

Nextron 4U 36 disk Storageserver



Executive summary

After performing all tests, the Nextron 4U 36 disk Storageserver system has been officially certified according to the [Open-E](#) Hardware Certification Program.

During the tests, it was found that the system is functional and efficient. With the [Open-E DSS V7](#) operating system installed, the Nextron 4U 36 disk Storageserver is stable and performs well.

In general, the system can be used for many different applications, but the following are recommended:

✓ iSCSI storage

Following features make Nextron 4U 36 disk Storageserver great iSCSI storage:

- Two 1GbE or two 10GbE interfaces for fast MPIO connection.
- Hardware RAID0, RAID5, RAID6, RAID10, RAID50, RAID60 for high performance and data safety.

✓ NAS filer

Following features make Nextron 4U 36 disk Storageserver good NAS filer solution:

- Thirty-six high class SATA hard drives provides plenty of space for user files.
- Hardware RAID5, RAID50, RAID6 and RAID60 for fault tolerance and most efficient use of available disk space.
- Two 1GbE or two 10GbE interfaces for independent connection to different networks or aggregated for improved throughput.

✓ Storage for Virtualization

Following features make Nextron 4U 36 disk Storageserver great storage for virtualization:

- Two 10GbE interfaces, provides enough throughput, even for demanding servers with many virtual machines running on.
- Two 1GbE interfaces for fast MPIO connection.
- Thirty-six SATA drives ensure fast data access and reliability.
- Hardware RAID5, RAID50, RAID6, RAID60 and RAID10 ensures failure-free work and great performance, even for demanding virtual environments.
- Capacity can be expanded on the fly while the server is in production.

Certification notes

Certification was performed according to the Open-E Hardware Certification Program Guide 2.0.

Storage capacity can easily be expanded by connecting one or several direct attached or daisy chained JBOD chassis.

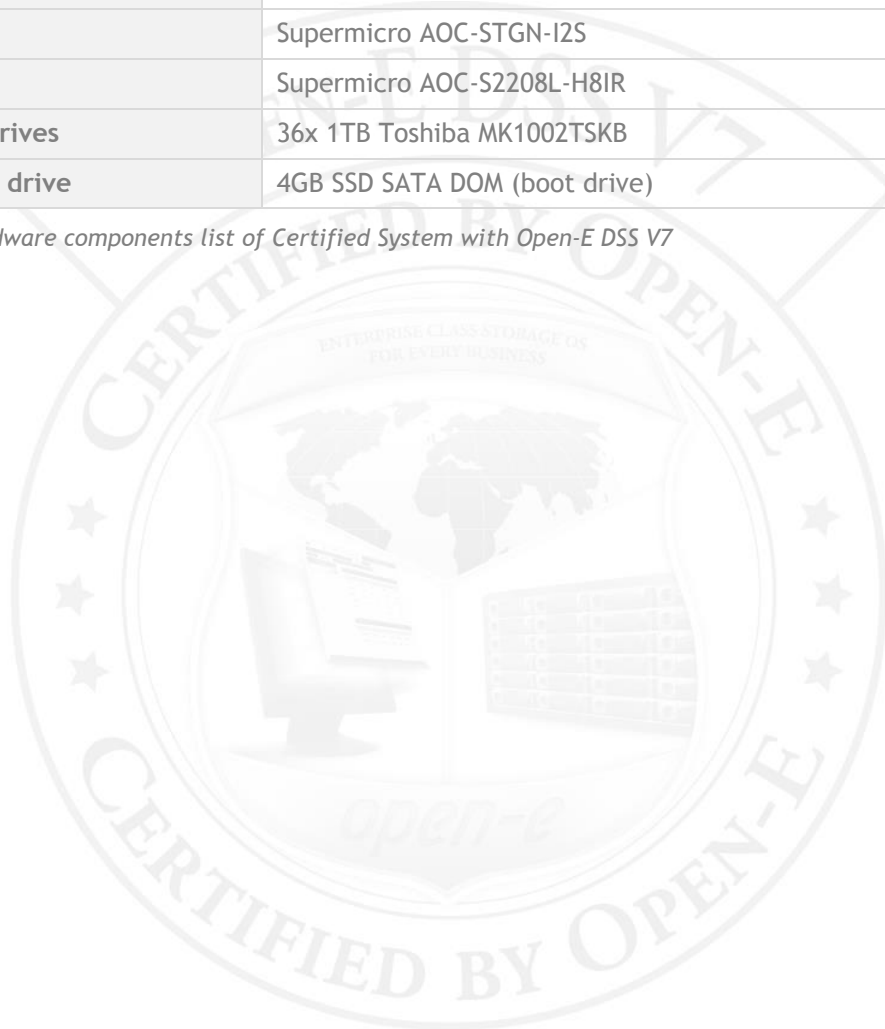
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Nextron 4U 36 disk Storageserver hardware components

Technical specifications about the certified system are listed below:

Model	Nextron 4U 36 disk Storageserver
Operating system	Open-E DSS V7 build 7637
Enclosure/chassis	Supermicro SuperChassis 847E16-R1400LPB
Motherboard	Supermicro X9DRH-IF
CPU	2x Intel Xeon E5-2620 2.50GHz
Memory	8x 4GB DDR3 ECC-REG Samsung 1600MHz
Network	2x Intel Gigabit Server Adapter I350 (on-board)
Network	Supermicro AOC-STGN-I2S
HW RAID	Supermicro AOC-S2208L-H8IR
Hard disk drives	36x 1TB Toshiba MK1002TSKB
Boot media drive	4GB SSD SATA DOM (boot drive)

TABLE 1: Hardware components list of Certified System with Open-E DSS V7



Nextron 4U 36 disk Storageserver photos



FIGURE 1: Front photo



FIGURE 2: Rear photo



FIGURE 3: Top photo

Auxiliary systems hardware components

Auxiliary systems with MS Windows or Open-E DSS V7 installed, used in Open-E Hardware Certification Process.

Model	Custom
Operating system	MS Windows Server 2008 R2
Enclosure/chassis	Intel Tech 19" IPC - 4088 4U
Motherboard	Asus Workstation P8B-E / 4L
CPU	Intel Xeon E-5630 2.53GHz
Memory	4x 4GB ECC-REG Samsung M39B5270CH0-CH9
Network	Intel Ethernet Converged Network Adapter X520-SR2
Network	Intel PRO/1000 PT Dual Port Server Adapter (i82561EB)
HW RAID	LSI MegaRAID SAS 9280-4i4e
Hard disk drives	4x 750GB Seagate Barracuda ST3750330NS

TABLE 2: Hardware components of first Workstation with MS Windows

Model	Custom
Operating system	MS Windows Server 2008 R2
Enclosure/chassis	Intel Tech 19" IPC - 4088 4U
Motherboard	Asus Workstation P8B-E / 4L
CPU	Intel Xeon E-5630 2.53GHz
Memory	4x 4GB ECC-REG Samsung M39B5270CH0-CH9
Network	Intel Ethernet Converged Network Adapter X520-SR2
Network	Intel PRO/1000 PT Dual Port Server Adapter (i82561EB)
HW RAID	LSI MegaRAID SAS 9280-4i4e
Hard disk drives	4x 750GB Seagate Barracuda ST3750330NS

TABLE 3: Hardware components of second Workstation with MS Windows

Model	Nextron 4U 36 disk Storageserver
Operating system	Open-E DSS V7 build 7637
Enclosure/chassis	Supermicro SuperChassis 847E16-R1400LPB
Motherboard	Supermicro X9DRH-IF
CPU	2x Intel Xeon E5-2620 2.50GHz
Memory	8x 4GB ECC-REG Samsung 1600MHz
Network	Intel Gigabit Server Adapter I350 (on-board)
Network	Supermicro AOC-STGN-I2S
HW RAID	Supermicro AOC-S2208L-H8IR
Hard disk drives	1x 4GB SSD SATA DOM (boot drive)
Hard disk drives	36x 1TB Toshiba MK1002TSKB

TABLE 4: Hardware components of Workstation with Open-E DSS V7

Model	Supermicro SSE-G24-TG4
Description	24-ports 1GbE and 4-ports 10GbE switch

TABLE 5: Network switch details for 1GbE connections



Administration functionality

The following functionality has been tested.

