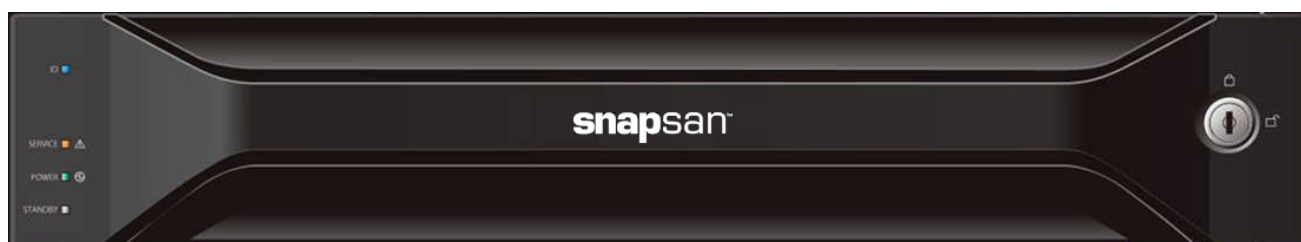


Application Note

October 2013

Configuring SnapSAN S5000 AutoTier



Summary

This application note describes how to configure AutoTier (Block-based) to optimize performance of the SnapSAN S5000 storage array.

Introduction

AutoTier (Block Based) is a new feature for analyzing I/O response from the disk array subsystem and providing information on how to improve cost performance. This is done by moving blocks of stored data to the fastest optimum device autonomously. This is based on frequency of accessing the data in order to make effective use of the devices. The two configurations options available with AutoTier are Faster-Speed Tier or Slower-Speed Tier. This document provides a guideline how to quickly setup and configure AutoTier with a single logical disk. Additional details about AutoTier are found in the AutoTier user guide.:

http://www.overlandstorage.com/pdfs/support/SnapSAN_S5000_AutoTier_User_Guide.pdf

Required Information, Tools, and Files

Before you begin these procedures, the following information, tools, and files are required.

Prerequisites

Prior to performing these procedures, ensure that you have the following:

- Overland Storage SnapSAN S5000 Disk Array must be installed and configured. You can get additional information on basic installation and configuration at <http://support.overlandstorage.com>, or by contacting Overland Storage using the information found on the [Contact Us](#) page on our web site.
- The SnapSAN S5000 must have firmware version U22R.007 and software version 082R.007.
- SnapSAN Manager Server must be installed and is running version 8.2.060.
- Verify that the following are installed on the server:
 - Java Runtime Environment (JRE)
 - SnapSAN Manager Server Web Management Interface.

Versions

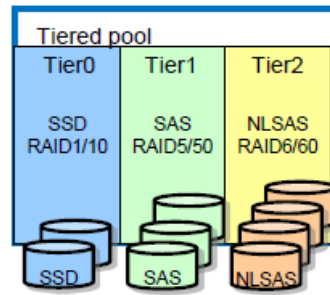
The test environment used for illustration in this document uses the following versions:

- Java JRE version 7 update 40
- SnapSAN Manager Server version 8.2.060
- SnapSAN S5000 software version 082R.007
- SnapSAN S5000 firmware version U22R.007

Creating a Multi-tiered Pool

A multi-tiered pool consists of multiple pool groups with various PD/RAID types.

A sample multi-tiered pool is shown in the following image:



NOTE: Block-based tier feature does not support virtual capacity pools.

In a multi-tier pool:

- Up to three tiers can be created.
- The specification of tiered pools conforms to that of conventional pool groups.
- Each tier is named as:
 - Tier0 (Faster speed tier)
 - Tier1
 - Tier2 (Slower speed tier)

Perform the following tasks to create a multi-tiered pool.

Creating a Basic Pool

1. Open your browser and login to the **SnapSAN Web Management Interface**.
2. Select the **SnapSAN S5000**.
3. Navigate to **Configuration > Pool > Pool Bind** page.
4. Click **Show Pool List**.

