



Echostreams DSS212 Storage system



Executive summary

After performing all tests, the Echostreams DSS212 has been officially certified according to the [Open-E Hardware Certification Program Guide 2.1](#).

During the tests, it was found that the system is functional and efficient. With the [Open-E DSS V7](#) operating system installed, the Echostreams DSS212 is stable and performs well.

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

✓ NAS filer

The following features make Echostreams DSS212 a good NAS filer solution:

- 4 high capacity SAS or 8 performance disks with 10000RPM provide a plenty of space for user files.
- HW RAID5, RAID6 for high performance and data safety.
- Four 1GbE interfaces for independent connection to different networks or link aggregation for improved throughput.
- Redundant power supply for system reliability.

✓ iSCSI storage

The following features make Echostreams DSS212 good iSCSI storage:

- 4 high capacity SAS drives ensure a lot of fast storage space.
- Four 1GbE interfaces for fast MPIO connection and flexible network topology.
- Redundant power supply for system reliability.
- 4 high capacity SAS drives ensure a lot of fast storage space.

✓ Storage for virtualization

For this application the following can be used:

- 8 fast SAS drives with HW RAID5 for good virtual machine density.
- Redundant power supply for system reliability.
- Four 1GbE interfaces, which may be aggregated, for connections with virtualized systems.

Certification notes

Echostreams DSS212 system is a dual-server in which only one node is certified, while the whole system should be treated as two separate single nodes. During tests, shared storage in Avago LSI Syncro controllers was disabled.

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Echostreams DSS212 hardware components

Technical specifications about the certified system are listed below:

Model	Echostreams DSS212
Operating system	Open-E DSS V7 build 10529
Enclosure/chassis	Echostreams DSS212
CPU	Intel® Xeon® Processor E5 2403 1.80GHz
Motherboard	Intel® S1400SP
Memory	8GB Kingston KVR1600D3D4R11S/8GI DDR3 1066
Network	Intel® Ethernet Server Adapter I350 Quad-Port GbE
HW RAID	Avago LSI Syncro CS9271-8i
Hard disk drives	8x 146GB Fujitsu MBD2147RC
Hard disk drives	4x 3TB Toshiba MG03SCA300

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



Echostreams DSS212 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 2012 R2
Enclosure/chassis	Tower
Motherboard	Supermicro X10SLV-Q
CPU	Intel® Xeon® Processor E3-1220 v3 3.10GHz
Memory	2x 4GB Crucial CT51264BF160BC16F
Network	Intel® Ethernet I210 1GbE
Hard disk controller	Intel Lynx Point 6-Port SATA AHCI
Hard disk drives	146GB Fujitsu MBD2147RC

TABLE 2: Hardware components of first Workstation with MS Windows

Model	Custom
Operating system	MS Windows Server 2012 R2
Enclosure/chassis	Echostreams FlacheSAN1S
Motherboard	Intel® S1400SP
CPU	Intel® Xeon® Processor E5-2407 2.2GHz
Memory	8GB DDR3
Network	Intel® Ethernet Server Adapter I350 Quad-Port GbE
Hard disk controller	Intel Patsburg 6-Port SATA AHCI
Hard disk drives	146GB Fujitsu MBD2147RC

TABLE 3: Hardware components of second Workstation with MS Windows

Model	Echostreams DSS212
Operating system	Open-E DSS V7 build 10529
Enclosure/chassis	Echostreams DSS212
Motherboard	Intel® Xeon® Processor E5 2403 1.80GHz
CPU	Intel® S1400SP
Memory	8GB Kingston KVR1600D3D4R11S/8GI DDR3 1066
Network	Intel® Ethernet Server Adapter I350 Quad-Port GbE
Hard disk controller	Avago LSI Syncro CS9271-8i
Hard disk drives	8x 146GB Fujitsu MBD2147RC
Hard disk drives	4x 3TB Toshiba MG03SCA300

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

Model	TP-Link® TL-SG3216
Description	16-Port Gigabit L2 Managed Switch with 2 Combo SFP Slots

TABLE 5: Network switch details for connection with 10GbE

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.