Drive identifier	OK
Power button	OK
Front and rear LEDs	OK

TABLE 6: Administration functionality test results



Network functionality

Tests performed in this section check the functionality, performance and stability of the network solutions available in the Open-E DSS V7 product on the certified system.

The tests rely on configuring the iSCSI targets and copying the data from many *Workstations with MS Windows* through various network connections with big block size using appropriate testing tools.

Network test topology

Network topology for Network testing is shown below.

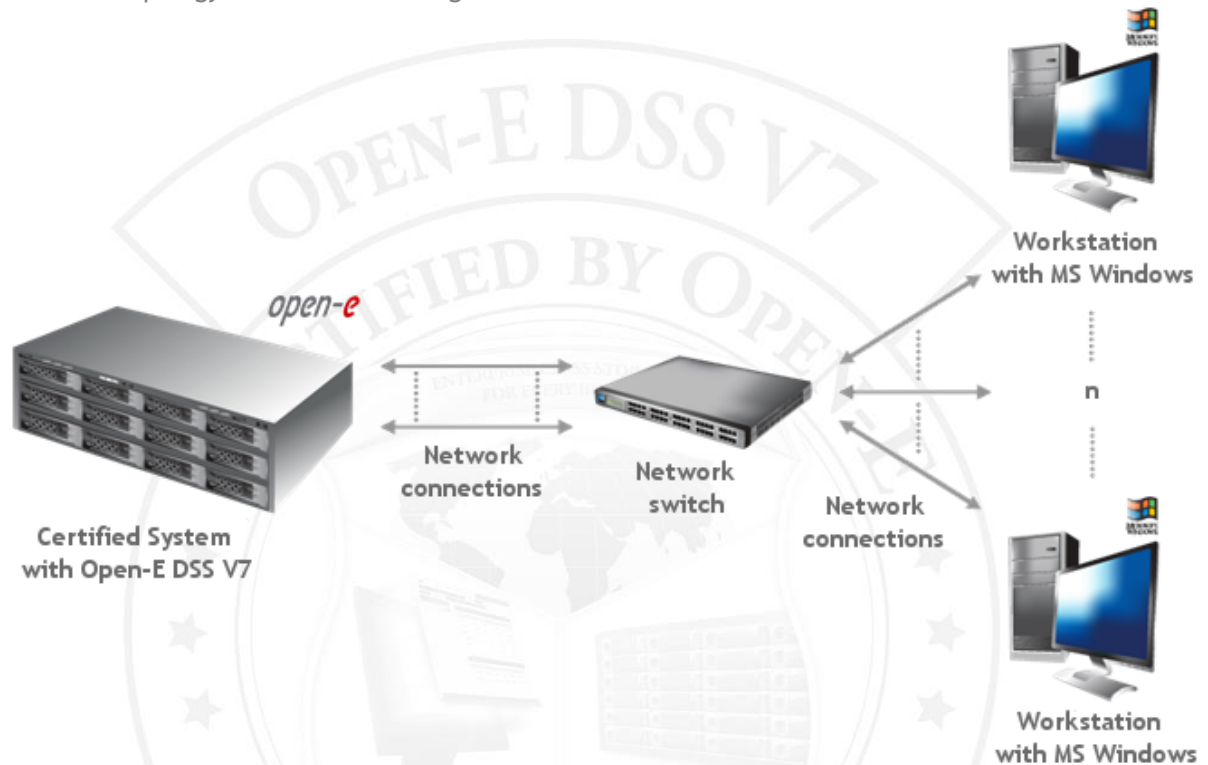


FIGURE 4: Network topology for Network testing

802.3ad bonding mode test

1. Test description

The test relies on configuring the iSCSI targets and copying the data from many *Workstations with MS Windows* through an 802.3ad bonding mode network connection with a 4MB block size using the iometer testing tool.

2. Test results for 802.3ad bonding mode test performed on Intel Gigabit Server Adapter I350 (on-board)

802.3ad bonding mode performance test results			
NIC model	Intel Gigabit Server Adapter I350 (on-board)		
Workstations with MS Windows	Write speed [MB/s]	Read speed [MB/s]	Performance test results
1 st Workstation	110.65	71.08	passed
2 nd Workstation	108.55	41.66	passed

TABLE 7: 802.3ad bonding mode performance test results table for Intel Gigabit Server Adapter I350 (on-board)

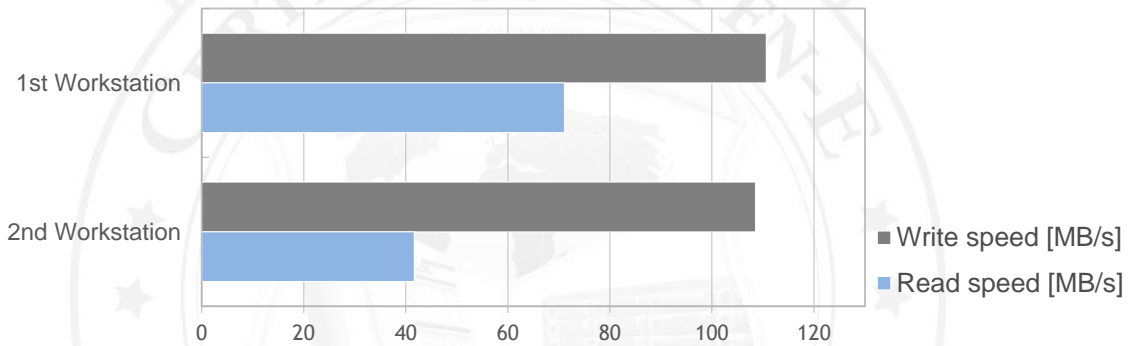


FIGURE 5: 802.3ad bonding mode performance test results chart for Intel Gigabit Server Adapter I350 (on-board)

3. Test results for 802.3ad bonding mode test performed on Supermicro AOC-STGN-I2S

802.3ad bonding mode performance test results			
NIC model	Supermicro AOC-STGN-I2S		
Workstations with MS Windows	Write speed [MB/s]	Read speed [MB/s]	Performance test results
1 st Workstation	416.74	496.45	passed
2 nd Workstation	488.64	490.14	passed

TABLE 8: 802.3ad bonding mode performance test results table for Supermicro AOC-STGN-I2S

