N-TEC rapidServe 316-G5 storage system

Executive summary

After performing all tests, the N-TEC rapidServe 316-G5 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 N-TEC rapidServe 316-G5 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 N-TEC rapidServe 316-G5 good iSCSI storage:

- Hardware RAID10, RAID5, RAID50, RAID6 or RAID60 for high performance and data safety.
- Two 1GbE interfaces for fast MPIO connection.
- Redundant power supply for system reliability.

✓ **NAS filer**

The following features make N-TEC rapidServe 316-G5 a good NAS filer solution:

- Sixteen enterprise class SATA hard drives provide a plenty of space for user files.
- Hardware RAID5, RAID6, RAID50 and RAID60 for fault tolerance and the most efficient use of available disk space.

✓ **Storage for CCTV**

For this application the following can be used:

- Sixteen enterprise class SATA hard drives provide a lot of space for CCTV records.
- Two 1GbE interfaces for independent connection to different networks or link aggregation for improved throughput.
- Redundant power supply for system reliability.

Certification notes

We recommend using Balance-alb bonding mode for link aggregation.

N-TEC rapidServe 316-G5 hardware components

Technical specifications about the certified system are listed below:

Model	N-TEC rapidServe 316-G5
Operating system	Open-E DSS V7 build 6645
Enclosure/chassis	N-TEC rapidServe 316-G5 3U
CPU	Intel Xeon E5502 1.87GHz
Motherboard	Supermicro X8DTL-iF
Memory	3x 2GB DDR3 1333 ECC Mustang M625664139X6NS
Network	2x Intel Gigabit Server Adapter (i82574L) (on-board)
HW RAID	Areca ARC-1882IX-16
Hard disk drives	16x 1TB Seagate Constellation ES ST31000524NS

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

All components were detected and properly recognized.

