



# **Performance monitoring of MetroCluster configurations**

**OnCommand Unified Manager 9.5**

NetApp  
October 23, 2024

# Table of Contents

- Performance monitoring of MetroCluster configurations ..... 1
- Volume behavior during switchover and switchback ..... 1

# Performance monitoring of MetroCluster configurations

Unified Manager enables you to monitor the write throughput between clusters in a MetroCluster configuration to identify workloads with a high amount of write throughput. If these high-performing workloads are causing other volumes on the local cluster to have high I/O response times, Unified Manager triggers performance events to notify you.

When a local cluster in a MetroCluster configuration mirrors its data to its partner cluster, the data is written to NVRAM and then transferred over the interswitch links (ISLs) to the remote aggregates. Unified Manager analyzes the NVRAM to identify the workloads whose high write throughput is overutilizing the NVRAM, placing the NVRAM in contention.

Workloads whose deviation in response time has exceeded the performance threshold are called *victims* and workloads whose deviation in write throughput to the NVRAM is higher than usual, causing the contention, are called *bullies*. Because only the write requests are mirrored to the partner cluster, Unified Manager does not analyze read throughput.

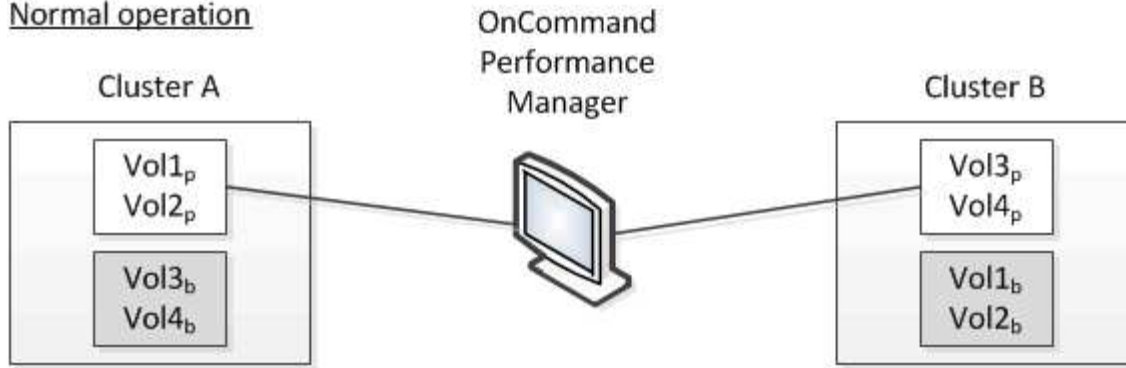
Unified Manager treats the clusters in a MetroCluster configuration as individual clusters. It does not distinguish between clusters that are partners or correlate the write throughput from each cluster.

## Volume behavior during switchover and switchback

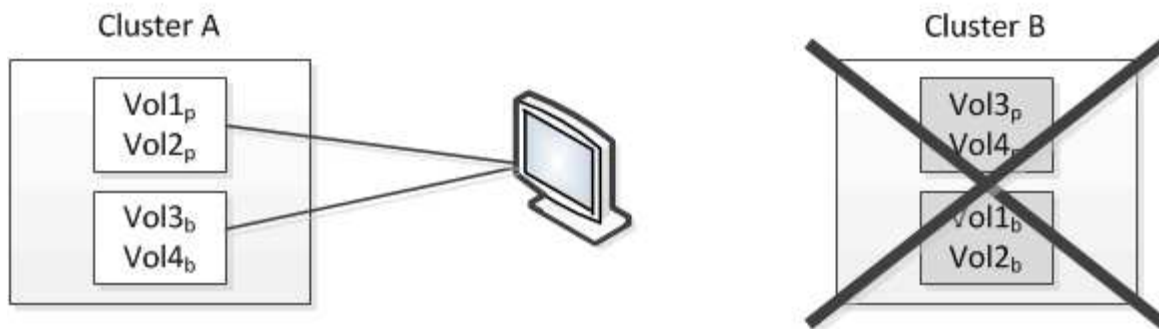
Events that trigger a switchover or switchback cause active volumes to be moved from one cluster to the other cluster in the disaster recovery group. The volumes on the cluster that were active and serving data to clients are stopped, and the volumes on the other cluster are activated and start serving data. Unified Manager monitors only those volumes that are active and running.

Because volumes are moved from one cluster to another, it is recommended that you monitor both clusters. A single instance of Unified Manager can monitor both clusters in a MetroCluster configuration, but sometimes the distance between the two locations necessitates using two Unified Manager instances to monitor both clusters. The following figure shows a single instance of Unified Manager:

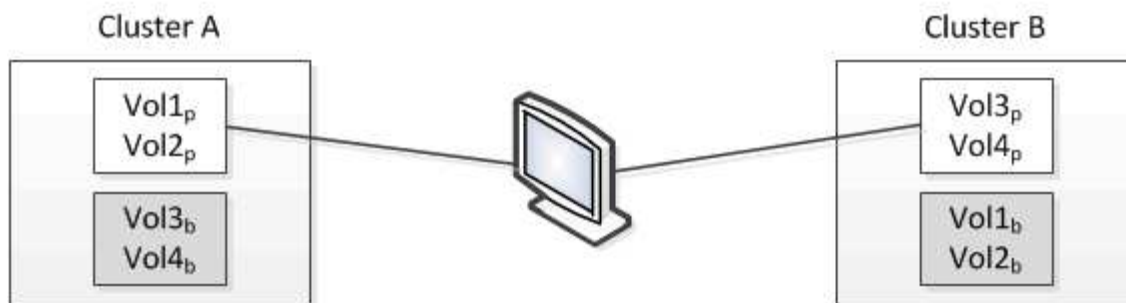
### Normal operation



### Cluster B fails --- switchover to Cluster A



### Cluster B is repaired --- switchback to Cluster B



= active and monitored by OPM     = inactive and not monitored by OPM

The volumes with p in their names indicate the primary volumes, and the volumes with b in their names are mirrored backup volumes that are created by SnapMirror.

