



# Intel R2312GZ4GCSAS storage system



## Executive summary

After performing all tests, the Intel Server System R2312GZ4GCSAS 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 R2312GZ4GCSAS is stable and performs well.

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

### ✓ iSCSI storage

The following features make the Intel Server System R2312GZ4GCSAS great iSCSI storage:

- Hardware RAID5, RAID50, RAID6 or RAID 60 for high performance and data safety.
- Two 10GbE interfaces for fast MPIO connection.
- Ten high class SATA hard drives provide a lot of storage space.
- SSD cache for faster access to frequently used blocks.

### ✓ NAS filer

The following features make Intel Server System R2312GZ4GCSAS a good NAS filer solution:

- Hardware RAID5, RAID50, RAID6 and RAID60 for fault tolerance and the most efficient use of available disk space.
- Ten high class SATA hard drives provide a lot of space for user files.
- Two 10GbE interfaces for independent connection to different networks or link aggregation for improved throughput.
- SSD cache for faster access to frequently used files.

### ✓ Storage for Virtualization

For this application the following can be used:

- Hardware RAID5, RAID50, RAID6 or RAID 60 for high performance and data safety.
- Four 1GbE interfaces for flexible network topology or fast MPIO connection.
- Two 10GbE interfaces for efficient network connections to virtualization platforms.
- SSD cache for I/O bottlenecks elimination and increased virtual machine density.

## Certification notes

It's recommended to disable NUMA in BIOS to avoid stability issues. Raid 10 performance test was performed on eight drives. CacheCade test was performed on write through policy. It's not recommended to use Balance-rr bonding mode for link aggregation.



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## Intel Server System R2312GZ4GCSAS hardware components

Technical specifications about the certified system are listed below:

<b>Model</b>	Intel Server System R2312GZ4GCSAS
<b>Operating system</b>	Open-E DSS V7 build 6491
<b>Enclosure/chassis</b>	Intel R2312GZ4GSPP 2U Chassis
<b>CPU</b>	2x Intel Xeon E5-2680 2.70 GHz
<b>Motherboard</b>	Intel Server Board S2600GZ4
<b>Memory</b>	8x 4GB DDR3 1333 ECC Micron MT18JSF51272AZ-1G4D1
<b>Network</b>	1GbE Intel I350 Quad Port Ethernet Controller (on-board)
<b>Network</b>	10GbE Intel AXN10GBNIAIOM Dual Port I/O Module (i82599EB)
<b>HW RAID</b>	Intel Integrated RAID Module RMS25CB080
<b>Hard disk drives</b>	10x 500GB Hitachi Ultrastar A7K1000 HUA721050KLA330
<b>Hard disk drives</b>	2x 120GB Intel 320 Series SSDSA2CW120G310

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

All components were detected and properly recognized.



## Intel Server System R2312GZ4GCSAS photos



FIGURE 1: Front photo



FIGURE 2: Rear photo

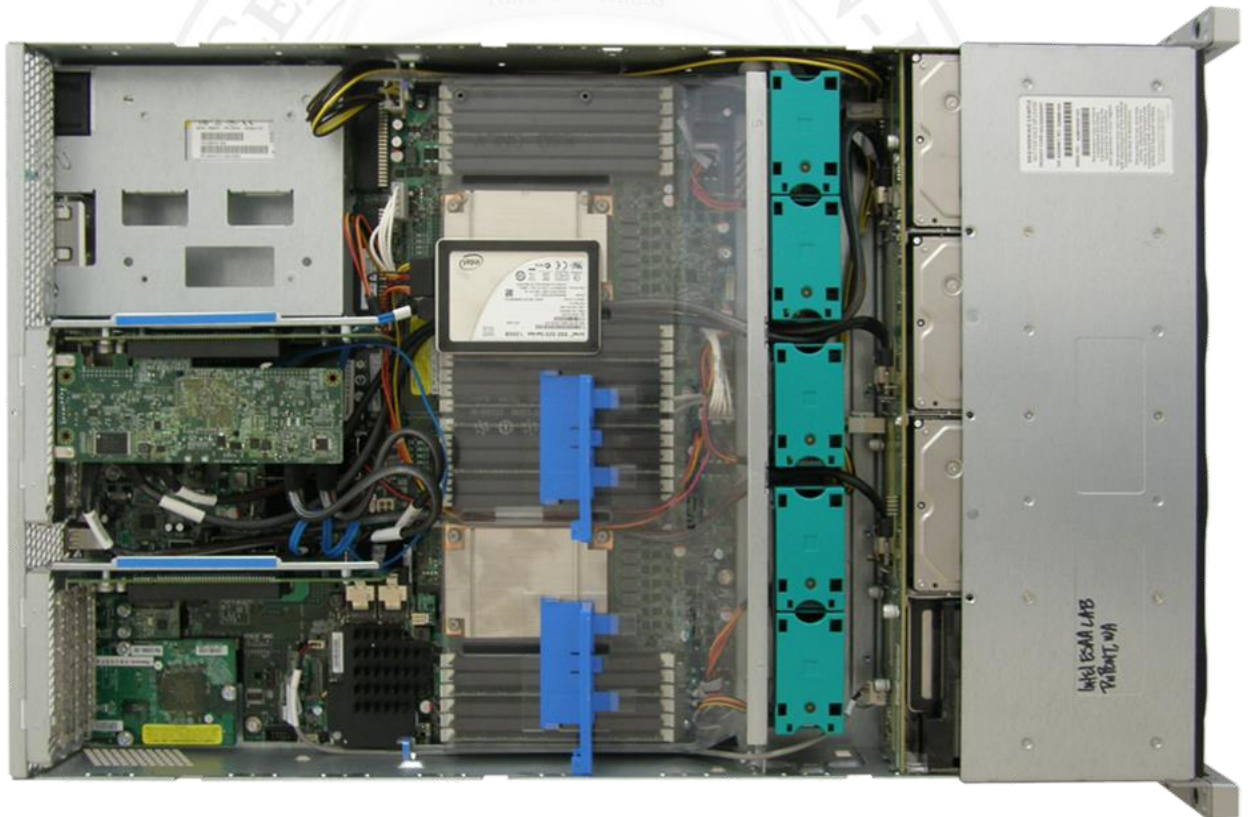


FIGURE 3: Top photo

## Auxiliary systems hardware components

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

<b>Model</b>	Supermicro SYS-6026TT-BIBQRF
<b>Operating system</b>	MS Windows Server 2008 R2
<b>Enclosure/chassis</b>	Supermicro CSE-827H-R1400B
<b>Motherboard</b>	Supermicro X8DTT-IBQF
<b>CPU</b>	Intel Xeon E5620 2.40GHz
<b>Memory</b>	6x 4GB DDR3 1333 ECC-REG ATP AL12M72E4BJH9S
<b>Network</b>	1GbE Intel ET Dual Port Server Adapter (i82576) (on board)
<b>Network</b>	10GbE Intel Ethernet Server Adapter X520-SR2 (i82599EB)
<b>Hard disk drives</b>	1x 750GB Seagate Barracuda ES.2 ST3750330NS

TABLE 2: Hardware components of first Workstation with MS Windows

<b>Model</b>	Supermicro SYS-6026TT-BIBQRF
<b>Operating system</b>	MS Windows Server 2008 R2
<b>Enclosure/chassis</b>	Supermicro CSE-827H-R1400B
<b>Motherboard</b>	Supermicro X8DTT-IBQF
<b>CPU</b>	Intel Xeon E5620 2.40GHz
<b>Memory</b>	6x 4GB DDR3 1333 ECC-REG ATP AL12M72E4BJH9S
<b>Network</b>	1GbE Intel ET Dual Port Server Adapter (i82576) (on board)
<b>Network</b>	10GbE Intel Ethernet Server Adapter X520-SR2 (i82599EB)
<b>Hard disk drives</b>	1x 750GB Seagate Barracuda ST3750330NS

TABLE 3: Hardware components of second Workstation with MS Windows

<b>Model</b>	Supermicro SYS-1026T-6RFT+
<b>Operating system</b>	Open-E DSS V7 build 6491
<b>Enclosure/chassis</b>	Supermicro CSE-119TQ-R700UB
<b>Motherboard</b>	Supermicro X8DTU-6TF+
<b>CPU</b>	Intel Xeon E5620 2.40GHz
<b>Memory</b>	6x 4GB DDR3 1333 ECC-REG ATP AL12M72E4BJH9S
<b>Network</b>	1GbE Intel ET Dual Port Server Adapter (i82576) (on board)
<b>Network</b>	10GbE Intel Ethernet Server Adapter X520-SR2 (i82599EB)
<b>HW RAID controller</b>	LSI MPTSAS 2108 (on board)
<b>Hard disk drives</b>	8x 73.5GB Fujitsu MBC2073RC

