FAStT Storage Manager

Demo Guide

Version 9.1

October 13, 2004

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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.

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:

() IBM FASt	f Storage Manager 9 (Enterprise Manag	jement)				_ 🗆 ×
Edit View	Tools Help					
*@ 4						IBM TotalStorage
💂 rsl		Name	Туре	Status	Network Management Type	Com
🗄 📰 In-Bar	nd Storage Subsystems	FAStT 900 Configured	333 333	Veeds Attention	In-Band (rsl)	
		FAStT 600 Configured	32	🔷 🛱 Optimal	In-Band (rsl)	
L		FAStT 900 Unconfigured	32	🔷 🛱 Optimal	In-Band (rsl)	
		FAStT 100	322	🔷 🛱 Optimal	In-Band (rsl)	
		I				
	Discovered host rsl and attached stora	ge subsystems				

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:

🗱 FAStT 900 Configured - IBM FAStT Storage Manage	r 9 (Subsystem Management)	
Storage Subsystem View Mappings Array Logical Drive	Controller Drive Advanced Help	
II 🕐 🖌 🗷 🦉		IBM TotalStorage
🛍 Logical/Physical View 🖥 🔓 Mappings View		
Logical	Physical	
Storage Subsystem FAStT 900 Configured	Controller Enclosure 0 ()	
- Total Unconfigured Capacity (2,444 GB)		
+		
Array 2 (RAID 3)		
H-GArray 3 (RAID 5)	Drive Enclosure 1 (Fibre)	
	Drive Enclosure 3 (Fibre)	
	Drive Enclosure 4 (Fibre)	
	TC IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	
0000		

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

Storage Subsystem	View	Mappings	Array	Logical Drive	Controller	Drive	Advanced	Help
_ ~ /	_				_	_	_	

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

Getting Started	
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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:

歸 FAStT 900 Configured - IBM FAStT Storage Manage	er 9 (Subsystem Mana	gement)			_ 🗆 ×
Storage Subsystem View Mappings Array Logical Drive	Controller Drive Adv	vanced Help			
II 🕐 🌭 🖻 🤫					IBM TotalStorage
🙀 Logical/Physical View 🔓 Mappings View					
Topology	Defined Mappings				
Storage Subsystem FAStT 900 Configured	Logical Drive Name	Accessible By	LUN	Logical Drive Capacity	Туре
	inventory7	Default Group	0	10 GB	Standard
	inventory6	Default Group	1	10 GB	Standard
	inventory2	Host Group Main	0	10 GB	Standard
🖻 🕂 🚺 Host Group Main	inventory4	Host Group Main	1	10 GB	Standard
🔁 🖶 📋 Host Killian	inventory8	Host Group Main	2	10 GB	Standard
Host Ports	Marketing	Host Killian	3	50 GB	Standard
	Test	Host Killian	4	84 GB	Standard
Host Port CYG_FIBRE_000	Engineering	Host Killian	5	400 GB	Standard
Host Port CYG_FIBRE_001	hventory5	Host Killian	6	10 GB	Standard
🖃 📄 Host Kondor	Backup1	Host Square	2	20 GB	Standard
	Backup2	Host Square	3	20 GB	Standard
	Backup3	Host Square	4	20 GB	Standard
Host Port CYG_FIBRE_000	Backup4	Host Square	5	20 GB	Standard
🔄 🖶 📋 Host Square					
Host Ports					
Host Port CYG_FIBRE_000					
Host Port CYG_FIBRE_001					
Host Part CYG_EIBRE_002					
	1				

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:



Arrout		
	Locate	
🛨 🚺 Engine	Change	•
— 间 Marke	Add Free Capacity (Drives)	
— 间 Test (Delete	
- 🗍 Shared	(50 GB)	

Г ^{Contr}	roller Enclosure 0 ()		
A		Uieur Accesisted Componente	
_		view Associated Components	
В		Change 🕨	•
		Properties	
[Drive	Enclosure 1 (Fibre)		Т

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.

Getting Started

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.

FAST 900 Configured - IBM FAST Storage Manag Storage Subsystem View Mappings Array Logical Drive	er 9 (Subsystem Management) 9 Controller Drive Advanced Help	
9 1 0 1 1		IBM TotalStorage
🔃 Logical/Physical View 🔓 🎲 Mappings View		
Logical	Physical	
- 1 Total Unconfigured Capacity (2,444 GB)		
E-GArray 1 (RAID 1)	ate Logical Drive	
E- Engineering (400 GB)		
Marketing (50 GB) Test (84 GB)		
Shared (50 GB)	•••••	
+	Drive Enclosure 2 (Fibre)	
The Array 3 (RAID 5)		
	Drive Enclosure (3 (Eibre)	
	[Drive Enclosure 4 (Fibre)	
0000		

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:

FAStT 900 Configured	- Introduction (Create Logical Drive)	×
	This wizard will help you quicity create an array and its corresponding logical drives. An array is a set of drives that you logically group together to provide capacity and a RAD level for one or more logical drives.	
	You specify the exact capacity for the logical drive on a subsequent wizard screen.	
	C Unconfigured capacity selected: 2,444.000.68 Tips and exemples on allocating capacity	
	Next > Cancel Hel	.

Select the array capacity and RAID level from the following:

