



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

## **ONTAP Select**

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# 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

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