

Product Overview

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This publication introduces the IBM® System Storage® Easy Tier Quick Start, which helps you get started with Easy Tier functions using the IBM System Storage DS® Storage Manager.

Easy Tier is a new feature that is available with Version 5 Release 1 of the DS8700. It is designed to help you move data more efficiently between tiers of spinning disk and solid-state drives (SSDs).

Easy Tier provides automated and manual mode capabilities. With Easy Tier in automated mode, data (at the sub-volume or sub-LUN level) is automatically and dynamically moved to the appropriate storage tier in the system, based on ongoing performance monitoring. With Easy Tier in manual mode, you can manually and non-disruptively relocate a logical volume between extent pools or within an extent pool. Relocating a volume is used to change the extent allocation method or to redistribute the volume across new ranks that have been added. You can also merge two existing pools into one without affecting the data on the logical volumes associated with the extent pools.



Easy Tier - IBM System Storage DS8000® Storage Tier Advisor application tool

In addition to the Easy Tier capabilities, the DS8700 also offers the IBM System Storage DS8000 Storage Tier Advisor, which provides a graphical representation of performance data that is collected by Easy Tier over a 24-hour operational cycle. The Storage Tier Advisor tool can help you determine which volumes are likely candidates for Easy Tier management by analyzing the performance of their current application workloads.

The Storage Tier Advisor tool displays a system summary report that contains the distribution of "heat" data in each volume and how much heat data is included for all volumes. The summary report also contains a recommendation of SSD capacity and configuration values and the potential performance improvement if SSD is applied with Easy Tier in automated mode.

The results included in the Easy Tier summary report requires that statistics be gathered, from each processor complex over a 24-hour workload learning period. An example on how to gather the statistics is provided on a later page.

The Storage Tier Advisor application tool can be downloaded from the following Web site: ftp://ftp.software.ibm.com/storage/ds8000/updates/DS8K_Customer_Download_Files/Storage_Tier_Advisor_Tool/



Easy Tier - IBM System Storage DS8000 Storage Tier Advisor



3

Easy Tier - IBM System Storage DS8000 Storage Tier Advisor

IBM System Storage™ DS8000 Storage M	anager					((IBM.
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To offload the Storage Tier Advisor summary report, select **Storage Complexes 1**, select the storage image that you want **2**, click **Select action > Export Easy Tier Summary Report 3**, and finally click **OK** to save the offloaded, compressed file **4**. The compressed file includes two data files that will be used with the Storage Tier Advisor application tool.

Easy Tier - IBM System Storage DS8000 Storage Tier Advisor

Example of the summary report created by the Storage Tier Advisor application:

IBM System Storage™ DS8000





Volume Heat Distribution on LPAR SF75FK840ESS01

Volume Heat Distribution

The data is collected from Tue Dec 08 01:20:55 PST 2009 to Tue Dec 08 09:23:55 PST 2009

Volume ID ^{*1}	Extent Pool ID	Configured Size ^{*2}	Capacity on SSD*3	Heat Distributio	on*4
0x0001	0x0000	100G	0G	90G	10G
0x0002	0x0000	100G (0G	92G	8G
0x0003	0x0000	100G	10G	70G	30G
0x0004	0x0000	116G	0G	93G	13G
20 🛟 Per Page	Entries (GO		< >> > Displ	aying Page 1

30GB is the hot data in volume 3 and 10GB is already in SSD ranks.

*1. Volume ID is the id to represent the volume inside DS8000, which is specified during the volume creation.

*2. The configured capacity of the volume.

*3. The Capacity on SSD means the capacity of data already be migrated to SSD.

*4. The Heat Distribution shows the heat distribution of the data in this volume, and blue bar is the capacity of the cold data, and the red bar is the capacity of the hot data.

Easy Tier manual migration

Easy Tier includes the ability to dynamically relocate individual logical volumes without disrupting applications. You can move a volume that is allocated to a Serial Advanced Technology Attachment (SATA) disk group to an Enterprise disk group or a SSD disk group.

After you analyze the performance of your current application workloads using tools such as the IBM Storage System DS8000® Storage Tier Advisor or IBM Tivoli® Storage Productivity Center for Disk, the steps required to determine which volumes are likely candidates for Easy Tier manual migration are straight forward.

With manual migration, you can change the allocation method that is assigned to a logical volume. For example, you can change the allocation method of a given volume that is allocated to one rank to rotating the volume's extents across all ranks in an extent pool, or vice versa.

The following procedure describes the steps used for changing the allocation method of a volume from rotating volumes across the ranks to rotating the extents of the volumes across the ranks in the same extent pool. The procedure is conceptually the same for moving volume across disk class groups (extent pools).