To create an array, y	ou must specify the redur	ndancy protection (RAID lev	vel) and its overall capacity (i	number of drives). You can
either select the capa use the Calculate Car	acity from a list of automat bacity button to determine	ic choices or manually sele the overall capacity.	ct the drives. If you manually	v select the drives, you must
Mhat RAID level is be	st for my application?			
Most is spalasure las	e protection?			
what is enclosure los	is protection?			
RAID level:				
RAID 5		v		
Drive selection choice	BS:			
Automatic - select	t from capacities provide	d in list		
C				
U Manual - select d	rives to obtain array capa	acity (minimum 3 drives)		
Array Capacity	Number Of Drive	es Speed	Drive Type	Enclosure Loss Protec
292.000 GB	3	p15,000 rpm	Fibre	Ves
146.000 CR	2	15 000 mm	Fibro	Voo
146.000 GB	3	15,000 rpm 15,000 rpm	Fibre	Yes Vec
146.000 GB 72.000 GB 438.000 GB	3 3 4	15,000 rpm 15,000 rpm 15,000 rpm	Fibre Fibre Fibre	Yes Yes Yes
146.000 GB 72.000 GB 438.000 GB 219.000 GB	3 3 4	15,000 rpm 15,000 rpm 15,000 rpm 15,000 rpm	Fibre Fibre Fibre Fibre	Yes Yes Yes Yes
146.000 GB 72.000 GB 438.000 GB 219.000 GB 584.000 GB	3 3 4 5	15,000 rpm 15,000 rpm 15,000 rpm 15,000 rpm 15,000 rpm	Fibre Fibre Fibre Fibre Fibre	Ves Ves Ves Ves No
146.000 GB 72.000 GB 438.000 GB 219.000 GB 584.000 GB 292.000 GB	3 3 4 5 5	15,000 rpm 15,000 rpm 15,000 rpm 15,000 rpm 15,000 rpm 15,000 rpm	Fibre Fibre Fibre Fibre Fibre Fibre	Yes Yes Yes Yes No No
146.000 GB 72.000 GB 438.000 GB 219.000 GB 584.000 GB 292.000 GB 730.000 GB	3 4 4 5 5 6	15,000 rpm 15,000 rpm 15,000 rpm 15,000 rpm 15,000 rpm 15,000 rpm 15,000 rpm	Filore Filore Filore Filore Filore Filore Filore	Yes Yes Yes Yes No No No
146.000 GB 72.000 GB 438.000 GB 219.000 GB 584.000 GB 292.000 GB 365.000 GB	3 4 4 5 5 6	15,000 rpm 15,000 rpm 15,000 rpm 15,000 rpm 15,000 rpm 15,000 rpm 15,000 rpm 15,000 rpm	Filore Filore Filore Filore Filore Filore Filore	Yes Yes Yes No No No
146.000 GB 72.000 GB 438.000 GB 584.000 GB 584.000 GB 292.000 GB 730.000 GB 365.000 GB 576.000 GB	3 4 4 5 6 6 7	15,000 rpm 15,000 rpm 15,000 rpm 15,000 rpm 15,000 rpm 15,000 rpm 15,000 rpm 15,000 rpm 15,000 rpm	Fibre Fibre Fibre Fibre Fibre Fibre Fibre Fibre	Yes Yes Yes No No No No No
146.000 GB 72.000 GB 438.000 GB 219.000 GB 584.000 GB 292.000 GB 730.000 GB 365.000 GB 876.000 GB	3 3 4 5 5 6 6 7 7	15,000 rpm 15,000 rpm 15,000 rpm 15,000 rpm 15,000 rpm 15,000 rpm 15,000 rpm 15,000 rpm 15,000 rpm 15,000 rpm	Fibre Fibre Fibre Fibre Fibre Fibre Fibre Fibre Fibre	Yes Yes Yes No No No No No No
146.000 GB 72.000 GB 438.000 GB 584.000 GB 584.000 GB 292.000 GB 365.000 GB 365.000 GB 438.000 GB 438.000 GB	3 4 5 5 6 7 7 8	15,000 rpm 15,000 rpm	Filore Filore Filore Filore Filore Filore Filore Filore Filore Filore Filore	Yes Yes Yes No No No No No No No No
146.000 GB 72.000 GB 2438.000 GB 219.000 GB 282.000 GB 730.000 GB 365.000 GB 365.000 GB 438.000 GB 1.022.000 GB	3 4 4 5 5 6 6 7 7 8 8	15,000 rpm 15,000 rpm	Filore Filore Filore Filore Filore Filore Filore Filore Filore Filore Filore Filore Filore	Yes Yes Yes No No No No No No No No No
146.000 GB 72.000 GB 243.000 GB 249.000 GB 292.000 GB 292.000 GB 355.000 GB 375.000 GB 376.000 GB 511.000 GB 511.000 GB	3 4 5 5 6 7 7 8 8 8	15,000 rpm 15,000 rpm	Filore Filore Filore Filore Filore Filore Filore Filore Filore Filore Filore Filore Filore Filore	Yes Yes Yes No No No No No No No No No
146.000 GB 72.000 GB 243.000 GB 249.000 GB 229.000 GB 220.000 GB 730.000 GB 876.000 GB 876.000 GB 438.000 GB 511.000 GB 511.000 GB	3 4 4 5 5 6 6 7 7 8 8 9 9	15,000 rpm 15,000 rpm	Fibre Fibre Fibre Fibre Fibre Fibre Fibre Fibre Fibre Fibre Fibre Fibre Fibre Fibre Fibre Fibre Fibre Fibre	Yes Yes Yes No No No No No No No No No No No No
146.000 GB 72.000 GB 249.000 GB 249.000 GB 249.000 GB 282.000 GB 385.000 GB 385.000 GB 385.000 GB 1,022.000 GB 11,0200 GB 11,168.000 GB 1,314.000 GB	3 4 4 5 5 6 6 7 7 8 8 8 9 10 11	15,000 rpm 15,000 rpm	Filore Filore Filore Filore Filore Filore Filore Filore Filore Filore Filore Filore Filore Filore Filore Filore Filore	Yes Yes Yes No ONO No ONO No ONO No ONO No ONO No ONO No ONO ONO
146.000 GB 72.000 GB 438.000 GB 219.000 GB 242.000 GB 242.000 GB 365.000 GB 365.000 GB 511.000 GB 511.000 GB 511.000 GB 1,486.000 GB	3 4 4 5 5 6 6 6 7 7 8 8 9 9 10 11	15,000 rpm 15,000 rpm	Fibre Fibre Fibre Fibre Fibre Fibre Fibre Fibre Fibre Fibre Fibre Fibre Fibre Fibre Fibre Fibre Fibre Fibre Fibre Fibre	Yes Yes Yes No No No No No No No No No No No No No

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



FAStT	Storage Manager																							
-------	-----------------	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

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*:

,	allocate for an individual logical drive.	
ay RAID level: 5		
ay available capacity: 292.000 GB		
gical Drive parameters		
New logical drive capacity:	Units:	
	50 🕺 GB 💌	
Name (30 characters maximum):		
New-Logical-Drive		
 Use recommended settings 	s.	
C Customize settings (I/O chara	cteristics and controller ownership)	

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:

The last step is to specify how you want a logical unit number (LUN) to be mapped to the individual logical drive. You have two stores: Default Mapping if you do NOT intera to use storage partitions. The software will automatically assign a LUN, place the gived drive and event available to all hosts attached to this storage partitions. The software will automatically assign a LUN, place the gived drive in the Mapping Silver, and make it available to all hosts drached to this storage partitions. The software will automatically assign a LUN, place the gived drive in the Mapping Silver, and make it available to all hosts drached to this storage partitions. The software will automatically assign a LUN, place the gived drives, the operating system of all attached hosts must match the host type listed below. HORTANT: You only need to change the host type once for ALL logical drives. You can also change it using the Storage dusystem>-Change>-Default Host Type option. HORTANT: You private the use storage partitions (you must have the feature enabled). You will use the Define options in the appings View to (1) specify each host (and host type), and (2) create a storage partition by indicating the hosts you want to crease specific logical drives and the LUNs to assign to the logical drives. spical Drive-to-LUN mapping: → Default mapping: → Default mapping Sitem (Viet So TMP) → Solaris (with Vertas DMP) ↓ Windows 2000/Server 2003 Non-C	ASLT	900 Configured – Specify Logical Drive-to-LUN Mapping (Create Logical Drive)
elect Default Mapping if you do NOT intend to use storage partitions. The software will automatically assign a LUN, place the gical drive in the default group in the Mappings View, and make it available to all hosts attached to this storage subsystem. Also, correctly access the logical drives, the operating system of all disched hosts must marked the host type lates the beave. PORTANT: You only need to change the host type once for ALL logical drives. You can also change it using the Storage ubsystems-Changes-Default Host Type option. elect Map Later if you intend to use storage partitions (you must have the feature enabled). You will use the Define options in the appings View to (1) specify each host (and host type), and (2) create a storage partition by indicating the hosts you want to ccess specific logical drives and the LUNs to assign to the logical drives. gical Drive-to-LUN mapping: Default mapping Most type (operating system): Yindows NT Clustered (SPS or h Storage (voth Verties DMP) Windows 2000/Server 2003 Clust Windows 2000/Server 2003 Non-C	The la option	st step is to specify how you want a logical unit number (LUN) to be mapped to the individual logical drive. You have two s: Default Mapping or Map Later.
PORTANT: You only need to change the host type once for ALL logical drives. You can also change it using the Storage ubsystems-Changes-Default Host Type option. elect Map Later if you intend to use storage partitions (you must have the feature enabled). You will use the Define options in the appings View to (1) specify each host (and host type), and (2) create a storage partition by indicating the hosts you want to crease specific logical drives and the LUNs to assign to the logical drives. gical Drive-to-LUN mapping: Default mapping Host type (operating system): Vindows NT Clustered (SPS or h	Select ogical to con	Default Mapping if you do NOT intend to use storage partitions. The software will automatically assign a LUN, place the drive in the default group in the Mappings Vew, and make it available to all hosts attached to this storage subsystem. Also, rectly access the logical drives, the operating system of all attached hosts must match the host type listed below.
elect Map Later if you intend to use storage partitions (you must have the feature enabled). You will use the Define options in the appings View to (1) specify each host (and host type), and (2) create a storage partition by indicating the hosts you want to coses specific logical drives and the LUNs to assign to the logical drives. agical Drive-to-LUN mapping Post type (operating system): Vindows NT Clustered (SPS or h) Solaris (Wh Vertas DNP) Windows 2000/Server 2003 Non-C)	MPOR Subsy	(TANT: You only need to change the host type once for ALL logical drives. You can also change it using the Storage (stem>Change>>Default Host Type option.
agical Drive-to-LUN mapping: Default mapping Host type (operating system): Vindows TOLustered (SPS or h Solaris (with Vertas DNP) Windows 2000/Server 2003 Non-C Vindows 2000/Server 2000/Server 2000/Server 2000/Server 2000/S	Select Mappi acces	Map Later if you intend to use storage partitions (you must have the feature enabled). You will use the Define options in the rigs View to (1) specify each host (and host type), and (2) create a storage partition by indicating the hosts you want to is specific logical drives and the LUNs to assign to the logical drives.
Default mapping Host type (operating system): Windows NT Clustered (SP5 or h Solaris (WH Vertas DNP) Windows 2000/Server 2003 Clust Windows 2000/Server 2003 Non-C	oaica	al Drive-to-LUN mapping:
Host type (operating system): Vindows NT Clustered (SP5 or h Solitic (wth Vertices DMP) Windows 2000/Server 2003 Clust Windows 2000/Server 2003 Non-C	Őр	efault mapping
Windows NT Clustered (SFS or h Solaris (wth Veritas DMP) Windows 2000/Server 2003 Clust Windows 2000/Server 2003 Non-C	н	nst type (operating system):
Solaris (wth Vertas DMP) Windows 2000/Server 2003 Non-C	- Fr	Mindows NT Chistered (SP5 or h
Mindows 2000/Server 2003 Non-C	- 5	(alaris (with Veritas DMP)
Windows 2000/Server 2003 Non-C	• v	Vindows 2000/Server 2003 Clust
	v	Vindows 2000/Server 2003 Non-C 📃 🔽

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*.

