

Newtech Supremacy II NAS storage system

Executive summary

The Newtech Supremacy II NAS system was tested by the Open-E QA team. It has been found that the system is stable and functional but performance problems occur on RAID5, RAID6, RAID51 and RAID61.

With the Open-E DSS V6 operating system installed, the Newtech Supremacy II NAS system still can be taken into consideration for various uses, as long as RAID0 or RAID10 is used. With such a setup, we suggest using it especially as:

✓ Storage for backup

The following features make Newtech Supremacy II NAS good storage for backup:

- Sixteen large and fast SATA hard drives provide plenty of space for backups.
- Hardware RAID10 for high performance and data safety.
- Redundant power supply for an uninterrupted backup process.
- Three 1GbE interfaces, allow simultaneous connection to different networks. Two of them may be aggregated for improved throughput.

Test notes

Benchmarks show the best performance with RAID10 and it is the only recommended RAID level. RAID5, RAID51, RAID6 and RAID61 are not recommended if high overall performance is required.

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Newtech Supremacy II NAS hardware components

Below is listed technical information about the tested system.

Model	Newtech Supremacy II NAS
Operating system	Open-E DSS V6 build 5845
Enclosure/chassis	Newtech Supremacy II
CPU	Intel Xeon E5620 2.40GHz
Motherboard	Quanta QSSC-98MB
Memory	3x 2GB DDR3 1066 ECC-REG Kingston KVR-1066D3D8R7S/2GI
Network	Intel Gigabit ET Dual Port Server Adapter (i82576) (on board)
Network	Intel Gigabit Ethernet Server Adapter (i82574L) (on board)
Hard disk controller	Newtech Npro5
Hard disk controller	Quanta Mezzanine 1064E (LSISAS1064E)
Hard disk drives	16x 2TB Hitachi Deskstar 7K2000 HDS722020ALA330

TABLE 1: Hardware components list of tested system with Open-E DSS V6

All components were detected and properly recognized.