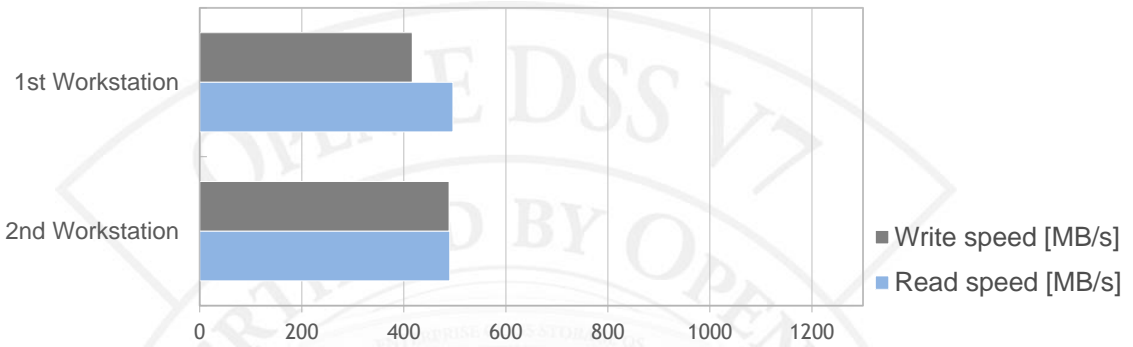
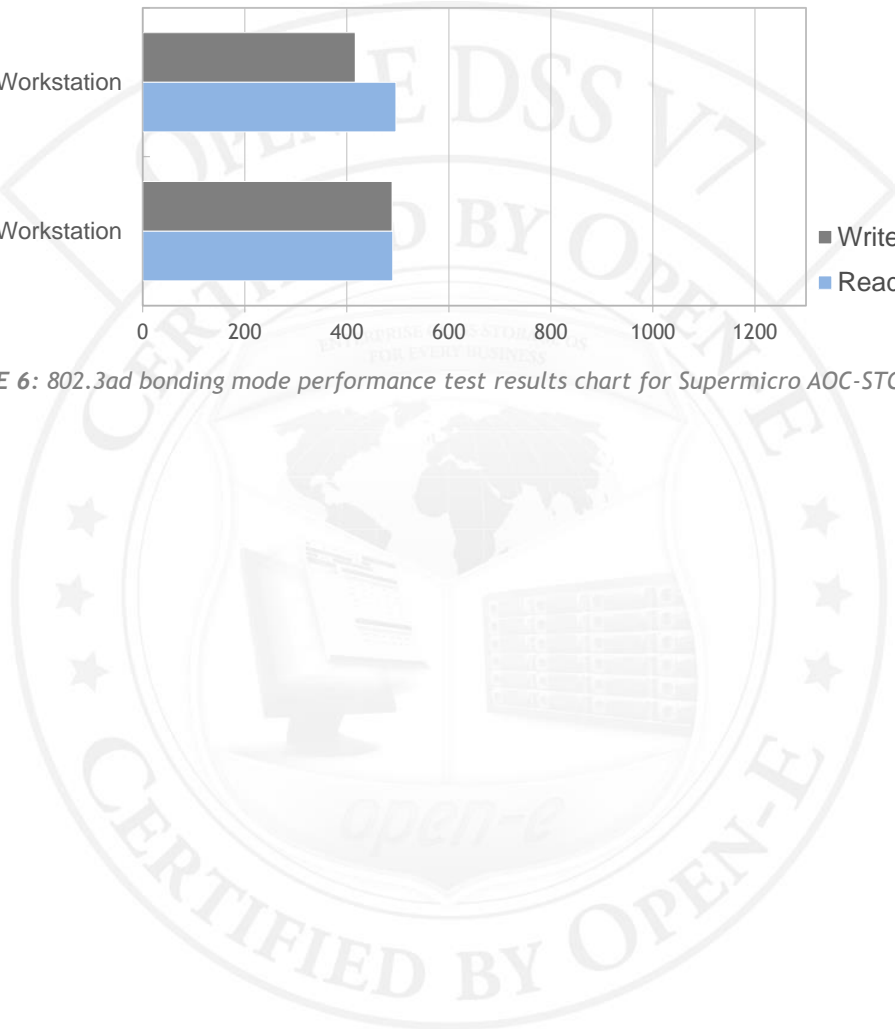


FIGURE 6: 802.3ad bonding mode performance test results chart for Supermicro AOC-STGN-I2S



Balance-alb bonding mode test

1. Test description

The test relies on configuring the iSCSI targets and copying the data from many *Workstations with MS Windows* through a Balance-alb bonding mode network connection with a 4MB block size using the iometer testing tool.

2. Test results for Balance-alb bonding mode test performed on Intel Gigabit Server Adapter I350 (on-board)

Balance-alb bonding mode performance test results			
NIC model	Intel Gigabit Server Adapter I350 (on-board)		
Workstations with MS Windows	Write speed [MB/s]	Read speed [MB/s]	Performance test results
1 st Workstation	108.96	110.19	passed
2 nd Workstation	110.25	110.34	passed

TABLE 9: Balance-alb bonding mode performance test results table for Intel Gigabit Server Adapter I350 (on-board)

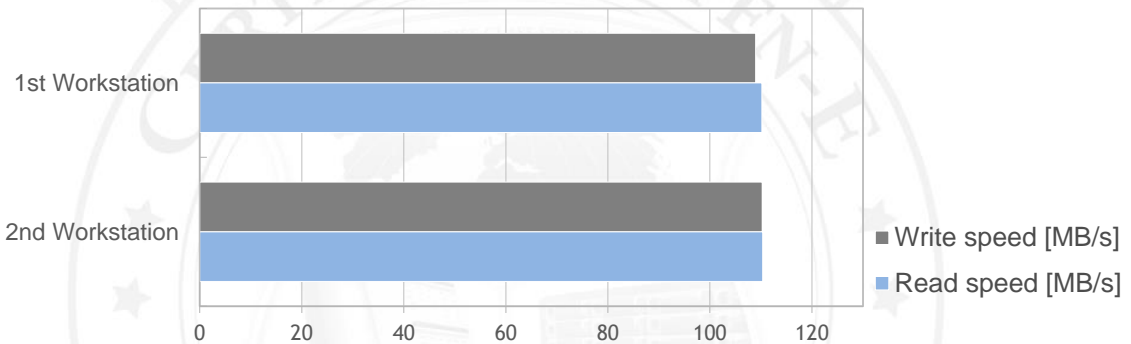


FIGURE 7: Balance-alb bonding mode performance test results chart for Intel Gigabit Server Adapter I350 (on-board)

3. Test results for Balance-alb bonding mode test performed on Supermicro AOC-STGN-I2S

Balance-alb bonding mode performance test results			
NIC model	Supermicro AOC-STGN-I2S		
Workstations with MS Windows	Write speed [MB/s]	Read speed [MB/s]	Performance test results
1 st Workstation	524.93	471.42	passed
2 nd Workstation	603.85	499.41	passed

TABLE 10: Balance-alb bonding mode performance test results table for Supermicro AOC-STGN-I2S

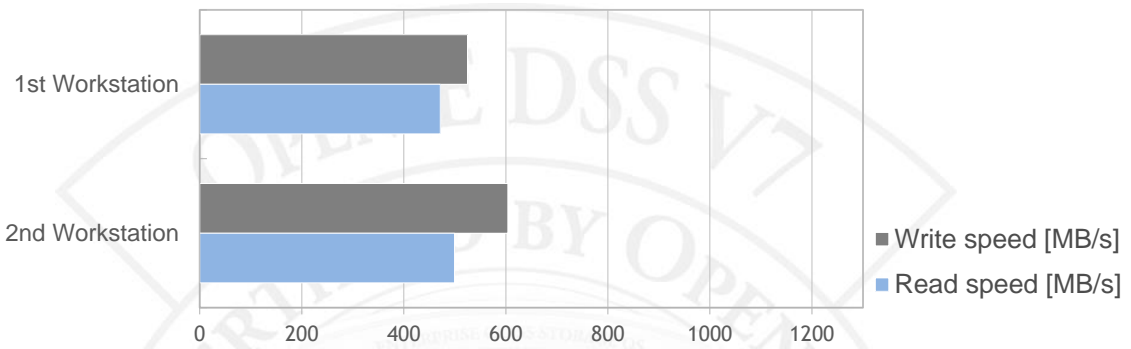
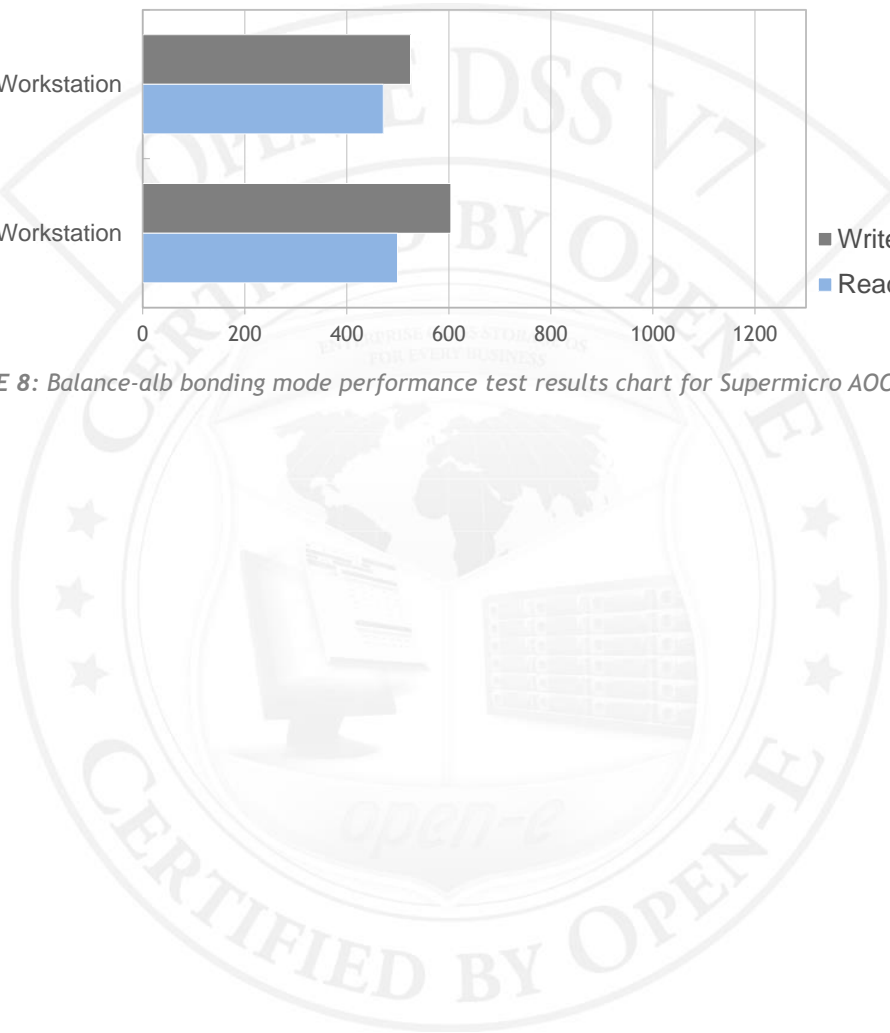