🗱 FAStT 900 Configured - IBM FAStT Storage Manage	r 9 (Subsystem Management)	_ 🗆 🗡
Storage Subsystem View Mappings Array Logical Drive	Controller Drive Advanced Help	
II 🖸 🔽 😫 👺		IBM TetalStorage
🕕 Logical/Physical View 🚹 Mappings View		
Logical	Physical	
Storage Subsystem FAStT 900 Configured	Controller Enclosure 0 ()	
- Total Unconfigured Capacity (2,444 GB)		
🕀 📭 🖲 Array 1 (RAID 1)		
H Array 2 (RAID 3)		
H-G Array 3 (RAD 5)	Drive Enclosure 1 (Fibre)	
array 4 (RAD 5)		
	0 0	
	«Drive Enclosure 3 (Eilvra)	
	Drive Enclosure 4 (Fibre)	
	<u> </u>	

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

FAStT 900 Configured - IBM FAStT Storage Manager 9 (Subsystem Management)	_ 🗆 🗵
Storage Subsystem View Mappings Array Logical Drive Controller Drive Advanced Help	
🗉 🟥 ڬ 😼 😫 🤒	IBM TotalStorage
🗓 Logical/Physical View 🔒 🛅 Mappings View	
ogical Physical	
Controller Enclosure 0 ()	
Total Unconfigured Capacity (2,444 GB)	
B 🛛 🗖 🖷 krray 1 (RAID 1)	
Array 2 (RAID 3)	
The Array 3 (RAID 5) Change	
Ard Free Capacity (Drives)	
Délète	
Debu Factoria (Char)	
Drive Enclosure 3 (Filore)	
Drive Enclosure 4 (Fibre)	
8 88 89 69	

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:

Sarrent array in	ormation	Current array information									
RAID level: 1											
Free capacity available:None											
Fibre drives [enclosure, slot]: [1,7], [1,8], [2,6], [2,7], [3,5], [3,6], [4,5], [4,8]											
Enclosure loss protection: No											
Capacities of d	rives currently	in array: All 146 GB									
	,										
Lugilabla drivae	(applacet trave) -										
valiable unves	(Select two)										
elect two additio	(select two)	orm a new mirror pair. F	Because the array	/ does not have er	closure loss						
elect two addition rotection, you car	onal drives to 1 an select any i	orm a new mirror pair. E drives from the list below	Because the array	/ does not have er	nclosure loss						
elect two addition rotection, you ca Enclosure	onal drives to 1 an select any Slot	orm a new mirror pair. E drives from the list below Usable Capacity	Because the array v. Speed	/ does not have er Product ID	nclosure loss Drive Type						
elect two additio rotection, you ca Enclosure 1	onal drives to 1 an select any Slot 5	orm a new mirror pair. E drives from the list below Usable Capacity 146 GB	Because the array v. Speed 15000 rpm	/ does not have er Product ID B337	nclosure loss Drive Type Fibre						
elect two addition rotection, you ca Enclosure 1 1	onal drives to t an select any Slot 5 6	orm a new mirror pair. E trives from the list below Usable Capacity 146 GB 146 GB	Secause the array v. Speed 15000 rpm 15000 rpm	v does not have er Product ID B337 B337	nclosure loss Drive Type Fibre Fibre						
elect two additionation of the sector of the	onal drives to 1 an select any Slot 5 6 11	orm a new mirror pair. B drives from the list below Usable Capacity 146 GB 146 GB 73 GB	Because the array v. Speed 15000 rpm 15000 rpm 15000 rpm	/ does not have er Product ID B337 B337 B337	nclosure loss Drive Type Fibre Fibre Fibre						
elect two additio rotection, you ca Enclosure 1 1 1 1	onal drives to 1 an select any Slot 5 6 11 13	orm a new mirror pair. E strives from the list below Usable Capacity 146 GB 146 GB 73 GB 146 GB	ecause the array v. 15000 rpm 15000 rpm 15000 rpm 15000 rpm 15000 rpm	v does not have er Product ID B337 B337 B337 B337 B337	nclosure loss Drive Type Fibre Fibre Fibre Fibre Fibre						
elect two additionate university of the second seco	onal drives to 1 an select any - Slot 5 6 11 13 13	orm a new mirror pair. E strives from the list below Usable Capacity 146 GB 146 GB 73 GB 146 GB 36 GB	ecause the array v. 15000 rpm 15000 rpm 15000 rpm 15000 rpm 15000 rpm 15000 rpm	v does not have er Product ID B337 B337 B337 B337 B337 B337	Drive Type Fibre Fibre Fibre Fibre Fibre Fibre Fibre						
elect two additionate university of the second seco	(Select Two) onal drives to 1 an select any 5 6 11 13 13 1 5	orm a new mirror pair. E trives from the list below Usable Capacity 146 GB 146 GB 73 GB 146 GB 36 GB 146 GB	Because the array v. Speed 15000 rpm 15000 rpm 15000 rpm 15000 rpm 15000 rpm 15000 rpm	v does not have er Product ID B337 B337 B337 B337 B337 B337	Closure loss Drive Type Fibre Fibre Fibre Fibre Fibre Fibre Fibre						
elect two additio rotection, you co Enclosure 1 1 1 1 2 2 2 2	is a select two) an select any i Slot 5 6 11 13 1 5 8	orm a new mirror pair. E trives from the list below Usable Capacity 146 GB 146 GB 146 GB 36 GB 146 GB 146 GB 146 GB	Because the array x. Speed 15000 rpm 15000 rpm 15000 rpm 15000 rpm 15000 rpm 15000 rpm 15000 rpm	v does not have er Product ID B337 B337 B337 B337 B337 B337 B337	Closure loss Drive Type Fibre Fibre Fibre Fibre Fibre Fibre Fibre						
elect two additio ordection, you ca Enclosure 1 1 1 1 2 2 2 2 2 2	(select two) onal drives to 1 an select any 5 6 11 13 1 1 5 5 8 9	orm a new mirror pair. E trives from the list below Usable Capacity 146 GB 146 GB 73 GB 36 GB 146 GB 146 GB 146 GB 73 GB	Because the array v. Speed 15000 rpm 15000 rpm 15000 rpm 15000 rpm 15000 rpm 15000 rpm 15000 rpm	v does not have er Product ID B337 B337 B337 B337 B337 B337 B337 B337 B337	Closure loss Drive Type Fibre Fibre Fibre Fibre Fibre Fibre Fibre Fibre						
elect two additionation of the second	(select two) onal drives to 1 soloct 5 6 11 13 1 1 5 8 9 12	orm a new mirror pair. E trives from the list below Usable Capacity 146 GB 146 GB 146 GB 36 GB 146 GB 146 GB 146 GB 146 GB 73 GB	Speed Speed 15000 rpm 15000 rpm	v does not have er Product ID B337 B337 B337 B337 B337 B337 B337 B337 B337 B337	Closure loss Drive Type Fibre Fibre Fibre Fibre Fibre Fibre Fibre Fibre Fibre						