Newtech Supremacy II NAS photos



FIGURE 1: Front photo



FIGURE 2: Rear photo

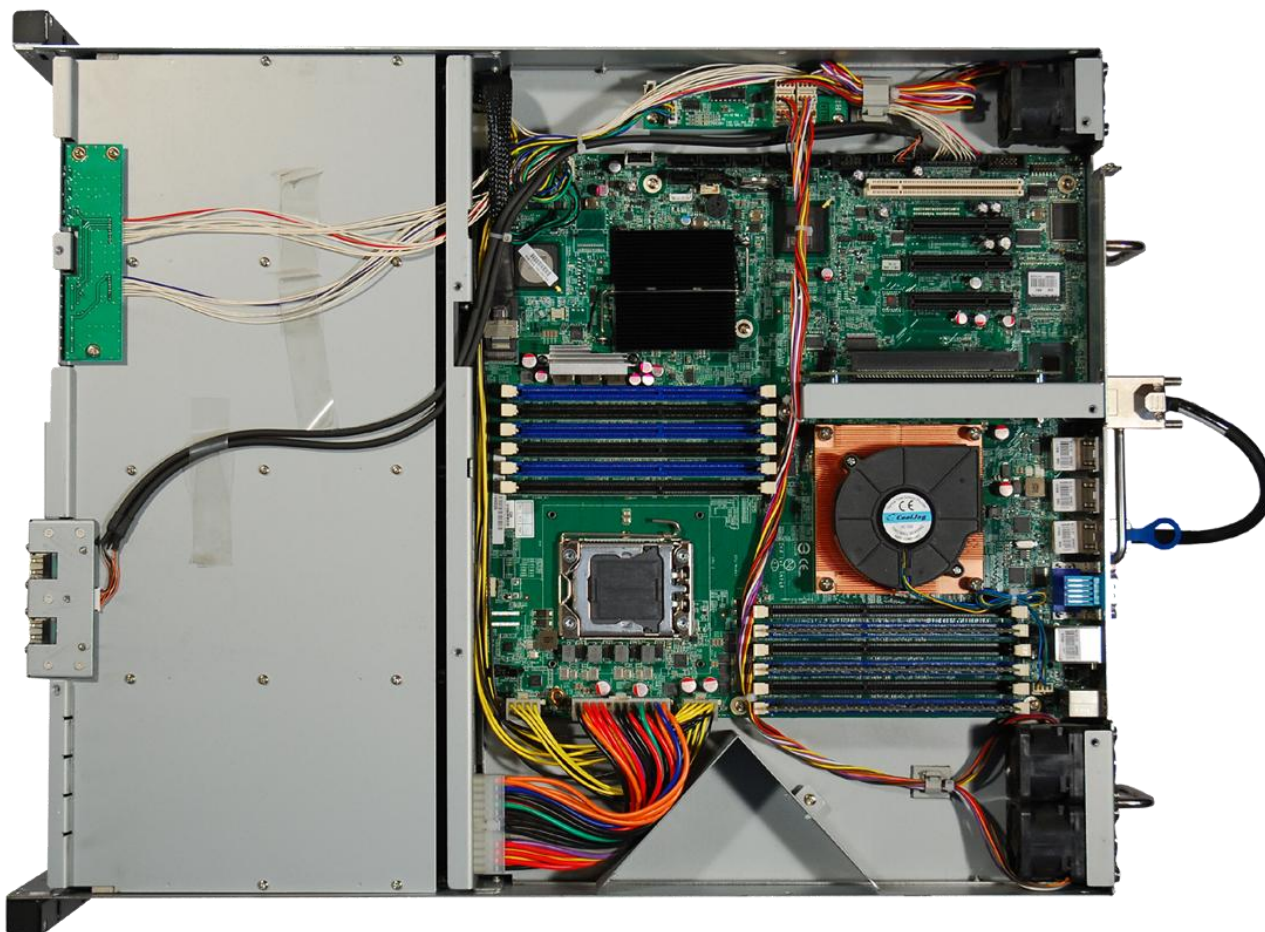


FIGURE 3: Top photo

Auxiliary systems hardware components

Auxiliary systems with MS Windows or Open-E DSS V6 installed, used in Open-E hardware testing process.

Model	Custom
Operating system	MS Windows Server 2008 R2
Enclosure/chassis	lpc-4u-600
Motherboard	Supermicro X7DVL-E
CPU	Intel Xeon E5405 2.0GHz
Memory	8x 1GB DDR2 667 ECC FB-DIMM Kingston KVR667D2D8F5K2/2G
Network controller	Intel Gigabit PRO/1000PT Dual Port Adapter (i82571EB)
Hard disk drives	1x 2TB Samsung SpinPoint F4EG HD204UI

TABLE 2: Hardware components of first Workstation with MS Windows

Model	Custom
Operating system	MS Windows Server 2008 R2
Enclosure/chassis	lpc-4u-600
Motherboard	Tyan Tempest i5400PW (S5397)
CPU	Intel Xeon E5405 2.0GHz
Memory	8x 1GB DDR2 667 ECC FB-DIMM Kingston KVR667D2D8F5K2/2G
Network controller	Intel Gigabit PRO/1000PT Dual Port Adapter (i82571EB)
Hard disk drives	1x 2TB Samsung SpinPoint F4EG HD204UI

TABLE 3: Hardware components of second Workstation with MS Windows

Model	Custom
Operating system	Open-E DSS V6 build 5845
Enclosure/chassis	lpc-4u-600
Motherboard	Supermicro X8DTH-IF
CPU	Intel Xeon E5630 2.53GHz
Memory	3x 4GB DDR3 ECC-REG Samsung M393B5270CH0-CH9
Network controller	Intel Gigabit PRO/1000 PT Quad LP Server Adapter (i82571GB)
HW RAID controller	Areca ARC-1680ix-12
Hard disk drives	12x 2TB Hitachi Ultrastar 7K3000 HUS723020ALS640

TABLE 4: Hardware components of Workstation with Open-E DSS V6

Model	Supermicro SSE-G24-TF4
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

In order to monitor the server please use external Supremacy II Management Console.

Network functionality

Tests performed in this section check the functionality, performance and stability of the network solutions available in the Open-E DSS V6 product on the tested 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.

