

StarWind Virtual SAN[®]

VAAI (vStorage API for Array Integration) Configuration and Performance Tuning Guide

FEBRUARY 2018

TECHNICAL PAPER



Trademarks

“StarWind”, “StarWind Software” and the StarWind and the StarWind Software logos are registered trademarks of StarWind Software. “StarWind LSF5” is a trademark of StarWind Software which may be registered in some jurisdictions. All other trademarks are owned by their respective owners.

Changes

The material in this document is for information only and is subject to change without notice. While reasonable efforts have been made in the preparation of this document to assure its accuracy, StarWind Software assumes no liability resulting from errors or omissions in this document, or from the use of the information contained herein. StarWind Software reserves the right to make changes in the product design without reservation and without notification to its users.

Technical Support and Services

If you have questions about installing or using this software, check this and other documents first - you will find answers to most of your questions on the [Technical Papers](#) webpage or in [StarWind Forum](#). If you need further assistance, please [contact us](#).

About StarWind

StarWind is a pioneer in virtualization and a company that participated in the development of this technology from its earliest days. Now the company is among the leading vendors of software and hardware hyper-converged solutions. The company's core product is the years-proven StarWind Virtual SAN, which allows SMB and ROBO to benefit from cost-efficient hyperconverged IT infrastructure. Having earned a reputation of reliability, StarWind created a hardware product line and is actively tapping into hyperconverged and storage appliances market. In 2016, Gartner named StarWind “Cool Vendor for Compute Platforms” following the success and popularity of StarWind HyperConverged Appliance. StarWind partners with world-known companies: Microsoft, VMware, Veeam, Intel, Dell, Mellanox, Citrix, Western Digital, etc.

Copyright ©2009-2018 StarWind Software Inc.

No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior written consent of StarWind Software.

Contents

Introduction	4
Enabling VAAI support inside StarWind VSAN	5
Checking the VAAI proper functioning	5
Summary	10

Introduction

This document is intended for experienced StarWind users and VMware administrators, who want to decrease the workload by using vStorage API for Array Integration (VAAI). The guide describes how to check VAAI proper functioning and its productivity.

VAAI is a complex of technologies, designed to offload certain VM disk operations to the storage array. In case VAAI is enabled while working with the disk subsystem, the ESXi host sends the commands to the array to perform the specific operations, without having to process all the data.

The screenshot below shows that some of the mounted disks have the hardware acceleration support. To identify if VAAI is supported, the ESXi host sends VAAI SCSI commands to each datastore.

Name	LUN	Type	Capacity	Operational State	Hardware Acceleration	Drive Type	Transport
Local NECVMWar CD-ROM (mpx.vmhba1:C0:T0:L0)	0	cdrom		Attached	Not supported	HDD	Block Adapter
Local VMware Disk (mpx.vmhba0:C0:T0:L0)	0	disk	40,00 GB	Attached	Not supported	HDD	Parallel SCSI
STARWIND iSCSI Disk (eui.102f21ad527c1409)	0	disk	15,00 GB	Attached	Supported	HDD	iSCSI
STARWIND iSCSI Disk (eui.ac1dc449f6a3ab13)	0	disk	15,00 GB	Attached	Supported	HDD	iSCSI

A full set of up-to-date technical documentation can always be found [here](#).

For any technical inquiries please visit our [online community](#), [Frequently Asked Questions](#) page, or use the [support form](#) to contact our technical support department.

Enabling VAAI support inside StarWind VSAN.