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

<b>Model</b>	Supermicro SSE-G24-TG4
<b>Description</b>	24-ports 1GbE and 4-ports 10GbE switch

TABLE 5: Network switch details

## 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.

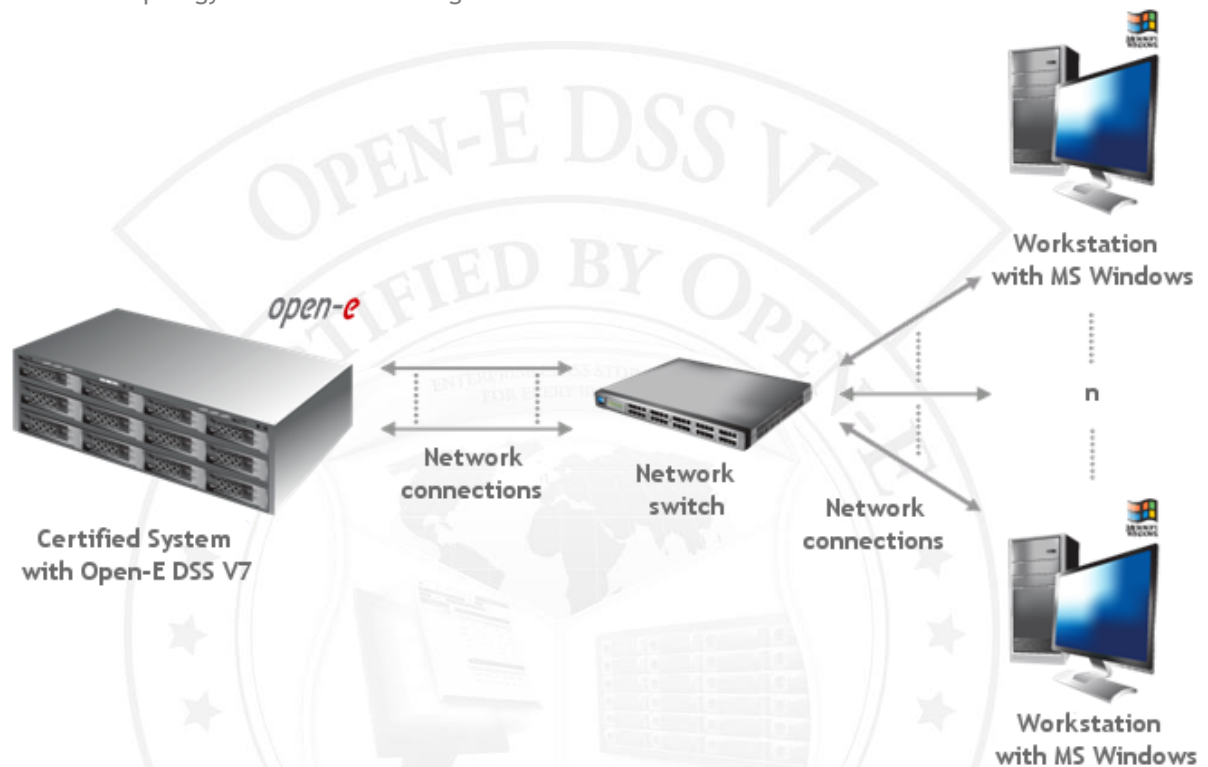


FIGURE 4: Network topology for Network testing



## 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 10GbE Intel AXX10GBNIAIOM Dual Port I/O Module (i82599EB)

802.3ad bonding mode performance test results			
NIC model	10GbE Intel AXX10GBNIAIOM Dual Port (i82599EB)		
Workstations with MS Windows	Write speed [MB/s]	Read speed [MB/s]	Performance test results
1 <sup>st</sup> Workstation	485.56	465.88	passed
2 <sup>nd</sup> Workstation	513.29	455.00	passed

TABLE 7: 802.3ad bonding mode performance test results table for 10GbE Intel AXX10GBNIAIOM Dual Port I/O Module (i82599EB)

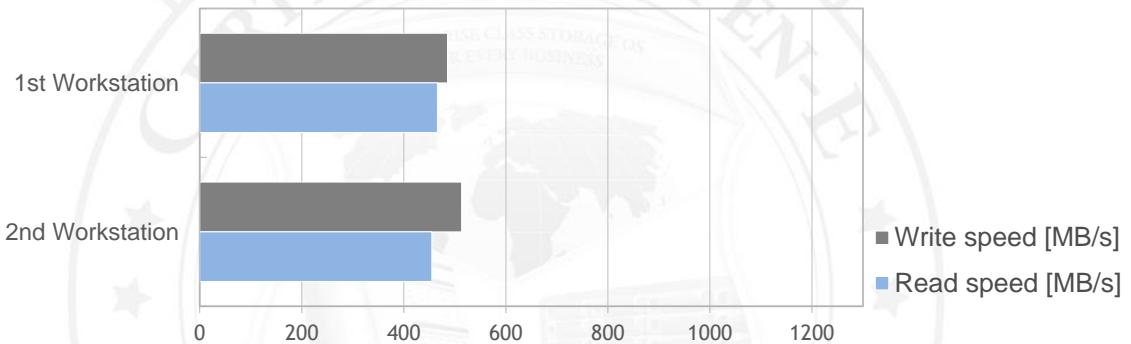


FIGURE 5: 802.3ad bonding mode performance test results chart for 10GbE Intel AXX10GBNIAIOM Dual Port I/O Module (i82599EB)

### 3. Test results for 802.3ad bonding mode test performed on 1GbE Intel I350 Quad Port Ethernet Controller (on-board)

802.3ad bonding mode performance test results			
NIC model	1GbE Intel I350 Quad Port Controller (on-board)		
Workstations with MS Windows	Write speed [MB/s]	Read speed [MB/s]	Performance test results
1 <sup>st</sup> Workstation	101.58	65.84	passed
2 <sup>nd</sup> Workstation	101.42	111.91	passed
3 <sup>rd</sup> Workstation	103.87	111.90	passed
4 <sup>th</sup> Workstation	102.43	48.01	passed

TABLE 8: 802.3ad bonding mode performance test results table for 1GbE Intel I350 Quad Port Ethernet Controller (on-board)