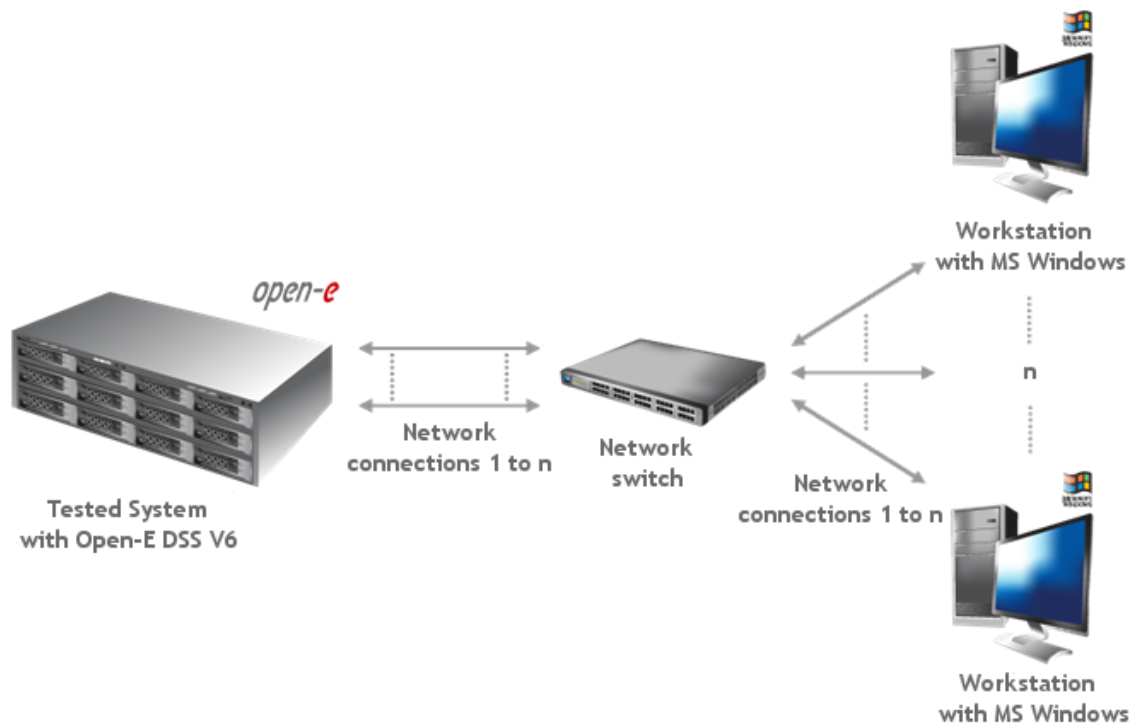


FIGURE 4: Network topology for Network testing

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 lometer testing tool.

2. Test results for 802.3ad bonding mode test performed on Intel Gigabit ET Dual Port Server Adapter (i82576) (on-board)

802.3ad bonding mode performance test results			
NIC model	Intel Gigabit ET Dual Port Server Adapter (i82576)		
Workstations with MS Windows	Write speed [MB/s]	Read speed [MB/s]	Performance test results
1 st Workstation	109.32	112.81	passed
2 nd Workstation	108.85	112.83	passed

TABLE 7: 802.3ad bonding mode performance test results table for Intel Gigabit ET Dual Port Server Adapter (i82576) (on-board)

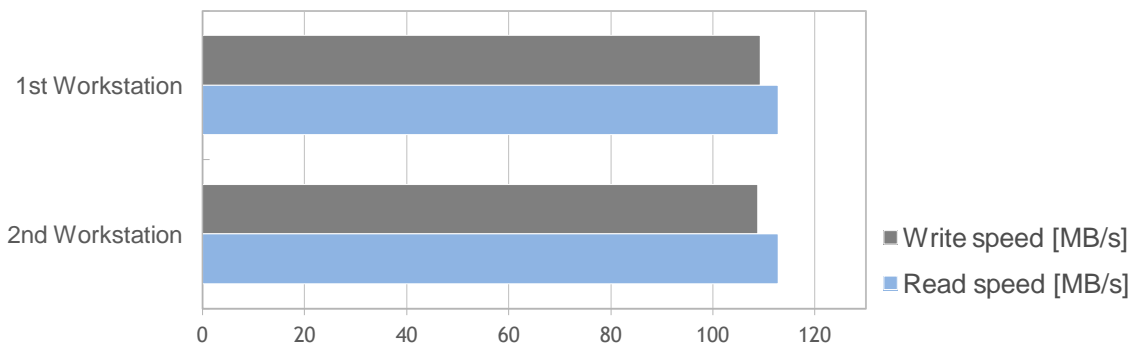


FIGURE 5: 802.3ad bonding mode performance test results chart for Intel Gigabit ET Dual Port Server Adapter (i82576) (on-board)

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 ET Dual Port Server Adapter (i82576) (on-board)

Balance-alb bonding mode performance test results			
NIC model	Intel Gigabit ET Dual Port Server Adapter (i82576)		
Workstations with MS Windows	Write speed [MB/s]	Read speed [MB/s]	Performance test results
1 st Workstation	112.88	112.65	passed
2 nd Workstation	112.31	112.40	passed

TABLE 8: Balance-alb bonding mode performance test results table for Intel Gigabit ET Dual Port Server Adapter (i82576) (on-board)

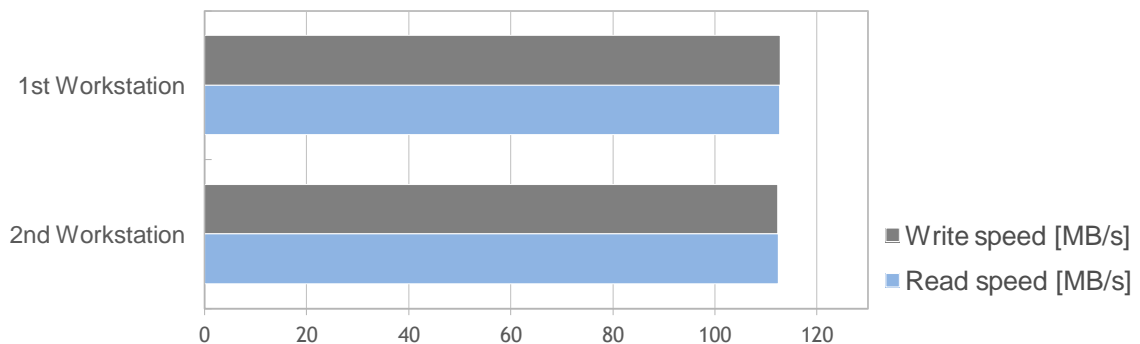


FIGURE 6: Balance-alb bonding mode performance test results chart for Intel Gigabit ET Dual Port Server Adapter (i82576) (on-board)

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 Intel Gigabit ET Dual Port Server Adapter (i82576) (on-board)