The screenshot shows the 'Pool Bind' configuration page in the SnapSAN Web Management Interface. The page is titled 'Pool Bind' and has a breadcrumb trail: 'Pool Bind > Confirmation > Completion'. The page contains four numbered steps:

1. Click Show pool list to see the pools that have been bound. (A 'Show pool list' button is visible below this step.)
2. Select the type of physical disks that configure a pool. (The 'Physical disk type' dropdown menu is set to 'SAS'.)
3. Select RAID type. (The 'RAID type' dropdown menu is set to 'RAID6/60(4+PQ)'.)
4. Specify the number of physical disks that configure the pool and their capacity. (The 'Auto disk selection' radio button is selected. Below it, 'The number of physical disks (6-10)' is set to 6, and 'Physical disk capacity' is set to 266GB/10000rpm. The 'Manual disk selection' radio button is unselected, and there is a 'Select physical disks' button below it.)

At the bottom of the page, there is a 'Calculate pool capacity' button and navigation buttons: '< Back', 'Next >', 'Cancel', and 'Help'.

5. Select items from the drop-down menus for these **two** options:
 - Physical disk type
 - RAID type

6. Select **one** of the following options:
 - **Auto disk selection**
 - **Manual disk selection**
7. Click **Next**.
8. Verify the basic **settings**.
If you need to modify the default settings, proceed to [Basic Pool Advanced Settings](#).
9. Click **Set**.
10. Click **Yes** to complete the binding.

Basic Pool Advanced Settings

If the default settings need modification, click **Advanced** and follow these steps:

The screenshot shows the 'Pool Bind' dialog box with the following settings:

- Pool name: TieredPool
- Rebuild priority: Medium (Expected time when Medium is selected: 7 hour)
- System volume: Bind
- Explanation:
 - Rebuild priority
 - Specify pool rebuilding I/O priority.

Buttons at the bottom: OK, Cancel, Help.

1. Enter **both** items:
 - Pool name
 - Rebuild priority
2. Click **OK**.
3. Click **Yes**.
4. Click **Finish**.

Add a Tier and Bind a Tiered Pool

1. Use **one** of the options:
 - From the **Pool Bind Completion** screen, click **Add a tier and bind a tiered pool**.
 - From the **SnapSAN Manager Monitor** screen, navigate to **Configuration > Pool > Tier Add**.

The screenshot shows the 'Tier Add' dialog box with the following steps and settings:

- Select a pool (you can select a tiered or non-tiered pool):

Number	Pool name	RAID	Physical disk type	Free capacity[GB]	Capacity[GB]	Actual capacity[GB]	Actual used
0000h	SYSDOL	RAID1/10	SAS	248.7	262.0		
0001h	TieredPool	RAID6/60	SAS	1061.5	1061.5		
- Select where you want to insert a new tier:
 - Tier0
 - SAS
 - RAID6/60 (4+PQ)

Explanation: Select the option button on the left to add a faster-speed tier. Select the option button on the right to add a slower-speed tier.
- Select the type of physical disks for the tier:

Physical disk type: SAS
- Select a RAID type for the tier:

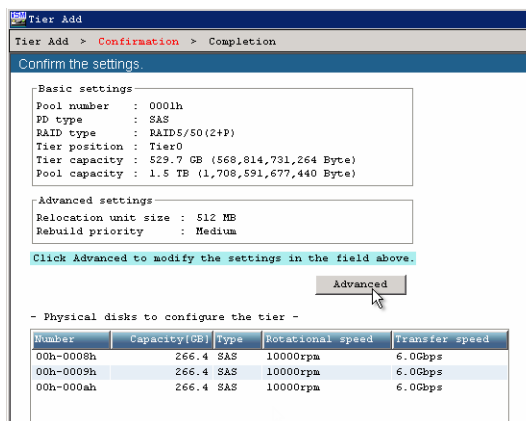
RAID type: RAID6/60 (4+PQ)

Buttons at the bottom: < Back, Next >, Cancel, Help.