Easy Tier manual migration

IBM System Storage™ DS8000 Storage M	lanager	
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 Welcome Monitor System Long Running Task Summary User Administration Manage Hardware Storage Complexes Host Connections Encryption Key Servers Groups Configure Storage Disk Configuration Open Systems Volumes Open Systems Volumes and LCUs Copy Services FlashCopy Paths Metro Mirror / Global Copy Global Mirror 	DS8000 Storage Manager Wersion 5.5.1.1631 Learning and Tutorials B DS8000 overview B Hardware configuration concepts B System configuration Choosing the best configuration Choosing the best configuration Choosing the best configuration During the Information Center Identication States and States are trademarks of Sun Microsystems, Inc. in the United States, other countries, or both.	

1. To set up Easy Tier manual migration, select the type of system that you want to manage. From the navigation, click **Open Systems Volumes 1**.

Easy Tier manual migration

IBM System Storage™ DS8000 Storage Ma	nager
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PlashCopy	No alerts active
Pains Metro Mirror / Global Conv	Tasks
Global Mirror	
	Create new volumes Manage existing volumes Manage LSSs Explore open systems relationships

2. On the **Open Systems - Storage Summary** page, select a storage image. Then, enter a range of volumes that you want to manage and click **Go 2**, or click **Manage Existing Volumes 1**.

Easy Tier manual migration

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3. On the **Manage Volumes** page, select the check box **1** next to the volume or volumes that you want to manage. Click **Select action** > **Properties 2** to validate your volume selection.



Easy Tier manual migration

IBM System Storage ¹⁴ DS8000 Storage I	lanager	IBM.
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4. Click the **Storage** tab and verify that the options that you selected for the volume are correct, and then click **OK**. Notice that the allocation method for the volume in this example was allocated with **Rotate Volumes**. Click **OK** to continue.

Note:

This example shows the **Single Volume Properties** page because only one volume was selected. 10 However, if more than one volume is selected, a different panel displays with similar information.

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Easy Tier manual migration

Open Systems Volumes

Refresh Last refresh: Fri May 07 13:26:18 MST 2010

Back to Open Systems Volumes Main Page

Manage Volumes

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5. With the volumes selected, click **Select action** > **Initiate Migration**.



Easy Tier manual migration

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6. On the **Initiate Migration** page, select the options assigned to your volumes that you want to change. You can select to move the volumes to a different extent pool, change the allocation method within the same extent pool, or change the allocation method of the volumes and move them to a different extent pool.

In this example, only the allocation method **1** is changed; the volume stays in the same extent pool **2**. If you want to move your volume to a different extent pool, select the radio button next to that extent pool and click **Next**.

Easy Tier manual migration

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FlashCopy		Cancel Migration	Normal	DS	50.0	Standard	FB_8IP0	regatta3(VG)	regatta3
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7. If you do not receive any error messages, the task is complete. To view the status of the volumes, select the check box of each volume 1 and click **Select action** > **Properties** 2.

Easy Tier manual migration

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Easy Tier automated mode

After you analyze the performance of your current application workloads using the IBM System Storage DS8000 Storage Tier Advisor and determine which volumes are likely candidates for Easy Tier automatic mode optimization, setting up an Easy Tier environment can also be straightforward.

There are two methods to create your Easy Tier automatic mode environment:

•Add capacity to an existing extent pool that you would want to optimize with one or more SSD ranks.

•Dynamically merge an extent pool that you want to optimize with an existing extent pool that has one or more SSD ranks installed.

Easy Tier automated mode – Adding capacity to an existing extent pool

Use the following procedure to add capacity to an existing extent pool that you would want to optimize with one or more SSD ranks.



1. To set up Easy Tier automatic mode by adding capacity to an existing extent pool, click **Disk Configuration 1**. **Note:**

This example assumes that you previously assigned an SSD rank to an array.

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Easy Tier automated mode – Adding capacity to an existing extent pool

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2. From the **Manage Disk Configuration** section, click the **Ranks** tab **1** and find one or more SSD ranks that you created. Make note of the rank numbers. For this example, a single SSD rank, R10 **2** is selected. Also, notice that the extent pool entry is blank **3** for an unassigned rank.



Easy Tier automated mode – Adding capacity to an existing extent pool

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3. Click the **Extent Pools** tab. The results of the Storage Tier Advisor analysis indicates that extent pool **ckd_p4 3** would benefit by using Easy Tier. For this example, an SSD rank will be added to this extent pool. Select the check box **1** of the extent pool for which you want to add capacity and click **Select action 2** > **Add Capacity to Pool.**