Balance-rr bonding mode performance test results			
NIC model	Intel Gigabit ET Dual Port Server Adapter (i82576)		
Workstations with MS Windows	Write speed [MB/s]	Read speed [MB/s]	Performance test results
1 st Workstation	107.52	109.44	passed
2 nd Workstation	103.33	100.59	passed

TABLE 9: Balance-rr bonding mode performance test results table for Intel Gigabit ET Dual Port Server Adapter (i82576) (on-board)

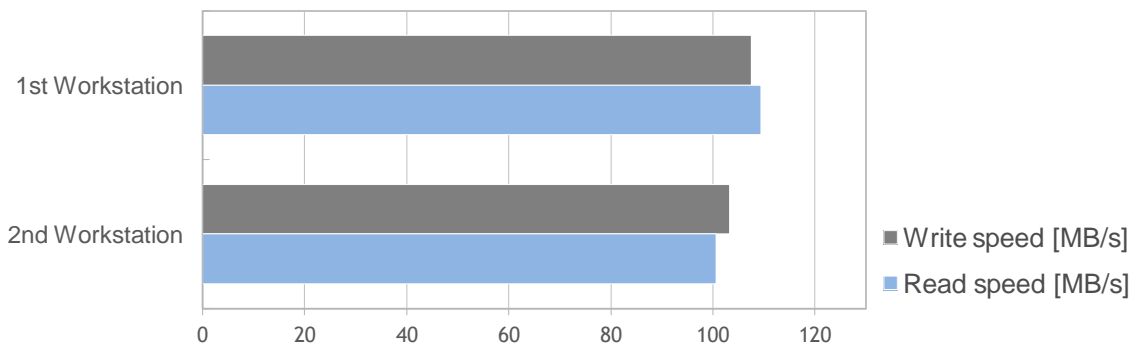


FIGURE 7: Balance-rr bonding mode performance test results chart for Intel Gigabit ET Dual Port Server Adapter (i82576) (on-board)

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 Ethernet Server Adapter (i82574L) (on-board)

Single NIC performance test results			
NIC model	Intel Ethernet Server Adapter (i82574L)		
Workstations with MS Windows	Write speed [MB/s]	Read speed [MB/s]	Performance test results
1 st Workstation	112.53	111.36	passed

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

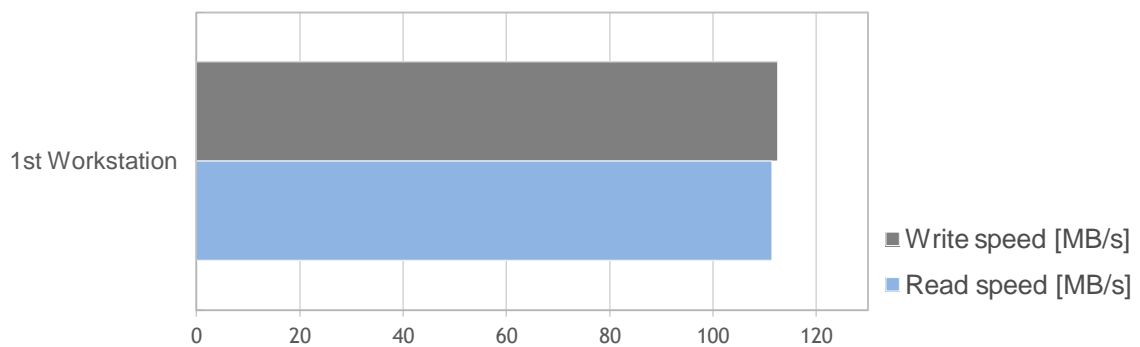


FIGURE 8: Single NIC performance test results chart for Gigabit Ethernet Server Adapter (i82574L) (on-board)

RAID functionality

Tests performed in this section check the functionality, performance and stability of Open-E DSS V6 storage devices on the tested system.

Tests in this section rely on the creation of the RAID units on 0, 5, 6, 10, 51 and 61 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

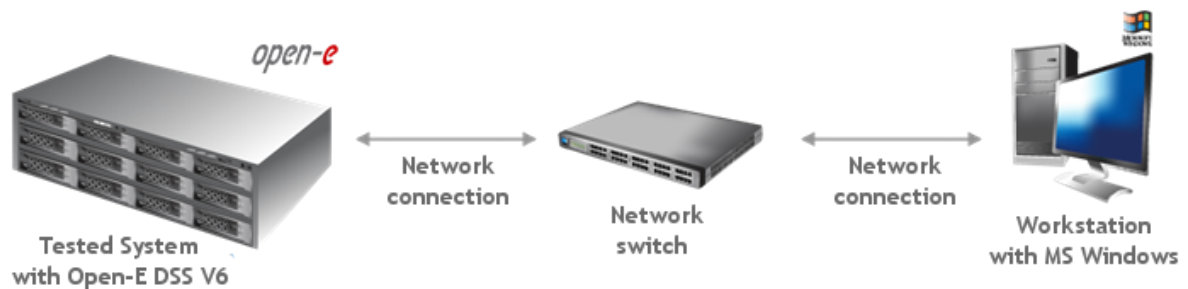


FIGURE 9: Network test topology for RAID testing

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 Gigabit ET Dual Port Server Adapter (i82576) (on-board)