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

urrent array into	rmation					
RAID level: 1						
ree capacity av	vailable:None			4.01		
Fibre anves (end	votection: No	[1,7][1,0][2,0][2,0][2,7][5	2'2]' [2'0]' [4'2]' [-	+,o]		
Capacities of dri	ives currently	, / in array: All 146 GB				
capacities of an	ives currently	androy. All 140 OD				
vailable drives (;	select two) -					
vailable drives (select two)					
vailable drives (: lect two addition	select two) nal drives to 1	form a new mirror pair. E	Because the arra	y does not have e	nclosure loss	
vailable drives (lect two addition stection, you ca	select two) nal drives to 1 n select any	form a new mirror pair. E drives from the list belov	Because the arra	y does not have e	nclosure loss	
vailable drives (lect two addition stection, you ca Enclosure	select two) nal drives to t n select any Slot	form a new mirror pair. E drives from the list belov Usable Capacity	Because the arra	y does not have e	nclosure loss Drive Type	
vailable drives (lect two addition stection, you ca Enclosure 1	select two) nal drives to r n select any Slot 5	form a new mirror pair. E drives from the list belov Usable Capacity 146 GB	Because the arra v. Speed 15000 rpm	y does not have e Product ID B337	nclosure loss Drive Type Fibre	
vailable drives (; lect two addition stection, you ca Enclosure 1 1	select two) nal drives to t n select any Slot 5 6	form a new mirror pair. E drives from the list belov Usable Capacity 148 GB 148 GB	Secause the arra v. Speed 15000 rpm 15000 rpm	y does not have e Product ID B337 B337	nclosure loss Drive Type Fibre Fibre	.
vailable drives (lect two addition tection, you ca Enclosure 1 1 1	select two) nal drives to 1 n select any Slot 5 6 11	form a new mirror pair. E drives from the list belov Usable Capacity 146 GB 146 GB 73 GB	Secause the arra v. Speed 15000 rpm 15000 rpm 15000 rpm	y does not have er Product ID B337 B337 B337	nclosure loss Drive Type Fibre Fibre Fibre	
railable drives (; lect two addition tection, you ca Enclosure 1 1 1	select two) nal drives to 1 n select any Slot 5 6 11 13	form a new mirror pair. E drives from the list below Usable Capacity 145 GB 146 GB 73 GB 146 GB	Because the arra V. Speed 15000 rpm 15000 rpm 15000 rpm 15000 rpm	y does not have er Product ID B337 B337 B337 B337	nclosure loss Drive Type Fibre Fibre Fibre Fibre	•
vailable drives (; lect two addition tection, you can Enclosure 1 1 1 2	select two) nal drives to t n select any Slot 5 6 11 13 13 1	form a new mirror pair. E drives from the list below Usable Capacity 146 GB 146 GB 73 GB 146 GB 36 GB	Because the arra V. Speed 15000 rpm 15000 rpm 15000 rpm 15000 rpm	y does not have en Product ID B337 B337 B337 B337 B337 B337	nclosure loss Drive Type Fibre Fibre Fibre Fibre Fibre	-
vailable drives (; lect two addition tection, you can Enclosure 1 1 1 2 2 2	select two)	form a new mirror pair. E drives from the list below Usable Capacity 146 GB 73 GB 146 GB 36 GB 146 GB 146 GB	Pecause the array Speed 15000 rpm 15000 rpm 15000 rpm 15000 rpm 15000 rpm	y does not have en Product ID B337 B337 B337 B337 B337 B337 B337	nclosure loss Drive Type Fibre Fibre Fibre Fibre Fibre Fibre	
vailable drives (; lect two addition stection, you ca Enclosure 1 1 1 2 2 2 2	select two)	form a new mirror pair. E drives from the list below Usable Capacity 146 CB 73 CB 146 CB 36 CB 36 CB 146 CB 146 CB	Speed Speed 15000 rpm	y does not have er Product ID B337 B337 B337 B337 B337 B337 B337 B337	Drive Type Fibre Fibre Fibre Fibre Fibre Fibre Fibre Fibre Fibre	•
vailable drives () lect two addition tection, you ca Enclosure 1 1 1 1 2 2 2 2 2 2	select two) nal drives to t n select any Slot 5 6 11 13 1 13 5 8 9	form a new mirror pair. E drives from the list below Usable Capacity 146 GB 73 GB 146 GB 38 GB 146 GB 146 GB 73 GB	Speed speed 15000 rpm 15000 rpm	y does not have en Product ID B337 B337 B337 B337 B337 B337 B337 B33	Drive Type Fibre Fibre Fibre Fibre Fibre Fibre Fibre Fibre Fibre	-
vailable drives () lect two addition tection, you car Enclosure 1 1 1 2 2 2 2 2 2 2 2 2 2	select two)	form a new mirror pair. E drives from the list below Usable Capacity 146 CB 73 GB 146 CB 38 GB 146 GB 146 GB 146 GB 73 GB	Because the array Speed 15000 rpm 15000 rpm	y does not have er Product ID B337 B337 B337 B337 B337 B337 B337 B337 B337 B337 B337	nclosure loss Drive Type Fibre Fibre Fibre Fibre Fibre Fibre Fibre Fibre Fibre	

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

5 FAStT	900 Configured - Confirm Add Free Capacity (Drives) 🛛 🔀
	This operation will take a long time to complete and you cannot cancel it atter it starts. However, the data on the array will remain accessible during this operation. Select OK to use the selected drives or select Cancel to return to the previous screen to select different drives.
	OK

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:

Devices	Total	Read	Cache Hit	Current	Maximum	Current	Maximum	
5011000	lOs	Percenta	Percenta	KB/second	KB/second	10/second	10/second	
ONTROLLER IN SLOT A	0	0.0	0.0	0.0	0.0	0.0	0.0	
📕 Logical Drive Backup2	0	0.0	0.0	0.0	0.0	0.0	0.0	Ī
📕 Logical Drive Backup4	0	0.0	0.0	0.0	0.0	0.0	0.0	
j Logical Drive Backup6	0	0.0	0.0	0.0	0.0	0.0	0.0	
📕 Logical Drive Engineering	0	0.0	0.0	0.0	0.0	0.0	0.0	
📕 Logical Drive Inventory1	0	0.0	0.0	0.0	0.0	0.0	0.0	
📕 Logical Drive Inventory11	0	0.0	0.0	0.0	0.0	0.0	0.0	
📕 Logical Drive Inventory13	0	0.0	0.0	0.0	0.0	0.0	0.0	Ī
Logical Drive Inventory15	0	0.0	0.0	0.0	0.0	0.0	0.0	I
📕 Logical Drive Inventory17	0	0.0	0.0	0.0	0.0	0.0	0.0	I
Logical Drive Inventory19	0	0.0	0.0	0.0	0.0	0.0	0.0	I
Logical Drive Inventory3	0	0.0	0.0	0.0	0.0	0.0	0.0	I
Logical Drive Inventory5	0	0.0	0.0	0.0	0.0	0.0	0.0	I
📕 Logical Drive Inventory7	0	0.0	0.0	0.0	0.0	0.0	0.0	I
Logical Drive Inventory9	0	0.0	0.0	0.0	0.0	0.0	0.0	1
Logical Drive Repository1	0	0.0	0.0	0.0	0.0	0.0	0.0	l
							1	

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:

	4							_
Devices	Total	Read	Cache Hit	Current	Maximum	Current	Maximum	
Devices	IOs	Percenta	Percenta	KB/second	KB/second	IO/second	IO/second	
ONTROLLER IN SLOT A	20,040	60.0	16.7	5,010.0	5,010.0	10,020.0	10,020.0	
📕 Logical Drive Backup2	1,402	65.0	13.0	350.5	350.5	701.0	701.0	
📕 Logical Drive Backup4	1,902	96.0	16.0	475.5	475.5	951.0	951.0	
📕 Logical Drive Backup6	476	4.0	21.1	119.0	119.0	238.0	238.0	
📕 Logical Drive Engineering	902	34.9	9.8	225.5	225.5	451.0	451.0	
📕 Logical Drive Inventory1	1,702	86.0	24.0	425.5	425.5	851.0	851.0	
Logical Drive Inventory11	668	15.9	10.4	167.0	167.0	334.0	334.0	L
📕 Logical Drive Inventory1 3	778	24.9	17.5	194.5	194.5	389.0	389.0	
📕 Logical Drive Inventory15	1,292	56.0	20.9	323.0	323.0	646.0	646.0	
Logical Drive Inventory17	484	6.8	18.2	121.0	121.0	242.0	242.0	
📕 Logical Drive Inventory1 9 🚽	970	36.9	20.9	242.5	242.5	485.0	485.0	I.
📕 Logical Drive Inventory3	1,094	47.0	12.8	273.5	273.5	547.0	547.0	
📕 Logical Drive Inventory5	1,594	77.0	16.0	398.5	398.5	797.0	797.0	
📕 Logical Drive Inventory7	860	27.9	13.8	215.0	215.0	430.0	430.0	
📕 Logical Drive Inventory9	1,270	58.0	15.9	317.5	317.5	635.0	635.0	
📕 Logical Drive Repository1	1,484	68.0	24.0	371.0	371.0	742.0	742.0	
<u>Stop</u>	Įpdate	Settings.	Sa	ye As	Close	Help	J	
tart: 9/18/03 3:01:40 PM			Stop:			Time Monito	ored: 00:00):(