FIGURE 8: Balance-alb bonding mode performance test results chart for Supermicro AOC-STGN-I2S



Balance-rr bonding mode test

1. Test description

The test relies on configuring the iSCSI targets and copying the data from many *Workstations with MS Windows* through a Balance-rr bonding mode network connection with a 4MB block size using the lometer testing tool.

2. Test results for Balance-rr bonding mode test performed on Intel Gigabit Server Adapter I350 (on-board)

Balance-rr bonding mode performance test results			
NIC model	Intel Gigabit Server Adapter I350 (on-board)		
Workstations with MS Windows	Write speed [MB/s]	Read speed [MB/s]	Performance test results
1 st Workstation	111.25	63.42	passed
2 nd Workstation	111.68	99.99	passed

TABLE 11: Balance-rr bonding mode performance test results table for Intel Gigabit Server Adapter I350 (on-board)

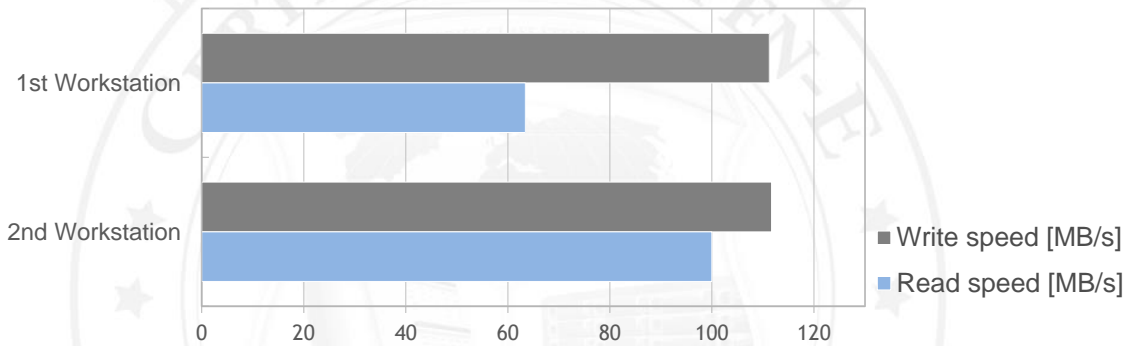


FIGURE 9: Balance-rr bonding mode performance test results chart for Intel Gigabit Server Adapter I350 (on-board)

3. Test results for Balance-rr bonding mode test performed on Supermicro AOC-STGN-I2S

Balance-rr bonding mode performance test results			
NIC model	Supermicro AOC-STGN-I2S		
Workstations with MS Windows	Write speed [MB/s]	Read speed [MB/s]	Performance test results
1 st Workstation	336.40	200.81	passed
2 nd Workstation	660.67	201.92	passed

TABLE 12: Balance-rr bonding mode performance test results table for Supermicro AOC-STGN-I2S

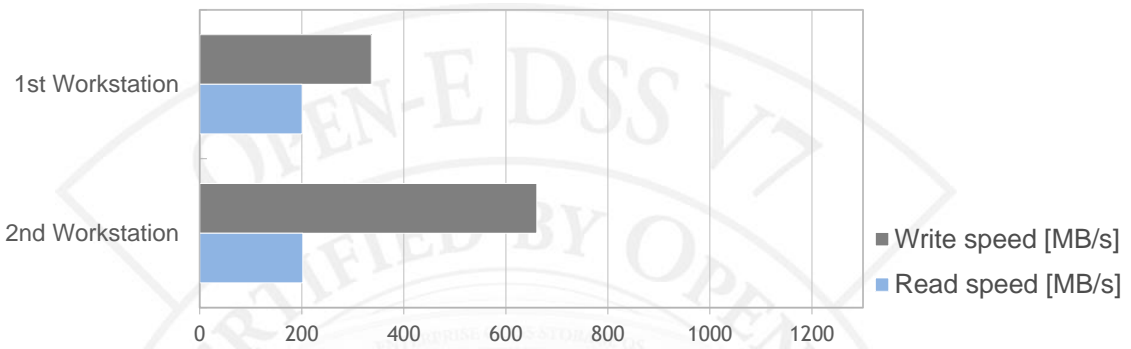


FIGURE 10: Balance-rr bonding mode performance test results chart for Supermicro AOC-STGN-I2S

Single NIC performance test

1. Test description

The test relies on configuring the iSCSI targets and copying the data from *Workstations with MS Windows* through single NIC with a 4MB block size using the iometer testing tool.

2. Test results for single NIC test performed on Intel Gigabit Server Adapter I350 (on-board)

Single NIC performance test results			
NIC model	Intel Gigabit Server Adapter I350 (on-board)		
Workstations with MS Windows	Write speed [MB/s]	Read speed [MB/s]	Performance test results
1 st Workstation	111.14	109.21	passed

TABLE 13: Single NIC performance test results table for Intel Gigabit Server Adapter I350 (on-board)

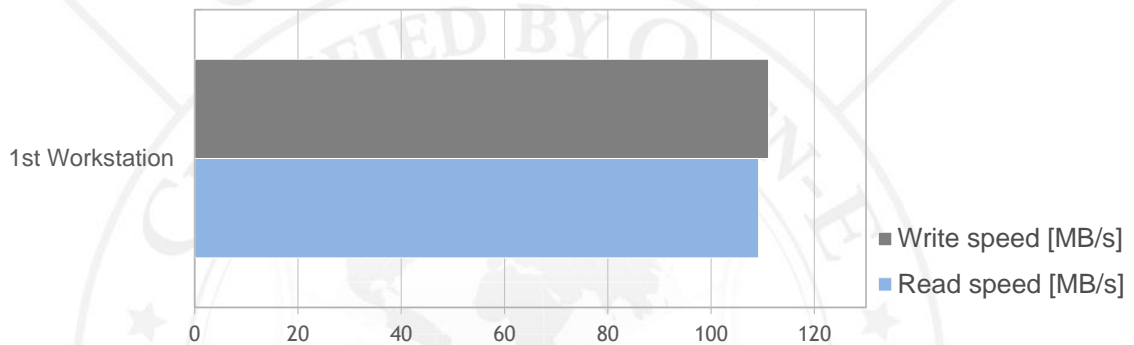


FIGURE 11: Single NIC performance test results chart for Intel Gigabit Server Adapter I350 (on-board)

3. Test results for single NIC test performed on Supermicro AOC-STGN-I2S

Single NIC performance test results			
NIC model	Supermicro AOC-STGN-I2S		
Workstations with MS Windows	Write speed [MB/s]	Read speed [MB/s]	Performance test results
1 st Workstation	555.22	508.55	passed