RAID0 performance test results			
Block size [KB]	Write speed [MB/s]	Read speed [MB/s]	Performance test results
4	14.69	54.64	passed
32	88.66	104.50	passed
64	107.44	109.51	passed
128	108.58	110.90	passed
256	111.76	113.03	passed
512	112.73	113.02	passed
1024	112.85	113.00	passed
4096	112.90	112.89	passed

TABLE 11: RAID0 performance test results table for Intel Gigabit ET Dual Port Server Adapter (i82576) (on-board)

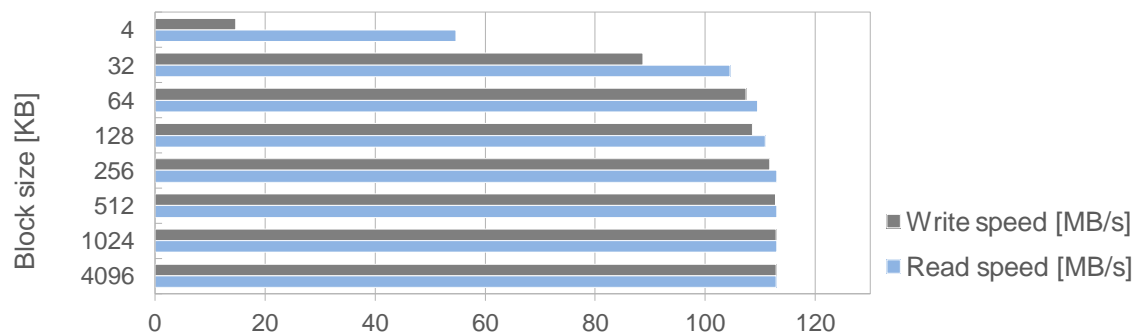


FIGURE 10: RAID0 performance test results chart for Intel Gigabit ET Dual Port Server Adapter (i82576) (on-board)

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 lometer testing tool.

2. Test results for RAID5 and Intel Gigabit ET Dual Port Server Adapter (i82576) (on-board)

RAID5 performance test results			
Block size [KB]	Write speed [MB/s]	Read speed [MB/s]	Performance test results
4	12,25	56.44	passed
32	11,62	112.50	failed
64	26.63	112.84	failed
128	35.72	113.03	failed
256	54.84	113.04	failed
512	64.27	113.02	failed
1024	106.84	113.01	passed
4096	111.84	112.89	passed

TABLE 12: RAID5 performance test results table for Intel Gigabit ET Dual Port Server Adapter (i82576) (on-board)

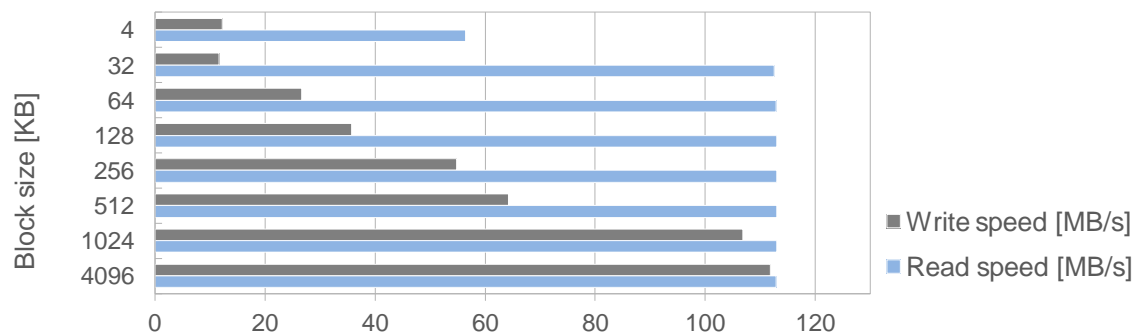


FIGURE 11: RAID5 performance test results chart for Intel Gigabit ET Dual Port Server Adapter (i82576) (on-board)

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 ET Dual Port Server Adapter (i82576) (on-board)

RAID6 performance test results			
Block size [KB]	Write speed [MB/s]	Read speed [MB/s]	Performance test results
4	4.77	54.19	failed
32	7.55	105.15	failed
64	22.06	108.77	failed
128	28.71	109.76	failed
256	42.01	112.25	failed
512	66.00	113.04	failed
1024	107.55	113.01	passed
4096	111.89	112.91	passed

TABLE 13: RAID6 performance test results table for Intel Gigabit ET Dual Port Server Adapter (i82576) (on-board)