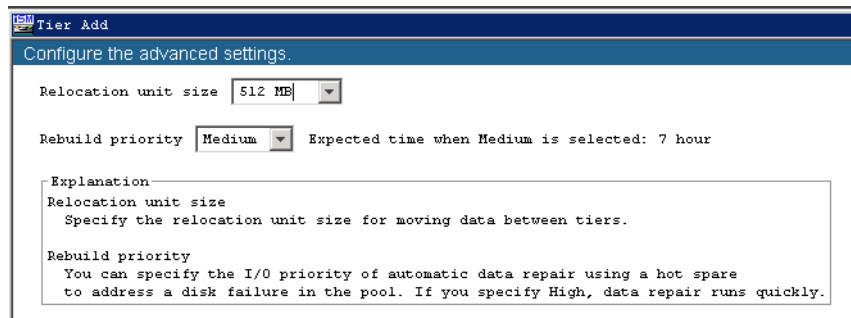
2. Select inputs for **these** options:
 - Type of pool
 - Faster-speed tier or slower-speed tier
 - Type of physical disk
 - Type of RAID
3. Select **one** of the following:
 - **Auto disk selection**
 - **Manual disk selection**
4. Click **Calculate tier capacity**.
5. Click **Next**.
6. Verify the **basic settings**.
If you need to modify the default settings, proceed to [Add/Bind a Tier Advanced Settings](#).
7. Repeat [Steps 1–6](#) (and if necessary, the [Add/Bind a Tier Advanced Settings](#)) to create **two** more tiers.

Add/Bind a Tier Advanced Settings

If the default settings need modification, click **Advanced** and follow these steps:



1. Enter these **options** to create a tier.
 - **Relocation unit size** – This size is used to move data between tiers.
 - **Rebuild priority** – Select a priority of **High**, **Medium** or **Low**.



2. Click **OK**.
3. Click **Set**.

4. Click **Yes**.
5. Click **Finish**.

Creating a Logical Disk containing Multiple Tiers in the Multi-tiered Pool

Using the multi-tiered pool previously created, you now create (bind) a logical disk onto it. Depending on the access frequency, the data blocks from this logical disk move from one pool to another which is possible because the logical disk lies on top of the multi-tiered pool. The following steps define and create such a logical disk.

Binding a Logical Disk

Use these steps to bind a logical disk that consists of multiple tiers of SSD/SAS/NLSAS.

1. Use **one** of the following options:
 - From the **Tier Add Completion** screen, click **Bind Logical Disk**.
 - From the **SnapSAN Manager Monitor** screen, navigate to **Configuration > Logical Disk > Logical Disk Bind**.

ID	Name	Type	Capacity
0001h	TieredPool	Multi	Multi
			1853.2
			1853.2

2: Specify the number of logical disks and their capacity.

Number of logical disks (1-1024)

Logical disk capacity (1-1853) GB

Logical disk capacity : 10.0 GB
 Capacity logical disks consume : 10.2 GB
 Unused capacity of the pool : 1,853.2 GB

3: Set logical disk name.

Logical disk name

Explanation
 Set the name of the logical disk to be bound.
 If two or more logical disks are bound, enter the prefix for them.

2. Enter the following **information**:
 - Number of logical disks
 - Logical disk capacity
 - Name of the logical disk
3. Click **Next**.
4. Verify the basic **settings**.
5. Continue with [Binding Advanced Settings](#).

Binding Advanced Settings

Specify how the capacity is assigned to each tier with regard to the logical disk on the multi-tiered pool:

1. Click **Advanced**.

Logical Disk Bind

Configure the advanced settings.

Logical disk type: Windows MBR (WN)

First logical disk number: 1 h

Binding priority: Medium Expected time when Medium is selected: 1 hour

Capacity Ratio

According to unused capacity (14% : 28% : 58%)

High speed tiers take priority (17% : 35% : 48%)

Low speed tiers take priority (0% : 29% : 71%)

Specify capacity ratio

Tier0: 70% Tier1: 20% Tier2: 10%

2. Enter the following information:

- Type of logical disk
- Number of first logical disk
- Binding priority

3. Select the rate of capacity used by each tier that is **Capacity Ratio**.

The pattern can be selected from the following options (the setting can be changed either at the time of or after binding a tiered pool):

- **According to unused capacity** – Same as the unused capacity proportion of each tier in a tiered pool (default)
- **High speed tiers take priority** – Allocate more capacity to higher speed tiers (performance-oriented logical disks)
- **Low speed tiers take priority** – Allocate more capacity to lower speed tiers (cost-oriented logical disks)
- **Specify capacity ratio** – Specify the proportion of the tiers to be used.