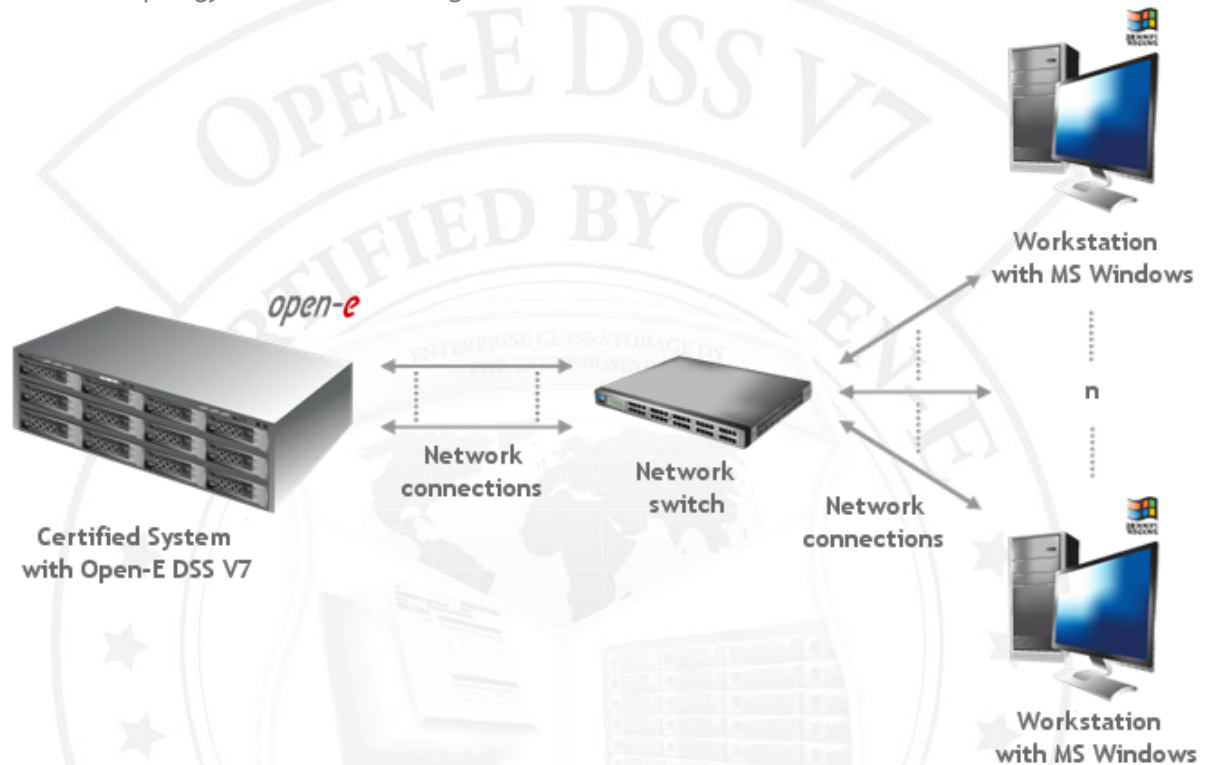


FIGURE 4: Network topology for Network testing

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® Ethernet Server Adapter I350 Quad-Port GbE

802.3ad bonding mode performance test results			
NIC model	Intel® Ethernet Server Adapter I350 Quad-Port GbE		
Workstations with MS Windows	Write speed [MB/s]	Read speed [MB/s]	Performance test results
1 st Workstation	51	91	passed
2 nd Workstation	20	86	passed
3 rd Workstation	107	111	passed
4 th Workstation	37	31	passed

TABLE 7: 802.3ad bonding mode performance test results table for Intel® Ethernet Server Adapter I350 Quad-Port GbE

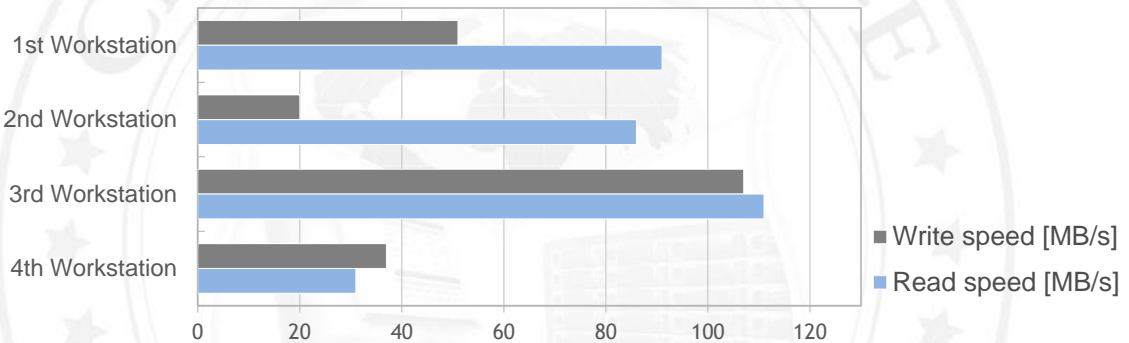


FIGURE 5: 802.3ad bonding mode performance test results chart for Intel® Ethernet Server Adapter I350 Quad-Port GbE

