



# ONTAP Select 9.4 performance: Premium HA direct-attached SSD storage

## ONTAP Select

Barb Einarsen  
November 19, 2019

This PDF was generated from [https://docs.netapp.com/us-en/ontap-select/concept\\_perf\\_premium\\_ha\\_direct\\_ssd\\_94.html](https://docs.netapp.com/us-en/ontap-select/concept_perf_premium_ha_direct_ssd_94.html) on October 12, 2020. Always check docs.netapp.com for the latest.



# Table of Contents

ONTAP Select 9.4 performance: Premium HA direct-attached SSD storage .....	1
Reference platform .....	1
8K random 50% write 50% read .....	3

# ONTAP Select 9.4 performance: Premium HA direct-attached SSD storage

ONTAP Select 9.4 performance with premium HA direct-attached SSD storage.

## Reference platform

ONTAP Select 9.4 (Premium) hardware (per node):

- Cisco UCS C240 M4S2:
  - Intel Xeon CPU E5-2697 at 2.60GHz
  - 2 x sockets; 14 x CPUs per socket
  - 56 x logical CPUs (HT enabled)
  - 256GB RAM
  - VMware ESXi 6.5
  - Drives per host: 24 X371A NetApp 960GB SSD

Client hardware:

- 4 x NFSv3 IBM 3550m4 clients

Configuration information:

- 1,500 MTU for data path between clients and Select cluster
- No storage efficiency features in use (compression, deduplication, Snapshot copies, SnapMirror, and so on)

The following table lists the throughput measured against read/write workloads on an HA pair of ONTAP Select Premium nodes. Performance measurements were taken using the SIO load-generating tool.

**Performance results for a single node (part of a four-node medium instance) ONTAP Select 9.4 cluster on DAS (SSD)**

Description	Sequential Read 64KiB	Sequential Write 64KiB	Random Read 8KiB	Random Write 8KiB	Random WR/ RD (50/50) 8KiB
ONTAP 9.4 Select Medium instance with DAS (SSD)	1045MBps 16,712 IOPS	251MBps 4016 IOPS	492MBps 62,912 IOPS	141MBps 18,048 IOPS	218MBps 27,840 IOPS

## **64K sequential read**

Details:

- SIO direct I/O enabled
- 2 x data NIC
- 1 x data aggregate (2TB)
- 64 volumes; 64 SIO procs/threads
- 32 volumes per node (64 total)
- 1 x SIO procs per volume; 1 x SIO thread per file
- 1 x files per volume; files are 12000MB each

## **64K sequential write**

Details:

- SIO direct I/O enabled
- 2 x data NIC
- 1 x data aggregate (2TB):
- 64 volumes; 128 SIO procs/threads
- 32 volumes per node (64 total)
- 2 x SIO procs per volume; 1 x SIO thread per file
- 2 x files per volume; files are 30720MB each

## **8K random read**

Details:

- SIO direct I/O enabled
- 2 x data NIC
- 1 x data aggregate (2TB):
- 64 volumes; 64 SIO procs/threads
- 32 volumes per node (64 total)
- 1 x SIO procs per volume; 8 x SIO thread per file
- 1 x files per volume; files are 12228MB each

## **8K random write**

Details:

- SIO direct I/O enabled
- 2 x data NIC
- 1 x data aggregate (2TB)
- 64 volumes; 64 SIO procs/threads
- 32 volumes per node (64 total)
- 1 x SIO procs per volume; 8 x SIO thread per file
- 1 x files per volume; files are 8192MB each

## **8K random 50% write 50% read**

Details:

- SIO direct I/O enabled
- 2 x data NIC
- 1 x data aggregate (2TB)
- 64 volumes; 64 SIO procs/threads
- 32 volumes per node (64 total)
- 1 x SIO procs per volume; 20 x SIO thread per file
- 1 x files per volume; files are 12228MB each

## 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.