N-TEC rapidServe 316-G5 photos

FIGURE 1: Front photo

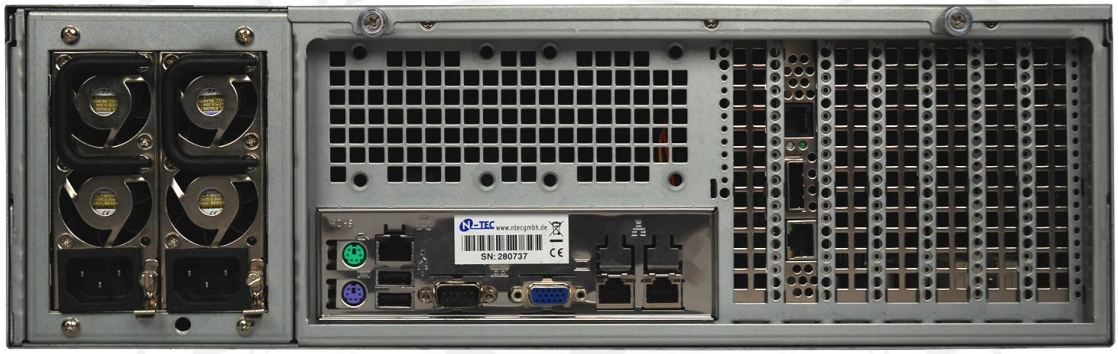

FIGURE 2: Rear photo

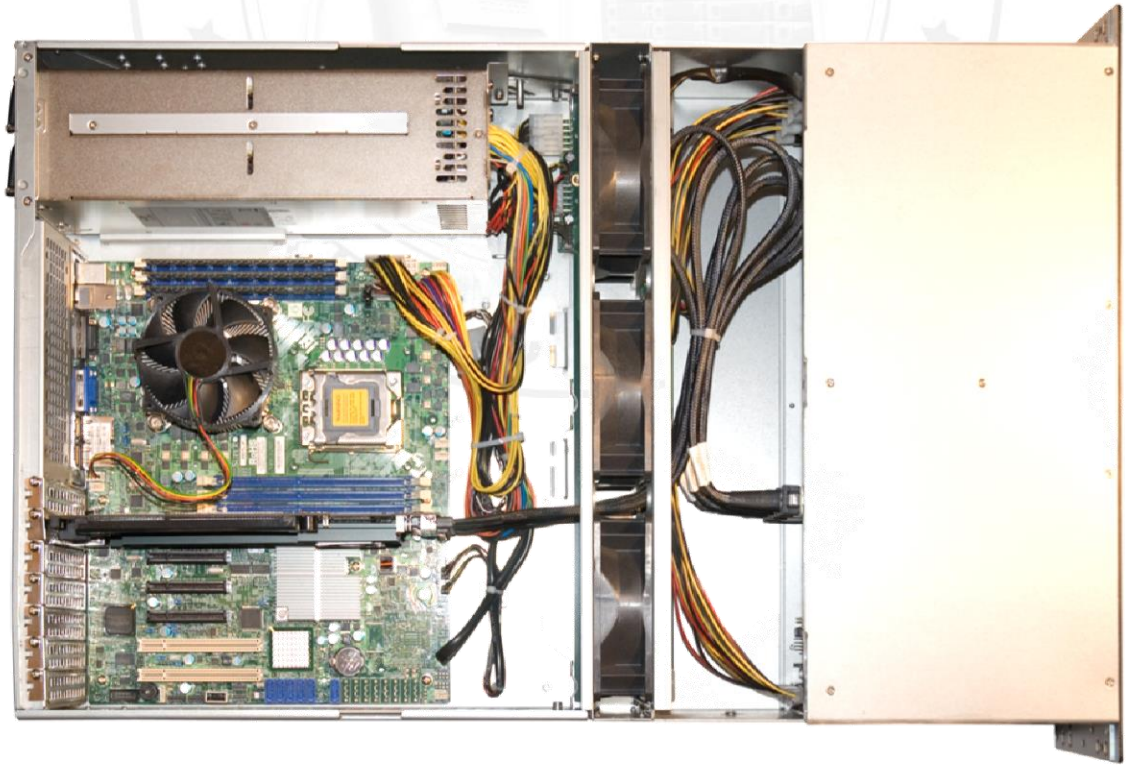

FIGURE 3: Top photo

Auxiliary systems hardware components

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

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

TABLE 2: Hardware components of first Workstation with MS Windows

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

TABLE 3: Hardware components of second Workstation with MS Windows

Model	Custom
Operating system	Open-E DSS V7 build 6645
Enclosure/chassis	Ipc-4u-600
CPU	Intel Xeon E5630 2.53GHz
Motherboard	Supermicro X8DTH-IF
Memory	4x 4GB DDR3 ECC-REG Samsung M393B5270CH0-CH9
Network	Intel dual port (on-board) (i82576)
Network	Intel PRO/1000 PT Quad LP Server Adapter (i82571GB)
HW RAID	LSI MegaRAID SAS 9280-4i4e
Hard disk drives	2x 32GB Kingston SSDNow V100 SV100S2/32G

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

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.

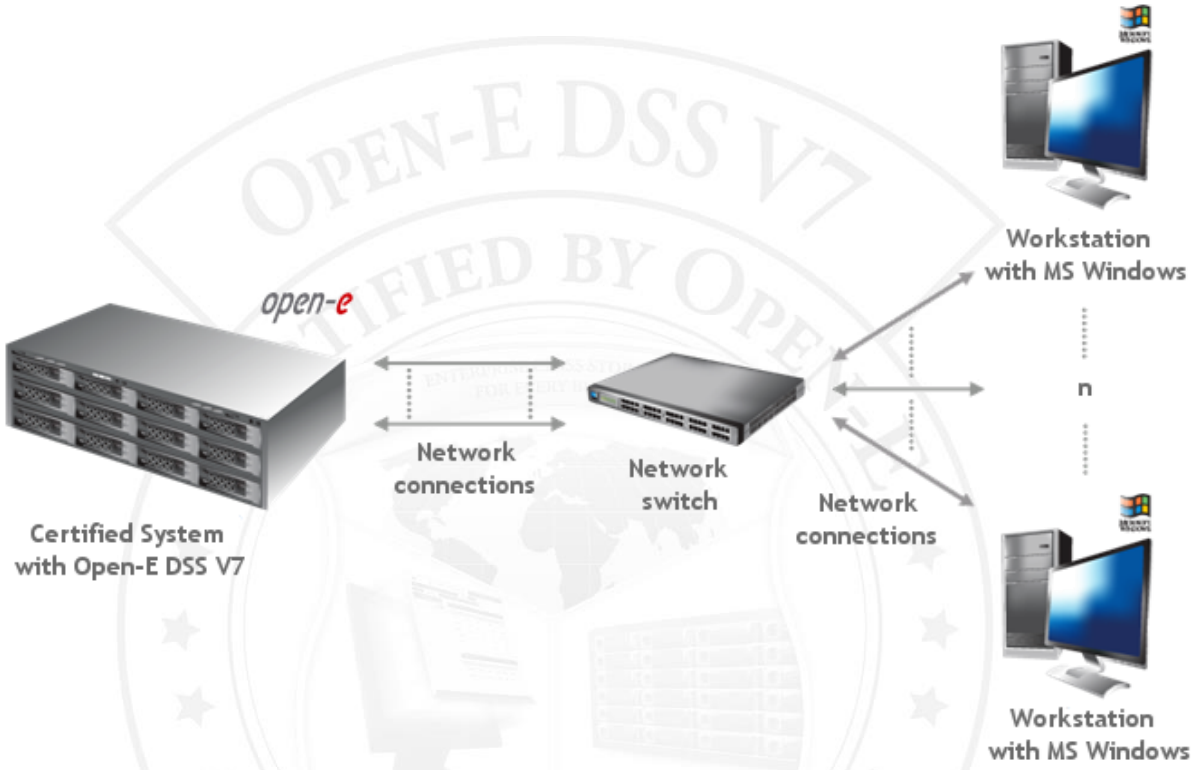

FIGURE 4: Network topology for Network testing

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 (i82574L) (on-board)

802.3ad bonding mode performance test results			
NIC model	Intel Gigabit Server Adapter (i82574L) (on-board)		
Workstations with MS Windows	Write speed [MB/s]	Read speed [MB/s]	Performance test results
1st Workstation	108.39	60.55	passed
2nd Workstation	108.83	50.98	passed

TABLE 7: 802.3ad bonding mode performance test results table for Intel Gigabit Server Adapter (i82574L) (on-board)