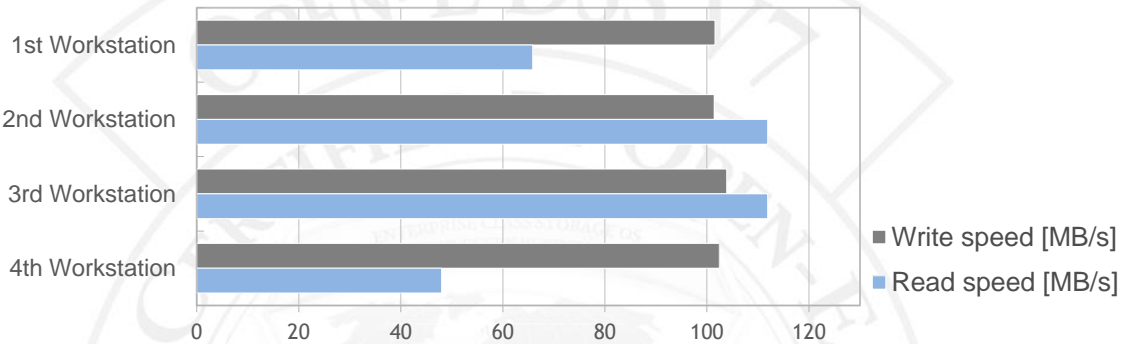
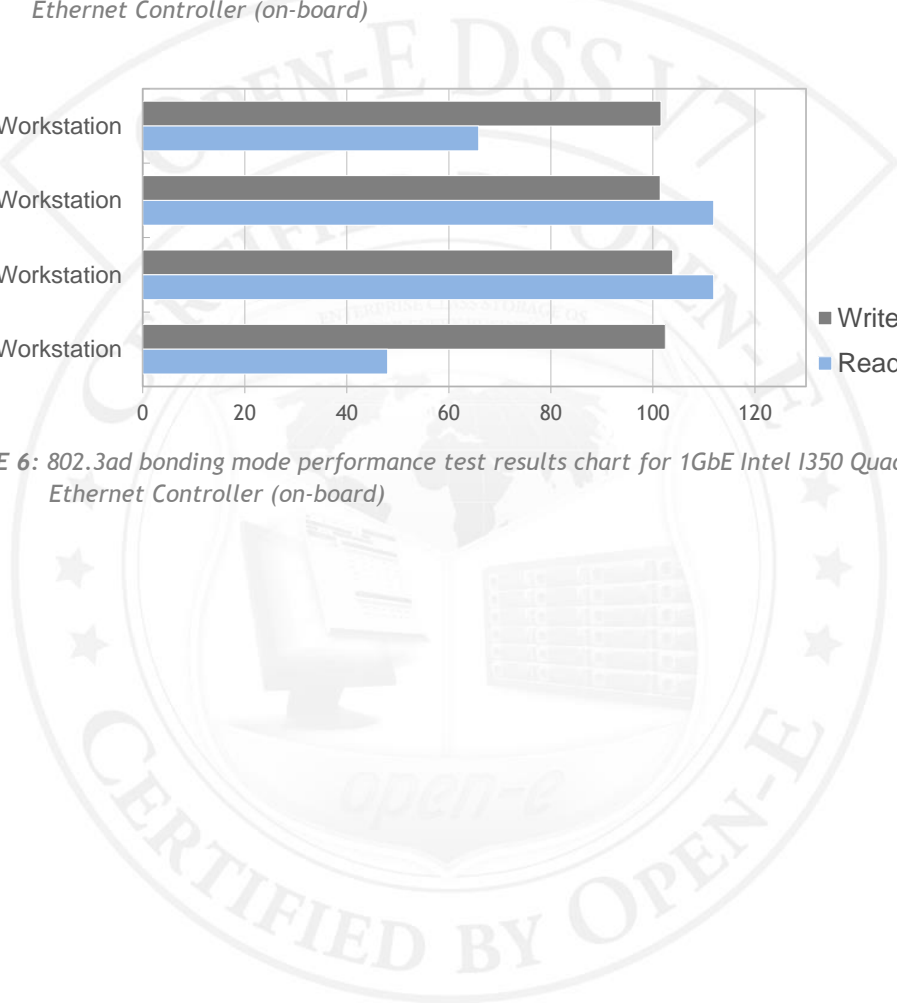


FIGURE 6: 802.3ad bonding mode performance test results chart for 1GbE Intel I350 Quad Port Ethernet Controller (on-board)



## 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 10GbE Intel AXX10GBNIAIOM Dual Port I/O Module (i82599EB)

Balance-alb bonding mode performance test results			
NIC model	10GbE Intel AXX10GBNIAIOM Dual Port (i82599EB)		
Workstations with MS Windows	Write speed [MB/s]	Read speed [MB/s]	Performance test results
1 <sup>st</sup> Workstation	451.65	470.96	passed
2 <sup>nd</sup> Workstation	445.66	475.38	passed

TABLE 9: Balance-alb bonding mode performance test results table for 10GbE Intel AXX10GBNIAIOM Dual Port I/O Module (i82599EB)

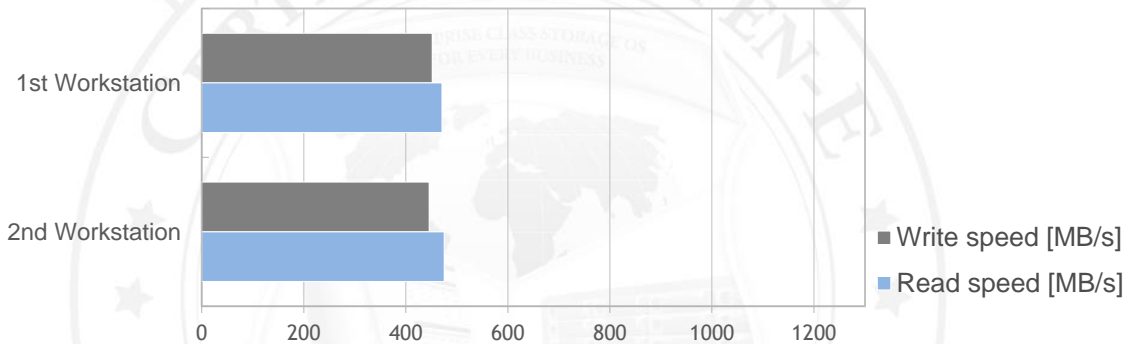


FIGURE 7: Balance-alb bonding mode performance test results chart for 10GbE Intel AXX10GBNIAIOM Dual Port I/O Module (i82599EB)

### 3. Test results for Balance-alb bonding mode test performed on 1GbE Intel I350 Quad Port Ethernet Controller (on-board)

Balance-alb bonding mode performance test results			
NIC model	1GbE Intel I350 Quad Port Controller (on-board)		
Workstations with MS Windows	Write speed [MB/s]	Read speed [MB/s]	Performance test results
1 <sup>st</sup> Workstation	46.01	110.93	passed
2 <sup>nd</sup> Workstation	105.84	111.01	passed
3 <sup>rd</sup> Workstation	56.56	111.33	passed
4 <sup>th</sup> Workstation	105.56	111.06	passed

TABLE 10: Balance-alb bonding mode performance test results table for 1GbE Intel I350 Quad Port Ethernet Controller (on-board)

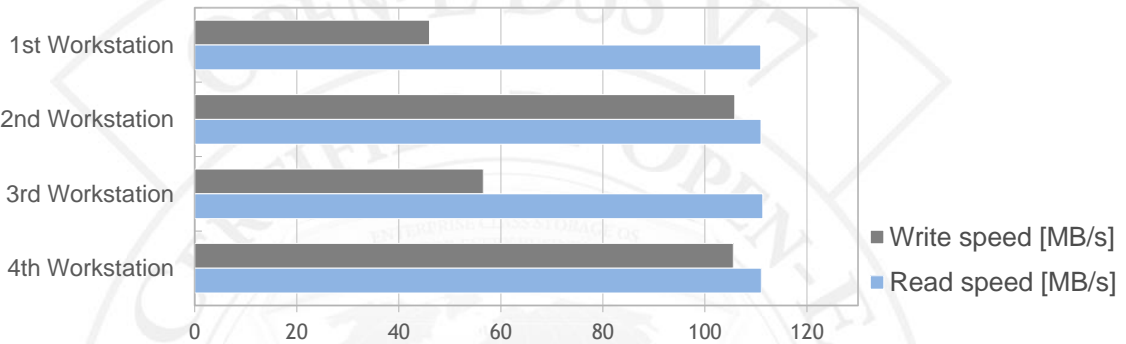
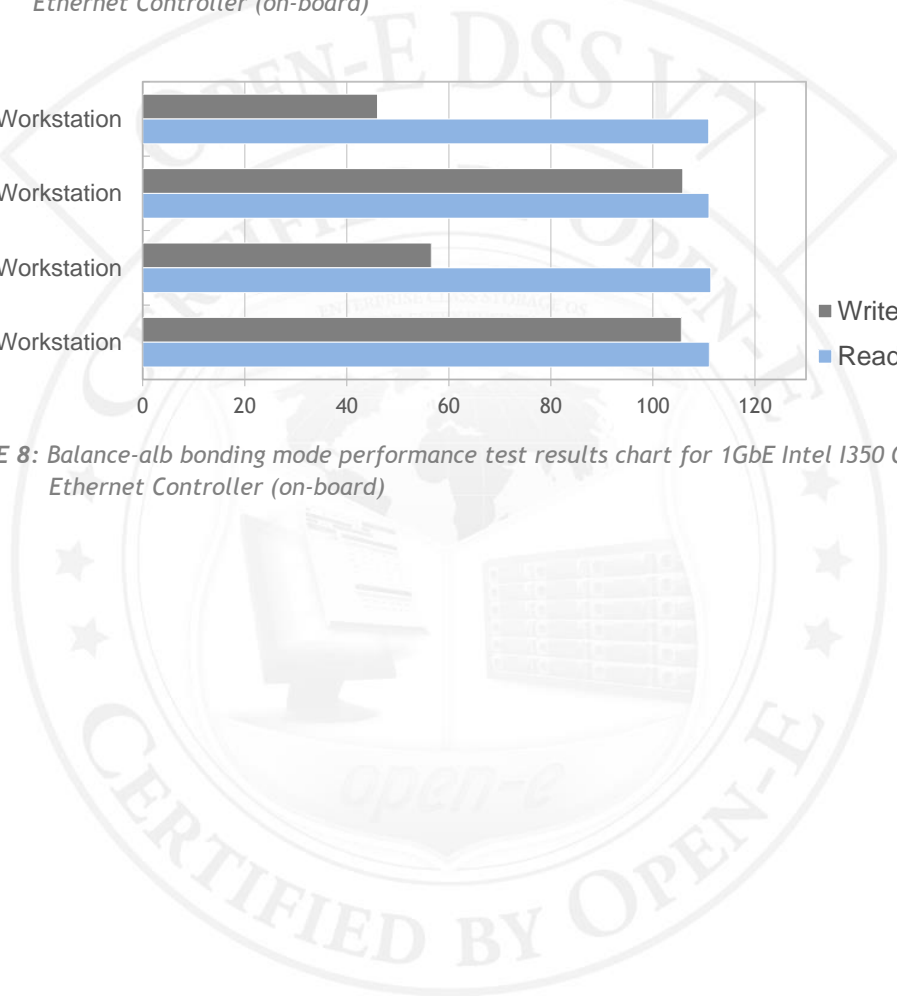


