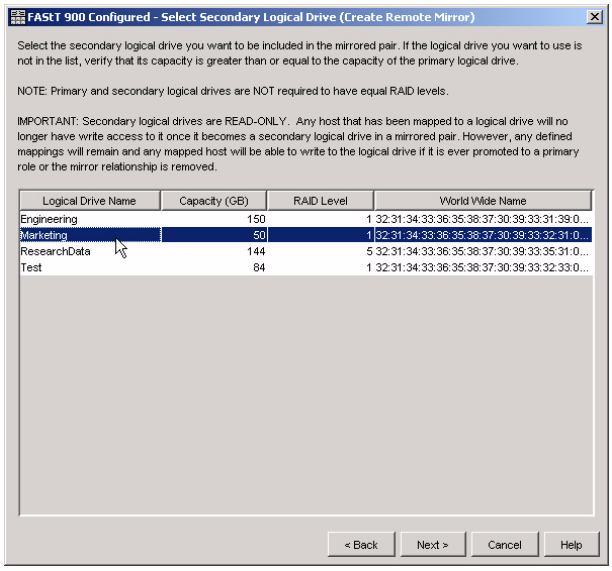
The following provides information on the mirroring requirements:



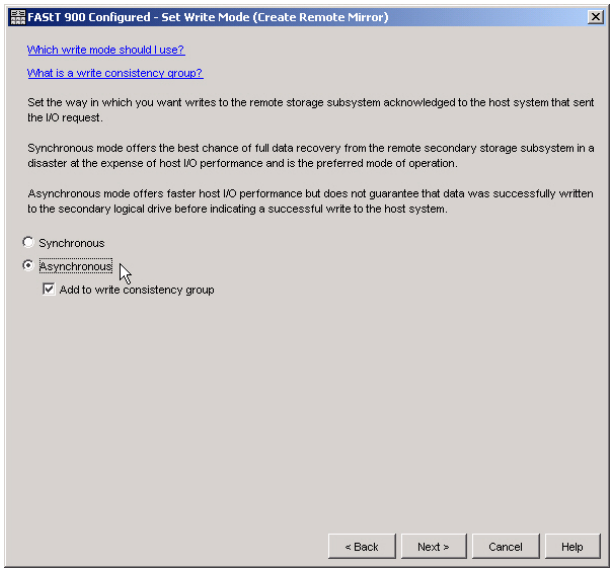
The following box indicates other storage subsystems which have activated the Remote Mirroring option. Select ***FAStT 600 Configured***:



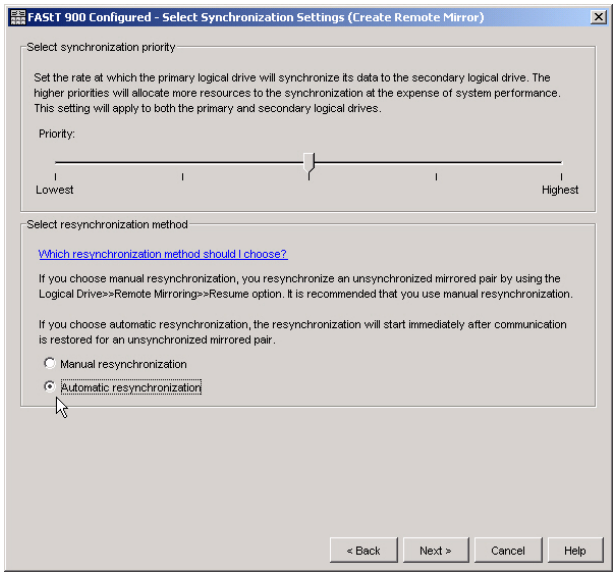
The following box indicates the logical drives on ***FAStT 600 Configured*** that are available as mirrors. Select a logical drive that is at least as large as the primary logical drive that was selected on ***FAStT 900 Configured***. Select the **Marketing** logical drive:



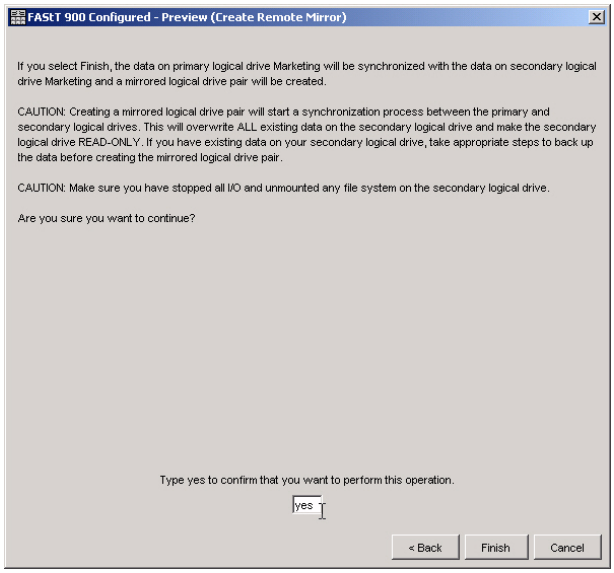
Using the following box select the mirroring mode. There are three modes available: synchronous, asynchronous, and asynchronous with write order consistency. Select **Asynchronous** along with a check for **Add to write consistency group** (this allows adding additonal logical drives to the write consistency group):



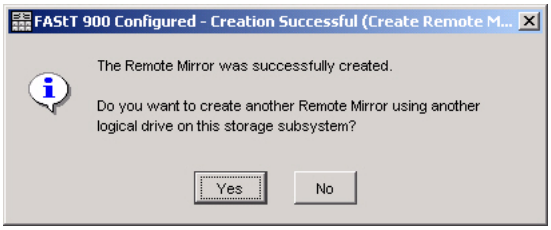
Select **synchronization priority** and either **manual** or **automatic** resynchronization:



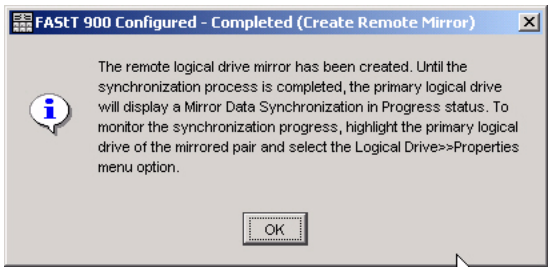
The following indicates that mirroring will begin after confirmation:



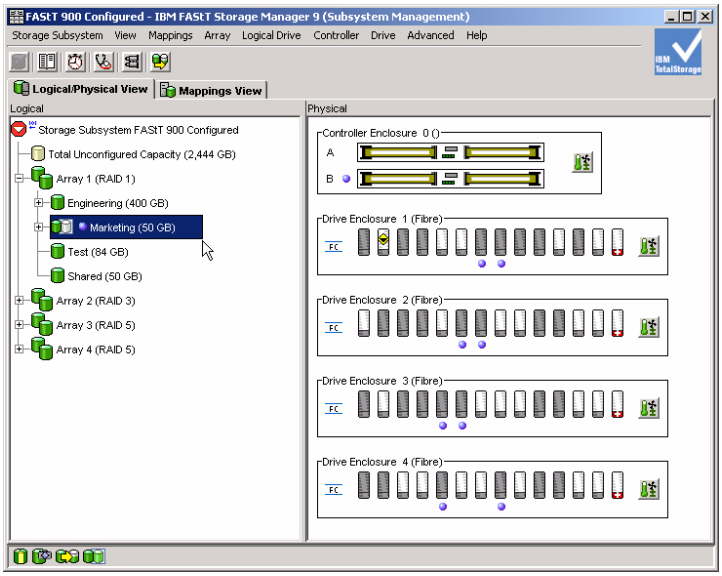
Remote Mirroring begins!



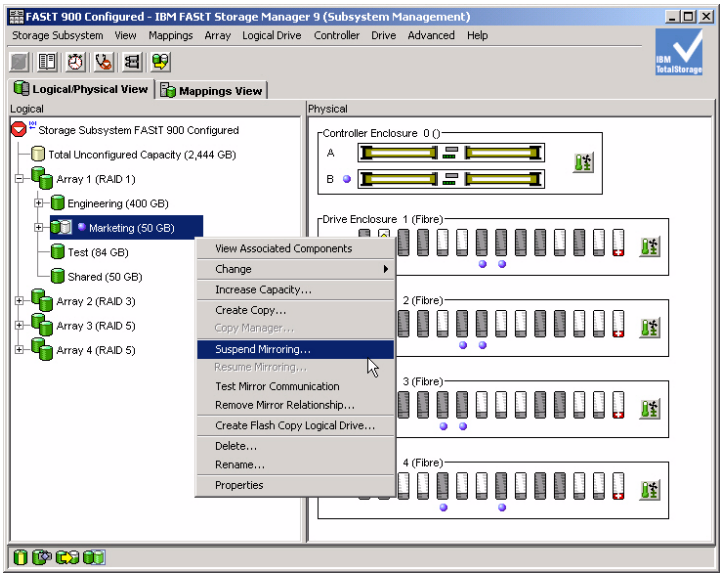
The following provides information on monitoring the mirroring synchronization:



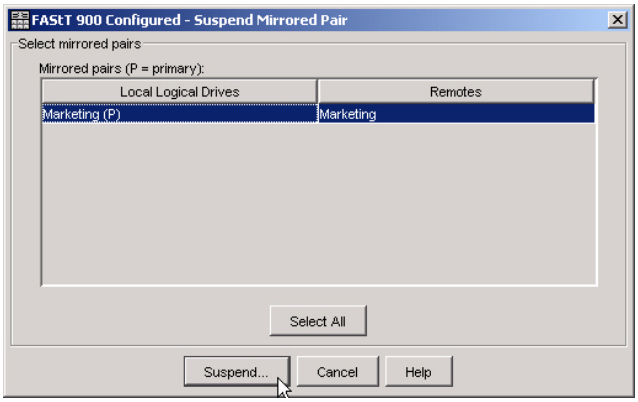
Note that the **Marketing** logical drive has an additonal icon to indicate that it is being mirrored:



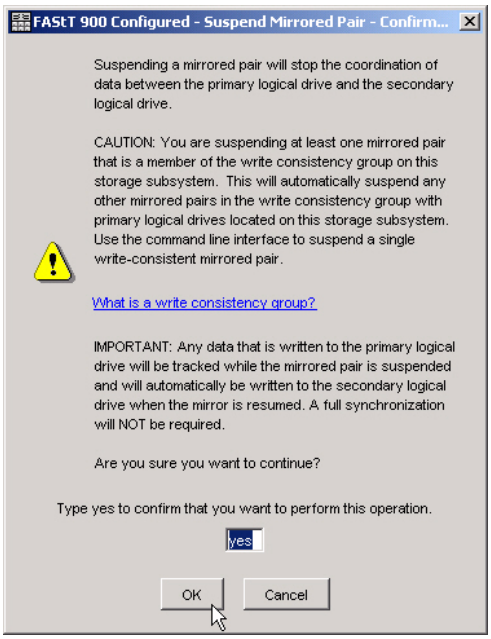
Now we will suspend mirroring for the **Marketing** logical drive. Select the **Suspend Mirroring** option:



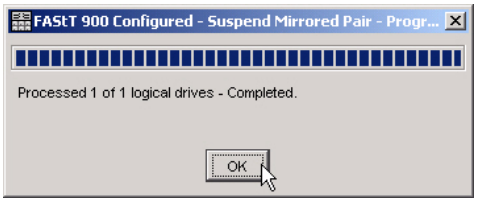
Select the **Marketing** logical drive and click on **Suspend**:



You will be asked to confirm suspending the **Marketing** logical drive:

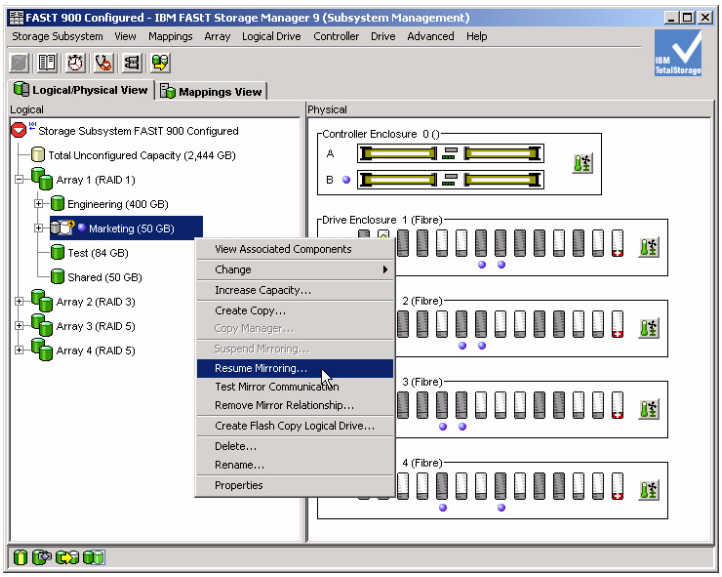


The **Marketing** logical drive is now suspended!