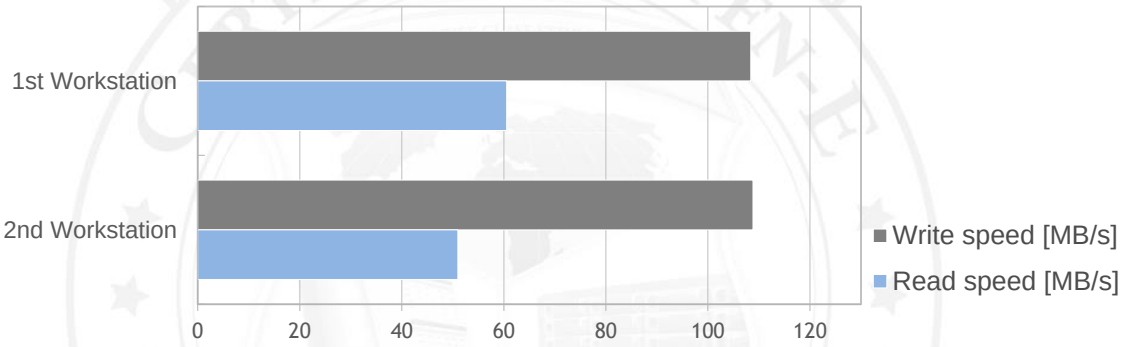

FIGURE 5: 802.3ad bonding mode performance test results chart for Intel Gigabit Server Adapter (i82574L) (on-board)

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 Intel Gigabit Server Adapter (i82574L) (on-board)

Balance-alb bonding mode performance test results			
NIC model	Intel Gigabit Server Adapter (i82574L) (on-board)		
Workstations with MS Windows	Write speed [MB/s]	Read speed [MB/s]	Performance test results
1st Workstation	109.26	108.88	passed
2nd Workstation	108.41	108.63	passed

TABLE 8: Balance-alb bonding mode performance test results table for Intel Gigabit Server Adapter (i82574L) (on-board)

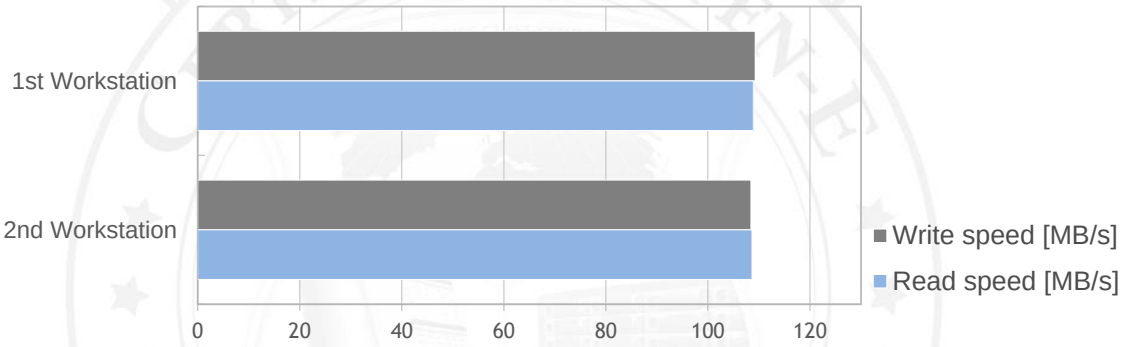

FIGURE 6: Balance-alb bonding mode performance test results chart for Intel Gigabit Server Adapter (i82574L) (on-board)

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 Iometer testing tool.

2. Test results for Balance-rr bonding mode test performed on Intel Gigabit Server Adapter (i82574L) (on-board)

Balance-rr bonding mode performance test results			
NIC model	Intel Gigabit Server Adapter (i82574L) (on-board)		
Workstations with MS Windows	Write speed [MB/s]	Read speed [MB/s]	Performance test results
1st Workstation	55.28	98.56	passed
2nd Workstation	56.81	67.10	passed

TABLE 9: Balance-rr bonding mode performance test results table for Intel Gigabit Server Adapter (i82574L) (on-board)

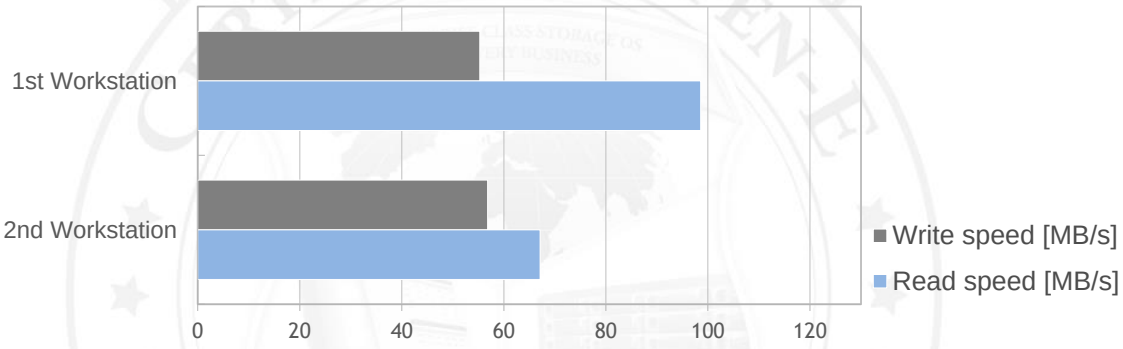

FIGURE 7: Balance-rr bonding mode performance test results chart for Intel Gigabit Server Adapter (i82574L) (on-board)

