



Managing Storage Options

StorageGRID 11.5

NetApp

January 04, 2024

This PDF was generated from <https://docs.netapp.com/us-en/storagegrid-115/admin/what-object-segmentation-is.html> on January 04, 2024. Always check docs.netapp.com for the latest.

Table of Contents

- Managing Storage Options. 1
 - What object segmentation is 1
 - What Storage Volume watermarks are 2

Managing Storage Options

You can view and configure Storage Options using the Configuration menu in the Grid Manager. Storage Options include the object segmentation settings and the current values for storage watermarks. You can also view the S3 and Swift ports used by the deprecated CLB service on Gateway Nodes and by the LDR service on Storage Nodes.

For information on port assignments, see [Summary: IP addresses and ports for client connections](#).

Storage Options
Overview
Configuration



Storage Options Overview

Updated: 2019-03-22 12:49:16 MDT

Object Segmentation

Description	Settings
Segmentation	Enabled
Maximum Segment Size	1 GB

Storage Watermarks

Description	Settings
Storage Volume Read-Write Watermark	30 GB
Storage Volume Soft Read-Only Watermark	10 GB
Storage Volume Hard Read-Only Watermark	5 GB
Metadata Reserved Space	3,000 GB

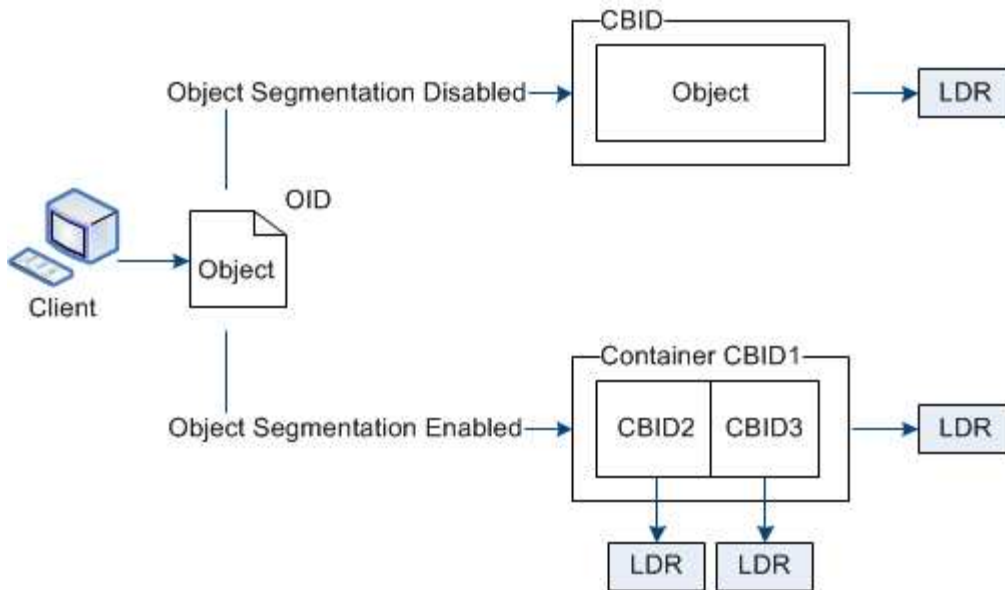
Ports

Description	Settings
CLB S3 Port	8082
CLB Swift Port	8083
LDR S3 Port	18082
LDR Swift Port	18083

What object segmentation is

Object segmentation is the process of splitting up an object into a collection of smaller fixed-size objects in order to optimize storage and resources usage for large objects. S3 multi-part upload also creates segmented objects, with an object representing each part.

When an object is ingested into the StorageGRID system, the LDR service splits the object into segments, and creates a segment container that lists the header information of all segments as content.



If your StorageGRID system includes an Archive Node whose Target Type is Cloud Tiering — Simple Storage Service and the targeted archival storage system is Amazon Web Services (AWS), the Maximum Segment Size must be less than or equal to 4.5 GiB (4,831,838,208 bytes). This upper limit ensures that the AWS PUT limitation of five GBs is not exceeded. Requests to AWS that exceed this value fail.

On retrieval of a segment container, the LDR service assembles the original object from its segments and returns the object to the client.

The container and segments are not necessarily stored on the same Storage Node. Container and segments can be stored on any Storage Node.

Each segment is treated by the StorageGRID system independently and contributes to the count of attributes such as Managed Objects and Stored Objects. For example, if an object stored to the StorageGRID system is split into two segments, the value of Managed Objects increases by three after the ingest is complete, as follows:

segment container + segment 1 + segment 2 = three stored objects

You can improve performance when handling large objects by ensuring that:

- Each Gateway and Storage Node has sufficient network bandwidth for the throughput required. For example, configure separate Grid and Client Networks on 10 Gbps Ethernet interfaces.
- Enough Gateway and Storage Nodes are deployed for the throughput required.
- Each Storage Node has sufficient disk IO performance for the throughput required.