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® Ethernet Server Adapter I350 Quad-Port GbE

Balance-alb bonding mode performance test results			
NIC model	Intel® Ethernet Server Adapter I350 Quad-Port GbE		
Workstations with MS Windows	Write speed [MB/s]	Read speed [MB/s]	Performance test results
1 st Workstation	107	111	passed
2 nd Workstation	108	112	passed
3 rd Workstation	108	111	passed
4 th Workstation	105	111	passed

TABLE 8: Balance-alb bonding mode performance test results table for Intel® Ethernet Server Adapter I350 Quad-Port GbE

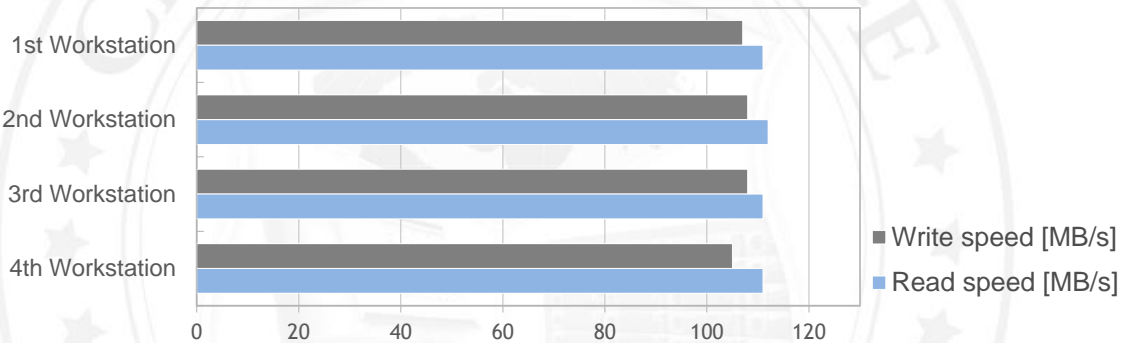


FIGURE 6: Balance-alb bonding mode performance test results chart for Intel® Ethernet Server Adapter I350 Quad-Port GbE

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 Iometer testing tool.

2. Test results for Balance-rr bonding mode test performed on Intel® Ethernet Server Adapter I350 Quad-Port GbE

Balance-rr bonding mode performance test results			
NIC model	Intel® Ethernet Server Adapter I350 Quad-Port GbE		
Workstations with MS Windows	Write speed [MB/s]	Read speed [MB/s]	Performance test results
1 st Workstation	26	76	passed
2 nd Workstation	20	82	Passed
3 rd Workstation	26	84	passed
4 th Workstation	28	81	passed

TABLE 9: Balance-rr bonding mode performance test results table for Intel® Ethernet Server Adapter I350 Quad-Port GbE

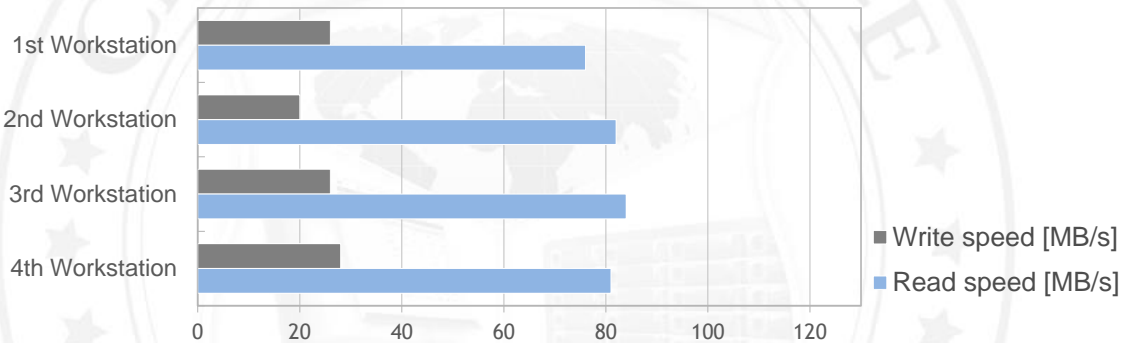


FIGURE 7: Balance-rr bonding mode performance test results chart for Intel® Ethernet Server Adapter I350 Quad-Port GbE