4. Click **OK**.

5. Click **Set**.

6. Click **Yes**.

7. Click **Finish**.

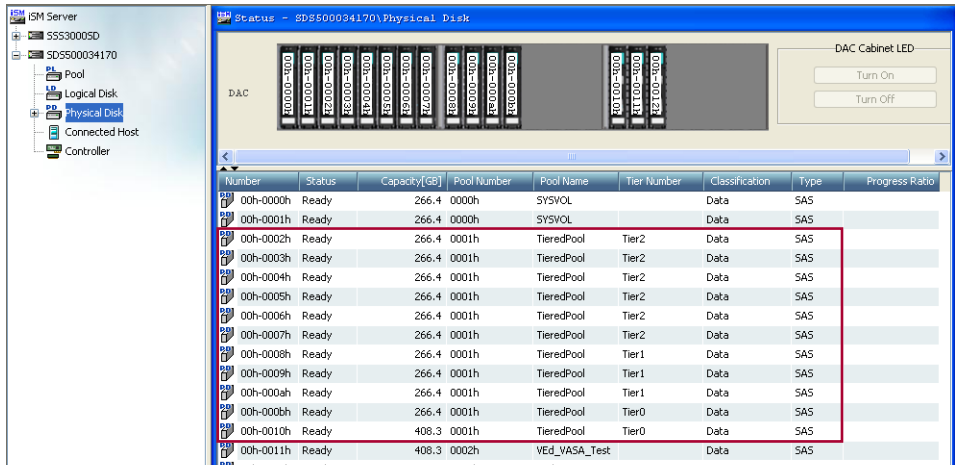
The tiered pool's RAID type and physical disk type are displayed as "**Multi**".

Number	Pool name	RAID	Physical disk type
0001h	TieredPool	Multi	Multi

Verifying the Physical Disks used to Create Tiers

1. From the SnapSAN Server Manager Monitor screen, select the **SnapSAN S5000**.
2. Select **Physical Disk**.

The physical disks used to create tiers are shown in this graphic:



Assigning Logical Disk to a Host

- Use **one** of the following options:
 - From the **Logical Disk Bind Completion** screen, click **Assign logical disks to the host**.
 - From the **SnapSAN Manager Monitor** screen, navigate to **Configuration > Host > Assignment of Logical Disk**.
- Select the **Host** and the **Logical Disk**.
- Click **Next**.
- Click **Set**.
- Click **Yes**.
- Click **Finish**.
- Click **Yes**.

Mount Logical Disk to a Host

- From the host server, navigate to **Computer Management > Disk Management** to view the list of logical disks.
- Right-click the assigned **logical disk**, and select **Online**.

Verifying the Performance when Running Heavy I/O using the I/O Meter

- Monitor the disks using **Performance Monitor** to observe the performance of the different tiers to which the logical disk is configured.
- From SnapSAN Manager Monitor screen, navigate to the **Options > Performance** page to view the performance details under the **Physical Disk** tab.

Object Disk Array: SDS500094170

Statistic Information starting

Number	I/O Density [IOPS]	Transfer Rate [MB/s]	Average Transfer Length [KB]	Average Response Time [ms]	Busy Ratio [%]
00h-0002h	11.36	0.47	42.06	6.67	3
00h-0003h	10.08	0.45	45.25	6.85	2
00h-0004h	10.39	0.41	40.87	6.73	3
00h-0005h	10.41	0.46	45.26	6.56	3
00h-0006h	10.66	0.49	47.10	7.24	3
00h-0007h	10.76	0.46	44.31	7.14	3
00h-0008h	73.63	1.58	22.02	8.84	19
00h-0009h	71.54	1.55	22.19	9.74	19