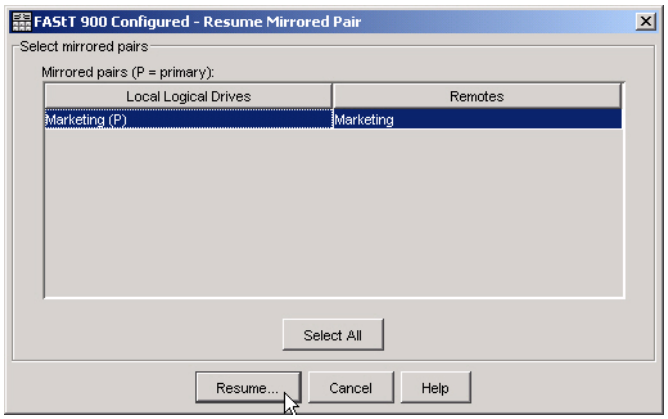


Note that there is a *Suspend* indicator on the **Marketing** logical drive:

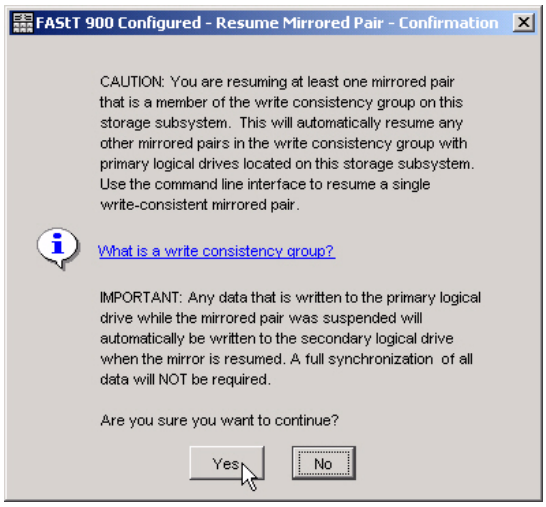
We will now resume mirroring of the **Marketing** logical drive. Select the **Resume Mirroring** option:



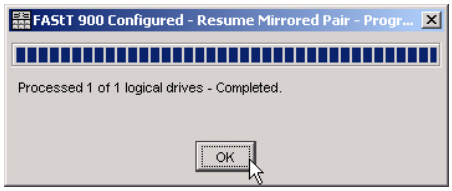
Select the **Marketing** logical drive and click on **Resume**:



Confirm the **Resume Mirroring** option (note that other logical drives in this consistency group will also resume mirroring):



You have just resumed mirroring for the **Marketing** logical drive.



Congratulations! You have just activated the Remote Mirroring feature of two storage subsystems, selected and mirrored a logical drive, and suspended and resumed mirroring for that logical drive! Wasn't that easy!

Putting Together An Effective Demo

The FAStT Storage Manager Demo program is an effective tool that can be used in a variety of situations. Its ease-of-use design can be simply demonstrated to support a strong message that IBM Storage Servers reduces the Total Cost of Ownership (TCO). As a single storage management package, FAStT Storage Manager's capability is unmatched in the industry.

It would certainly be overwhelming to demonstrate every single feature provided by the FAStT Storage Manager Demo program. The FAStT Storage Manager Demo program is versatile enough to be used to show FSM features in a variety of demo situations to address any issues that may crop up.

Our goal for this section is to provide some scenarios on how to address a specific business issue using specific FAStT Storage Manager functions. Once you are familiar with using the FAStT Storage Manager Demo program you can begin to develop your own scenarios.

Scenario 1: Identifying Key Issues and Concerns

It's often not clear what the driving forces are behind a storage purchase opportunity. Instead of using standard Powerpoint presentations, use the FAStT Storage Manager Demo tool as an alternative way of presenting the value propositions of the IBM FAStT Storage Servers. By introducing several features visually, this provides an easy way for the prospect to tell you which of these features are important to them.