FIGURE 8: Balance-alb bonding mode performance test results chart for 1GbE Intel I350 Quad Port Ethernet Controller (on-board)



## 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 10GbE Intel AXX10GBNIAIOM Dual Port I/O Module (i82599EB)

Balance-rr bonding mode performance test results			
NIC model	10GbE Intel AXX10GBNIAIOM Dual Port (i82599EB)		
Workstations with MS Windows	Write speed [MB/s]	Read speed [MB/s]	Performance test results
1 <sup>st</sup> Workstation	466.26	213.15	passed
2 <sup>nd</sup> Workstation	452.85	212.40	passed

TABLE 11: Balance-rr bonding mode performance test results table for 10GbE Intel AXX10GBNIAIOM Dual Port I/O Module (i82599EB)

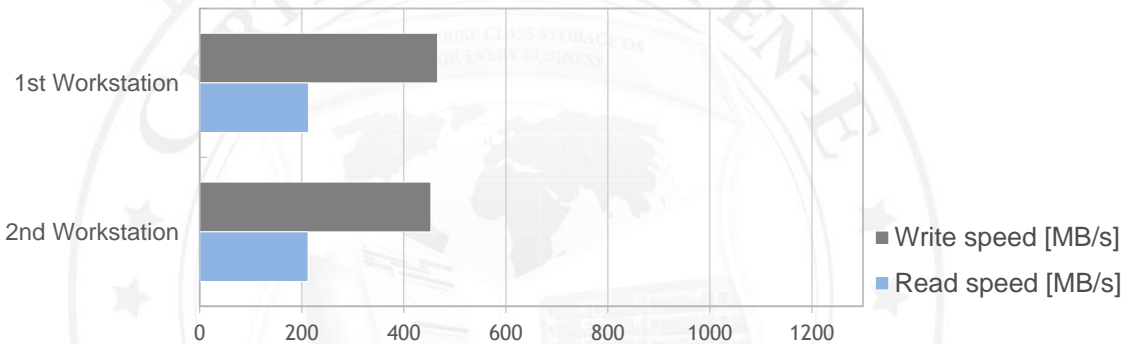


FIGURE 9: Balance-rr bonding mode performance test results chart 10GbE Intel AXX10GBNIAIOM Dual Port I/O Module (i82599EB)

### 3. Test results for Balance-rr bonding mode test performed on 1GbE Intel I350 Quad Port Ethernet Controller (on-board)

Balance-rr bonding mode performance test results			
NIC model	1GbE Intel I350 Quad Port Controller (on-board)		
Workstations with MS Windows	Write speed [MB/s]	Read speed [MB/s]	Performance test results
1 <sup>st</sup> Workstation	51.49	60.83	passed
2 <sup>nd</sup> Workstation	105.45	60.10	passed
3 <sup>rd</sup> Workstation	106.01	86.16	passed
4 <sup>th</sup> Workstation	51.28	87.77	passed

TABLE 12: Balance-rr bonding mode performance test results table for 1GbE Intel I350 Quad Port Ethernet Controller (on-board)

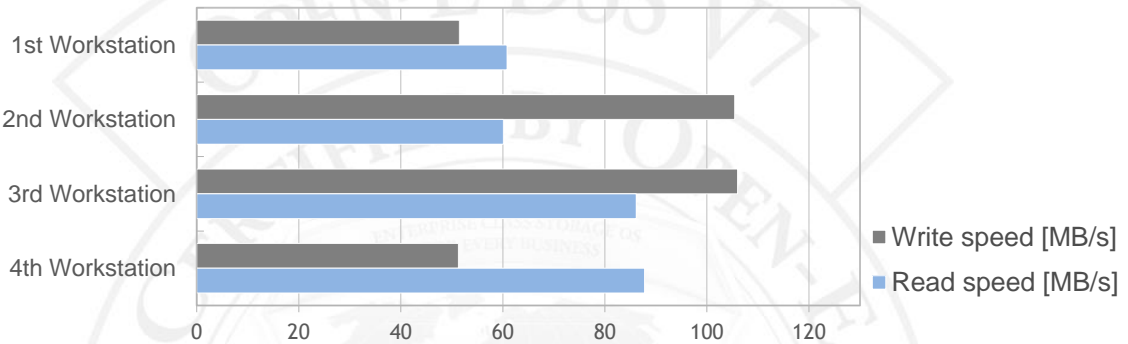
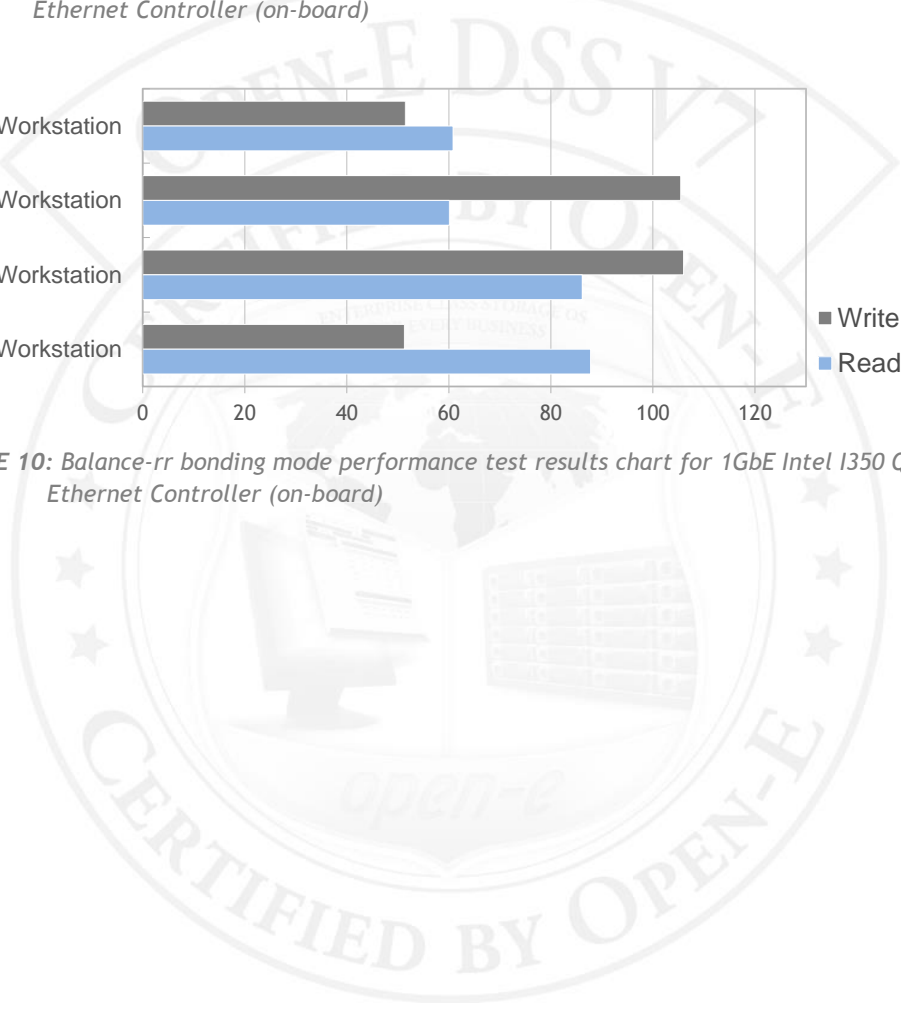