During normal operation:

- Cluster A has two active volumes: Vol1p and Vol2p.
- Cluster B has two active volumes: Vol3p and Vol4p.
- Cluster A has two inactive volumes: Vol3b and Vol4b.
- Cluster B has two inactive volumes: Vol1b and Vol2b.

Information pertaining to each of the active volumes (statistics, events, and so on) is collected by Unified Manager. Vol1p and Vol2p statistics are collected by Cluster A, and Vol3p and Vol4p statistics are collected by Cluster B.

After a catastrophic failure causes a switchover of active volumes from Cluster B to Cluster A:

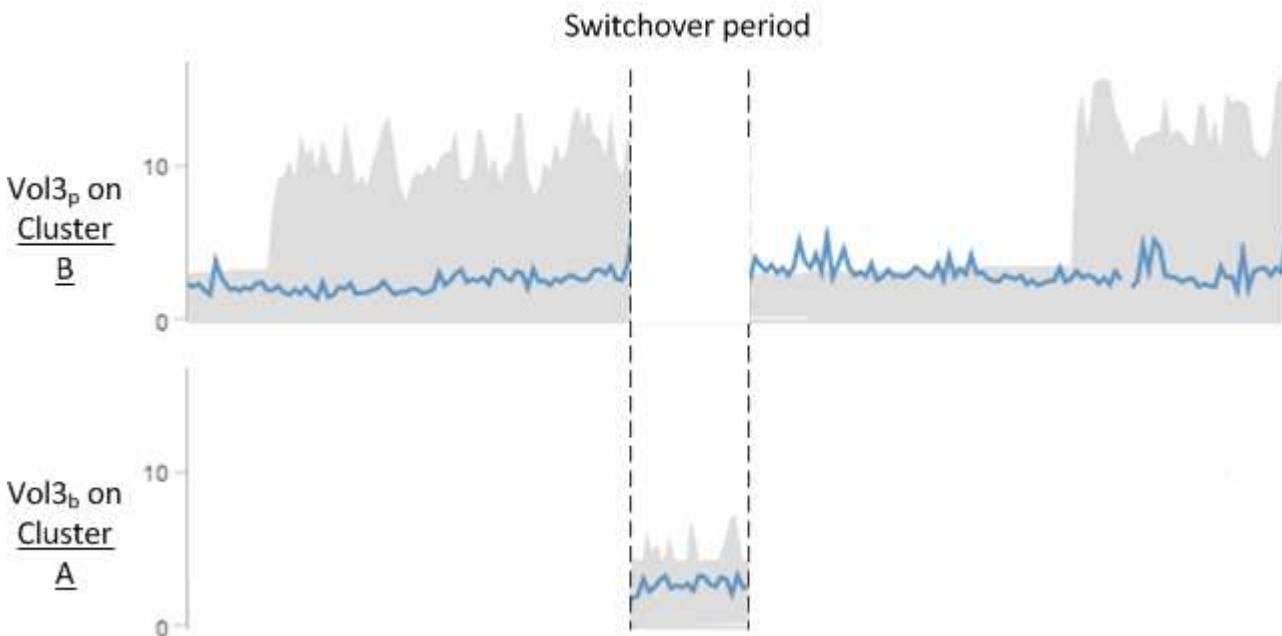
- Cluster A has four active volumes: Vol1p, Vol2p, Vol3b, and Vol4b.
- Cluster B has four inactive volumes: Vol3p, Vol4p, Vol1b, and Vol2b.

As during normal operation, information pertaining to each of the active volumes is collected by Unified Manager. But in this case, Vol1p and Vol2p statistics are collected by Cluster A, and Vol3b and Vol4b statistics are also collected by Cluster A.

Note that Vol3p and Vol3b are not the same volumes, because they are on different clusters. The information in Unified Manager for Vol3p is not the same as Vol3b:

- During switchover to Cluster A, Vol3p statistics and events are not visible.
- On the very first switchover, Vol3b looks like a new volume with no historical information.

When Cluster B is repaired and a switchback is performed, Vol3p is active again on Cluster B, with the historical statistics and a gap of statistics for the period during the switchover. Vol3b is not viewable from Cluster A until another switchover occurs:



- MetroCluster volumes that are inactive, for example, Vol3b on Cluster A after switchback, are identified with the message "This volume was deleted". The volume is not actually deleted, but it is not currently being monitored by Unified Manager because it is not the active volume.
- If a single Unified Manager is monitoring both clusters in a MetroCluster configuration, volume search returns information for whichever volume is active at that time. For example, a search for "Vol3" would return statistics and events for Vol3b on Cluster A if a switchover has occurred and Vol3 has become active on Cluster A.

## Copyright information

Copyright © 2024 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.