Simply fire up the FAStT Storage Manager Demo program and describe it using one or more of the following talking points to emphasize the value propositions of IBM FAStT Storage Servers:

- ***Manageability***:

  FAStT Storage Manager provides a single interface to manage all of IBM storage systems regardless of the location. It will grow along with your systems without requiring a corresponding growth in the number of storage administrators. Starting the demo takes you to the Enterprise Management Window. From here all storage subsystems can be managed.

- ***Expandability***:

  FAStT Storage Manager lets you tailor your IBM storage subsystem to meet growing demands for both capacity and performance. This FAStT Storage Manager software is the only interface used to grow and manage an IBM FAStT Storage Server - scaling systems from gigabytes through terabytes of online storage.

- ***Lowest Total Cost of Ownership***:

  Because all of your storage systems are managed by a single administrator using a single interface, your costs of ownership are the lowest of all. From the **Subsystem Management Window**, simply right-click the device you want to manage. The FAStT Storage Manager has been designed for ease-of-use: simple tasks are accomplished through a series of pop-up windows and complex tasks have an associated wizard which steps you through the task.

Scenario 2: Solving Capacity and Utilization Problems

One of the biggest headaches businesses face with their storage is the never ending need to solve capacity and utilization problems. Servers and applications are frequently added to the mix of existing applications and their ever growing need for storage.

Balancing the needs of competing users requires the use of a simple but powerful storage management tool. The difficulty of storage provisioning and balancing is reduced to a series of tasks that are easily accomplished using the FAStT Storage Manager.

Simply show how FAStT Storage Manager:

- **Partitions** the storage for different host servers

  Click on the Mappings tab to list all the hosts for the various logical drives

- Easily **adds** a logical drive for immediate use by a server

  Simply right-click on the Unconfigured Capacity icon to create a new logical drive

- Easily **expands existing arrays** by adding one or more disks using Dynamic Array Expansion

  Simply right-click on any array to Add Free Capacity

- Easily **expands** the **capacity of a logical drive** to deliver more capacity for each logical drive using Dynamic Volume Expansion

  Simply right-click on any logical drive to Increase Capacity

- Easily **expands system capacity** by adding entire sets of drives and drive enclosures

In short, no matter what the capacity or utilization problem is, using FAStT Storage Manager reduces the problem down to a few FAStT Storage Manager exercises. The benefit from using this powerful tool is that optimal storage utilization is a few clicks away.

Scenario 3: Tuning for Performance

Once the issues of capacity and utilization are resolved, there's the normal day-to-day concerns of whether the storage subsystem is running optimally. Business applications only run as fast as their storage.

The FAStT Storage Manager provides a number of tools to monitor performance and tune the FAStT Storage Server for optimal performance without disruption to the applications that are accessing the storage. And, over time, to continue to tune storage performance to overcome a variety of bottlenecks and deliver the desired level of performance.

The FAStT Storage Manager provides an easy-to-use:

- Performance monitoring tool using the **Monitor Performance** power icon button
- Method of saving performance monitor statistics for long term trend analysis
- Method of cache setting changes to fine tune storage performance of logical drives, arrays, and controllers
- Changing of Preferred Paths to load balance storage traffic

The FAStT Storage Manager provides a large number of simple, easy-to-use features which solve just about any performance problems likely to appear. All FAStT Storage Servers have the ability to dynamically tune the storage subsystem to the level of performance desired.

Scenario 4: Adjusting Performance and Data Protection Levels

At some point, tuning an existing storage subsystem will reach a plateau – further performance enhancements will not occur with the existing storage configuration. Or, within the current storage configuration, there's the need to increase the level of security for a group of storage resources. The question is: How easily can this be accomplished?

One of the most effective ways to change performance and security metrics of storage subsystems is to change the underlying RAID structure of the disk arrays. In conjunction with the FAStT Storage Manager's Dynamic Array Expansion feature, provides a simple and robust method of increasing performance and security of any logical drives.

Examples of this are:

- Adding drives to an array adds performance from more spindles as well as capacity
- Existing logical drives on this expanded array will benefit from the increase in performance
- Existing logical drives can also benefit from the increased capacity
- Arrays built with RAID level 5 may migrate to RAID 1 for more performance

The FAStT Storage Manager's ability to dynamically change an array's RAID level as well as add drive capacity eliminates the need to shutdown the application and access to the storage. All of these changes are made while providing continuous data access to the logical drive by online applications.

