



# ONTAP Select 9.5 performance: Premium HA direct-attached SSD storage

## ONTAP Select

NetApp  
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# ONTAP Select 9.5 performance: Premium HA direct-attached SSD storage

ONTAP Select 9.5 performance with premium HA direct-attached SSD storage.

## Reference platform

ONTAP Select 9.5 (Premium) hardware (per node):

- Cisco UCS C240 M4SX:
  - Intel Xeon CPU E5-2620 at 2.1GHz
  - 2 x sockets; 16 x CPUs per socket
  - 128GB RAM
  - VMware ESXi 6.5
  - Drives per host: 24 900GB SSD

Client hardware:

- 5 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 using both software RAID and hardware RAID. 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 9.5 cluster on DAS (SSD) with software RAID and hardware RAID**

Description	Sequential Read 64KiB	Sequential Write 64KiB	Random Read 8KiB	Random Write 8KiB	Random WR/ RD (50/50) 8KiB
ONTAP 9.5 Select Medium instance with DAS (SSD) hardware RAID	1,714MiBps	412MiBps	391MiBps	1251MiBps	309MiBps

<b>Description</b>	<b>Sequential Read 64KiB</b>	<b>Sequential Write 64KiB</b>	<b>Random Read 8KiB</b>	<b>Random Write 8KiB</b>	<b>Random WR/ RD (50/50) 8KiB</b>
ONTAP 9.5 Select Medium instance with DAS (SSD) software RAID	1,674MiBps	360MiBps	451MiBps	223MiBps	293MiBps

## 64K sequential read

Details:

- SIO direct I/O enabled
- 2 nodes
- 2 x data NIC per node
- 1 x data aggregate per node (2TB hardware RAID), (8TB software RAID)
- 64 SIO procs, 1 thread per proc
- 32 volumes per node
- 1 x files per proc; files are 12000MB each

## 64K sequential write

Details:

- SIO direct I/O enabled
- 2 nodes
- 2 x data NIC per node
- 1 x data aggregate per node (2TB hardware RAID), (4TB software RAID)
- 128 SIO procs, 1 thread per proc
- volumes per node 32 (hardware RAID), 16 (software RAID)
- 1 x files per proc; files are 30720MB each

## 8K random read

Details:

- SIO direct I/O enabled
- 2 nodes
- 2 x data NIC per node

- 1 x data aggregate per node (2TB hardware RAID), (4TB software RAID)
- 64 SIO procs, 8 threads per proc
- volumes per node 32
- 1 file per proc; files are 12228MB each

## **8K random write**

Details:

- SIO direct I/O enabled
- 2 nodes
- 2 x data NIC per node
- 1 x data aggregate per node (2TB hardware RAID), (4TB software RAID)
- 64 SIO procs, 8 threads per proc
- volumes per node 32
- 1 file per proc; files are 8192MB each

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

Details:

- SIO direct I/O enabled
- 2 nodes
- 2 x data NIC per node
- 1 x data aggregate per node (2TB hardware RAID), (4TB software RAID)
- 64 SIO procs, 20 threads per proc
- volumes per node 32
- 1 file per proc; files are 12228MB each

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