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® Ethernet Server Adapter I350 Quad-Port GbE

Single NIC performance test results			
NIC model	Intel® Ethernet Server Adapter I350 Quad-Port GbE		
Workstations with MS Windows	Write speed [MB/s]	Read speed [MB/s]	Performance test results
1 st Workstation	107	112	passed

TABLE 10: Single NIC performance test results table for Intel® Ethernet Server Adapter I350 Quad-Port GbE

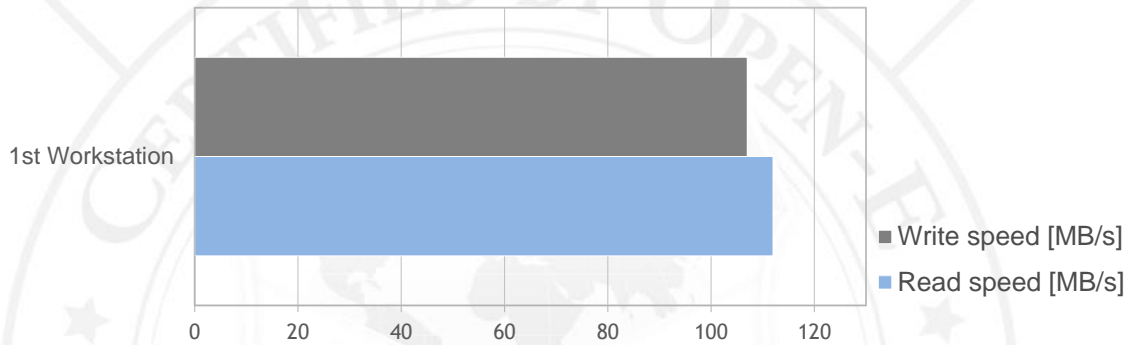


FIGURE 8: Single NIC performance test results chart for Intel® Ethernet Server Adapter I350 Quad-Port GbE

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, 1, 5 and 6 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

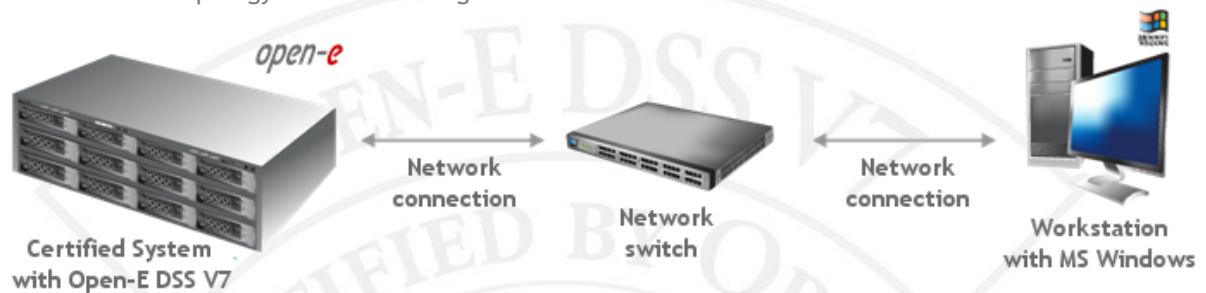


FIGURE 9: Network test topology for RAID testing

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 iometer testing tool.

2. Test results for RAID0 and Intel® Ethernet Server Adapter I350 Quad-Port GbE

RAID0 performance test results			
Block size [KB]	Write speed [MB/s]	Read speed [MB/s]	Performance test results
4	17	19	passed
32	77	103	passed
64	92	111	passed
128	103	112	passed
256	102	112	passed
512	106	112	passed
1024	107	112	passed
4096	108	112	passed

TABLE 11: RAID0 performance test results table for Intel® Ethernet Server Adapter I350 Quad-Port GbE