What Storage Volume watermarks are

StorageGRID uses Storage Volume watermarks to allow you to monitor the amount of usable space available on Storage Nodes. If the amount of space available on a node is less than a configured watermark setting, the Storage Status (SSTS) alarm is triggered so that you can determine if you need to add Storage Nodes.

To view the current settings for the Storage Volume watermarks, select **Configuration > Storage Options > Overview**.



Storage Options Overview

Updated: 2019-10-09 13:09:30 MDT

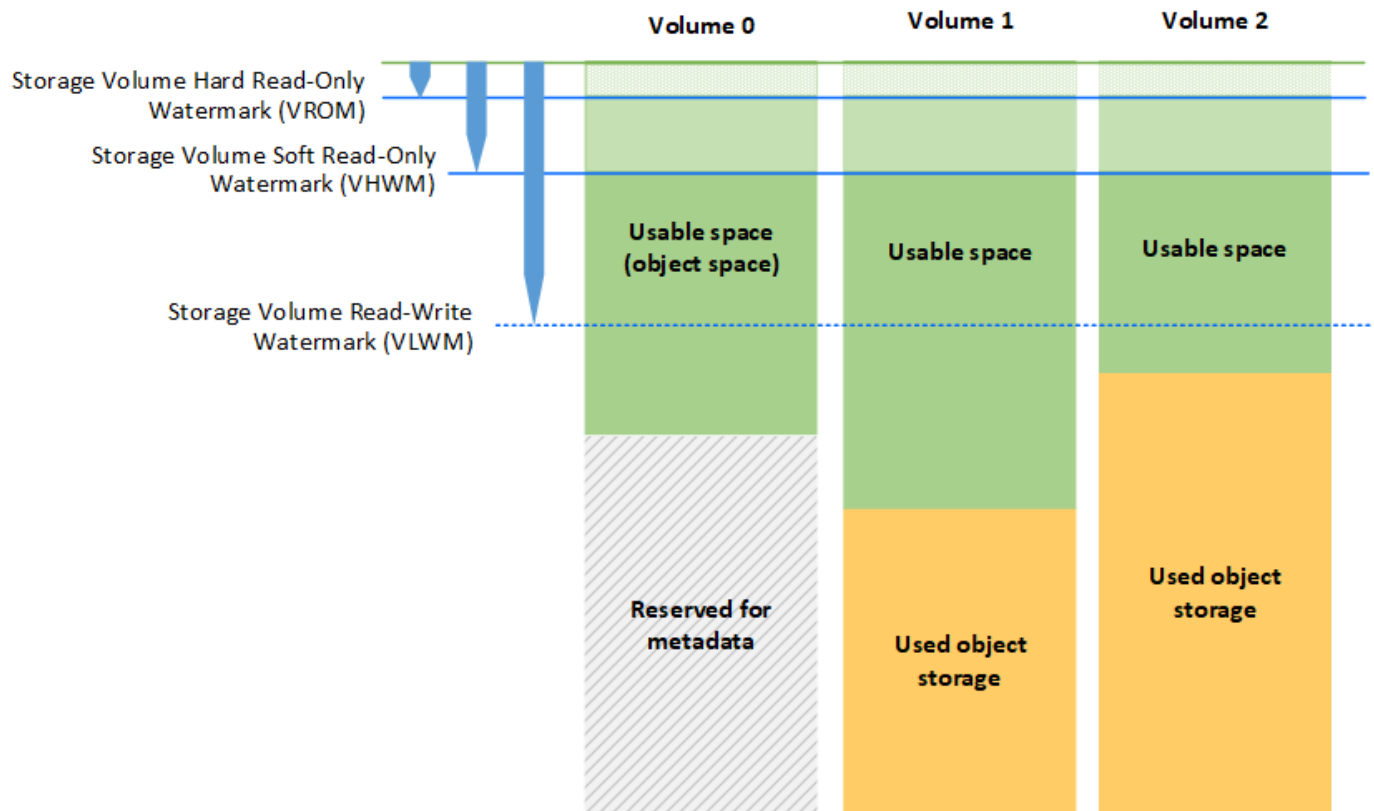
Object Segmentation

Description	Settings
Segmentation	Enabled
Maximum Segment Size	1 GB

Storage Watermarks

Description	Settings
Storage Volume Read-Write Watermark	30 GB
Storage Volume Soft Read-Only Watermark	10 GB
Storage Volume Hard Read-Only Watermark	5 GB
Metadata Reserved Space	3,000 GB

The following figure represents a Storage Node that has three volumes and shows the relative position of the three Storage Volume watermarks. Within each Storage Node, StorageGRID reserves space on volume 0 for object metadata; any remaining space on that volume is used for object data. All other volumes are used exclusively for object data, which includes replicated copies and erasure-coded fragments.