FIGURE 10: Balance-rr bonding mode performance test results chart for 1GbE Intel I350 Quad Port Ethernet Controller (on-board)



## 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 10GbE Intel AXX10GBNIAIOM Dual Port I/O Module (i82599EB)

Single NIC performance test results			
NIC model	10GbE Intel AXX10GBNIAIOM Dual Port (i82599EB)		
Workstations with MS Windows	Write speed [MB/s]	Read speed [MB/s]	Performance [passed/failed]
1 <sup>st</sup> Workstation	809.17	489.27	passed

TABLE 13: Single NIC test results table for 10GbE Intel AXX10GBNIAIOM Dual Port I/O Module (i82599EB)

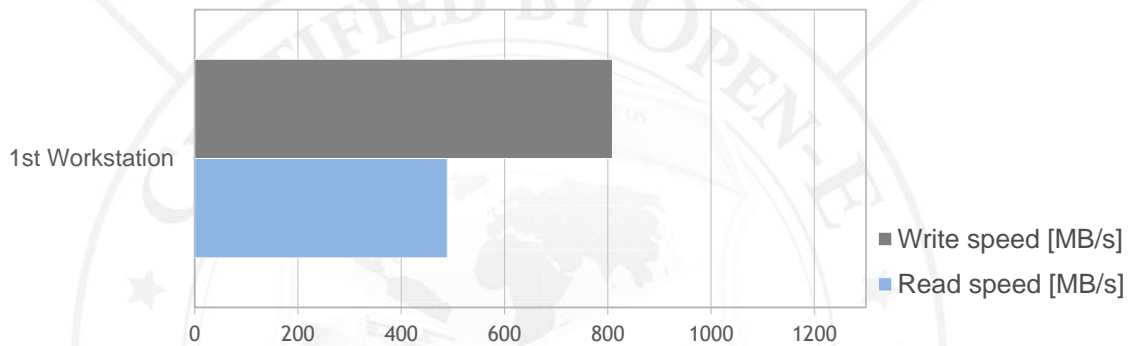


FIGURE 11: Single NIC performance test results chart for 10GbE Intel AXX10GBNIAIOM Dual Port I/O Module (i82599EB)

### 3. Test results for single NIC test performed on 1GbE Intel I350 Quad Port Ethernet Controller (on-board)

Single NIC performance test results			
NIC model	1GbE Intel I350 Quad Port Controller (on-board)		
Workstations with MS Windows	Write speed [MB/s]	Read speed [MB/s]	Performance [passed/failed]
1 <sup>st</sup> Workstation	101.48	112.14	passed

TABLE 14: Single NIC test results table 1GbE Intel I350 Quad Port Ethernet Controller (on-board)

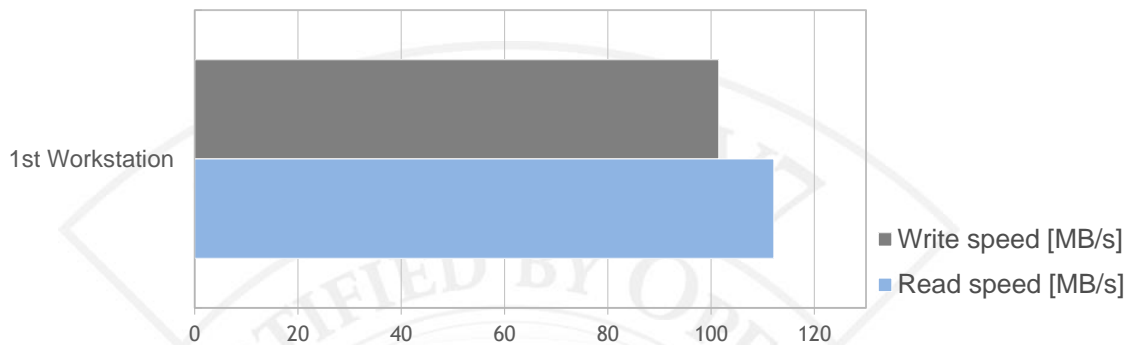


FIGURE 12: Single NIC performance test results chart for 1GbE Intel I350 Quad Port Ethernet Controller (on-board)





## 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

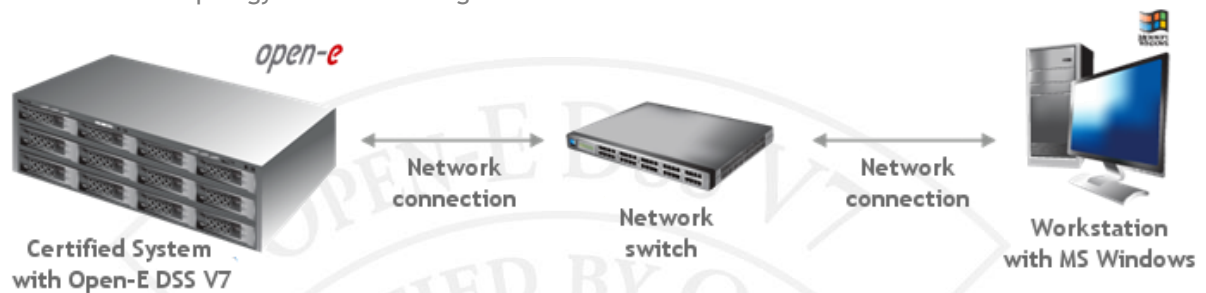


FIGURE 13: Network test topology for RAID testing

## 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 10GbE Intel AXX10GBNIAIOM Dual Port I/O Module (i82599EB)

RAID0 performance test results			
Block size [KB]	Write speed [MB/s]	Read speed [MB/s]	Performance test results
4	8.15	89.17	passed
32	45.33	393.56	passed
64	118.47	448.49	passed
128	363.41	540.18	passed
256	547.69	595.71	passed
512	547.06	517.09	passed
1024	583.89	552.25	passed
4096	601.33	527.39	passed

TABLE 15: RAID0 performance test results table for 10GbE Intel AXX10GBNIAIOM Dual Port I/O Module (i82599EB)

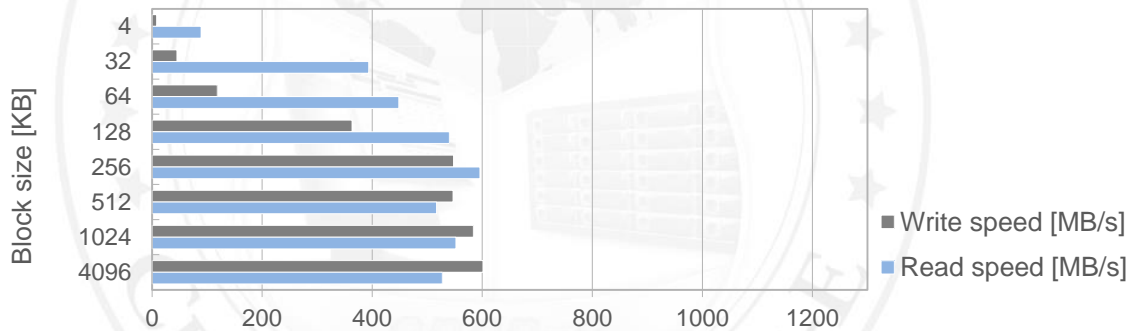


FIGURE 14: RAID0 performance test results chart for 10GbE Intel AXX10GBNIAIOM Dual Port I/O Module (i82599EB)

## 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 10GbE Intel AXX10GBNIAIOM Dual Port I/O Module (i82599EB)

RAID5 performance test results			
Block size [KB]	Write speed [MB/s]	Read speed [MB/s]	Performance test results
4	6.70	86.02	passed
32	42.87	369.38	passed
64	141.54	451.30	passed
128	443.16	538.66	passed
256	569.84	595.83	passed
512	595.60	530.53	passed
1024	616.08	556.00	passed
4096	620.91	540.63	passed

TABLE 16: RAID5 performance test results table for 10GbE Intel AXX10GBNIAIOM Dual Port I/O Module (i82599EB)

