



# Configuring a host to use NVMe drives

## ONTAP Select

Barb Einarsen, David Peterson  
January 23, 2020

This PDF was generated from [https://docs.netapp.com/us-en/ontap-select/task\\_chk\\_nvme\\_configure.html](https://docs.netapp.com/us-en/ontap-select/task_chk_nvme_configure.html) on December 11, 2020. Always check docs.netapp.com for the latest.

# Table of Contents

Configuring a host to use NVMe drives ..... 1

# Configuring a host to use NVMe drives

If you plan to use NVMe drives with software RAID, you need to configure the host to recognize the drives.

Use VMDirectPath I/O Pass-through on the NVMe devices to maximize data efficiency. This setting exposes the drives to the ONTAP Select virtual machine, allowing ONTAP to have direct PCI access to the device.

## *Before you begin*

Make sure your deployment environment meets the following minimum requirements:

- ONTAP Select 9.7 or later with the associated Deploy administration utility
- Premium XL platform license offering or a 90-day evaluation license
- VMware ESXi version 6.7 or later
- NVMe devices conforming to specification 1.0 or later

Follow the [host preparation checklist](#), review the [required information for Deploy utility installation](#), and the [required information for ONTAP Select installation](#) topics for more information.

## *About this task*

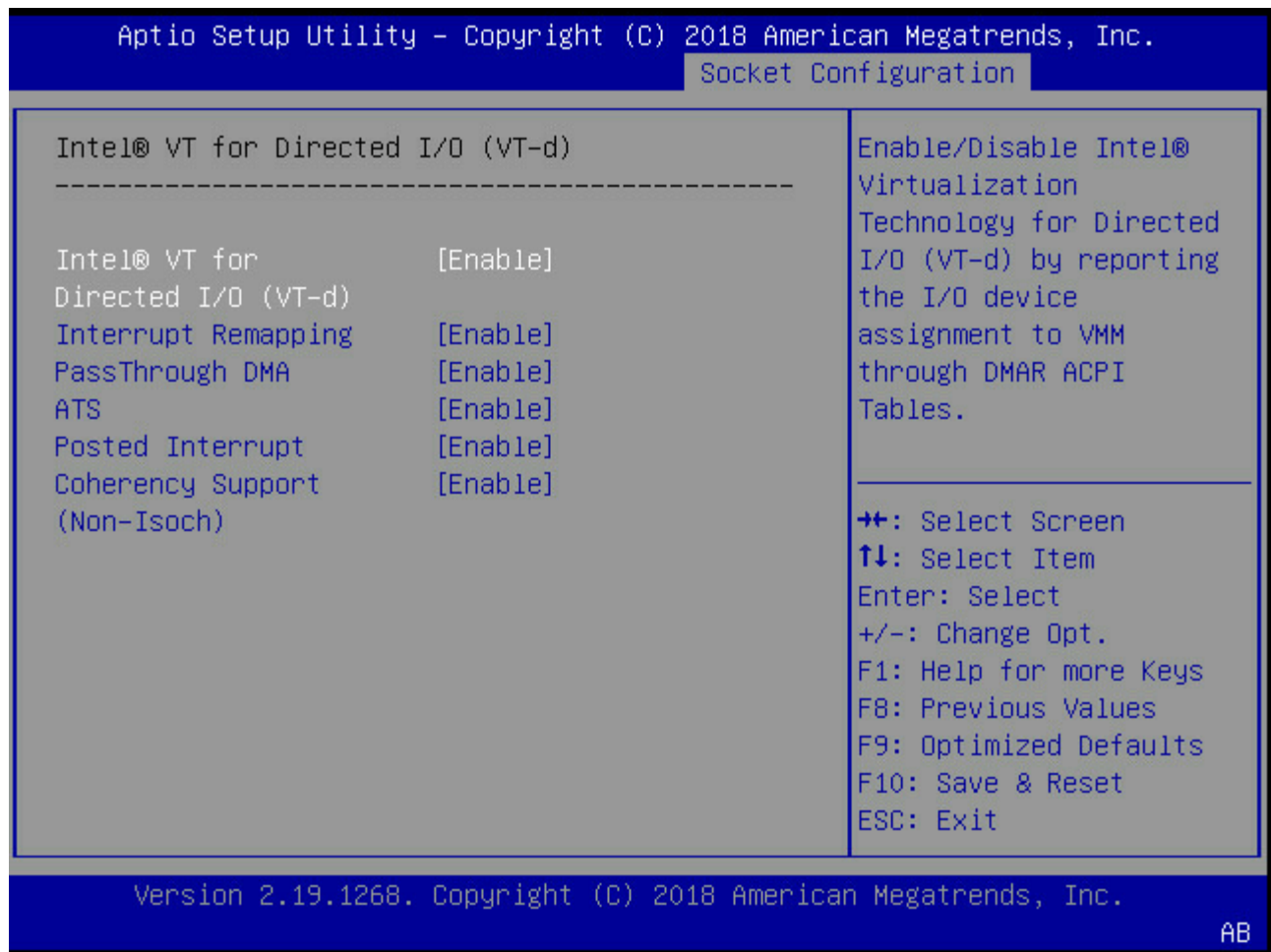
This procedure is designed to be performed before creating a new ONTAP Select cluster. You can also perform the procedure to configure additional NVMe drives for an existing SW-RAID NVMe cluster. In this case, after configuring the drives, you must add them through Deploy as you would additional SSD drives. The main difference is that Deploy detects the NVMe drives and reboots the nodes. When adding NVMe drives to an existing cluster, note the following about the reboot process:

- Deploy handles the reboot orchestration.
- HA takeover and giveback is performed in an orderly fashion, but it can be time consuming to resynchronize the aggregates.
- A single-node cluster will incur downtime.