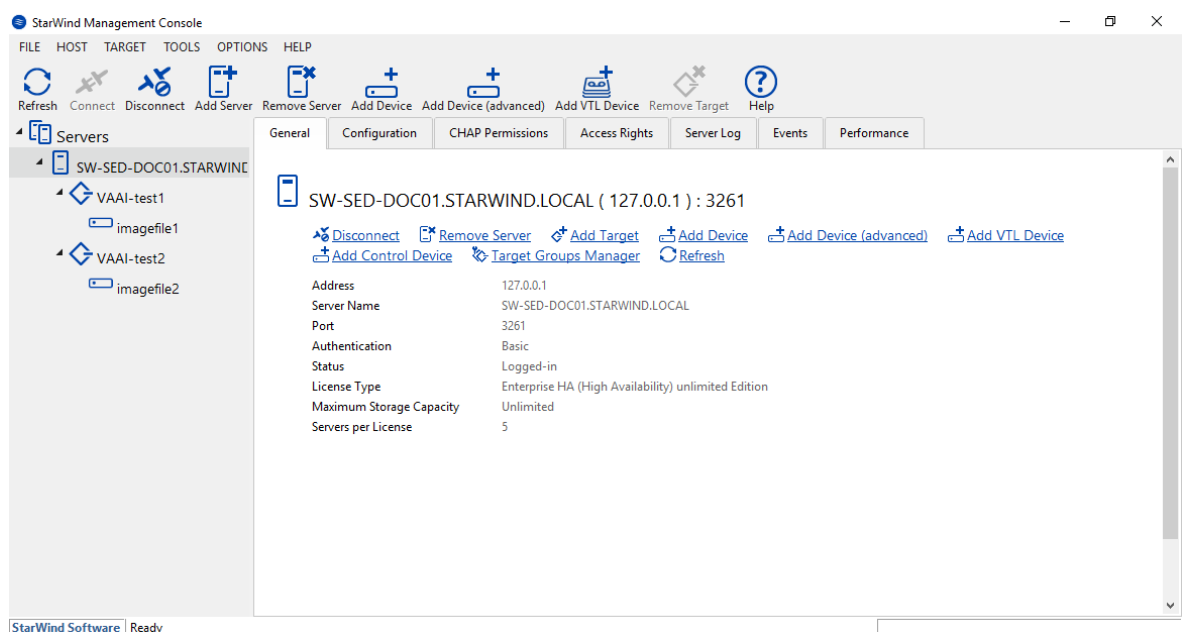
By default, VAAI is turned on in the StarWind configuration file. To turn off the VAAI support, the StarWind configuration file needs to be modified by following the steps described below.

NOTE: The StarWind service must be stopped before editing the configuration file.

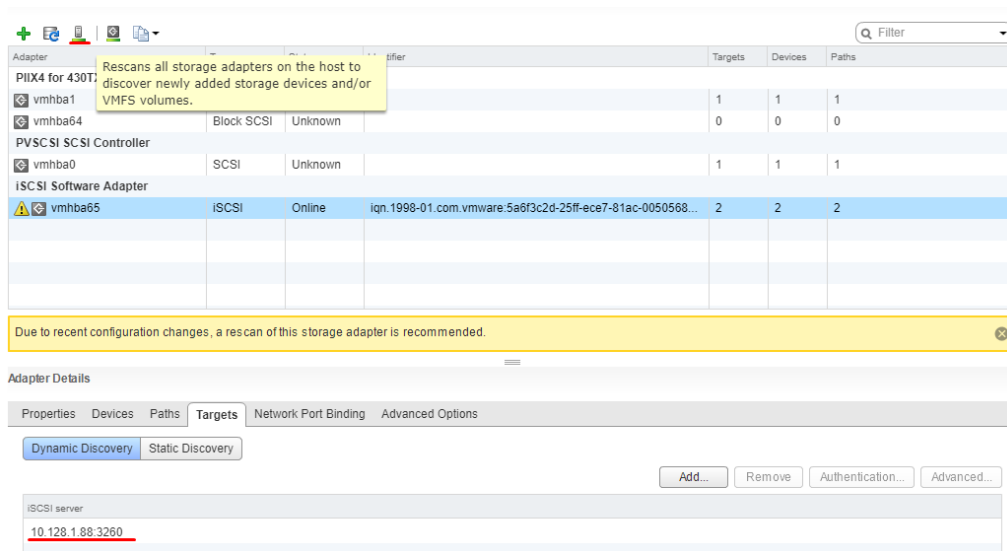
1. Stop the StarWind service
2. Navigate to the StarWind root directory and locate the StarWind.cfg file.
The default location is "C:\Program Files\StarWind Software\StarWind\StarWind.cfg".
3. Make the backup of StarWind.cfg file.
4. Open the file via text editor, find the VAAI strings **<VaaExCopyEnabled value="yes"/>**, **<VaaCawEnabled value="yes"/>**, **<VaaWriteSameEnabled value="yes"/>** below the **<hardwareacceleration>** section and change "yes" to "no".
5. Save the changes and close the text editor.
6. Restart the host where StarWind VSAN is installed.