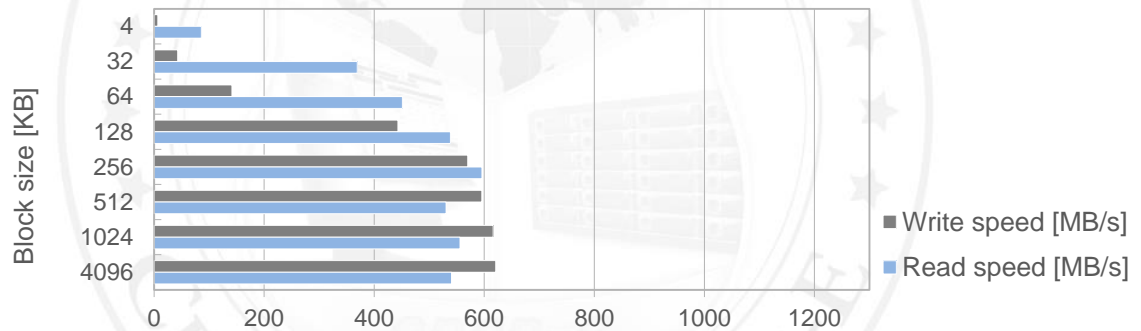


FIGURE 15: RAID5 performance test results chart for 10GbE Intel AXX10GBNIAIOM Dual Port I/O Module (i82599EB)

## 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 10GbE Intel AXX10GBNIAIOM Dual Port I/O Module (i82599EB)

RAID6 performance test results			
Block size [KB]	Write speed [MB/s]	Read speed [MB/s]	Performance test results
4	7.05	85.11	passed
32	47.33	370.51	passed
64	125.60	453.08	passed
128	439.03	548.67	passed
256	612.30	594.01	passed
512	606.63	523.51	passed
1024	638.05	533.92	passed
4096	636.03	522.09	passed

TABLE 17: RAID6 performance test results table for 10GbE Intel AXX10GBNIAIOM Dual Port I/O Module (i82599EB)

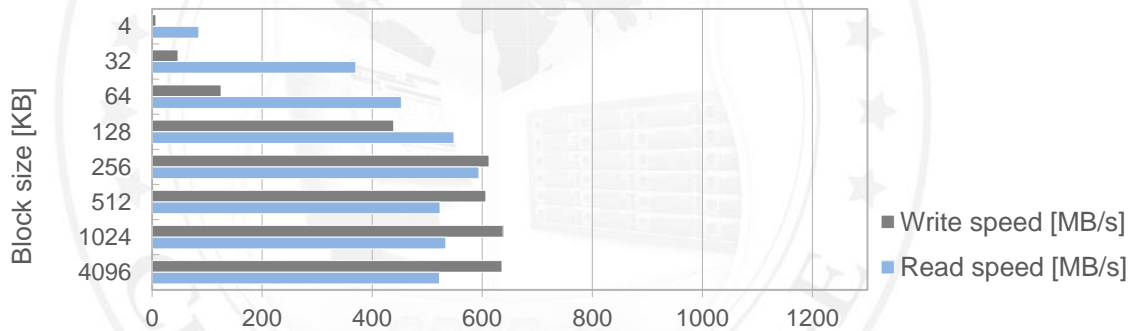


FIGURE 16: RAID6 performance test results chart for 10GbE Intel AXX10GBNIAIOM Dual Port I/O Module (i82599EB)

## Hardware RAID10 test

### 1. 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.

### 2. Test results for RAID10 and 10GbE Intel AXX10GBNIAIOM Dual Port I/O Module (i82599EB)

RAID10 performance test results			
Block size [KB]	Write speed [MB/s]	Read speed [MB/s]	Performance test results
4	6.86	92.95	passed
32	41.61	344.27	passed
64	129.93	450.06	passed
128	419.67	540.12	passed
256	597.40	637.54	passed
512	614.12	531.67	passed
1024	620.60	525.27	passed
4096	639.42	527.23	passed

TABLE 18: RAID10 performance test results table for 10GbE Intel AXX10GBNIAIOM Dual Port I/O Module (i82599EB)

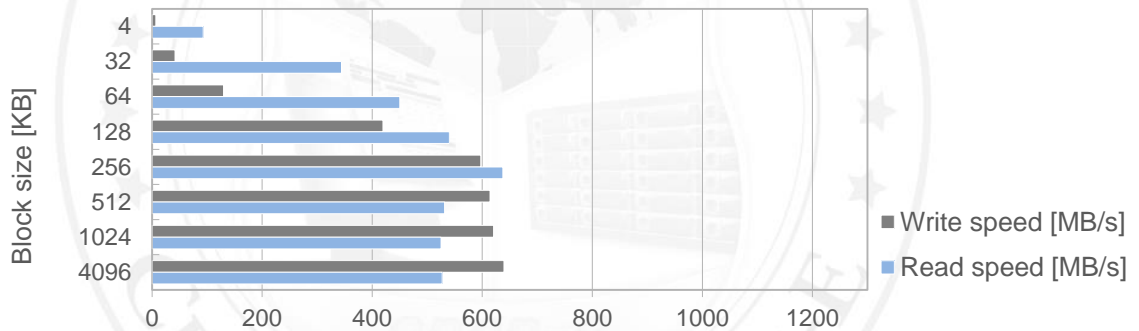


FIGURE 17: RAID10 performance test results chart for 10GbE Intel AXX10GBNIAIOM Dual Port I/O Module (i82599EB)

## 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 10GbE Intel AXX10GBNIAIOM Dual Port I/O Module (i82599EB)

RAID50 performance test results			
Block size [KB]	Write speed [MB/s]	Read speed [MB/s]	Performance test results
4	7.64	84.88	passed
32	41.46	375.33	passed
64	122.51	443.46	passed
128	396.35	517.96	passed
256	566.17	589.55	passed
512	556.54	544.49	passed
1024	597.43	516.77	passed
4096	628.77	536.74	passed

TABLE 19: RAID50 performance test results table for 10GbE Intel AXX10GBNIAIOM Dual Port I/O Module (i82599EB)

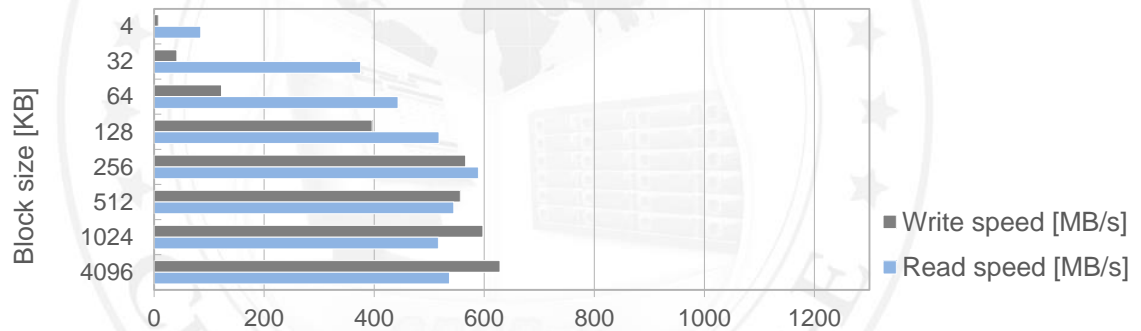


FIGURE 18: RAID50 performance test results chart for 10GbE Intel AXX10GBNIAIOM Dual Port I/O Module (i82599EB)

## 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 and 10GbE Intel AXX10GBNIAIOM Dual Port I/O Module (i82599EB)

RAID60 performance test results			
Block size [KB]	Write speed [MB/s]	Read speed [MB/s]	Performance test results
4	7.29	85.87	passed
32	41.26	347.05	passed
64	128.76	449.23	passed
128	390.78	537.90	passed
256	582.69	586.94	passed
512	578.15	545.00	passed
1024	606.28	519.00	passed
4096	615.09	547.95	passed

TABLE 20: RAID60 performance test results table for 10GbE Intel AXX10GBNIAIOM Dual Port I/O Module (i82599EB)

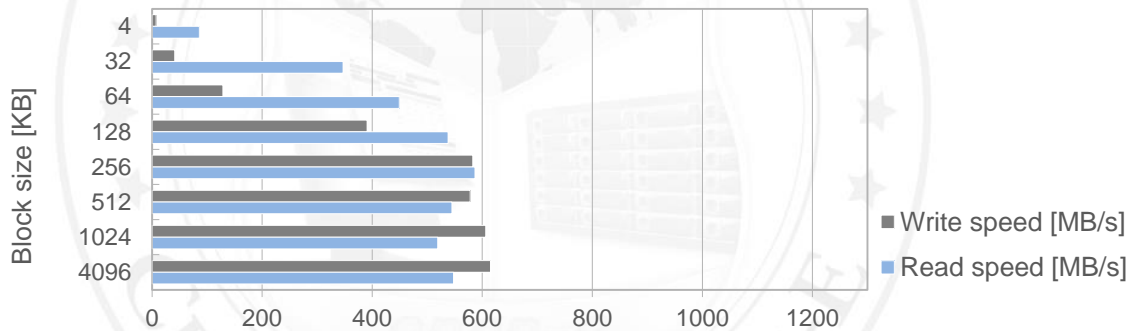


FIGURE 19: RAID60 performance test results chart for 10GbE Intel AXX10GBNIAIOM Dual Port I/O Module (i82599EB)