TABLE 14: Single NIC performance test results table for Supermicro AOC-STGN-I2S

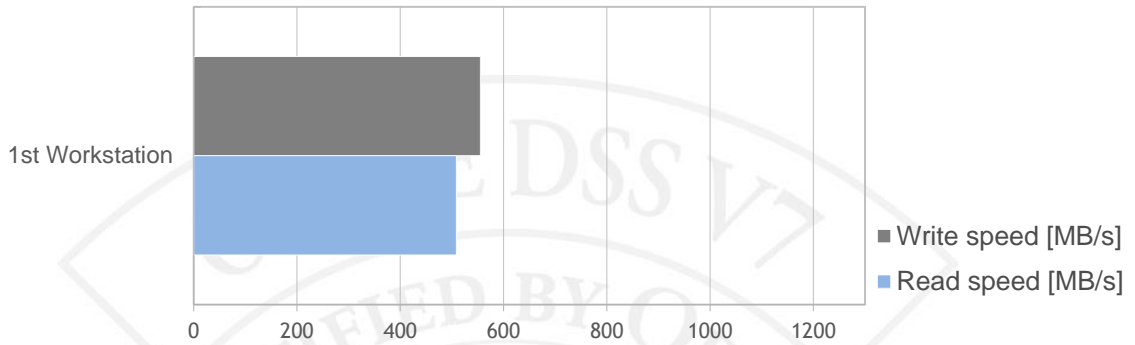
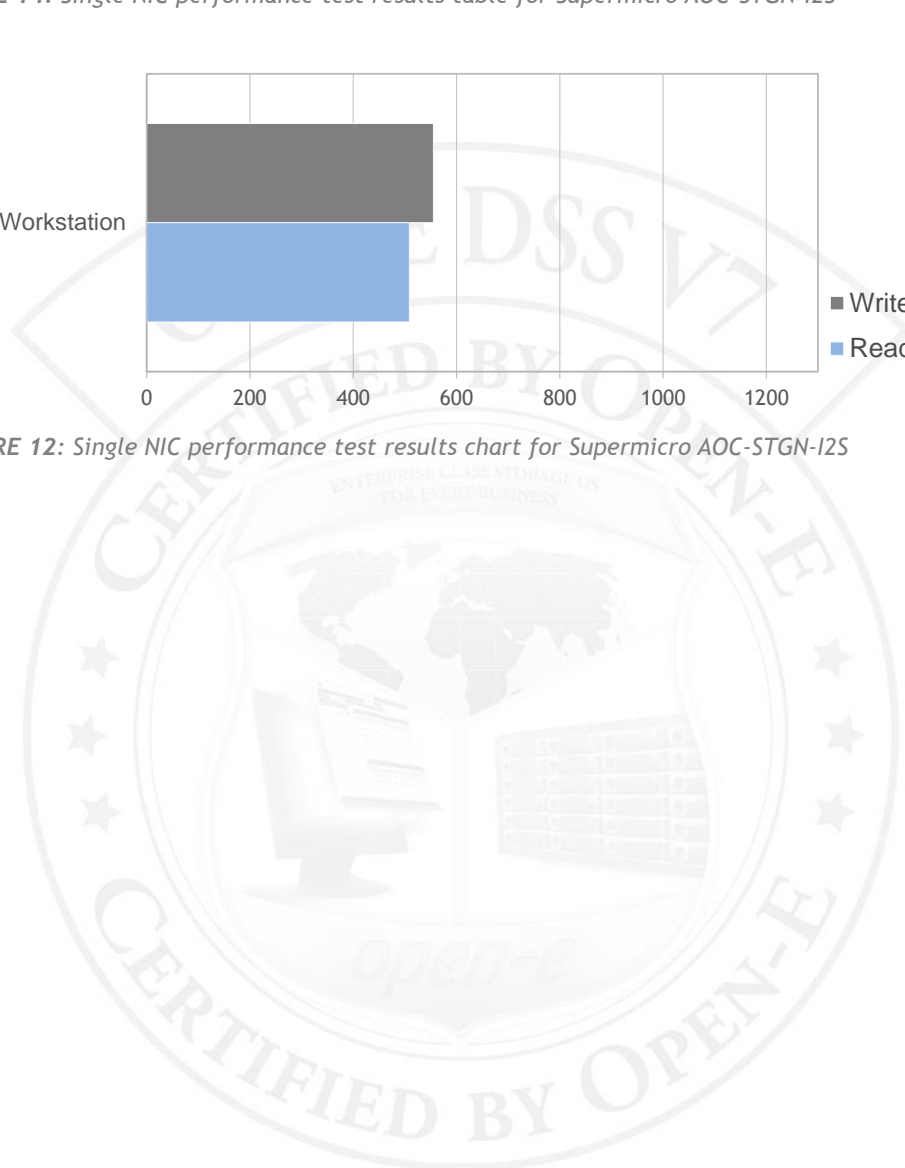


FIGURE 12: Single NIC performance test results chart for Supermicro AOC-STGN-I2S



RAID functionality

Tests performed in this section check the functionality, performance and stability of Open-E DSS V7 storage devices on the certified system.

Tests in this section rely on the creation of the RAID units on 0, 5, 6, 10, 50 and 60 levels, configuring the iSCSI target and copying the data from a *Workstation with MS Windows* via network connection with various block sizes using the lometer testing tool.

RAID test topology

Network test topology for RAID testing is shown below

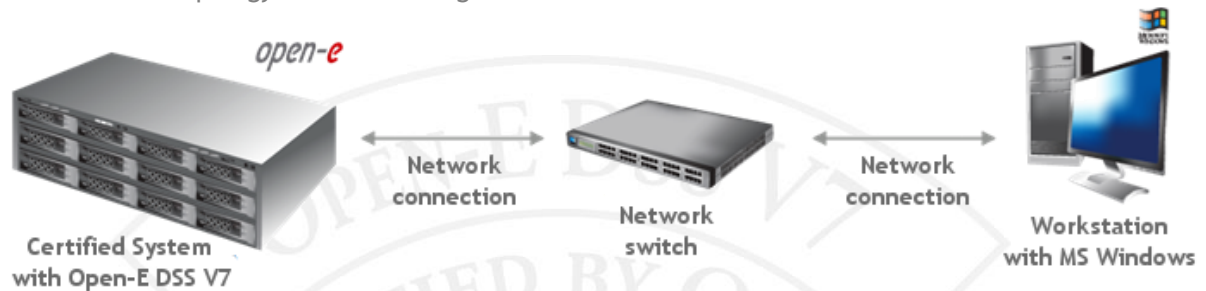


FIGURE 13: Network test topology for RAID testing

Hardware RAID0 test

1. Test description

The test relies on creation of the RAID0 unit on all hard disk drives, configuring the iSCSI target and copying the data from a *Workstation with MS Windows* via network connection with various block sizes using the lometer testing tool.

2. Test results for RAID0 and Supermicro AOC-STGN-I2S

RAID0 performance test results			
Block size [KB]	Write speed [MB/s]	Read speed [MB/s]	Performance test results
4	19.32	40.05	passed
32	122.17	280.92	passed
64	219.31	424.72	passed
128	334.06	564.52	passed
256	432.22	665.69	passed
512	483.90	759.78	passed
1024	497.95	543.46	passed
4096	494.31	541.04	passed

TABLE 15: RAID0 performance test results table for Supermicro AOC-STGN-I2S

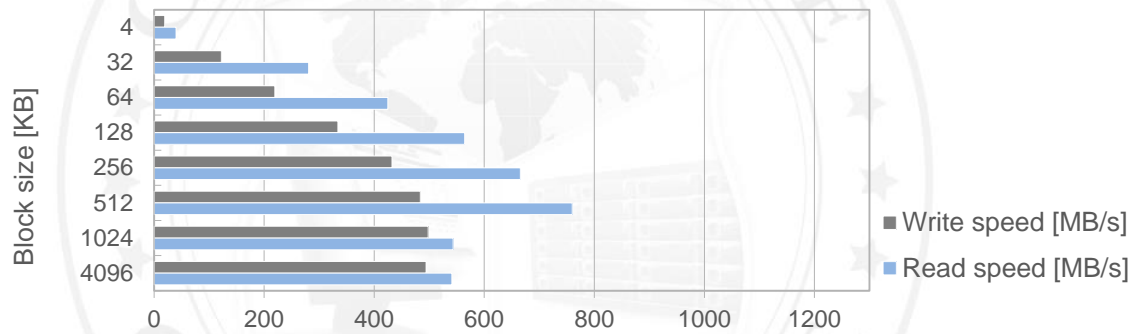


FIGURE 14: RAID0 performance test results chart for Supermicro AOC-STGN-I2S

Hardware RAID5 test

1. Test description

The test relies on creation of the RAID5 unit on all hard disk drives, configuring the iSCSI target and copying the data from a *Workstation with MS Windows* via network connection with various block sizes using the lometer testing tool.