Scenario 5: Reducing the Impact of Hot Backups

One significant business problem that IBM FAStT Storage Servers solve is the ever increasing backup windows of today's online applications. As databases grow, the time to backup them up also grows. To the point that there's a major impact on online applications whenever backups are taken – response times suffer.

Best practices for virtually of all of today's databases provide for the ability to copy critical database files during a hot backup window. Most databases provide a hot backup window which suspends normal disk I/O to allow an online backup. Within this backup window, files are copied to online media and from there backups are created. However, this is a lengthy process, often taking hours to copy files.

FAStT Storage Manager's FlashCopy feature solves this problem by shortening the hot backup window. First, the hot backup process is split into two parts. The first part replaces the file copy with an extremely quick point-in-time copy using FlashCopy. Then, while the database closes the hot backup window and resumes normal processing of database transactions, part two executes in parallel by copying the point-in-time FlashCopy to backup media.

There are numerous benefits to using FlashCopy:

- The hot backup window is reduced from hours to under a minute
- The vulnerability of the database to failure is reduced
- The backup process reduces the impact of backups on the application
- The backup of the database is performed in parallel while the database continues to process transactions
- The FlashCopy backup itself is a copy from which recovery can be initiated
- FlashCopys are not permanent and its resources can be re-used again

A simple demonstration of the FAStT Storage Manager's FlashCopy function will show the benefits of reducing the impact of hot backups.

Scenario 6: Implementing Business Continuity Initiatives

All of a corporation's business information is mission-critical and crucial to its continued success. To protect these data assets against unplanned outages and contingencies, business continuity initiatives focus on minimizing disruptions to data access and reduce the time to recover to a short period of time as possible.

The goal is to provide adequate levels of data protection for all storage in the data center.

The IBM FAStT Storage Servers with the FAStT Storage Manager provide a wide range of data protection features to meet every business continuity requirement.

For local data protection, the FlashCopy feature offers rapid point-in-time copies of any logical drive. Particularly useful in database applications, FlashCopy can shorten the backup window while optimizing database backups, and with the most recent FlashCopy logical drive, forms the basis for a quick recovery from any problems affecting the database application. FlashCopy is also useful for replicating data for recovery purposes in the event that the original logical drive is no longer available.

Within the data center, IBM FAStT Storage Servers may use the Remote Mirroring feature to replicate data from one array to another. This allows data protection between storage subsystems in the event of an outage of a particular storage subsystem.

For longer distances, the Remote Mirroring feature is used to replicate logical drives from a primary site to a secondary, physically remote, site. This provides the secondary site with the data necessary for initiating a recovery.

No matter what the business continuity requirements are, the combination of FAStT Storage Server and FAStT Storage Manager provides all the necessary functionality to build solutions to handle contingencies ranging from simple outages to disaster recovery at a secondary site.

Scenario 7: FAStT Storage Manager Training Session

An effective strategy to win over the prospect is to provide training to the eventual administrators and managers of the IBM FAStT Storage Server. This will show the ease of use of the FAStT Storage Manager product as well as ease their concerns about a new software system to learn. Stressing the ease-of-use design, this course can be tailored to the specific needs of the group you are training:

- Basic operations for their particular environment
- Advanced features for when they may need them
- Specific operations on
  - Growing a volume
  - Adding a drive to a volume group
- Tuning their storage subsystems
- Application specific tips and techniques

This course can be held over several days and is best designed as an interactive exchange of "*How do I ...*" topics and exercises that provide *best practices* for common tasks that FAStT Storage Manager users will be using.

This strategy has been used successfully on numerous occasions in parallel with the sales process. It's an excellent vehicle to step ahead of the competition.

Scenario 8: Using SATA Technology

Today, enterprises have an almost unquenchable thirst for storage. Enterprise applications drive this demand—the need to store information is growing at an ever-increasing rate. In addition, new laws requiring extensive archiving of corporate information also fuel this demand.

The dilemma is how to keep more data online while keeping costs down.

There is a unique solution to this problem. Online data used in mission-critical applications employs Fibre Channel drive technology. For data that is less frequently accessed or requires less performance when accessed, Serial ATA (SATA) drive technology is an ideal economic alternative.

IBM's FAStT Storage Servers provide two SATA solutions:

- EXP100 Drive Expansion Units add SATA drive technology to the FAStT line (FAStT600, FAStT600 Turbo, FAStT700, FAStT900).
- The new FAStT100 provides dedicated SATA drive technology in a compact configuration.