Checking the VAAI proper functioning

7. Create the device in [StarWind Management Console](#)



8. To discover the StarWind device on ESXi host, navigate to **Configuration -> Storage Adapters** and click on the **iSCSI Software Adapter**.
9. In **Targets -> Dynamic Discovery section**, add the iSCSI interface of the StarWind host by clicking on the **Add** button.



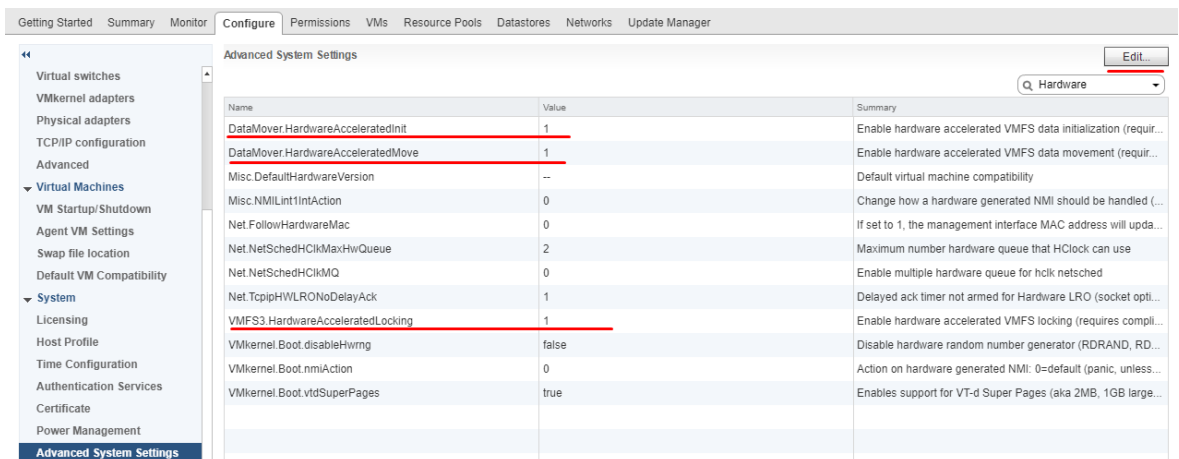
10. Click **Rescan All**. Once Rescan is done, all the available devices that can be discovered from the StarWind host will appear.



11. Create new Datastores based on the StarWind devices.

To check how VAAI works, enable its support in the StarWind configuration file and then in ESXi. VAAI can be turned on in ESXi via Web-GUI or through CLI.

12. To turn on VAAI through Web-GUI, select the ESX-host, navigate to the **Configure** tab, select **Advanced System Settings**, and click **Edit** button.
13. Set **HardwareAcceleratedMove** and **HardwareAcceleratedInit** parameters value to 1.
 Also, set "VMFS3.HardwareAcceleratedLocking" value to 1.