The Storage Volume watermarks are system-wide defaults that indicate the minimum amount of free space required on each volume in the Storage Node to prevent StorageGRID from changing the node's read-write behavior or triggering an alarm. Note that all volumes must reach the watermark before StorageGRID takes action. If some volumes have more than the minimum required amount of free space, the alarm is not triggered and the node's read-write behavior does not change.

Storage Volume Soft Read-Only Watermark (VHWM)

The Storage Volume Soft Read-Only Watermark is the first watermark to indicate that a node's usable space for object data is becoming full. This watermark represents how much free space must exist on every volume in a Storage Node to prevent the node from going into "soft read-only mode." Soft read-only mode means that the Storage Node advertises read-only services to the rest of the StorageGRID system, but fulfills all pending write requests.

If the amount of free space on each volume is less than the setting of this watermark, the Storage Status (SSTS) alarm is triggered at the Notice level, and the Storage Node transitions to soft read-only mode.

For example, suppose the Storage Volume Soft Read-Only Watermark is set to 10 GB, which is its default value. If less than 10 GB of free space remains on each volume in the Storage Node, the SSTS alarm is triggered at the Notice level, and the Storage Node transitions to soft read-only mode.

Storage Volume Hard Read-Only Watermark (VROM)

The Storage Volume Hard Read-Only Watermark is the next watermark to indicate that a node's usable space for object data is becoming full. This watermark represents how much free space must exist on every volume in a Storage Node to prevent the node from going in to "hard read-only mode." Hard read-only mode means that the Storage Node is read-only and no longer accepts write requests.

If the amount of free space on every volume in a Storage Node is less than the setting of this watermark, the Storage Status (SSTS) alarm is triggered at the Major level, and the Storage Node transitions to hard read-only mode.

For example, suppose the Storage Volume Hard Read-Only Watermark is set to 5 GB, which is its default value. If less than 5 GB of free space remains on each storage volume in the Storage Node, the SSTS alarm is triggered at the Major level, and the Storage Node transitions to hard read-only mode.

The value of the Storage Volume Hard Read-Only Watermark must be less than the value of the Storage Volume Soft Read-Only Watermark.

Storage Volume Read-Write Watermark (VLWM)

The Storage Volume Read-Write Watermark only applies to Storage Nodes that have transitioned to read-only mode. This watermark determines when the Storage Node is allowed to become read-write again.

For example, suppose a Storage Node has transitioned to hard read-only mode. If the Storage Volume Read-Write Watermark is set to 30 GB (default), the free space on every storage volume in the Storage Node must increase from 5 GB to 30 GB before the node can become read-write again.

The value of the Storage Volume Read-Write Watermark must be greater than the value of the Storage Volume Soft Read-Only Watermark.

Related information

[Managing full Storage Nodes](#)

Copyright information

Copyright © 2023 NetApp, Inc. All Rights Reserved. Printed in the U.S. No part of this document covered by copyright may be reproduced in any form or by any means—graphic, electronic, or mechanical, including photocopying, recording, taping, or storage in an electronic retrieval system—without prior written permission of the copyright owner.

Software derived from copyrighted NetApp material is subject to the following license and disclaimer:

THIS SOFTWARE IS PROVIDED BY NETAPP “AS IS” AND WITHOUT ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, WHICH ARE HEREBY DISCLAIMED. IN NO EVENT SHALL NETAPP BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

NetApp reserves the right to change any products described herein at any time, and without notice. NetApp assumes no responsibility or liability arising from the use of products described herein, except as expressly agreed to in writing by NetApp. The use or purchase of this product does not convey a license under any patent rights, trademark rights, or any other intellectual property rights of NetApp.

The product described in this manual may be protected by one or more U.S. patents, foreign patents, or pending applications.

LIMITED RIGHTS LEGEND: Use, duplication, or disclosure by the government is subject to restrictions as set forth in subparagraph (b)(3) of the Rights in Technical Data -Noncommercial Items at DFARS 252.227-7013 (FEB 2014) and FAR 52.227-19 (DEC 2007).

Data contained herein pertains to a commercial product and/or commercial service (as defined in FAR 2.101) and is proprietary to NetApp, Inc. All NetApp technical data and computer software provided under this Agreement is commercial in nature and developed solely at private expense. The U.S. Government has a non-exclusive, non-transferrable, nonsublicensable, worldwide, limited irrevocable license to use the Data only in connection with and in support of the U.S. Government contract under which the Data was delivered. Except as provided herein, the Data may not be used, disclosed, reproduced, modified, performed, or displayed without the prior written approval of NetApp, Inc. United States Government license rights for the Department of Defense are limited to those rights identified in DFARS clause 252.227-7015(b) (FEB 2014).

Trademark information

NETAPP, the NETAPP logo, and the marks listed at <http://www.netapp.com/TM> are trademarks of NetApp, Inc. Other company and product names may be trademarks of their respective owners.