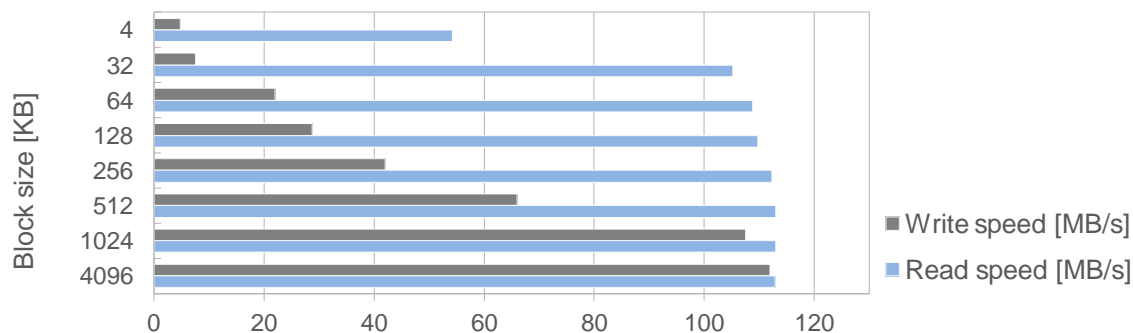


FIGURE 12: RAID6 performance test results chart for Intel Gigabit ET Dual Port Server Adapter (i82576) (on-board)

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 lometer testing tool.

2. Test results for RAID10 and Intel Gigabit ET Dual Port Server Adapter (i82576) (on-board)

RAID10 performance test results			
Block size [KB]	Write speed [MB/s]	Read speed [MB/s]	Performance test results
4	13.16	35.29	passed
32	71.83	103.14	passed
64	106.86	108.72	passed
128	108.68	110.16	passed
256	111.95	112.86	passed
512	112.93	112.89	passed
1024	112.86	112.86	passed
4096	112.76	112.67	passed

TABLE 14: RAID10 performance test results table for Intel Gigabit ET Dual Port Server Adapter (i82576) (on-board)

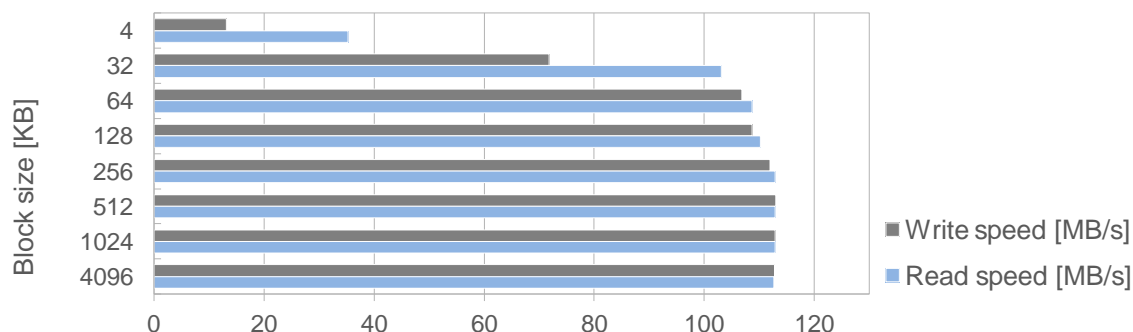


FIGURE 13: RAID10 performance test results chart for Intel Gigabit ET Dual Port Server Adapter (i82576) (on-board)

Hardware RAID51 test

1. Test description

The test relies on creation of the RAID51 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 RAID51 and Intel Gigabit ET Dual Port Server Adapter (i82576) (on-board)

RAID51 performance test results			
Block size [KB]	Write speed [MB/s]	Read speed [MB/s]	Performance test results
4	1.68	36.52	failed
32	11.63	103.21	failed
64	11.53	108.65	failed
128	42.17	110.04	failed
256	68.56	112.80	failed
512	83.39	112.86	failed
1024	100.92	112.84	passed
4096	111.17	112.71	passed

TABLE 15: RAID51 performance test results table for Intel Gigabit ET Dual Port Server Adapter (i82576) (on-board)

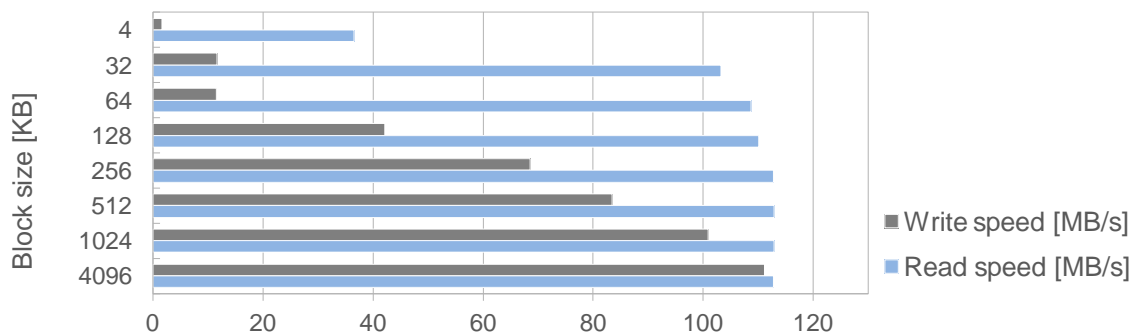


FIGURE 14: RAID51 performance test results chart for Intel Gigabit ET Dual Port Server Adapter (i82576) (on-board)