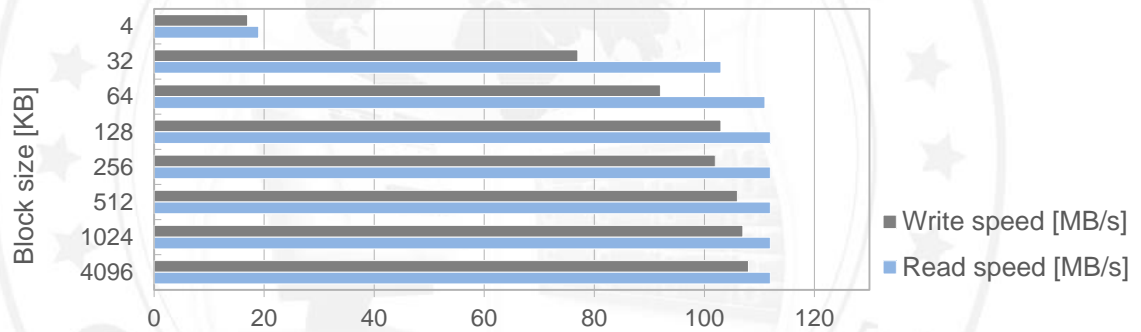


FIGURE 10: RAID0 performance test results chart for Intel® Ethernet Server Adapter I350 Quad-Port GbE

Hardware RAID1 test

1. Test description

The test relies on creation of the RAID1 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 iometer testing tool.

2. Test results for RAID1 and Intel® Ethernet Server Adapter I350 Quad-Port GbE

RAID1 performance test results			
Block size [KB]	Write speed [MB/s]	Read speed [MB/s]	Performance test results
4	18	24	passed
32	21	103	passed
64	89	111	passed
128	99	111	passed
256	102	112	passed
512	105	112	passed
1024	109	112	passed
4096	106	111	passed

TABLE 12: RAID1 performance test results table for Intel® Ethernet Server Adapter I350 Quad-Port GbE

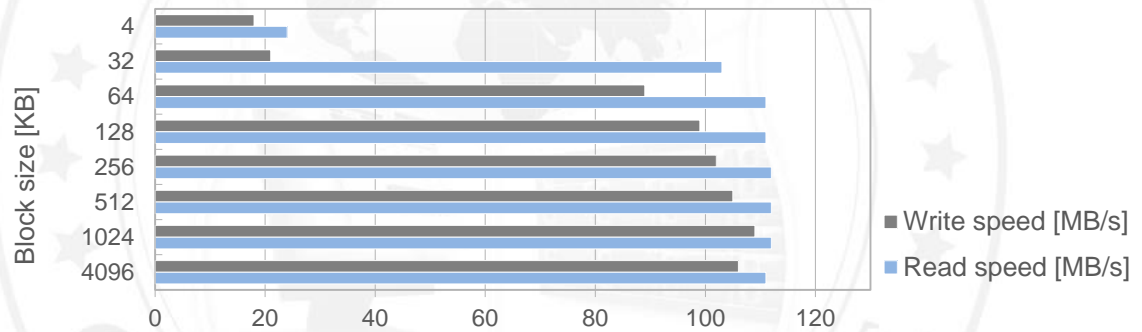


FIGURE 11: RAID1 performance test results chart for Intel® Ethernet Server Adapter I350 Quad-Port GbE

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 iometer testing tool.

2. Test results for RAID5 and Intel® Ethernet Server Adapter I350 Quad-Port GbE

RAID5 performance test results			
Block size [KB]	Write speed [MB/s]	Read speed [MB/s]	Performance test results
4	16	19	passed
32	81	103	passed
64	90	111	passed
128	98	111	passed
256	101	112	passed
512	106	111	passed
1024	106	112	passed
4096	106	112	passed

TABLE 13: RAID5 performance test results table for Intel® Ethernet Server Adapter I350 Quad-Port GbE

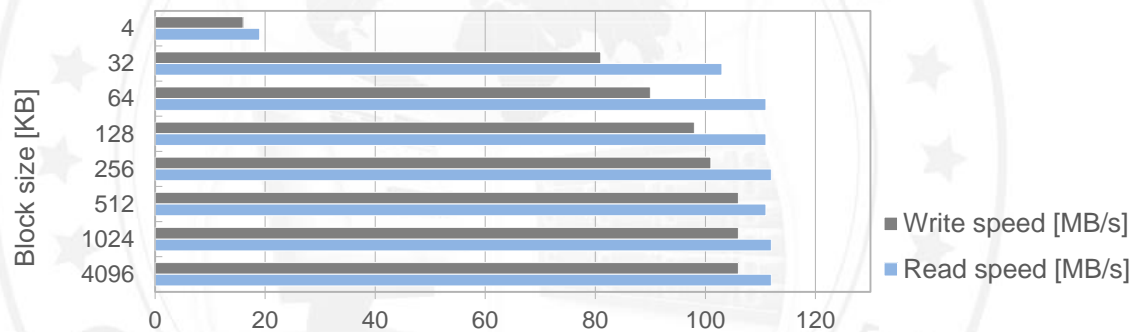


FIGURE 12: RAID5 performance test results chart for Intel® Ethernet Server Adapter I350 Quad-Port GbE

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 iometer testing tool.