2. Test results for RAID5 and Supermicro AOC-STGN-I2S

RAID5 performance test results			
Block size [KB]	Write speed [MB/s]	Read speed [MB/s]	Performance test results
4	21.06	41.06	passed
32	127.15	288.34	passed
64	221.63	428.71	passed
128	326.96	584.64	passed
256	418.54	663.61	passed
512	480.50	753.51	passed
1024	481.90	527.49	passed
4096	488.68	523.76	passed

TABLE 16: RAID5 performance test results table for Supermicro AOC-STGN-I2S

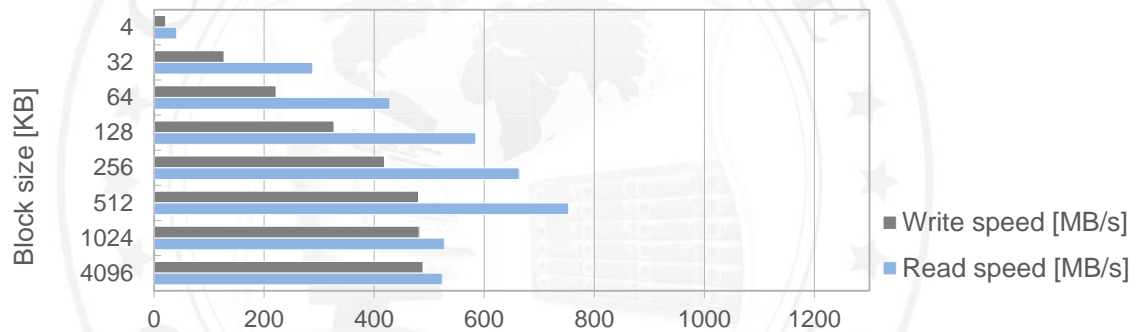


FIGURE 15: RAID5 performance test results chart for Supermicro AOC-STGN-I2S

Hardware RAID6 test

1. Test description

The test relies on creation of the RAID6 unit on all hard disk drives, configuring the iSCSI target and copying the data from a *Workstation with MS Windows* via network connection with various block sizes using the lometer testing tool.

2. Test results for RAID6 and Supermicro AOC-STGN-I2S

RAID6 performance test results			
Block size [KB]	Write speed [MB/s]	Read speed [MB/s]	Performance test results
4	41.84	19.87	passed
32	277.72	117.53	passed
64	419.85	219.86	passed
128	518.43	325.34	passed
256	614.24	419.49	passed
512	703.13	470.52	passed
1024	522.75	480.98	passed
4096	490.95	519.36	passed

TABLE 17: RAID6 performance test results table for Supermicro AOC-STGN-I2S

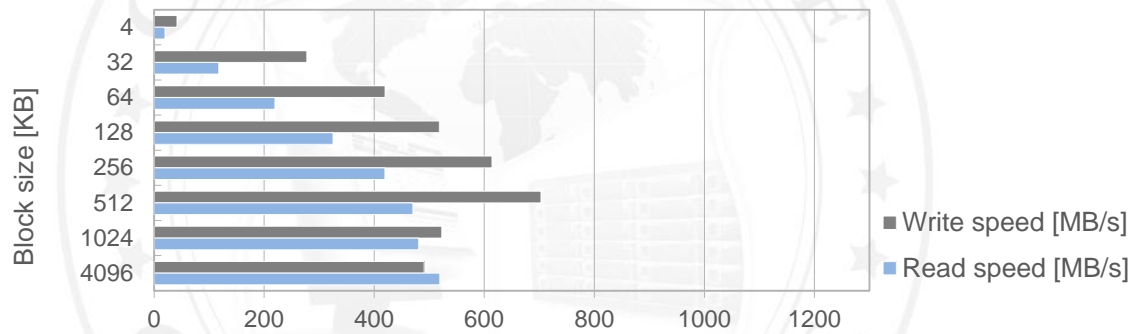


FIGURE 16: RAID6 performance test results chart for Supermicro AOC-STGN-I2S

Hardware RAID10 test

3. Test description

The test relies on creation of the RAID10 unit on all hard disk drives, configuring the iSCSI target and copying the data from a *Workstation with MS Windows* via network connection with various block sizes using the lometer testing tool.

4. Test results for RAID10 and Supermicro AOC-STGN-I2S

RAID10 performance test results			
Block size [KB]	Write speed [MB/s]	Read speed [MB/s]	Performance test results
4	17.66	35.22	passed
32	93.18	269.95	passed
64	170.34	404.27	passed
128	267.73	522.29	passed
256	263.91	653.27	passed
512	321.00	702.12	passed
1024	397.99	533.48	passed
4096	499.49	532.28	passed

TABLE 18: RAID10 performance test results table for Supermicro AOC-STGN-I2S

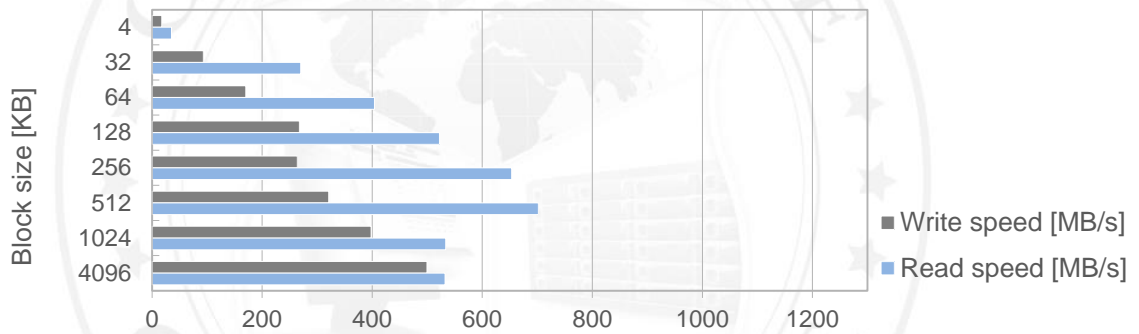


FIGURE 17: RAID10 performance test results chart for Supermicro AOC-STGN-I2S

Hardware RAID50 test

1. Test description

The test relies on creation of the RAID50 unit on all hard disk drives, configuring the iSCSI target and copying the data from a *Workstation with MS Windows* via network connection with various block sizes using the lometer testing tool.

2. Test results for RAID50 and Supermicro AOC-STGN-I2S

RAID50 performance test results			
Block size [KB]	Write speed [MB/s]	Read speed [MB/s]	Performance test results
4	21.65	40.85	passed
32	114.03	280.92	passed
64	227.24	404.87	passed
128	324.30	552.81	passed
256	420.30	660.36	passed
512	481.99	762.63	passed
1024	491.25	525.31	passed
4096	511.25	531.13	passed

TABLE 19: RAID50 performance test results table for Supermicro AOC-STGN-I2S

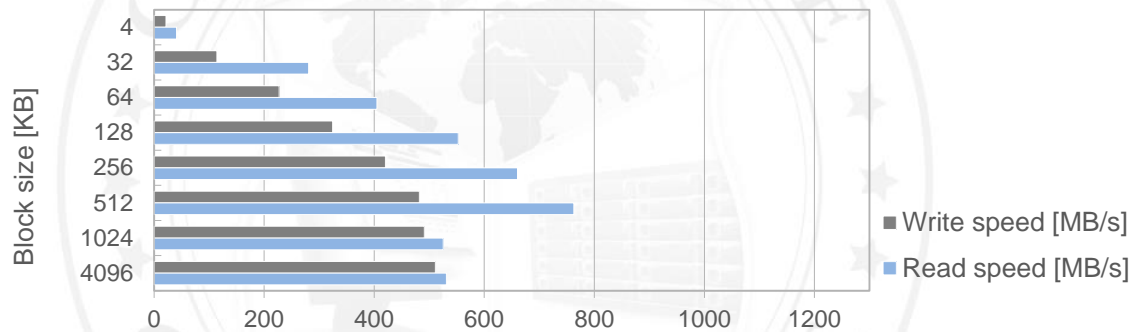


FIGURE 18: RAID50 performance test results chart for Supermicro AOC-STGN-I2S

Hardware RAID60 test

1. Test description

The test relies on creation of the RAID60 unit on all hard disk drives, configuring the iSCSI target and copying the data from a *Workstation with MS Windows* via network connection with various block sizes using the lometer testing tool.