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 Intel Gigabit Server Adapter (i82574L) (on-board)

Single NIC performance test results			
NIC model	Intel Gigabit Server Adapter (i82574L) (on-board)		
Workstations with MS Windows	**Write speed [MB/s]**	**Read speed [MB/s]**	**Performance [passed/failed]**
1st Workstation	109.34	106.39	passed

TABLE 10: Single NIC test results table for Intel Gigabit Server Adapter (i82574L) (on-board)

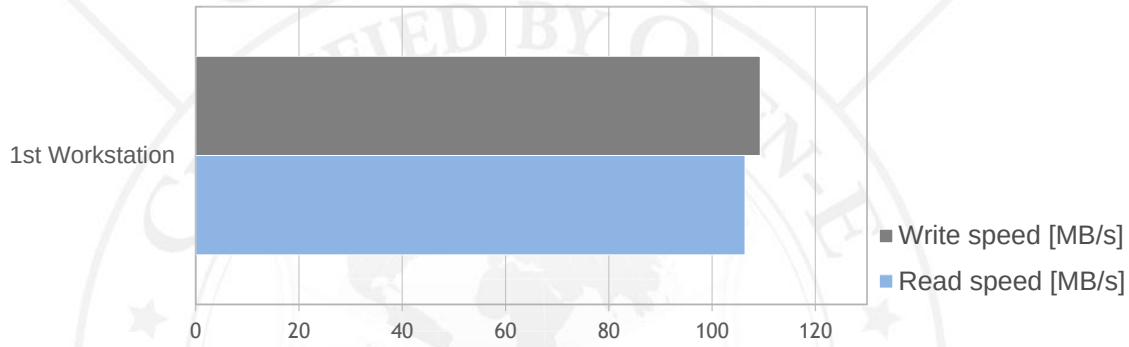

FIGURE 8: Single NIC performance test results chart for Intel Gigabit Server Adapter (i82574L) (on-board)

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 Iometer testing tool.

RAID test topology

Network test topology for RAID testing is shown below

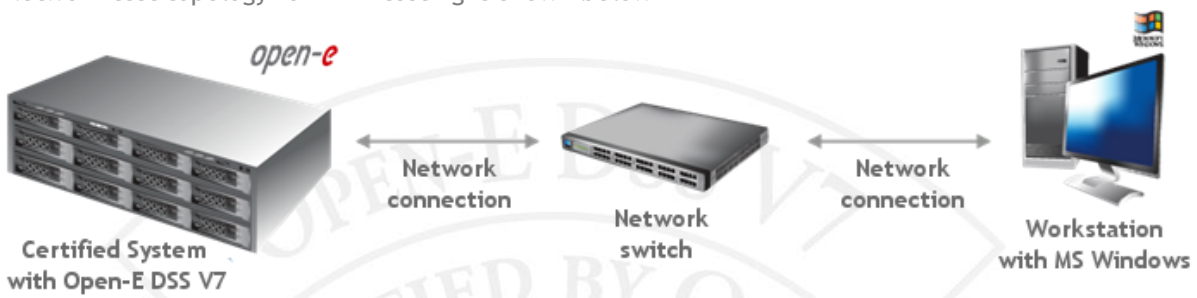

FIGURE 9: Network test topology for RAID testing

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 Gigabit Server Adapter (i82574L) (on-board)

RAID0 performance test results			
Block size [KB]	Write speed [MB/s]	Read speed [MB/s]	Performance test results
4	19.11	85.66	passed
32	102.39	105.57	passed
64	103.73	106.21	passed
128	104.34	106.38	passed
256	107.88	106.48	passed
512	107.91	106.47	passed
1024	108.13	106.44	passed
4096	108.28	106.27	passed

TABLE 11: RAID0 performance test results table for Intel Gigabit Server Adapter (i82574L) (on-board)

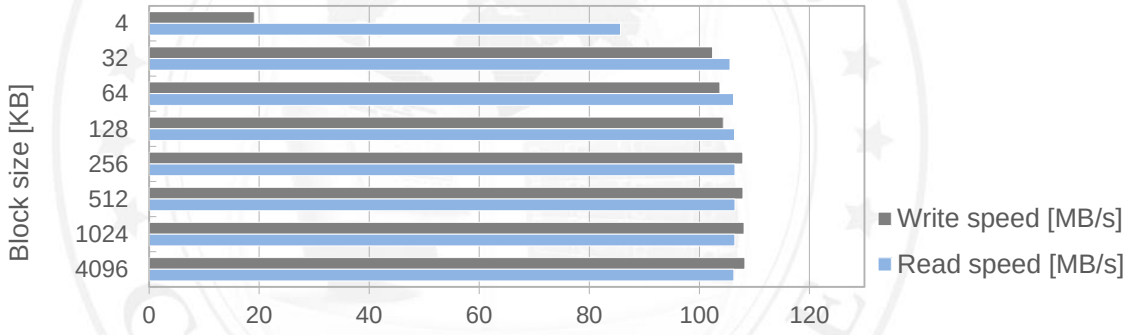

FIGURE 10: RAID0 performance test results chart for Intel Gigabit Server Adapter (i82574L) (on-board)