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:

🙁 FAStT 900 (Configured - Save Performar	nce Stati	stics		×
Look <u>i</u> n:	= ca	· 🖻	•	<u>e</u>	
SMclientDer	mo9840G503				
🚞 SMDemo					
🚞 temp					
🚞 Uninstall					
insfiles					-
File <u>n</u> ame:					<u>S</u> ave
Files of type:	Report Format (*.perf)		•		ancel

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 FAStT 900 Configured and select Change and select Cache Settings:

FAStT 900 Configured - Change Cache Settings	×
The start value must be greater than or equal to the stop value.	
NOTE: To change the cache settings for an individual logical drive, use the Logical Drive>>Change>>Cache Settings option.	
Cache flush settings	
Start flushing	
● 80%● 20%	
$20\frac{1}{2}$ Stop flushing	
4 KB Cache block size	
OK Cancel Help	

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:

	Array 1
	Logical Drive Engineering
	Logical Drive Marketing
	Logical Drive Reared
	Logical Drive Inventory1
	Logical Drive Inventory2
ele	et cache properties
ele	act cache properties
ŀ	Z Enable read caching
ŀ	Enable write caching
	Enable write caching without batteries
	✓ Enable write caching with mirroring
Γ	5 🛒 <u>C</u> ache read ahead multiplier (0 to 32768)

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:

歸 FAStT	900 Configured - Change Cache Settings	X
	Are you sure you want to change the cache settings on th selected logical drives to the following values?	e
•	Read cache: Enabled Write cache: Enabled Write cache without batteries: Disabled Write cache mirroring: Enabled Read ahead multipiler. 5	
	Yes No	

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**:

器 FAStT 900 Configured - IBM FAStT Storage Manager 9 (Subsystem Management)	
Storage Subsystem View Mappings Array Logical Drive Controller Drive Advanced Help	
	8M otalStorage
🔃 Logical/Physical View 🔓 Mappings View	
Logical Physical	
Controller Enclosure 0 ()	
A O Terret Unconfigured Capacity (2,188 GB)	
E- C Array 1 (RAD 3)	
e- 🥫 🖲 Engineering (400 GB)	
View Associated Components re 1 (Fibre)	
Change Modification Priority	
Test (84 GP)	
Create Copy Create Copy Ownership/Preferred Path	
Shared (S0 GB) Create Flach Conv Logical Drive Segment Size > 8 KB	
Delete	
Array 2 (RAID 3) 32 KB	
Properties are 3 (Fibre)	
Array 4 (RAID 5)	
• •	

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:

Array 1					-
Logical Drive Engi	neering				
Logical Drive Mark	eting				
Logical Drive Test					
Logical Drive Shar	ed				
Аггау 2					
Logical Drive Inver	ntory1				
Logical Drive Inver	tory2				
Logical Drive Inver	tory3				
Logical Drive Inver	ntorv4				-
ct media scan prope	rties	Select			
Enable backgrou	nd media :	scan			
C With redund	ancy chec	:k			
Vvithout redu	indancy cl	heck			
se the Storage Sub iew/change the frei	system>>0 quency wi	Change>>∛ th which th	ledia Scan e scan wil	Settings op I run.	ition to

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.

🗱 FAStT 900 Configured - Change Logical Drive Properti 🗙
Processed 1 of 1 logical drives - Completed.
ОК
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*:

👬 FAStT 900 Configured - IBM FAStT Storage Manager	r 9 (Subsystem Management)	
Storage Subsystem View Mappings Array Logical Drive	Controller Drive Advanced Help	
II 🕐 💊 🕿 🖻		IBM TotalStorage
🕕 Logical/Physical View 📔 🏠 Mappings View		
Logical	Physical	
Storage Subsystem FAStT 900 Configured	Controller Enclosure 0 ()	
🕀 📲 Array 1 (RAID 3)	8 • 💶 💷 🖿	
🕀 📲 Array 2 (RAID 3)		
H Array 3 (RAID 5)	Drive Enclosure 1 (Fibre)	
E-GATTAN 4 (RAID 5)		
Backup1 (20 GB)	• •	
Backup2 (20 GB)	Drive Enclosure 2 (Fibre)	
Backup3 (20 GB)		
Backup4 (20 GB)		
Backupt (20 CB)		
Backups (20 CB)		
Repusitoryo (ou GB)	• •	
Free Capacity (238 GB)	Drive Enclosure 4 (Fibre)	
, 		

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:

FAStT 900 Configured - Specify Names (Create A Flash Copy Logical Drive)	x
Specify a name that helps you associate the flash copy logical drive and flash copy repository logical drive with its correspond base logical drive. The name can be up to 30 characters.	ing
Base logical drive name: Backup1	
Flash Copy logical drive name:	
Backup1-1	
Flash Copy repository logical drive name:	
Backup1-R1	
< Back Rent Cancel Hei	p
	and the local division of the local division

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.

FAStT 900 Configured - Preview (Create A Flash Copy Logical D	rive)
A flash copy logical drive and associated flash copy repository logical driv Finish to create the logical drives.	e will be created with the following parameters. Selec
Flash Copy Logical Drive Parameters	
Name: Backup1-1	
lash Copy logical drive capacity: 20.000 GB	
Flash Copy Repository Logical Drive Parameters	
Name: Backup1-R1	
Tash Copy repository logical drive capacity: 4.000 GB (20% of base logical	al drive capacity)
Japacity used from: Free Capacity 238,000 GB on array 4	
	< Back Finish Cancel Help

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**

🗱 FAStT 900 Configured - IBM FAStT Storage Manage	r 9 (Subsystem Management)	_ 🗆 🗵
Storage Subsystem View Mappings Array Logical Drive	Controller Drive Advanced Help	
		IBM TotalStorage
🕕 Logical/Physical View 🔓 Mappings View		
Logical	Physical	
Storage Subsystem FAStT 900 Configured	Controller Enclosure 0 ()	
-0 Total Unconfigured Capacity (2,152 GB)		
Array 1 (RAID 3)	▫▫∎⊒⊒	
🕀 崎 Array 2 (RAID 3)		
- 4 Array 3 (RAID 5)		
E- G Array 4 (RAID 5)		
Backup1 (20 GB)		
Backup2 (20 GB)	Drive Enclosure 2 (Fibre)	
Backup3 (20 GB)		
- Backup4 (20 GB)		
Backup5 (20 GB)	Drive Enclosure 3 (Fibre)	
— 📜 🗣 Backup1-R1 (4 GB)	Drive Freeleware of (Filters)	
Free Capacity (234 GB)		
	· · · · · · · · · · · · · · · · · · ·	
	1	

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:

FASTT 900 Configured - IBM Storage Subsystem View Mappin	FAStT Storage Manage Igs Array Logical Drive	r 9 (Subsystem Management) Controller Drive Advanced Help	
s 🗉 🖉 🌭 🖻 🕏			IBM TotalSteraes
🕕 Logical/Physical View 👔	Mappings View		
Logical		Physical	
😋 [#] Storage Subsystem FAStT 90	0 Configured	Controller Enclosure 0 ()	
- Total Unconfigured Capacity	(2,152 GB)		
E- Carray 1 (RAID 3)			
E-B Engineering (400 GB)			
C C C C C C C C C C C C C C C C C C C		Drive Enclosure 1 (Fibre)	
Marketing (SU GB)	Change		
- Test (84 GB)	Increase Capacity		
- Shared (50 GB)	Create Copy		
	Create Remote Mirror.		
🖅 🚰 Array 2 (RAID 3)	Create Flash Copy Log	ical Drive	
T- The Array 3 (RAID 5)	Delete		
T Array 4 (RAID 5)	Rename		
	Properties		
		• •	
		-Dates Englances & (Eliza)	
ា្រាលា			