2. Test results for RAID60 Supermicro AOC-STGN-I2S

RAID60 performance test results			
Block size [KB]	Write speed [MB/s]	Read speed [MB/s]	Performance test results
4	12.74	32.69	passed
32	68.88	274.03	passed
64	147.10	421.43	passed
128	194.63	569.04	passed
256	266.74	675.65	passed
512	320.29	728.87	passed
1024	385.33	534.47	passed
4096	495.33	538.29	passed

TABLE 20: RAID60 performance test results table for Supermicro AOC-STGN-I2S

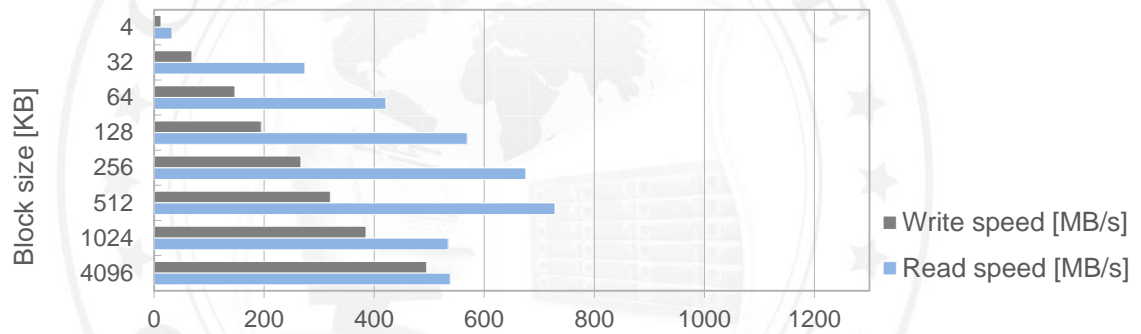


FIGURE 19: RAID60 performance test results chart for Supermicro AOC-STGN-I2S

NAS functionality

Tests performed in this section check the functionality, performance and stability of the NAS protocols in the Open-E DSS V7 product on the certified system.

The tests rely on creating NAS shares and copying the data from a *Workstation with MS Windows* via network connection with various block sizes using the Iometer testing tool.

NAS test topology

Network topology for NAS testing is shown below.

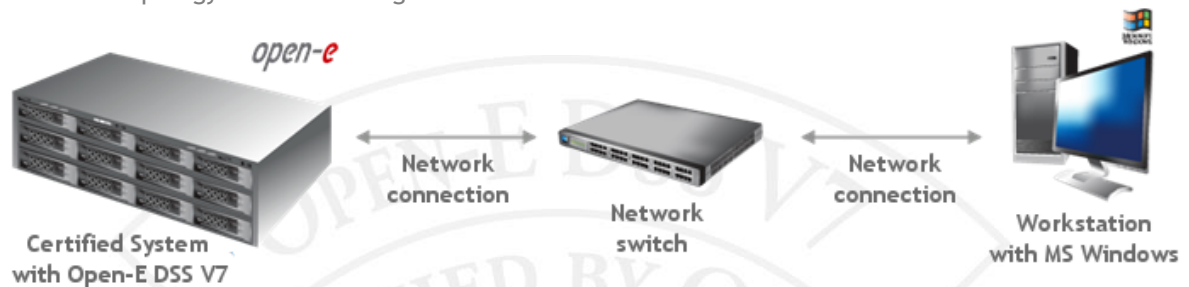
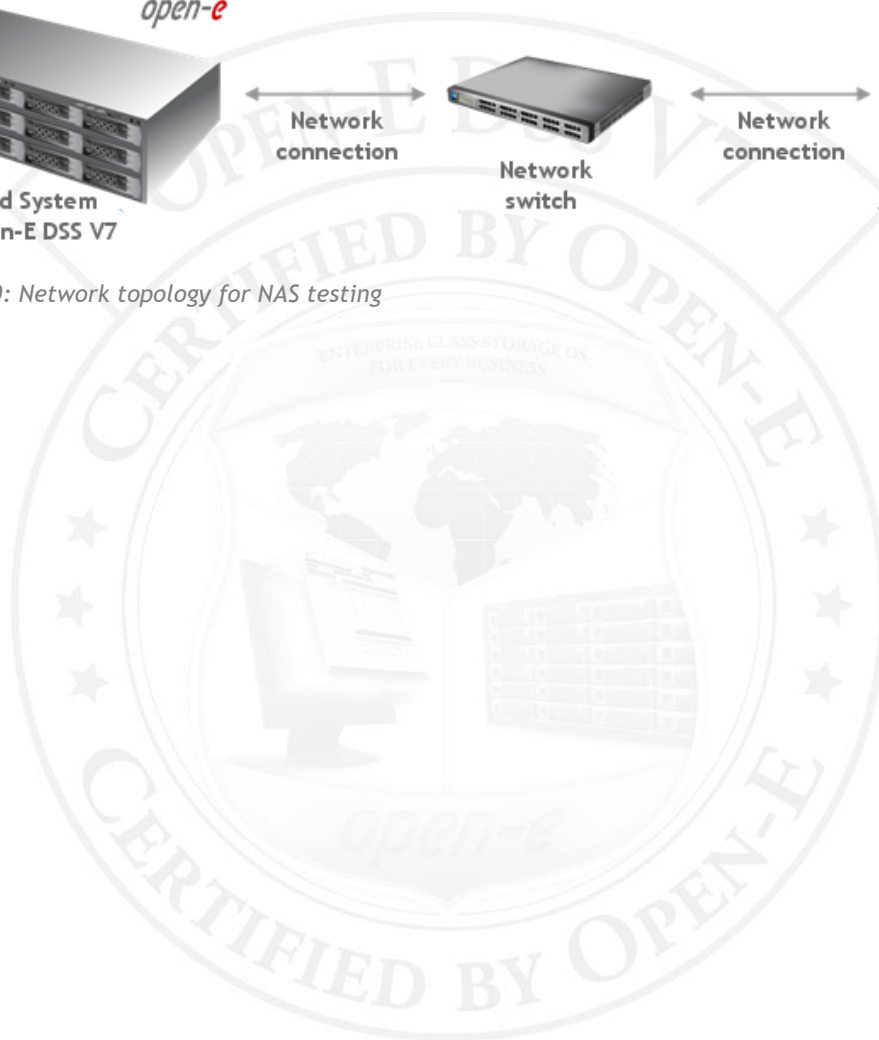


FIGURE 20: Network topology for NAS testing



SMB test

1. Test description

The tests rely on creating NAS shares and copying the data from a *Workstation with MS Windows* via network connection with various block sizes using the lometer testing tool.

2. Test results for SMB Supermicro AOC-STGN-I2S

SMB performance test results			
Block size [KB]	Write speed [MB/s]	Read speed [MB/s]	Performance test results
4	52.92	61.54	passed
32	375.73	407.25	passed
64	603.82	378.92	passed
128	937.89	459.95	passed
256	1033.41	503.28	passed
512	1044.91	524.74	passed
1024	1047.10	514.67	passed
4096	961.33	520.64	passed

TABLE 21: SMB performance test results table for Supermicro AOC-STGN-I2S

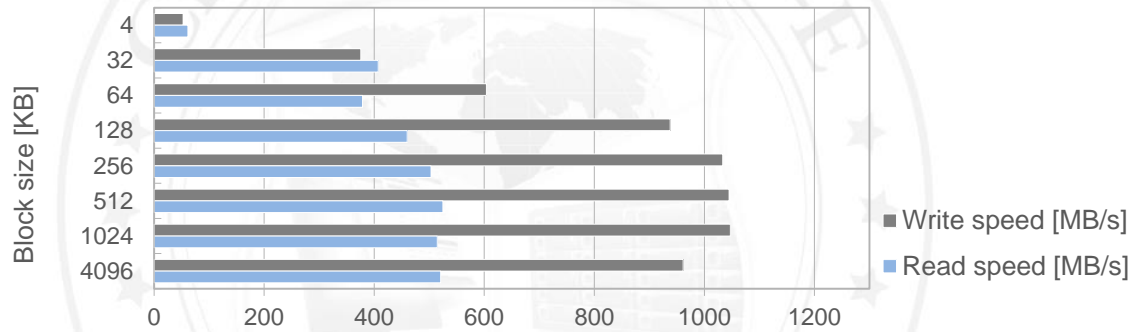


FIGURE 21: SMB performance test results chart for Supermicro AOC-STGN-I2S

iSCSI functionality

Tests performed in this section check the functionality, performance and stability of the iSCSI protocol in the Open-E DSS V7 product on the certified system.

iSCSI Initiator test topology

Network topology for iSCSI Initiator testing is shown below.