## 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.

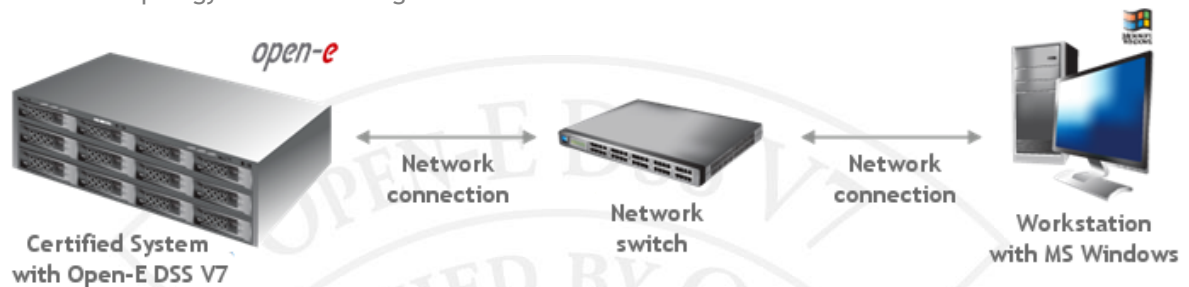


FIGURE 20: Network topology for NAS testing



## 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 and 10GbE Intel AXX10GBNIAIOM Dual Port I/O Module (i82599EB)

SMB performance test results			
Block size [KB]	Write speed [MB/s]	Read speed [MB/s]	Performance test results
4	107.46	94.99	passed
32	445.36	460.90	passed
64	605.16	480.23	passed
128	593.95	573.31	passed
256	570.13	615.86	passed
512	576.17	620.54	passed
1024	576.64	612.63	passed
4096	579.04	609.55	passed

TABLE 21: SMB performance test results table for 10GbE Intel AXX10GBNIAIOM Dual Port I/O Module (i82599EB)

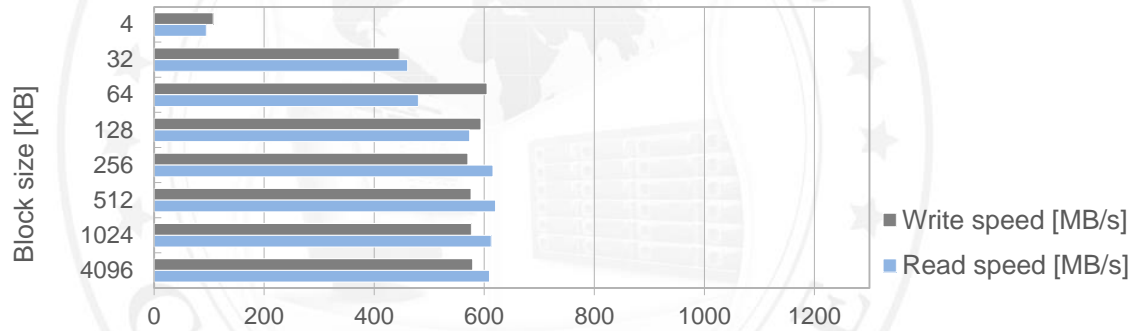


FIGURE 21: SMB performance test results chart for 10GbE Intel AXX10GBNIAIOM Dual Port I/O Module (i82599EB)

## 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.

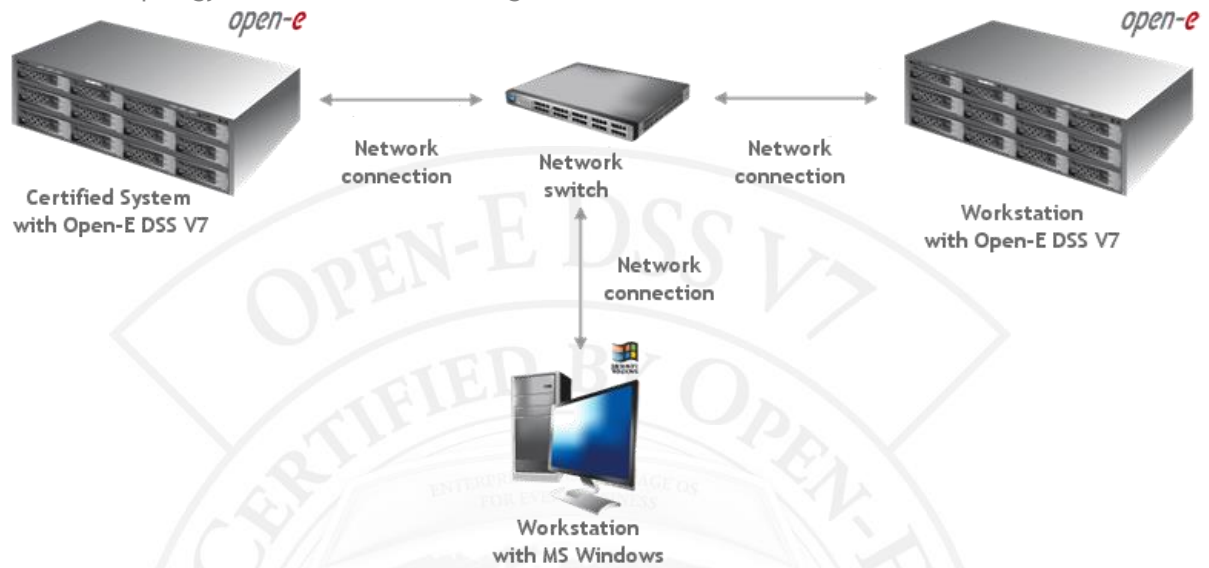


FIGURE 22: Network topology for iSCSI Initiator testing

### iSCSI Target test topology

Network topology for iSCSI Target testing is shown below.

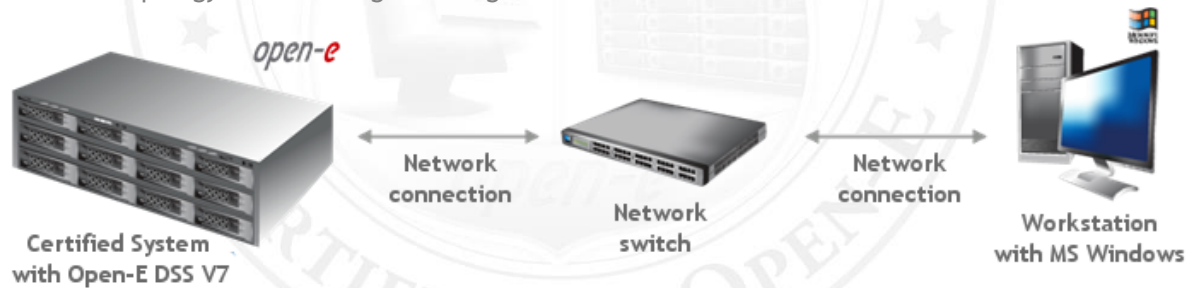


FIGURE 23: Network topology for iSCSI Target testing

## 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 and 10GbE Intel AXX10GBNIAIOM Dual Port I/O Module (i82599EB)

iSCSI Initiator performance test results			
Block size [KB]	Write speed [MB/s]	Read speed [MB/s]	Performance test results
4	101.25	101.48	passed
32	438.31	577.44	passed
64	386.89	353.96	passed
128	395.71	394.06	passed
256	375.40	408.46	passed
512	330.68	425.43	passed
1024	311.25	433.22	passed
4096	359.26	444.22	passed

TABLE 22: iSCSI Initiator performance test results table for 10GbE Intel AXX10GBNIAIOM Dual Port I/O Module (i82599EB)