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:

arget logical drive:				
Logical Drive Name	Capacity (GB)	Array	R	AID Level
ResearchData	252.000	3	5	
Shared	50.000	1	3	
est	84,000			
ource logical drive ca	pacity (GB): 50.000		v	ew Drives
ource logical drive ca	pacity (GB): 50.000		v	ew Drives
ource logical drive ca	pacity (CB): 50.000		v	ew Drives
ource logical drive ca elect copy priority The higher priorities w performance.	pacity (GB): 50.000 All eliocate more resource	s to the operation (v	ew Drives
ource logical drive ca elect copy priority The higher priorities w serformance. Priority:	pacity (GB): 50.000 All eliocate more resource	s to the operation (v at the expen	ew Drives

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

#FAStT 900 Configured - Preview (Create Copy)
The data on source logical drive Marketing (\$0.000 GB) will now be copied to target logical drive Test (\$4.000 GB) at Medium priority.
CAUTION. Starting the copy operation will overwrite ALL existing data on the target logical drive and make the target logical drive READ-ONLY to hosts, and will fail ALL flash copy logical drives associated with the target logical will were. If any exist if you have used logical drive Test as a copy before, be sure you no longer need that data or have it backed up.
For any post-creation activities, use the Logical Drive>>Logical DriveCopy>>Copy Manager option.
Are you sure you want to continue?
Type yes to confirm that you want to perform this operation.
lyes
< Back Finish Cancel Help

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:

🞲 FAStT 900 Configure	ed - Copy Manager			
Copy Change Help				
Source Logical Drive	Target Logical Drive	Status	Timestamp	Priority
Marketing	🙃 Test	In Progress*		Medium
Total number of conice: 4	tCV complete activat	ad time remaining (C minutes	
Total number of copies: 1	1 °6% complete, estimat	ed time remaining: 4	to minutes	

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

🞲 FASt	T 900 Configured	- Copy Manager			_ 🗆 🗵
Copy C	Ihange Help	_			
Sour	Copy Priority	ve	Status	Timestamp	Priority
Marketi	Target Logical Dri	ve Permissions	In Progress*		Medium
-					
Total nur	mber of copies: 1	*6% complete, estim	ated time remaining:	26 minutes	

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

🞲 FAStT 900 Ca	nfigured - Chan	ge Copy Priority	×
Selecting OK will copy pairs.	set the copy priori	ty for all selected	
Copy priority			
The higher pri the operation performance.	orities will allocate at the expense of :	more resources to system	
Priority:			
Lowest	1 1	I Highest	
ок	Cancel	Help	

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:

🚟 FAStT 900 Configured	i - IBM FAStT Stor	age Manage	r 9 (Subsys	stem M	anagemen	t)			1	- 🗆 ×
Storage Subsystem View	Mappings Array	Logical Drive	Controller	Drive	Advanced	Help				
B E 🖄 😼 B	9								IB N Tota	alStorage
📵 Logical/Physical View	w 🛅 Mappings '	liew								
Logical			Physical							
Storage Subsystem F.	ASIT 900 Configured		Controlle	r Enclos	ure 0()					
- Total Unconfigured	Copy Manager.							044		
Amou 1 (RAID 1)	View Profile					-	-	<u>8</u>		
	Locate	•			1	-				
Array 2 (RAID 3)	Configuration	•	-Duise En		4 (Filme)					
Array 3 (RAID 5)	Premium Featur	es 🕨			1 (Fibre)					
E-GARANTAY 4 (RAID 5)	Remote Mirrorin	g 🕨	Activate						<u>11</u>	
	Recovery Guru.		Deactivate,							
	Monitor Perform	ance	Upgrade Mir	ror Kepa	isitory Logica	al Drives				
	Change	•	Drive En	closure	2 (Fibre) —			000		
	Set Controller C	locks	FC				arte la		12	
	Rename								_	
	Exit									
			Drive En	closure	3 (Fibre) —					
			FC		Turne I				11	
			°							
			[Drive En	closure	4 (Fibre)					
			FC	Contract of Contra			the state		11	
0000										

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:

🗱 FAStT 900 Configured - Preview (Activate Remote Mirroring)	×
The Remote Mirroring feature will be set to active. As a result of the activation the following will occur:	
1. Two mirror repository logical drives will be created using the existing capacity on Array 2.	
 An insis our energy using insist point 2 with beingged out. Host point 2 will be reserved for mirror data transmissions. All host communication to the storage subsystem on host point 2 will be rejected as long as the feature is active. 	
< Back Finish Cancel He	р

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**:

It is witzard will lead you through the necessary steps to activate the Remote Mirroring forceted. These mirror repository logical drives serve as a resource for all mirror logical drives on this storage subsystem. You have the option to place these logical drives on a using array's free capacity (or create a new morror repository logical drives must have at least 256.000 MB to the capacity. In addition, activating Remote Mirroring will log out any connections to bot to place these logical drives on an using array's free capacity (192.000 GB) on array 2 (RAID 3) Image: Pree capacity (192.000 GB) on array 2 (RAID 3) Image: Pree capacity (192.000 GB) on array 4 (RAID 5) Image: Pree capacity (192.000 GB) on array 4 (RAID 5) Image: Pree capacity (192.000 GB) on array 4 (RAID 5)	EAStT 600 Configured - In	ntroduction (Activate Remote Mirroring)	×	×
	This feat creater drive exist of friction friction Sele C	wizard will lead you through the necessary steps to activate the Rendo we. As part of the activation, two global mirror repository logical drives s ated. These mirror repository logical drives serve as a resource for all mil- is sorthis storage subsystem. You have the option to place these logical ting array's receapacity or create a new array. array selected for the mirror repository logical drives must have at least ree capacity. In addition, activating Remote Mirroring will log out any com- port 2 and reserve this port for mirror data transmission. set where you would like to place the mirror repository logical drives: Free capacity on existing arrays	e Mirroring will be rror logical drives on an 256.000 MB nections to	

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:

Storage Subsystem View Mappings Array Logical Drive Controller Drive Advanced Help Image: Controller Drive Advanced Help Cocical/Physical View Mappings View Image: Controller Enclosure 0 () Array 1 (RAD 1) Controller Enclosure 0 () Array 1 (RAD 1) Forgineering (400 GB) Drive Enclosure 1 (Fbro) Image: Controller Enclosure 1 (Fbro) Storage Subsystem KAST 900 Configured Controller Enclosure 1 (Fbro) Image: Controller Enclosure 1 (Fbro) Marketing (50 GB) Increase Capacity Create Flash Copy Logical Drive Image: Controller Enclosure 1 (Fbro) Array 2 (RAD 3) Increase Capacity Create Flash Copy Logical Drive Image: Projectice Flash Copy Logical Drive Properties Image: Properties Image: Projectice Flash Copy Logical Drive Image: Projectice Flash Copy Logical Drive Properties Image: Projectice Flash Copy Logical Drive Image: Projectice Flash Copy Logical Drive Image: Projectice Flash Copy Logical Drive Delete Rename Projectice Flash Copy Logical Drive Image: Projectice Flash Copy Logical Drive Image: Projectice Flash Copy Logical Drive Delete Projectice Flash Copy Logical Drive Image: Projectice Flash Copy Logical Drive Image: Projectice Flash Copy Logical Drive	🚟 FAStT 900 Configured - IBM I	FAStT Storage Manage	r 9 (Subsys	stem M	lanagemer	it)		_ 🗆 ×
Image: Strate (So GB) Change Increase Capacity Create Elash Copy Create Elash Copy Logical Drive Projection Delete Rename Projection If Enclosure 4 (Fbre) Image: Increase Capacity Create Elash Copy Create Elash Copy Logical Drive Projection Image: Increase Capacity Create Elash Copy Create Elash Copy Logical Drive Image: Increase Capacity Orive Enclosure 4 (Fbre) Image: Increase Capacity Create Elash Copy Logical Drive Image: Increase Capacity Orive Enclosure 4 (Fbre) Image: Increase Capacity Create Elash Copy Logical Drive Image: Increase Capacity Delete Rename Properties Image: Increase Capacity Image: Increase Capacity Image: Im	Storage Subsystem View Mappin	igs Array Logical Drive	Controller	Drive	Advanced	Help		
Logical/Physical View Physical Cordination of the second secon	🗏 🗹 🖉 🖉 🛄							IBM TotalStorage
Logical Physical Image: Controller Enclosure 0 () A Image: Controller Enclosure 1 (Fbre) Image: Controller Enclosure 1 (Fbre) Image: Controller Enclosure 1 (Fbre) Image: Controller Enclosure 1 (Fbre) Image: Controller Enclosure 1 (Fbre) Image: Controller Enclosure 1 (Fbre) Image: Controller Enclosure 1 (Fbre) Image: Controller Enclosure 1 (Fbre) Image: Controller Enclosure 1 (Fbre) Image: Controller Enclosure 1 (Fbre) Image: Controller Enclosure 1 (Fbre) Image: Controller Enclosure 1 (Fbre) Image: Controller Enclosure 1 (Fbre) Image: Controller Enclosure 1 (Fbre) Image: Controller Enclosure 4 (Fbre) Image: Controller Enclosure 4 (Fbre) Image: Controller Enclosure 4 (Fbre) Image: Controller Enclosure 4 (Fbre) Image: Controller Enclosure 4 (Fbre) Image: Controller Enclosure 4 (Fbre) Image: Controller Enclosure 4 (Fbre) Image: Controller Enclosure 4 (Fbre) Image: Controller Enclosure 4 (Fbre) Image: Controller Enclosure 4 (Fbre) <td>📵 Logical/Physical View 🔓</td> <td>Mappings View</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	📵 Logical/Physical View 🔓	Mappings View						
Image Subsystem FAST 900 Configured Tratal Unconfigured Capacity (2,444 GB) Array 1 (RAD 1) Engineering (400 GB) Drive Enclosure 1 (Fbre) Drive Enclosure 1 (Fbre) Drive Enclosure 1 (Fbre) Drive Enclosure 1 (Fbre) Drive Enclosure 1 (Fbre) Create Capacity Create Capacity Create Reach Copy Logical Drive Delete Rename Properties ZC Drive Enclosure 4 (Fbre) Drive Enclosure 4 (Fbre)	Logical		Physical					
A A A A A A A A A A A A A A A A A A A	Storage Subsystem FAStT 900) Configured	Controlle	r Enclos	ure 0()			
Array 1 (RAD 1) B Diffuence Fingeering (400 C6) Drive Enclosure 1 (Fbre) Orive Enclosure 1 (Fbre) Diffuence Financese Capacity Create Flash Copy Logical Drive Create Flash Copy Logical Drive Delete Rename Properties Torive Enclosure 4 (Fbre) Diffuence Diffuence Started (Fbre) Started (Fbre)	Total Unconfigured Capacity	(2,444 GB)	A [
Prive Enclosure 1 (Fbre) Prive Enclosure 4 (Fbre) Prive Enclosure 4 (Fbre) Prive Enclosure 4 (Fbre)	E- The Array 1 (RAID 1)		в 🧿]				[
Image: Change Prive Enclosure 1 (Fbre) Image: Change Image: Change	Engineering (400 GB)							
Change Dircrease Capacity Create Capy Create Capy Create Capy Create Capy Create Flash Copy Logical Drive Delete Rename Properties If Dirive Enclosure 4 (Fbre) Tree Dirive Enclosure 4 (Fbre)	📑 🎙 Marketing (50 GB)		Drive End	closure	1 (Fibre)			
Increase Capacity Increase Capacity Greate Capy Greate Capy Create Resh Copy Logical Drive Increase Capacity Create Resh Copy Logical Drive Increase Capacity Delete Rename Properties Increase Capacity Create Resh Copy Logical Drive Increase Capacity Delete Rename Properties Increase Capacity Increase Resh Copy Logical Drive Increase Capacity Create Resh Copy Logical Drive Increase Capacity Properties Increase Capacity Increase Capacity Increase Capacity Create Resh Copy Logical Drive Increase Capacity Properties Increase Capacity Increase Capacity Increase Capacity Create Resh Copy Logical Drive Increase Capacity Properties Increase Capacity Increase Capacity		Change		• P				12
Array 2 (RAD 3) Create Copy Create Flash Copy Logical Drive Delete Rename Properties	Shared (50 GB)	Increase Capacity				00		
Array 3 (RAD 5) B Array 4 (RAD 5) Create Flash Copy Logical Drive Properties T.C. Properties T.C. Delete Properties T.C. Drive Enclosure 4 (Fore) T.C. Drive Enclosure 4 (Fore) Drive Enclosure	E-CARAND 3)	Create Copy		ure	2 (Fibre)-			
Create Hash Copy Logical Unive	H Array 3 (RAID 5)	Create Remote Mirror		-10				8-6
Properties	F-G Array 4 (RAID 5)	Create Hash Copy Lo	gical Drive	_P •				<u>01</u>
		Rename						
		Properties		re	3 (Fibre) —			
		Troportos	FC		A COLOR			主
					•	•		_
			Duiter Fra		4 (5)			
			FURINE ERIC	liusure IIIIII		0000		met
			FC				▋▋IJIJIJ	<u>1</u>
			1					

Ast 1900 Configured - Introduction (Create Remote Mirror)
 Figure 1
 Fig

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:

FAStT 900 Configured -	Select Secondary L	ogical Drive (Crea	te Remote Mirror)	>
Select the secondary logical not in the list, verify that its c	drive you want to be in apacity is greater than	cluded in the mirrored or equal to the capac	I pair. If the logical drive you want to us ity of the primary logical drive.	se is
NOTE: Primary and secondar	y logical drives are NO	T required to have eq	ual RAID levels.	
MPORTANT: Secondary logio onger have write access to	cal drives are READ-ON it once it becomes a se	LY. Any host that he condary logical drive	as been mapped to a logical drive will n in a mirrored pair. However, any defin	o ed
nappings will remain and any ole or the mirror relationship	y mapped host will be a is removed.	ble to write to the log	ical drive if it is ever promoted to a prim	ary
Logical Drive Name	Capacity (GB)	RAID Level	World Wide Name	
Engineering	150	1	32:31:34:33:36:35:38:37:30:39:33:31:3	39:0
Warketing	50	1	32:31:34:33:36:35:38:37:30:39:33:32:3	31:0
ResearchData りぐ	144	5	32:31:34:33:36:35:38:37:30:39:33:35:3	31:0
		< Bac	k Next > Cancel	Help

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):

🗱 FAStT 900 Configured - Set Write Mode (Create Remote Mirror)
Which write mode should Luse?
What is a write consistency group?
Set the way in which you want writes to the remote storage subsystem acknowledged to the host system that sent the I/O request.
Synchronous mode offers the best chance of full data recovery from the remote secondary storage subsystem in a disaster at the expense of host I/O performance and is the preferred mode of operation.
Asynchronous mode offers faster host I/O performance but does not guarantee that data was successfully written to the secondary logical drive before indicating a successful write to the host system.
C Synchronous
Asynchronous K Add to write consistency group
< Back Next > Cancel Help

Select synchronization priority and either manual or automatic resynchronization:

This setting wi	a appi) to i	ootri trio primar	/ and secondary lo	igical drives.		
Priority:			-			
I Lowest		T	۲		I.	l Highes
Select resynchr	onization n	nethod				
Which resynd	hronization	n method shoul	d I choose?			
Which resynd	hronization manual re	n method shoul synchronizatio	<u>d I choose?</u> n, you resynchron	ize an unsynch	nronized mirrored	pair by using the
Which resynd If you choose Logical Drives	hronization manual re Remote 1	n method shoul synchronizatio Mirroring>>Res	d I choose? n, you resynchron ume option. It is rei	ize an unsynch commended tha	nronized mirrored It you use manual	l pair by using the I resynchronization.
Which resynd If you choose Logical Drives	chronization manual re »Remote f	n method shoul esynchronizatio Mirroring>>Res resynchroniza	d I choose? n, you resynchron ume option. It is re- tion, the resynchro	ize an unsynch commended tha pnization will st	nronized mirrored It you use manual art immediately af	I pair by using the I resynchronization. fter communication
Which resynce If you choose Logical Drives If you choose is restored for	ehronization manual re >>Remote f automatic r an unsyn	n method shoul synchronizatio Mirroring>>Res resynchroniza nchronized mirr	d I choose? n, you resynchron ume option. It is rei tion, the resynchro ored pair.	ize an unsynch commended tha onization will st	nronized mirrored It you use manual art immediately af	pair by using the I resynchronization. fter communication
Which resynce If you choose Logical Drives If you choose is restored fo	shronization manual re >Remote f automatic r an unsyn ssynchroni	n method shoul synchronizatio Mirroring>>Res resynchroniza hchronized mirr ization	d I choose? n, you resynchror. ume option. It is rea tion, the resynchro pred pair.	ize an unsynch commended tha pnization will st	nronized mirrored t you use manuai art immediately af	pair by using the I resynchronization. fter communication
Which resynd If you choose Logical Drives If you choose is restored fo Manual re Lutomatik	e manual re »Remote M automatic r an unsyn esynchroni c resynchr	n method shoul esynchronizatio Mirroring>>Res resynchroniza hchronized mirr ization ronization	d I choose? n, you resynchror ume option, it is rer tion, the resynchro ored pair.	ize an unsynch commended tha prization will st	nronized mirrored t you use manual art immediately af	l pair by using the I resynchronization. fter communication
Which resync If you choose Logical Drives If you choose is restored fo O Manual re O Manual re	shronization manual re >>Remote f automatic r an unsyn >synchroni > resynchroni	n method shoul synchronizatio Mirroring>>Res resynchroniza rchronized mirr ization onization	d I choose? n, you resynchror ume option. It is re- tion, the resynchro pred pair.	ize an unsynch commended tha onization will st	nronized mirrored t you use manual art immediately af	pair by using the I resynchronization. Iter communication
Vhich resync If you choose Logical Driver If you choose is restored fo C Manual re C Automatic	shronization manual re >>Remote N a automatic r an unsyn ssynchroni	n method shoul synchronizatio Mirroring>>Res resynchronize chronized mirr ization onization	d I choose? n, you resynchror ume option. It is re- ttion, the resynchro ored pair.	ize an unsynch commended tha	ronized mirrored t you use manual art immediately af	I pair by using the I resynchronization. fter communication

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:

Storage Subsystem View Mappings Array Logical Drive Controller Drive Advanced Help Cogical Physical View Cogical Physical View Total Unconfigured Capacity (2,444 GB) Array 1 (RAID 1) Farsy 1 (RAID 3) Shared (S0 GB) Total (AG D5)
Cogical Physical View Cogical Physical View Cogical Physical View Cogical Constraints of the physical
Image: Logical Physical View Image: Mappings View Logical Physical Image: State
Logical Physical O "Strage Subsystem FAST 900 Configured Image: Controller Enclosure 0 () Image: Controller Enclosure 0 () Image: Controller Enclosure 0 () Image: Controller Enclosure 0 () Image: Controller Enclosure 0 () Image: Controller Enclosure 0 () Image: Controller Enclosure 0 () Image: Controller Enclosure 0 () Image: Controller Enclosure 0 () Image: Controller Enclosure 0 () Image: Controller Enclosure 0 () Image: Controller Enclosure 0 () Image: Controller Enclosure 0 () Image: Controller Enclosure 0 () Image: Controller Enclosure 0 () Image: Controller Enclosure 0 () Image: Controller Enclosure 0 () Image: Controller Enclosure 1 (Fixre) Image: Controller Enclosure 1 (Fixre) Image: Controller Enclosure 2 (Fixre) Image: Controller Enclosure 2 (Fixre) Image: Controller Enclosure 2 (Fixre) Image: Controller Enclosure 2 (Fixre) Image: Controller Enclosure 2 (Fixre) Image: Controller Enclosure 2 (Fixre) Image: Controller Enclosure 2 (Fixre) Image: Controller Enclosure 2 (Fixre) Image: Controller Enclosure 2 (Fixre) Image: Controller Enclosure 2 (Fixre) Image: Controller Enclosure 2 (Fixre) Image: Controller Enclosure 2 (Fixre) Image: Control (Image: Controlle
Image: Subsystem FASIT 800 Configured Image: Subsystem FASIT 800 Configured <td< th=""></td<>
Image: Construction of the construc
Image: Shared (SD GB) Image: Shared (SD GB) <td< th=""></td<>
 Engineering (400 GB) Marketing (50 GB) Marketing (50 GB) Shared (50 GB)
Image: Shared (SD GB) Image: Shared (SD GB) <td< th=""></td<>
Test (84 GB) Image: Constraint of the second s
Image: Shared (50 GB)
Image: Control of the contro
E- Array 4 (RAID 5)
Drive Enclosure 3 (Fibre)
-Drive Enclosure 4 (Filve)

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

📰 FAStT 900 Configured - IBM FAS	itT Storage Manage	r 9 (Subsys	item M	anagemer	it)					ſ	- 🗆 ×
Storage Subsystem View Mappings	Array Logical Drive	Controller	Drive	Advanced	Help						
🗏 🗄 💆 🗓 🗐										IB N Tota	IStorage
🕕 Logical/Physical View 🔓 Maj	pings View										
Logical		Physical									
Storage Subsystem FAStT 900 Co	infigured	Controlle	r Enclos	ure 0()					_		
- Total Unconfigured Capacity (2,	444 GB)	A]						89	4		
E- GAIRAN Array 1 (RAID 1)		в 🏻 🛛					1	83	8		
🕀 🗐 Engineering (400 GB)											
🕀 📆 🔍 Marketing (50 GB)		Drive End	losure	1 (Fibre) —					0.0		
Test (84 GB)	View Associated Co	mponents					1111			81	
Shared (50 GB)	Change		•		٩	٩					
	Increase Capacity.			2 (Fibro)							
Array 2 (RAD 3)	Create Copy		1			П		•	00		
E-1 Array 3 (RAID 5)	Copy Manager									11	
E-4 Array 4 (RAID 5)	Suspend Mirroring.				• •						
_	Resume Mirroring, .		2	2 (Fibro)							
	Test Mirror Commu	nication	ſ			п			пп		
	Remove Mirror Rela	ationship								8±	
	Create Flash Copy	Logical Drive		۲	•					_	
	Delete										
	Rename			4 (Fibre)		-					
	Properties						1111			11	
				••••		•	_				
0000											

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

FAStT 900 Configured - Suspend Mirrored	Pair X
Select mirrored pairs	
Mirrored pairs (P = primary):	
Local Logical Drives	Remotes
Marketing (P)	Marketing
Sele	zt All
Suspend	Cancel Help
2	

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:

FAStT 900 Configured - IBM FA	5tT Storage Manage	r 9 (Subsys	stem M	anagemer	it)					<u>- ×</u>
Storage Subsystem View Mappings	Array Logical Drive	Controller	Drive	Advanced	Help				_	
🗉 🗉 💆 🔽 🖳									IB N Tot	alStorage
🕕 Logical/Physical View 🛙 🔓 Ma	ppings View									
Logical		Physical								
🚭 [#] Storage Subsystem FAStT 900 C	onfigured	Controlle	r Enclos	ure 0()						
Total Unconfigured Capacity (2	444 GB)						I	0-6		
Array 1 (RAID 1)		воП			-	_		35		
					-					
		Drive End	closure	1 (Fibre)-						1
🛨 🛄 🎽 🔍 Marketing (50 GB)		e	• 🗖 🛛	Π'nΠ		0 0	0		140	
	View Associated Co	mponents		9881					<u>85</u>	
- Shared (50 GB)	Change		-		-	·]
Array 2 (RAID 3)	Increase Capacity			2 (Fibre) —						1
T-CATTON 3 (RAID 5)	Create Copy				1111		1111		85	
				9888					<u>81</u>	
Array 4 (RAID 5)	Resume Mirroring	,]
	Test Mirror Commun	nication		3 (Fibre) —						1
	Remove Mirror Rela	tionship					11111		1	
	Create Flash Copy I	Logical Drive			•		88			
	Delete		-							1
	Rename			4 (Fibre)						1
	Properties			11111	1000	Contract of the second	Tana a		11	
						••	88			
		·								,
n m ro m		,								

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

🗱 FAStT 900 Configured - Resume Mirrore	l Pair 🔀
Select mirrored pairs	
Mirrored pairs (P = primary):	
Local Logical Drives	Remotes
Marketing (P)	Marketing
Sel	ect All
Resume	Cancel Help

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.

🗱 FAStT 900 Configured - Resume Mirrored Pair - Progr 🗙
Processed 1 of 1 logical drives - Completed.
OK

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!

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.

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



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



0000

Then you will see:



All fixed!