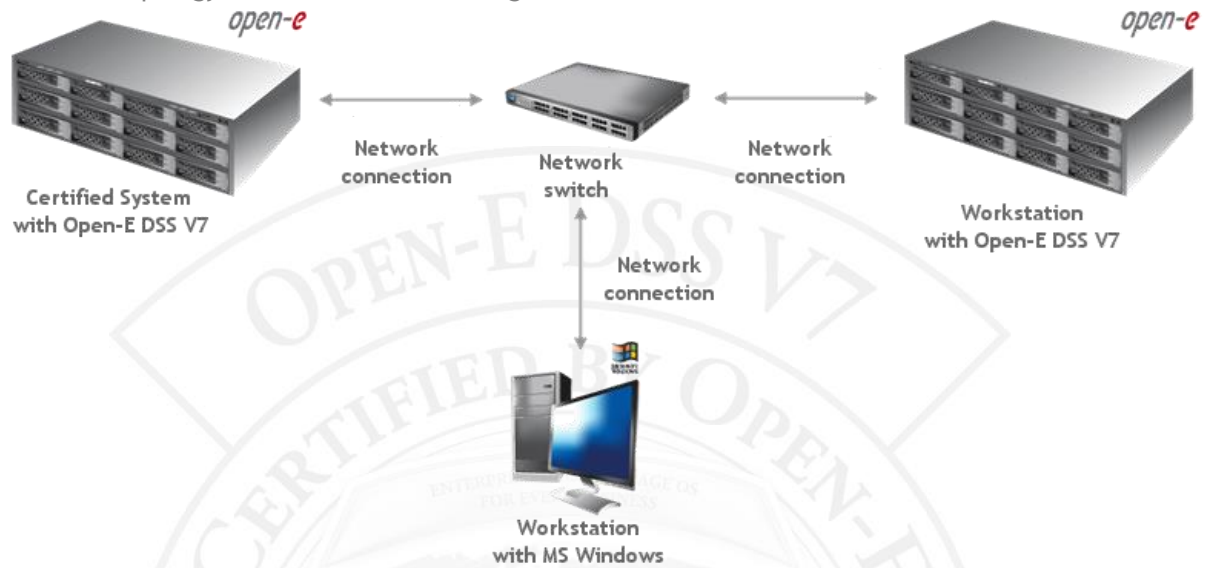


FIGURE 22: Network topology for iSCSI Initiator testing

iSCSI Target test topology

Network topology for iSCSI Target testing is shown below.

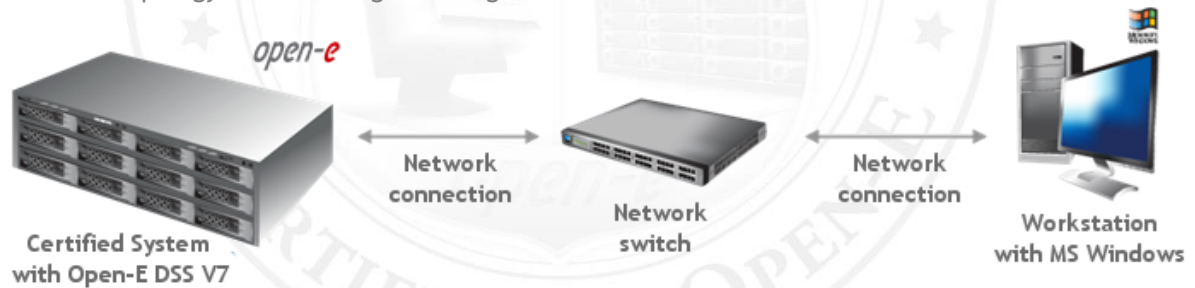


FIGURE 23: Network topology for iSCSI Target testing

iSCSI Initiator test

1. Test description

The test relies on using the storage connected via the built-in iSCSI Initiator for NAS volumes, creating SMB shares on these NAS volumes and copying data from a *Workstation with MS Windows* to them with various block sizes using the lometer testing tool.

2. Test results for iSCSI Initiator Supermicro AOC-STGN-I2S

iSCSI Initiator performance test results			
Block size [KB]	Write speed [MB/s]	Read speed [MB/s]	Performance test results
4	56.07	61.08	passed
32	335.60	386.39	passed
64	480.81	371.59	passed
128	329.04	449.39	passed
256	421.56	486.24	passed
512	500.33	423.49	passed
1024	599.82	490.95	passed
4096	456.97	487.83	passed

TABLE 22: iSCSI Initiator performance test results table for Supermicro AOC-STGN-I2S

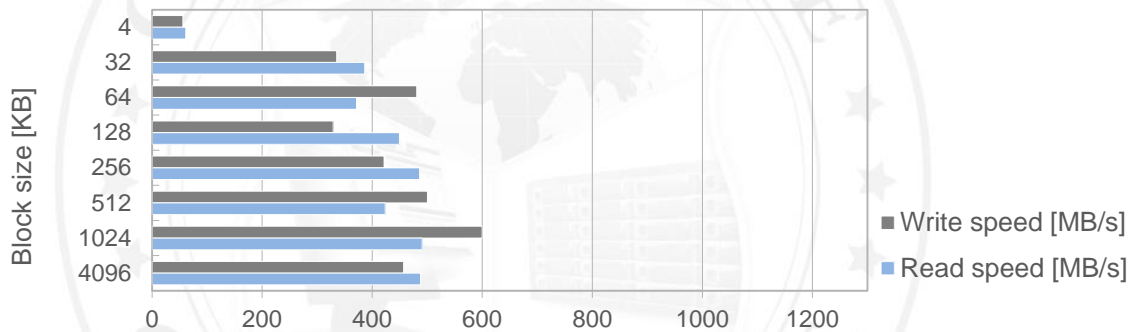


FIGURE 24: iSCSI Initiator performance test results chart for Supermicro AOC-STGN-I2S

iSCSI Target test

1. Test description

The test relies on creating the iSCSI target on the certified system and copying the data from a *Workstation with MS Windows* to it with various block sizes using the *Iometer* tool.

2. Test results for iSCSI Target Supermicro AOC-STGN-I2S

iSCSI Target performance test results			
Block size [KB]	Write speed [MB/s]	Read speed [MB/s]	Performance test results
4	22.13	40.62	passed
32	126.33	275.39	passed
64	230.54	404.61	passed
128	341.15	560.27	passed
256	435.60	659.66	passed
512	488.73	719.25	passed
1024	494.39	537.18	passed
4096	508.31	539.33	passed

TABLE 23: iSCSI Target performance test results table for Supermicro AOC-STGN-I2S

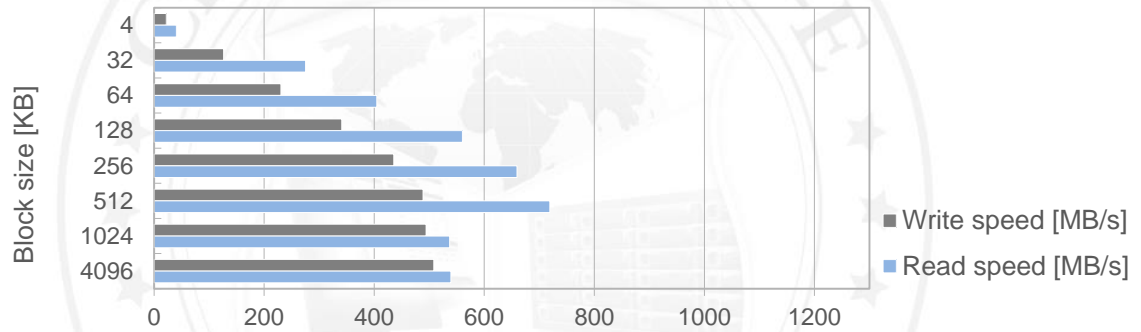


FIGURE 25: iSCSI Target performance test results chart for Supermicro AOC-STGN-I2S