Hardware RAID61 test

1. Test description

The test relies on creation of the RAID61 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 RAID61 and Intel Gigabit ET Dual Port Server Adapter (i82576) (on-board)

RAID61 performance test results			
Block size [KB]	Write speed [MB/s]	Read speed [MB/s]	Performance test results
4	2.22	36.54	failed
32	7.44	103.07	failed
64	14.77	108.42	failed
128	19.35	110.20	failed
256	40.25	112.81	failed
512	75.92	112.84	failed
1024	94.77	112.87	failed
4096	68.93	14.87	failed

TABLE 16: RAID61 performance test results table for Intel Gigabit ET Dual Port Server Adapter (i82576) (on-board)

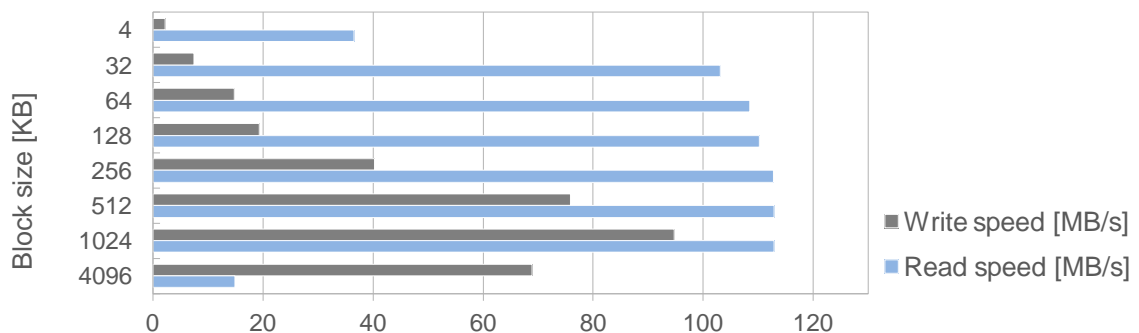


FIGURE 15: RAID61 performance test results chart for Intel Gigabit ET Dual Port Server Adapter (i82576) (on-board)

NAS functionality

Tests performed in this section check the functionality, performance and stability of the NAS protocols in the Open-E DSS V6 product on the tested 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.

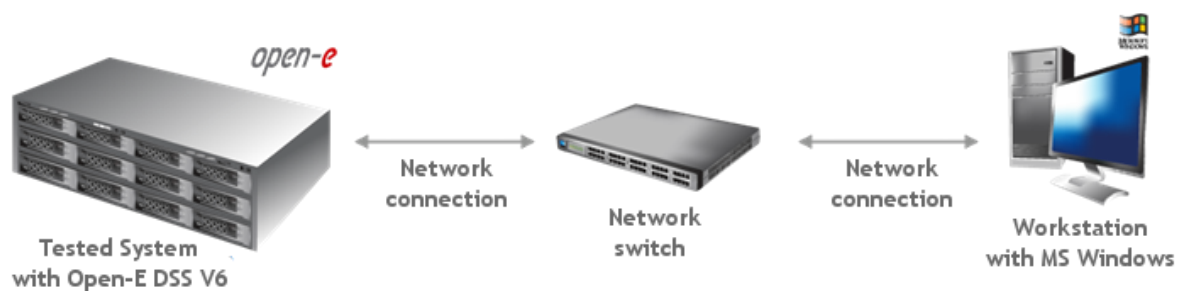


FIGURE 16: Network topology for NAS testing

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 ET Dual Port Server Adapter (i82576) (on-board)

SMB performance test results			
Block size [KB]	Write speed [MB/s]	Read speed [MB/s]	Performance test results
4	58.15	59.47	passed
32	112.48	112.63	passed
64	112.67	112.54	passed
128	112.82	112.23	passed
256	112.88	112.41	passed
512	112.88	112.37	passed
1024	112.76	112.29	passed
4096	112.67	112.20	passed

TABLE 17: SMB performance test results table for Intel Gigabit ET Dual Port Server Adapter (i82576) (on-board)

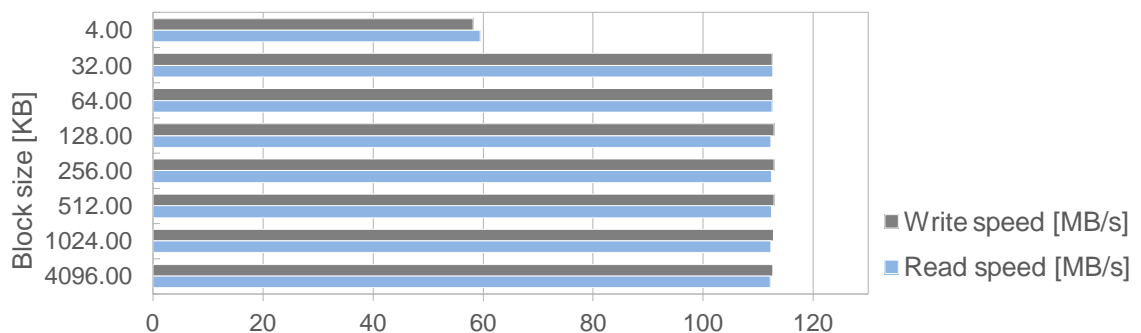


FIGURE 17: SMB performance test results chart for Intel Gigabit ET Dual Port Server Adapter (i82576) (on-board)

iSCSI functionality

Tests performed in this section check the functionality, performance and stability of the iSCSI protocol in the Open-E DSS V6 product on the tested system.

iSCSI Initiator test topology

Network topology for iSCSI Initiator testing is shown below.