SATA technology provides an economical alternative to Fibre Channel without sacrificing management flexibility. SATA provides more online storage capability for data that doesn't require the highest levels of performance. Its use as secondary storage provides much faster access than traditional offline storage.

The FAStT100 is an ideal platform with 3.5TB in a compact 3U package that offers the lowest cost per MB and capacity expansion to 28TB. It's an ideal blend of capacity, performance, manageability, and reliability. Its ability to solve business problems with an appealing cost advantage makes it an excellent storage solution for applications such as:

- Keeping more information online for quicker access
- Online backups to disk for faster recovery
- Moving data from online databases to data warehouse applications, datamarts, and Decision Support Systems
- Secondary site storage using remote mirroring for high availability and disaster recovery requirements

Scenario 9: Building DR Solutions

Protecting corporate data is no easy task. No matter what plans are developed to protect data assets, there's still the possibility of a disaster. Developing plans for planned and unplanned contingencies is the goal of disaster recovery solutions.

Finding the optimal technology to build a robust DR solution is difficult for a number of reasons. Many solutions are proprietary to the application, the database in use, or the hardware and OS platform. Other solutions require customization of the application environment with programming and procedural changes. And others are costly or don't scale well.

Storage-based replication offers the highest performance at the lowest cost:

- No impact on server performance.
- No customization of the application or the database.
- Least invasive and disruptive of all solutions.
- Uses the best practices of database backup and recovery.
- Provides scaling across multiple servers and applications.
- Low implementation effort.

Remote Mirroring provides the ability to replicate data as it changes. Mirroring can be synchronous for keeping two sites in constant synchronization or can be asynchronous for mirroring data over extended distances.

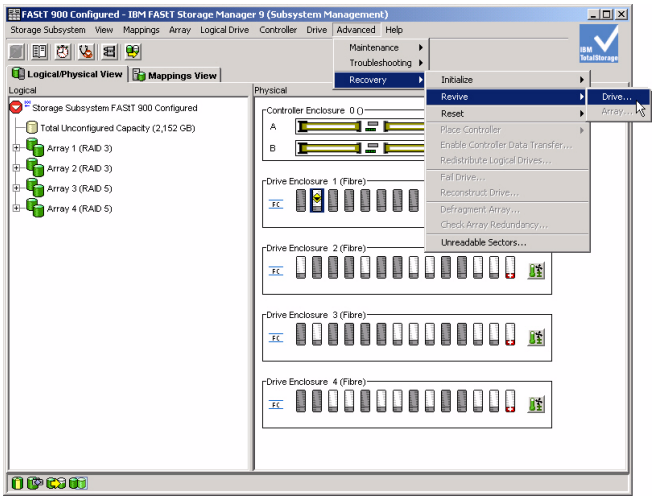
The ability to dynamically switch from synchronous to asynchronous mirroring (and back) provides flexibility in designing DR solutions.

IBM FAStT Storage Servers provide the replication technology that builds robust DR solutions with the least effort and cost.

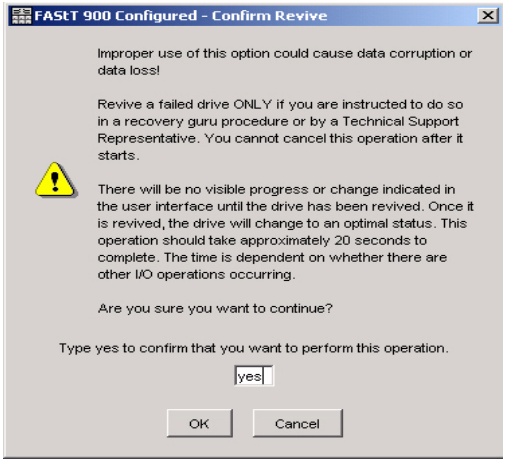
Appendix:
Removing the Red "Needs Attention" Icon

The **FAStT 900 configured** storage subsystem has a built-in "needs attention" warning which is seen as:

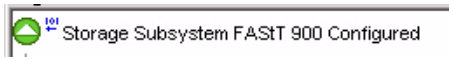
This is simply remedied by clicking on the drive with the yellow icon then select the **Advanced** menu item then click on **Recovery** then **Revive** then **Drive**:



The next screen will ask for confirmation – simply enter **yes** into the text box:



Then you will see:



All fixed!