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 Gigabit Server Adapter (i82574L) (on-board)

RAID5 performance test results			
Block size [KB]	Write speed [MB/s]	Read speed [MB/s]	Performance test results
4	19.37	85.98	passed
32	100.87	105.67	passed
64	104.42	105.86	passed
128	105.41	106.24	passed
256	108.51	106.43	passed
512	108.59	106.42	passed
1024	108.80	106.40	passed
4096	106.28	108.67	passed

TABLE 12: RAID5 performance test results table for Intel Gigabit Server Adapter (i82574L) (on-board)

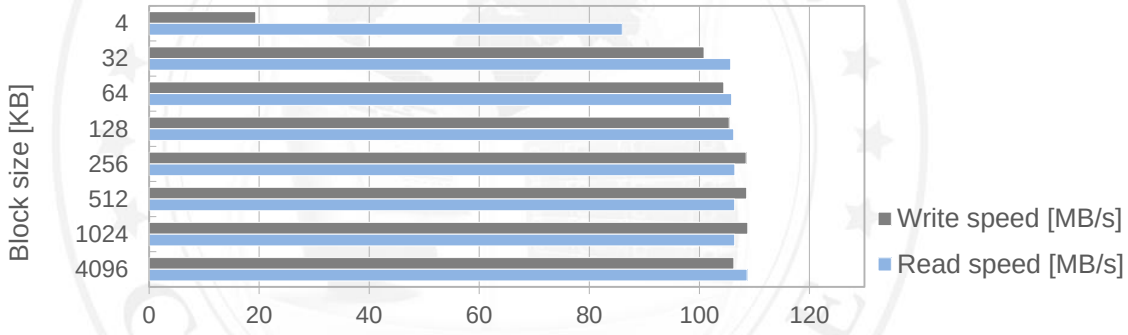

FIGURE 11: RAID5 performance test results chart for Intel Gigabit Server Adapter (i82574L) (on-board)

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 Gigabit Server Adapter (i82574L) (on-board)

RAID6 performance test results			
Block size [KB]	Write speed [MB/s]	Read speed [MB/s]	Performance test results
4	19.38	85.96	passed
32	102.02	105.28	passed
64	104.08	105.83	passed
128	105.57	106.11	passed
256	108.60	106.29	passed
512	108.81	106.29	passed
1024	108.69	106.26	passed
4096	108.47	106.17	passed

TABLE 13: RAID6 performance test results table for Intel Gigabit Server Adapter (i82574L) (on-board)

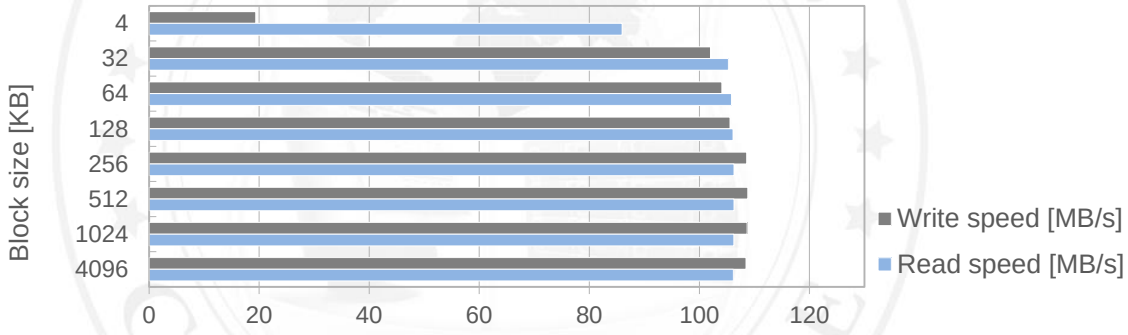

FIGURE 12: RAID6 performance test results chart for Intel Gigabit Server Adapter (i82574L) (on-board)

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 Iometer testing tool.

2. Test results for RAID10 and Intel Gigabit Server Adapter (i82574L) (on-board)

RAID10 performance test results			
Block size [KB]	Write speed [MB/s]	Read speed [MB/s]	Performance test results
4	20.71	85.81	passed
32	101.81	105.86	passed
64	102.90	106.10	passed
128	103.88	106.40	passed
256	107.90	106.51	passed
512	108.24	106.51	passed
1024	107.92	106.50	passed
4096	108.08	106.41	passed

TABLE 14: RAID10 performance test results table for Intel Gigabit Server Adapter (i82574L) (on-board)