2. Test results for RAID6 and Intel® Ethernet Server Adapter I350 Quad-Port GbE

RAID6 performance test results			
Block size [KB]	Write speed [MB/s]	Read speed [MB/s]	Performance test results
4	16	25	passed
32	68	103	passed
64	90	111	passed
128	98	111	passed
256	101	112	passed
512	105	111	passed
1024	109	111	passed
4096	107	112	passed

TABLE 14: RAID6 performance test results table for Intel® Ethernet Server Adapter I350 Quad-Port GbE

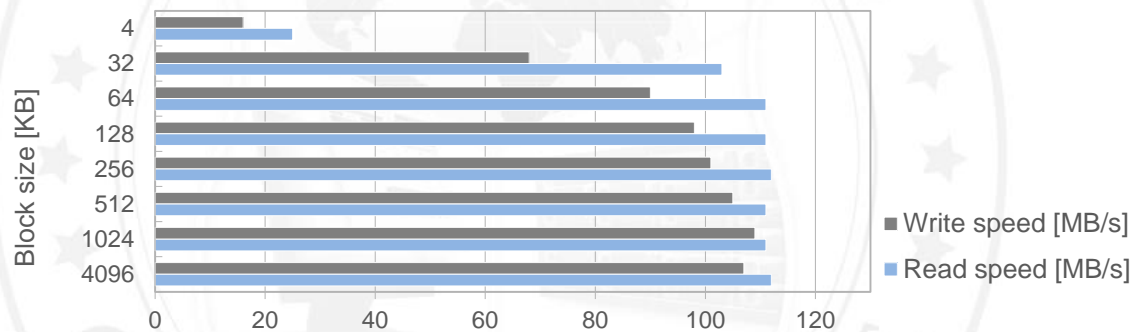


FIGURE 13: RAID6 performance test results chart for Intel® Ethernet Server Adapter I350 Quad-Port GbE

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.

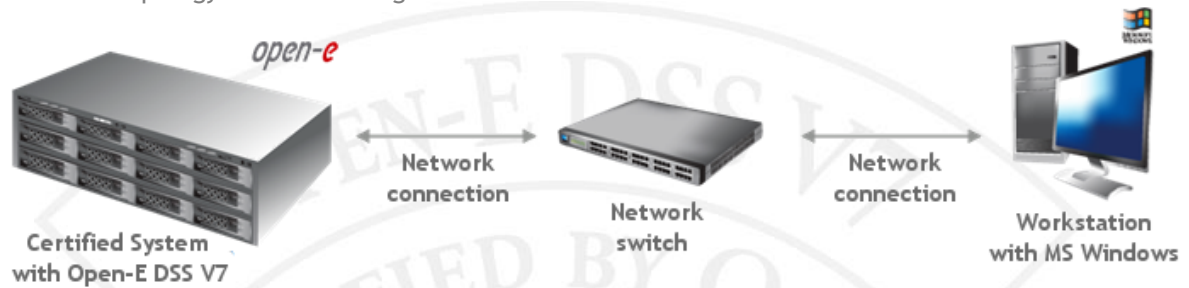


FIGURE 14: Network topology for NAS testing



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 and Intel® Ethernet Server Adapter I350 Quad-Port GbE

SMB performance test results			
Block size [KB]	Write speed [MB/s]	Read speed [MB/s]	Performance test results
4	32	27	passed
32	47	97	passed
64	99	82	passed
128	101	94	passed
256	106	99	passed
512	112	99	passed
1024	112	99	passed
4096	112	99	passed

TABLE 15: SMB performance test results table for Intel® Ethernet Server Adapter I350 Quad-Port GbE