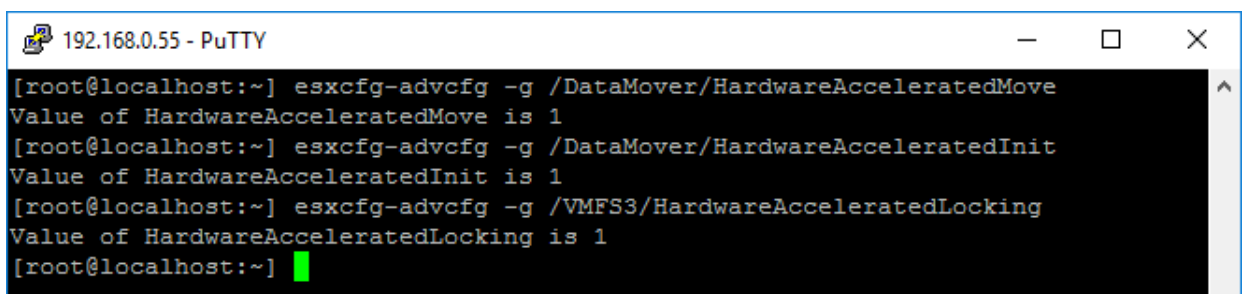
14. To turn on VAAI through CLI, connect to the ESX server via SSH. The commands below show the current status of the parameters, allowing to check the parameters value additionally.

```
esxcfg-advcfg -g /DataMover/HardwareAcceleratedMove  

esxcfg-advcfg -g /DataMover/HardwareAcceleratedInit  

esxcfg-advcfg -g /VMFS6/HardwareAcceleratedLocking
```

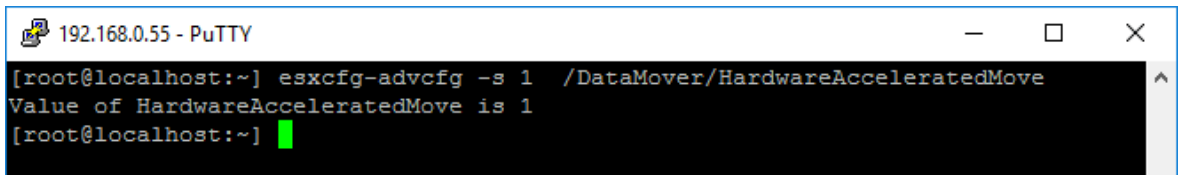
When VAAI is turned on, the result should look as demonstrated in the screenshot below:



The same commands with **-s** key will **change** the value of the parameter.

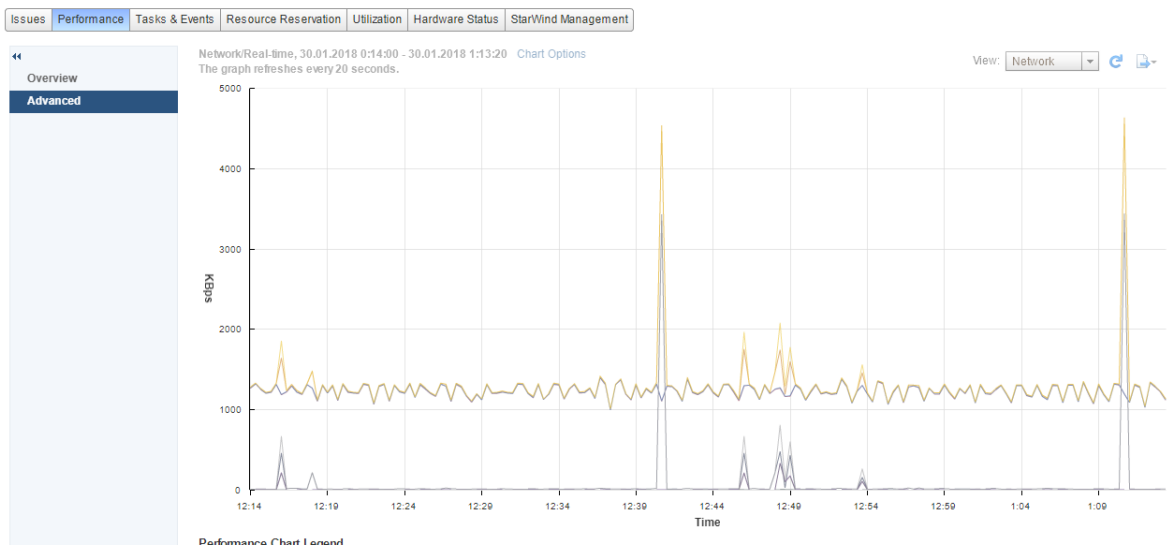
For example, the command:

`esxcfg-advcfg -s 1 /DataMover/HardwareAcceleratedMove` is demonstrated in the picture below:



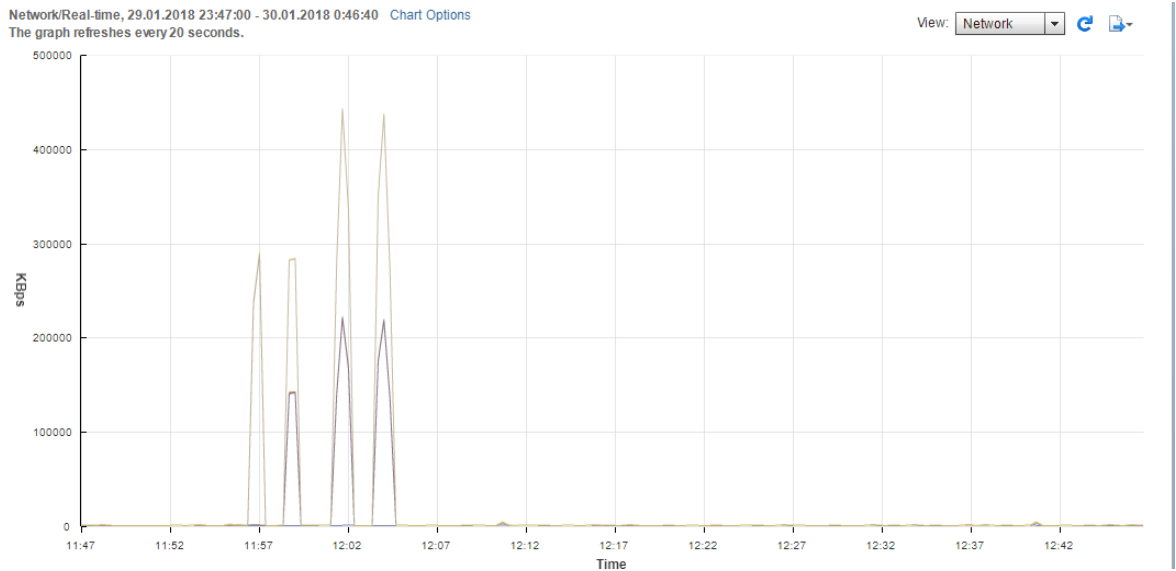
```
192.168.0.55 - PuTTY
[root@localhost:~] esxcfg-advcfg -s 1 /DataMover/HardwareAcceleratedMove
Value of HardwareAcceleratedMove is 1
[root@localhost:~]
```

15. In the case below, the virtual machine migrated between two Datastores created on StarWind devices. VAAI has been enabled on the ESXI host and in the StarWind configuration file. The virtual machine migration took around **55 seconds** and the workload on the NIC during the migration is shown in the picture below:



The maximum network usage was approximately 3 MBps.






16. Without VAAI, the virtual machine migration took around **1 minute 15 sec.** The maximum network usage was approximately 20 MBps. Contrary to the case above, the network load is higher.



Summary

VAAI support allows StarWind to offload multiple storage operations from the VMware hosts to the storage array itself. Thus, these operations are carried out much faster and with no impact on the system's performance.

Contacts

US Headquarters	EMEA and APAC
 1-617-449-77 17	 +44 203 769 18 57 (UK)
 1-617-507-58 45	 +34 629 03 07 17
 1-866-790-26 46	(Spain and Portugal)

Customer Support Portal: <https://www.starwind.com/support>
Support Forum: <https://www.starwind.com/forums>
Sales: sales@starwind.com
General Information: info@starwind.com



StarWind Software, Inc. 35 Village Rd., Suite 100, Middleton, MA 01949 USA www.starwind.com
©2018, StarWind Software Inc. All rights reserved.