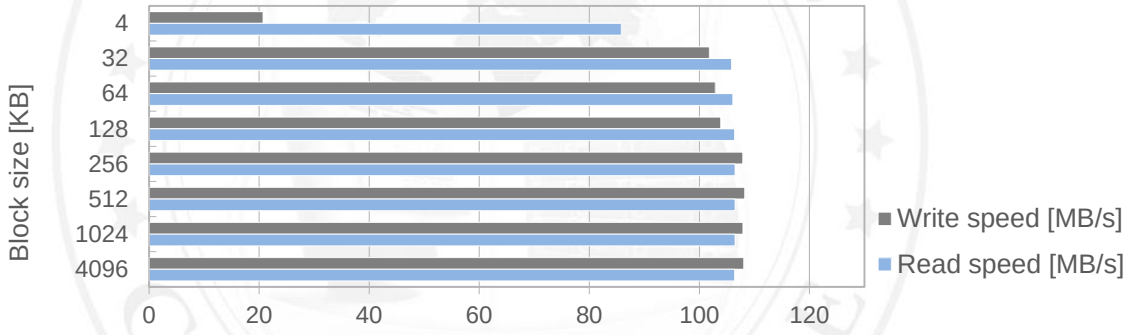

FIGURE 13: RAID10 performance test results chart for Intel Gigabit Server Adapter (i82574L) (on-board)

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 Iometer testing tool.

2. Test results for RAID50 and Intel Gigabit Server Adapter (i82574L) (on-board)

RAID50 performance test results			
Block size [KB]	Write speed [MB/s]	Read speed [MB/s]	Performance test results
4	18.62	85.62	passed
32	101.93	105.77	passed
64	103.70	105.98	passed
128	105.14	106.23	passed
256	108.60	106.48	passed
512	108.79	106.47	passed
1024	108.78	108.45	passed
4096	108.52	106.33	passed

TABLE 15: RAID50 performance test results table for Intel Gigabit Server Adapter (i82574L) (on-board)

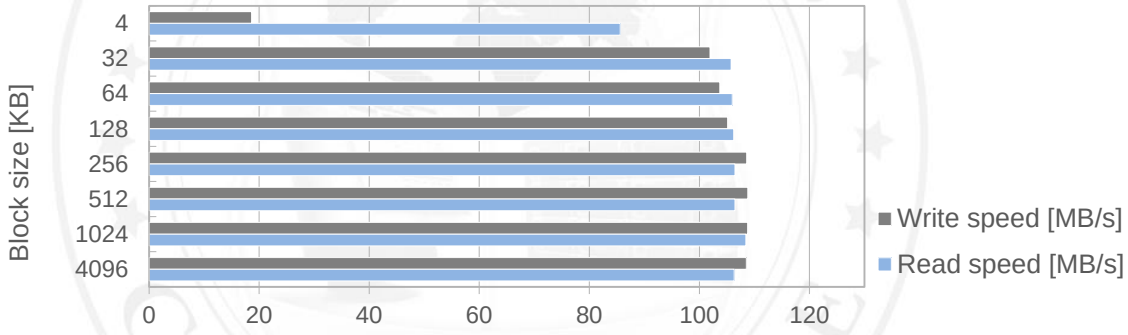

FIGURE 14: RAID50 performance test results chart for Intel Gigabit Server Adapter (i82574L) (on-board)

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 Iometer testing tool.

2. Test results for RAID60 and Intel Gigabit Server Adapter (i82574L) (on-board)

RAID60 performance test results			
Block size [KB]	Write speed [MB/s]	Read speed [MB/s]	Performance test results
4	19.21	85.54	passed
32	103.22	105.57	passed
64	103.79	105.86	passed
128	104.97	106.20	passed
256	108.71	106.38	passed
512	108.46	106.38	passed
1024	108.63	106.37	passed
4096	108.24	106.27	passed

TABLE 16: RAID60 performance test results table for Intel Gigabit Server Adapter (i82574L) (on-board)

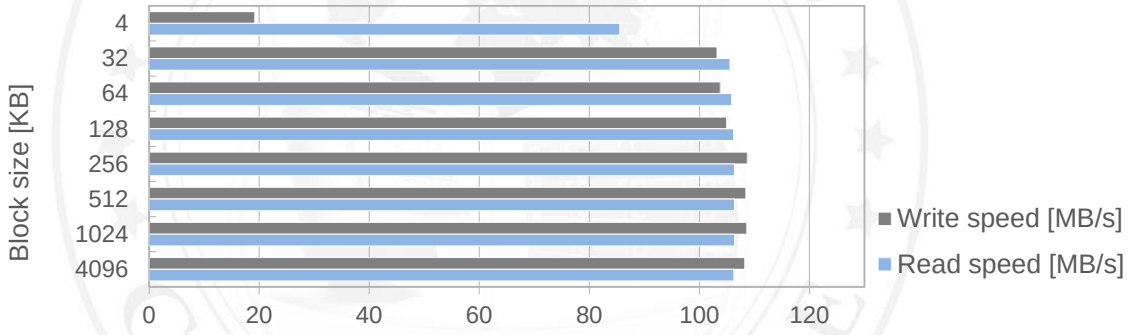

FIGURE 15: RAID60 performance test results chart for Intel Gigabit Server Adapter (i82574L) (on-board)

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.