See [Increasing storage capacity](#) for additional information.

## *Steps*

1. Access the **BIOS configuration** menu on the host to enable support for I/O virtualization.
2. Enable the **Intel® VT for Directed I/O (VT-d)** setting.



3. Some servers offer support for **Intel Volume Management Device (Intel VMD)**. When enabled, this makes the available NVMe devices invisible to the ESXi hypervisor; disable this option before proceeding.
4. Configure the NVMe drives for pass-through to virtual machines.
  - a. In vSphere, open the host **Configure** view and click **Edit** under **Hardware: PCI devices**.
  - b. Select the NVMe drives you want to use for ONTAP Select.

## Edit PCI Device Availability

sdot-dl380-003.gdl.englab.netapp.com



ID	Status	Vendor Name	Device Name	ESX/ESXi Device
0000:36:01.0	Not Configurable	Intel Corporation	Sky Lake-E PCI Expres...	
0000:38:...	Available (pending)	Seagate Technology ...	Nytro Flash Storage	
0000:36:02.0	Not Configurable	Intel Corporation	Sky Lake-E PCI Expres...	
0000:39:...	Available (pending)	Seagate Technology ...	Nytro Flash Storage	

No items selected

CANCEL

OK



You need a VMFS datastore that is also backed by an NVMe device to host the ONTAP Select VM system disks and virtual NVRAM. Leave at least one NVMe drive available for this purpose when configuring the others for PCI pass-through.

c. Click **OK**. The selected devices indicate **Available (pending)**.

5. Click **Reboot The Host**.

Configure
Permissions
VMs
Datastores
Networks
Updates

### DirectPath I/O PCI Devices Available to VMs

REFRESH
EDIT...

ID	Status	Vendor Name	Device Name
0000:12:00.0	Available (pending)	Seagate Technology PLC	Nytro Flash Storage
0000:13:00.0	Available (pending)	Seagate Technology PLC	Nytro Flash Storage
0000:14:00.0	Available (pending)	Seagate Technology PLC	Nytro Flash Storage
0000:15:00.0	Available (pending)	Seagate Technology PLC	Nytro Flash Storage
0000:37:00.0	Available (pending)	Seagate Technology PLC	Nytro Flash Storage
0000:38:00.0	Available (pending)	Seagate Technology PLC	Nytro Flash Storage

7 devices will become available when this host is rebooted.
Reboot This Host

*After you finish*

After the hosts are prepared, you can install the ONTAP Select Deploy utility. Deploy guides you through creating ONTAP Select storage clusters on your newly prepared hosts. During this process,

Deploy will detect the presence of the NVMe drives configured for pass-through and automatically select them for use as ONTAP data disks. You can adjust the default selection if needed.



A maximum of 14 NVMe devices are supported for each ONTAP Select node.

ONTAP Select Deploy

Clusters

Hypervisor Hosts

Administration

Storage

Storage Configuration

RAID Type

Software RAID

Data Disk Type

NVME

System Disk

nvme-snc-01

sdot-dl380-003-nvme(NVME)

Capacity: 1.41 TB

Data Disks for nvme-snc-01

	Device Name	Device Type	Capacity
<input checked="" type="checkbox"/>	0000:12:00.0	NVME	-
<input checked="" type="checkbox"/>	0000:13:00.0	NVME	-
<input checked="" type="checkbox"/>	0000:14:00.0	NVME	-
<input checked="" type="checkbox"/>	0000:15:00.0	NVME	-
<input checked="" type="checkbox"/>	0000:37:00.0	NVME	-
<input checked="" type="checkbox"/>	0000:38:00.0	NVME	-
<input checked="" type="checkbox"/>	0000:39:00.0	NVME	-

Selected Capacity: (7/7 disks)

Done

After the cluster is successfully deployed, ONTAP System Manager allows you to provision the storage according to best practices. ONTAP will automatically enable flash-optimized storage efficiency features that make the best use of your NVMe storage.

ONTAP System Manager (Return to classic version)

Search actions, objects, and pages

DASHBOARD

STORAGE

NETWORK

EVENTS & JOBS

PROTECTION

HOSTS

CLUSTER

ots-nvme Version 9.7.0

Health

→

✓ All systems are healthy

FDvM300

Capacity

→

The system discovered 6 disks. When you prepare the disk for provisioning, the system will group the disks for optimum performance and resiliency.

Prepare Storage

Performance

→

The system discovered 6 disks. When you prepare the disk for provisioning, the system will group the disks for optimum performance and resiliency.

Perform

Preparing Local Storage.

The local storage is being prepared.

ONTAP System Manager (Return to classic version)

Search actions, objects, and pages

DASHBOARD

STORAGE

NETWORK

EVENTS & JOBS

PROTECTION

HOSTS

CLUSTER

ots-nvme Version 9.7.0

Health

→

✓ All systems are healthy

FDvM300

Capacity

→

0 Bytes

USED

4.82 TB

AVAILABLE

0%

20%

40%

60%

80%

100%

1 to 1 Data Reduction

No cloud tier

## Copyright Information

Copyright © 2020 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.

RESTRICTED RIGHTS LEGEND: Use, duplication, or disclosure by the government is subject to restrictions as set forth in subparagraph (c)(1)(ii) of the Rights in Technical Data and Computer Software clause at DFARS 252.277-7103 (October 1988) and FAR 52-227-19 (June 1987).

## 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.