Easy Tier automated mode – Adding capacity to an existing extent pool

TEM System Storage * Distore stora	ige Manager			
My Work	Disk Configuration			
Welcome > Monitor System Long Running Task Summary User Administration > Manage Hardware Storage Complexes Host Connections > Encryption Key Servers Groups > Configure Storage Disk Configuration Open Systems Volumes Open Systems Volume Groups System z Volumes and LCUs > Conpy Services ElashCopy Paths Metro Mirror / Global Copy Global Mirror	Add capacity to pool Storage image: <75LH2415 Review the extent pool and on table drop-down list. When y Select Name Showing 0 – 0 of 0. Select Greate Al Cancel	Add Capacity to Extent Pool Storage Characteristics Choose the RAID type of the storage resources to add to Extent Pool Name: ckd_p4 Storage Type: CKD Select Available Capacity The storage resources that you select in this section are a available resources. Type of Configuration Automatic M Encryption Group Noce M Drive Class 73 GB SEX Sold State drive with 434 GB M Select capacity to configure The storage Type 1 OK Cancel	the extent pool. RAID Type RAID 5 \square added to the extent pool. If the list shows "No capacity to co DA Pair Usage Spread among all pars \square I I I I I I I I	nfigure,* change the RAID type to find other New Rasks - Server 0 Assigned Ranks - Server 0 New Rasks - Server 1 Rasigned Ranks - Server 1 Rasigned Ranks - Other Delives

4. On the Add Capacity to Extent Pool page, click Select the capacity to configure 1. In this example, there was only one rank to add 1. Click OK after you are done with your selection.



Easy Tier automated mode – Adding capacity to an existing extent pool

IBM System Storage ¹⁴ DS8000 Storage	Manager									11209	IBM.
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5. Verify your selections and click **Create All** 1 to initiate the creation process for the extent pool.



21

Easy Tier automated mode – Adding capacity to an existing extent pool

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6. If you did not receive errors during the merge operation, the task is complete. You can confirm the results of the task by selecting the extent pool that was modified **1**, click **Select action 2** > **Properties**, and click the **Ranks** tab **3** to list the ranks in the pool.



22

Easy Tier automated mode – Merging two existing extent pools

Use the following procedure to dynamically merge an extent pool that you want to optimize with an existing extent pool that has one or more SSD ranks installed:



1. To set up Easy Tier in automatic mode by merging two existing extent pools, click **Disk Configuration 1**. **Note:**

If you know which extent pools you would like to merge to create an Easy Tier automatic mode environment, go to step 6 and skip steps 2, 3, 4 and 5.



Easy Tier automated mode – Merging two existing extent pools

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		S10	Assigned	A9	2	73 GB 65K	Solid State	No	
		S11	Assigned	A10	2	73 GB 65K	Solid State	No	
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2. Identify which extent pool contains the SSD drives that you want to merge as well as the extent pool with hard disk drives (HDDs).

3. On the **Disk Configuration** page, click the **Array Sites 1** tab to identify your existing SSD array sites **2** and note the arrays to which they belong. For this example, A8/S9, A9/S10, A10/S11, and A11/S12 are included.



24

Easy Tier automated mode – Merging two existing extent pools

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		A10	Normal	5 (6+P+S)	Assigned	R8	2	73 GB 65K	None	1
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4. Click the **Arrays** tab **1** and look for the arrays from the previous page and make note of the ranks to which they are assigned. This example includes A8/R10, A9/R1, A10/R8 and A11/R2 **2**. Click the **Ranks** tab **3** to continue.



25

Easy Tier automated mode – Merging two existing extent pools

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5. On the **Ranks** tab **1**, look for the SSD ranks that you want to manage and take note of the extent pools to which they are assigned. For this example, we selected R8 **2**, which is assigned to extent pool FB_SSD **3** (the SSD extent pool) that we want to merge with a HDD extent pool. Select the **Extent Pools** tab **4** to continue.



Easy Tier automated mode – Merging two existing extent pools

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6. On the **Extent Pools** tab **1**, select the check box **2** by the SSD extent pool and the other extent pool that you identified that could benefit from running in Easy Tier automatic mode. For this example, fb_p5 was identified as a candidate for merging with SSD extent pool FB_SSD. Click **Select action 3** > **Merge Extent Pools** to merge the two extent pools.



Easy Tier automated mode – Merging two existing extent pools

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7. Select which extent pool that you want to remain. For this example, extent pool, example fb_p5 was selected to remain. Click **OK**.



Easy Tier automated mode – Merging two existing extent pools

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8. If you did not receive any errors during the merge operation, the task is complete. The extent pool no longer displays in the Extent Pools tab after the merge operation completes successfully.



Disable Easy Tier in automatic mode and controlling Storage Tier Advisor monitoring

When code is activated, monitoring for the Storage Tier Advisor is enabled to monitor extent pools which contain SSD and HDD drives by default. There might be occasions when you need to temporarily halt to automatic data relocation process or change the monitoring settings to monitor the entire unit or to disable the monitoring all together. Use the following procedure to disable Easy Tier in automatic mode or change the Easy Tier monitoring process.



1. From the navigation, click Storage Complexes 1.

Disable Easy Tier in automatic mode and controlling Storage Tier Advisor monitoring

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1. From the **Storage Complexes Summary** page, select the Storage Facility Image **1** and then click **Select action** > **Properties 2**.

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Disable Easy Tier in automatic mode and controlling Storage Tier Advisor monitoring

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1. From the **Properties** page, change the Easy Tier Auto mode **1** or the Storage Tier Monitoring settings **2**.





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