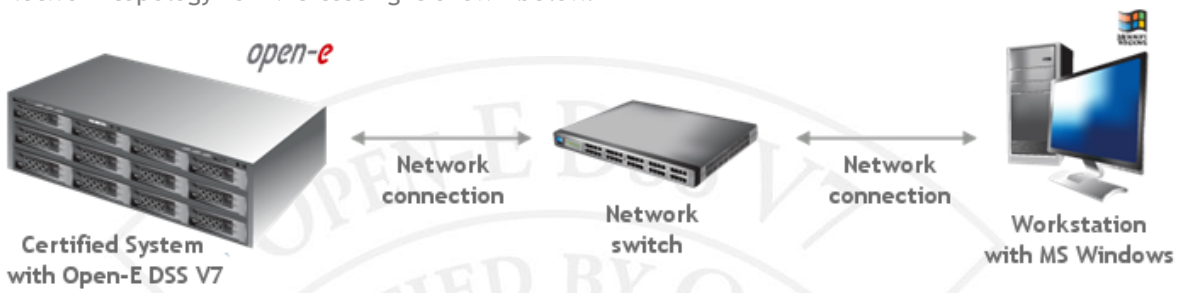

FIGURE 16: Network topology for NAS testing

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 Iometer testing tool.

2. Test results for SMB and Intel Gigabit Server Adapter (i82574L) (on-board)

SMB performance test results			
Block size [KB]	Write speed [MB/s]	Read speed [MB/s]	Performance test results
4	105.45	91.93	passed
32	111.61	112.22	passed
64	112.02	111.68	passed
128	112.14	112.42	passed
256	112.23	112.38	passed
512	112.31	112.46	passed
1024	112.28	112.37	passed
4096	112.18	112.18	passed

TABLE 17: SMB performance test results table for Intel Gigabit Server Adapter (i82574L) (on-board)

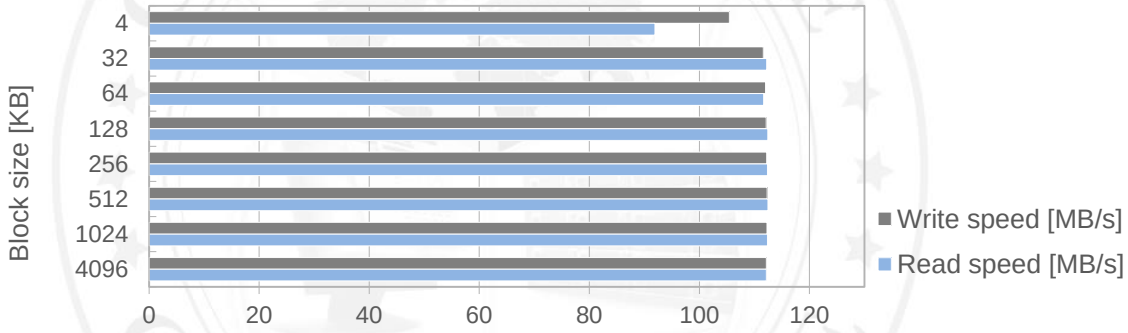

FIGURE 17: SMB performance test results chart for Intel Gigabit Server Adapter (i82574L) (on-board)

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.

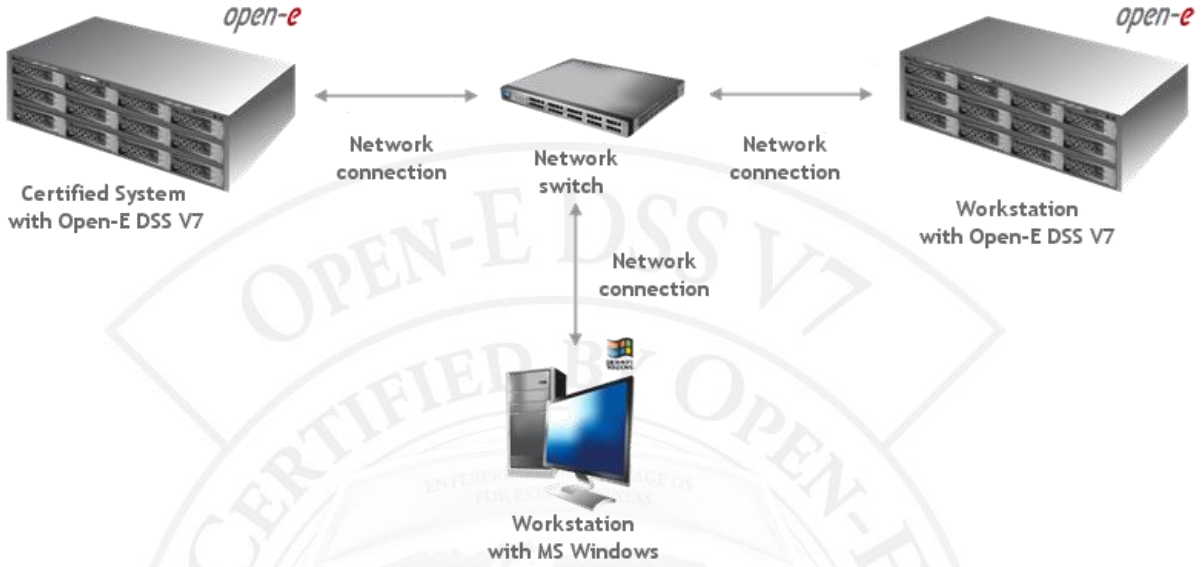

FIGURE 18: Network topology for iSCSI Initiator testing

iSCSI Target test topology

Network topology for iSCSI Target testing is shown below.