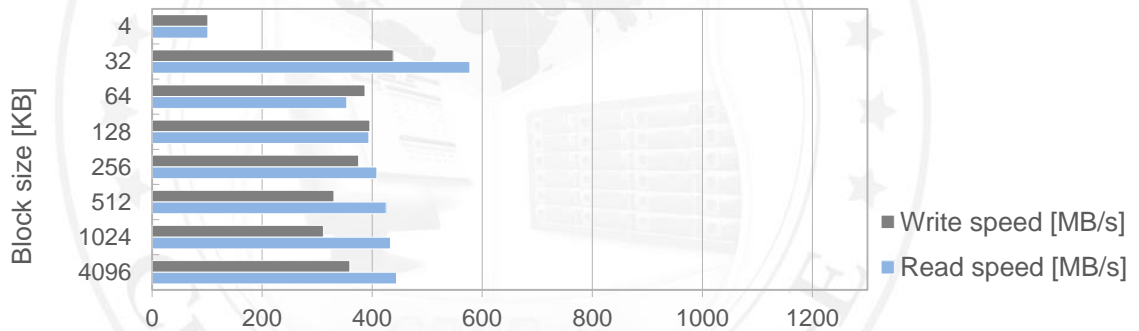


FIGURE 24: iSCSI Initiator performance test results chart for 10GbE Intel AXX10GBNIAIOM Dual Port I/O Module (i82599EB)

## 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 10GbE Intel AXX10GBNIAIOM Dual Port I/O Module (i82599EB)

iSCSI Target performance test results			
Block size [KB]	Write speed [MB/s]	Read speed [MB/s]	Performance test results
4	7.20	93.92	passed
32	46.04	358.69	passed
64	119.28	458.02	passed
128	338.63	551.30	passed
256	541.59	591.47	passed
512	586.91	523.10	passed
1024	581.14	514.17	passed
4096	611.14	516.93	passed

TABLE 23: iSCSI Target performance test results table for 10GbE Intel AXX10GBNIAIOM Dual Port I/O Module (i82599EB)

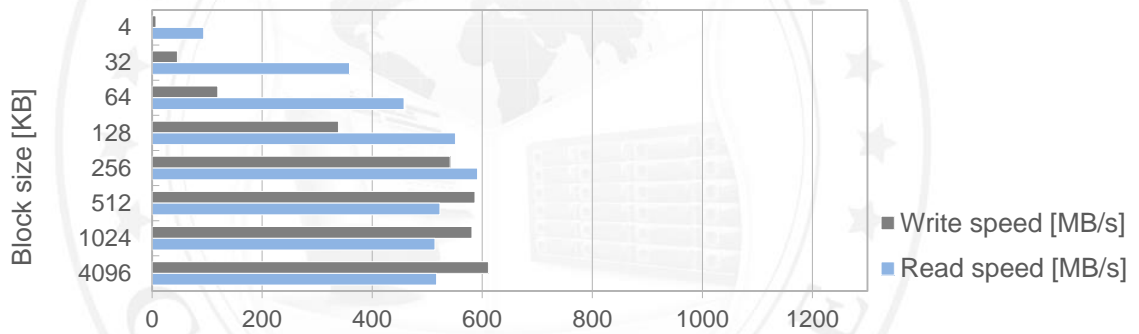


FIGURE 25: iSCSI Target performance test results chart for 10GbE Intel AXX10GBNIAIOM Dual Port I/O Module (i82599EB)

## SSD Cache performance

Tests performed in this section check the performance of SSD cache in the Open-E DSS V7 product on the certified system.

### SSD Cache test topology

Network topology for SSD Cache testing is shown below.

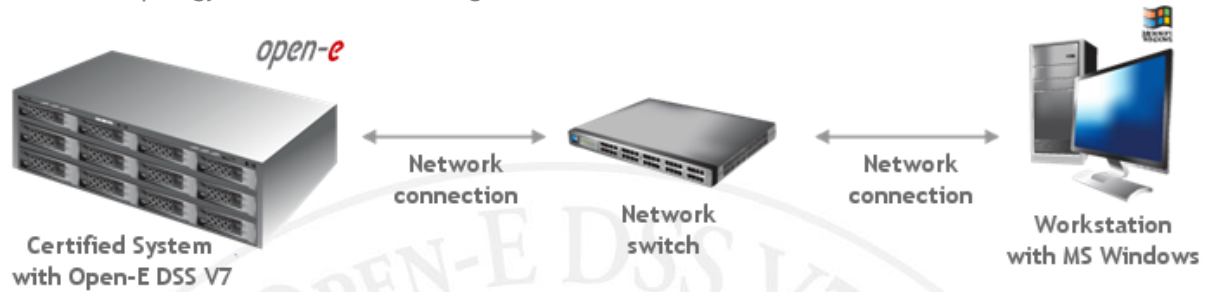


FIGURE 26: Network topology for SSD Cache testing



## SSD Cache with real life pattern test

### 1. Test description

The test relies on creating the iSCSI target on the certified system, writing (35%) and reading (65%) random data from a *Workstation with MS Windows* to it with various block sizes using the lometer tool.

### 2. Test results for SSD Cache with real life pattern and 10GbE Intel AXX10GBNIAIOM Dual Port I/O Module (i82599EB)

SSD Cache with real life pattern test results		
Block size [KB]	Performance [IOPS]	Performance test results
1	14013	passed
2	12026	passed
4	12300	passed

TABLE 24: SSD Cache with real life pattern test results table for 10GbE Intel AXX10GBNIAIOM Dual Port I/O Module (i82599EB)

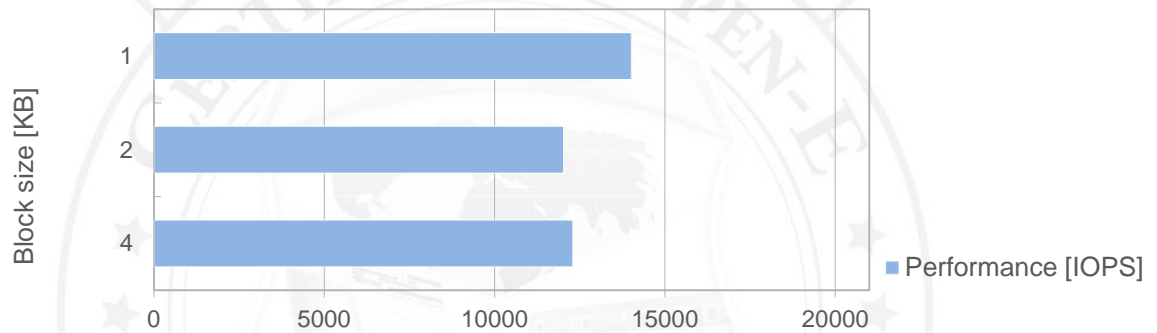


FIGURE 27: SSD Cache with real life pattern test results chart for 10GbE Intel AXX10GBNIAIOM Dual Port I/O Module (i82599EB)

## SSD Cache with random read/write pattern test

### 1. Test description

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

### 2. Test results for SSD cache with random read/write pattern 10GbE Intel AXX10GBNIAIOM Dual Port I/O Module (i82599EB)

SSD cache with random read/write pattern test results			
Block size [KB]	Write speed [IOPS]	Read speed [IOPS]	Performance test results
1	17967	19537	passed
2	17962	19197	passed
4	17147	16664	passed

TABLE 25: SSD cache with random read/write pattern test results table for 10GbE Intel AXX10GBNIAIOM Dual Port I/O Module (i82599EB)

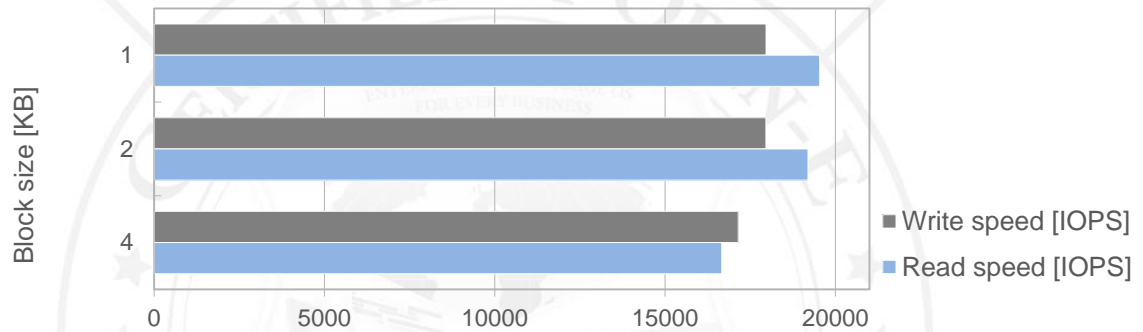


FIGURE 28: SSD cache with random read/write pattern test results chart for 10GbE Intel AXX10GBNIAIOM Dual Port I/O Module (i82599EB)