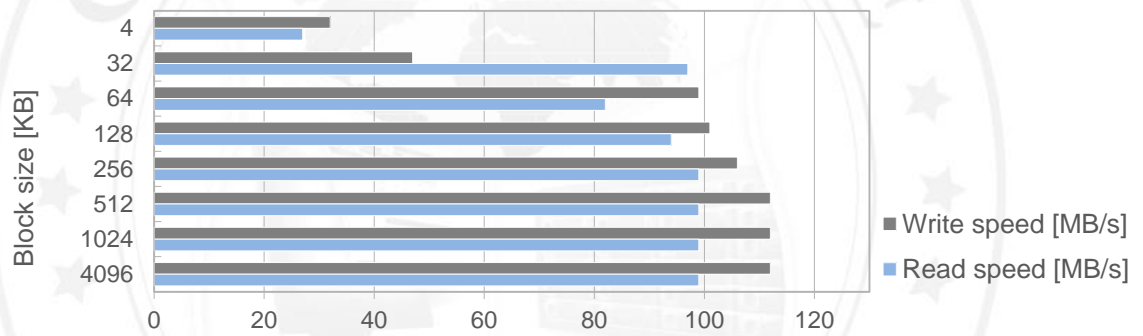


FIGURE 15: SMB performance test results chart for Intel® Ethernet Server Adapter I350 Quad-Port GbE

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.

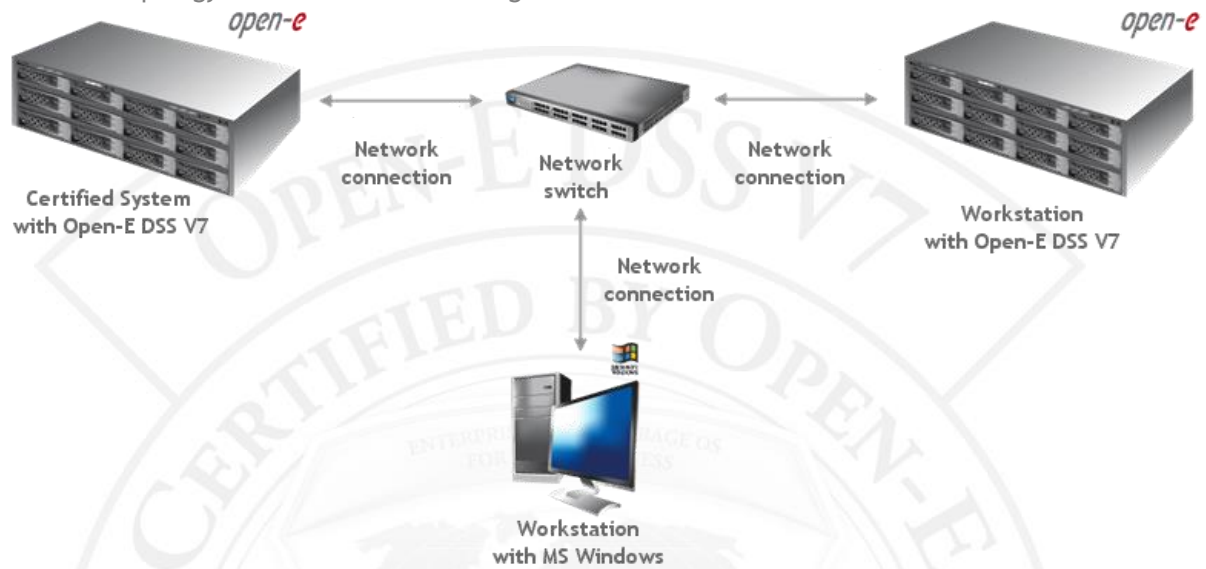


FIGURE 16: Network topology for iSCSI Initiator testing

iSCSI Target test topology

Network topology for iSCSI Target testing is shown below.

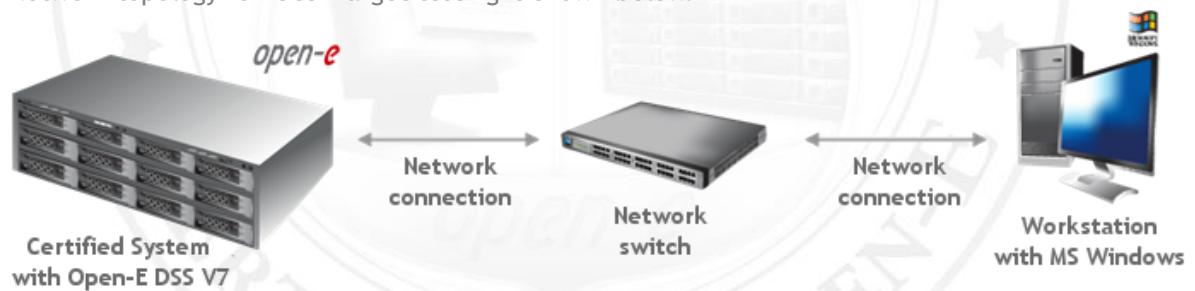


FIGURE 17: Network topology for iSCSI Target testing

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 iometer testing tool.