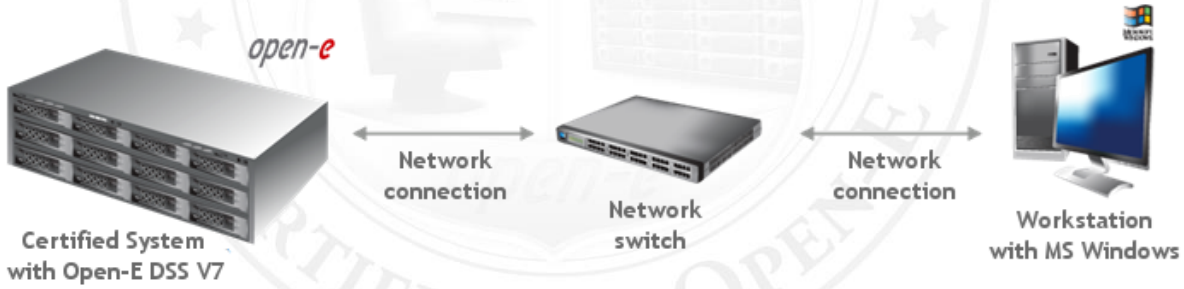

FIGURE 19: Network topology for iSCSI Target testing

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 Gigabit Server Adapter (i82574L) (on-board)

iSCSI Initiator performance test results			
Block size [KB]	Write speed [MB/s]	Read speed [MB/s]	Performance test results
4	89.79	91.16	passed
32	107.35	111.89	passed
64	109.81	111.57	passed
128	109.94	111.77	passed
256	110.97	107.61	passed
512	110.12	111.74	passed
1024	109.93	112.33	passed
4096	109.33	111.83	passed

TABLE 18: iSCSI Initiator performance test results table for Intel Gigabit Server Adapter (i82574L) (on-board)

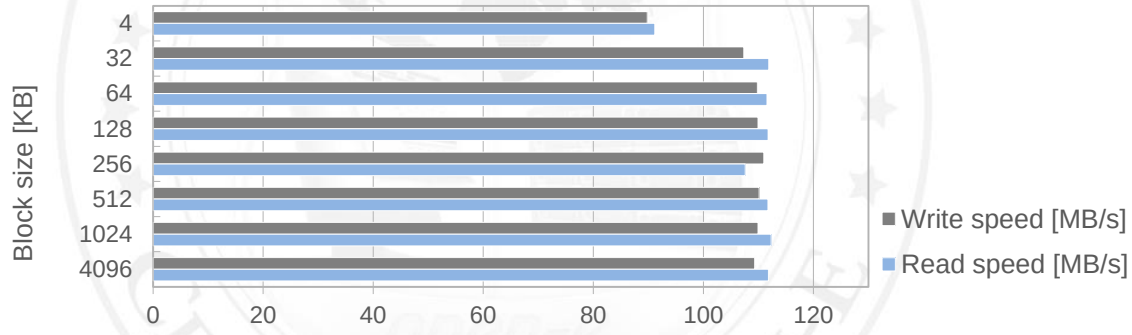

FIGURE 20: iSCSI Initiator performance test results chart for Intel Gigabit Server Adapter (i82574L) (on-board)

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 Gigabit Server Adapter (i82574L) (on-board)

iSCSI Target performance test results			
Block size [KB]	Write speed [MB/s]	Read speed [MB/s]	Performance test results
4	19.09	85.68	passed
32	102.03	105.80	passed
64	103.69	106.20	passed
128	104.21	106.26	passed
256	107.88	106.39	passed
512	107.88	106.39	passed
1024	107.84	106.44	passed
4096	108.15	106.34	passed

TABLE 19: iSCSI Target performance test results table for Intel Gigabit Server Adapter (i82574L) (on-board)

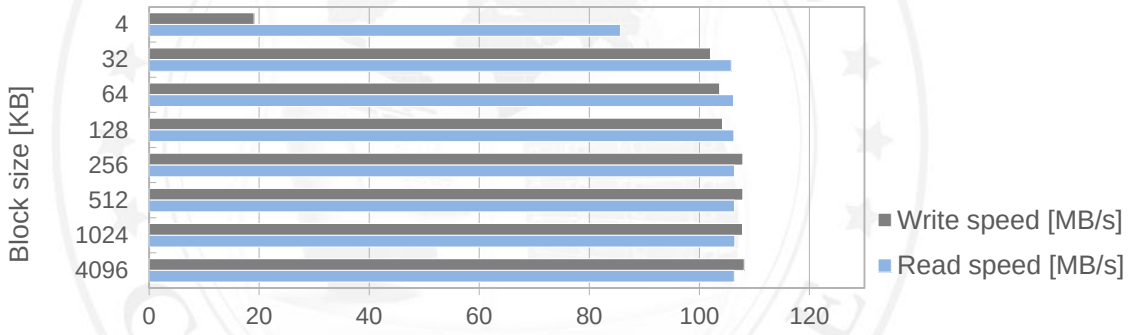

FIGURE 21: iSCSI Target performance test results chart for Intel Gigabit Server Adapter (i82574L) (on-board)