2. Test results for iSCSI Initiator and Intel® Ethernet Server Adapter I350 Quad-Port GbE

iSCSI Initiator performance test results			
Block size [KB]	Write speed [MB/s]	Read speed [MB/s]	Performance test results
4	37	30	passed
32	98	109	passed
64	109	89	passed
128	110	104	passed
256	110	104	passed
512	111	104	passed
1024	111	104	passed
4096	111	104	passed

TABLE 16: iSCSI Initiator performance test results table for Intel® Ethernet Server Adapter I350 Quad-Port GbE

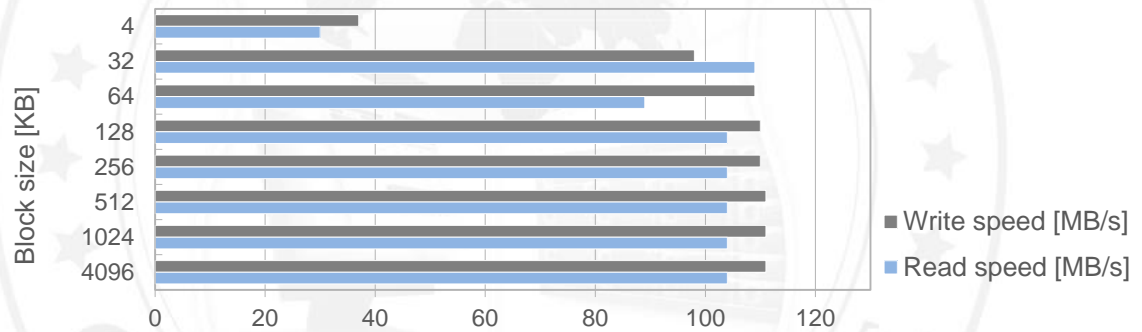


FIGURE 18: iSCSI Initiator performance test results chart for Intel® Ethernet Server Adapter I350 Quad-Port GbE

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 and Intel® Ethernet Server Adapter I350 Quad-Port GbE

iSCSI Target performance test results			
Block size [KB]	Write speed [MB/s]	Read speed [MB/s]	Performance test results
4	14	21	passed
32	52	62	passed
64	62	65	passed
128	73	80	passed
256	79	101	passed
512	89	111	passed
1024	88	111	passed
4096	93	111	passed

TABLE 17: iSCSI Target performance test results table for Intel® Ethernet Server Adapter I350 Quad-Port GbE

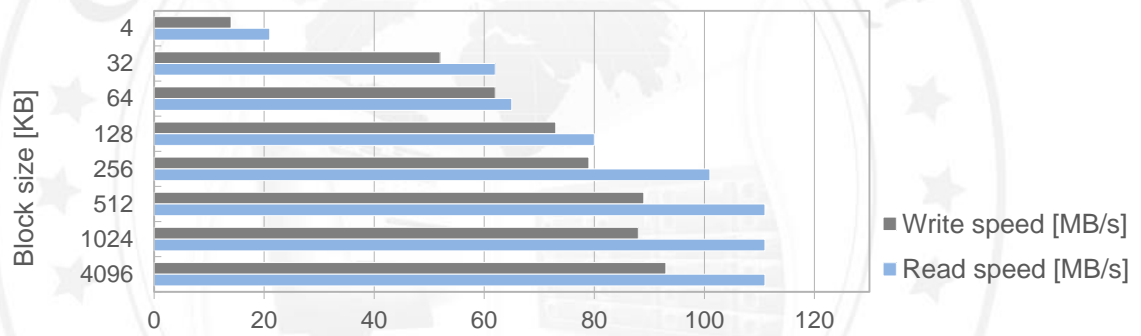


FIGURE 19: iSCSI Target performance test results chart for Intel® Ethernet Server Adapter I350 Quad-Port GbE