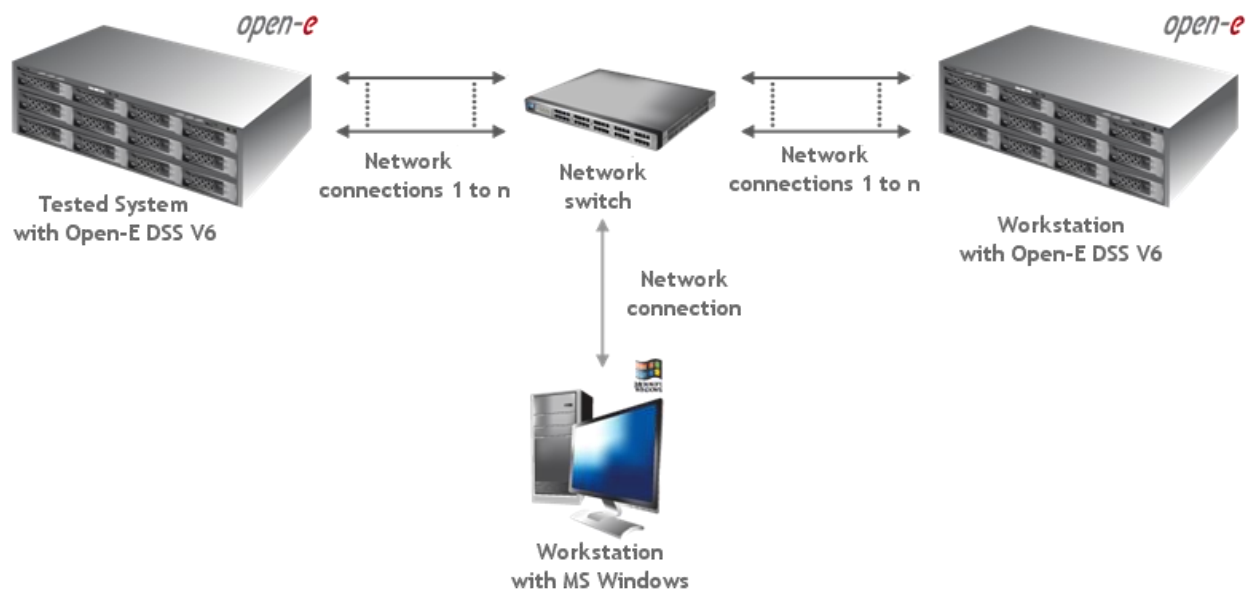


FIGURE 18: Network topology for iSCSI Initiator testing

iSCSI Target test topology

Network topology for iSCSI Target testing is shown below.

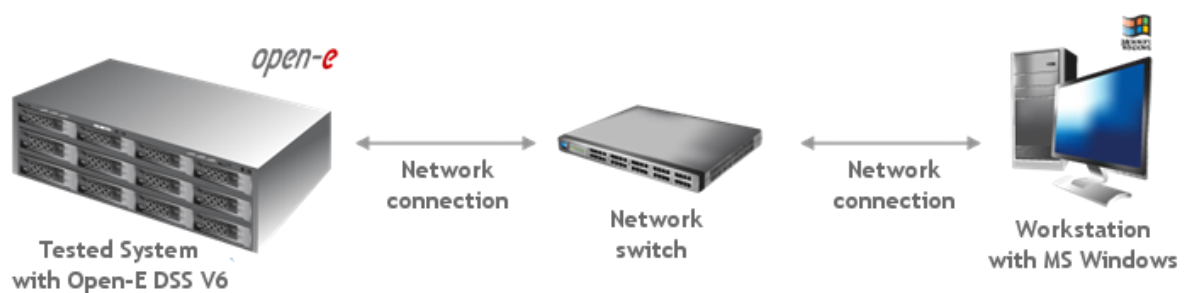


FIGURE 19: Network topology for iSCSI Target testing

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.

Tests were performed using network connection.

2. Test results for iSCSI Initiator and Intel Gigabit ET Dual Port Server Adapter (i82576) (on-board)

iSCSI Initiator performance test results			
Block size [KB]	Write speed [MB/s]	Read speed [MB/s]	Performance test results
4	55.17	59.29	passed
32	107.18	112.19	passed
64	112.19	112.09	passed
128	111.00	111.78	passed
256	111.02	111.76	passed
512	111.12	110.67	passed
1024	110.97	112.01	passed
4096	110.67	111.48	passed

TABLE 18: iSCSI Initiator performance test results table for Intel Gigabit ET Dual Port Server Adapter (i82576) (on-board)

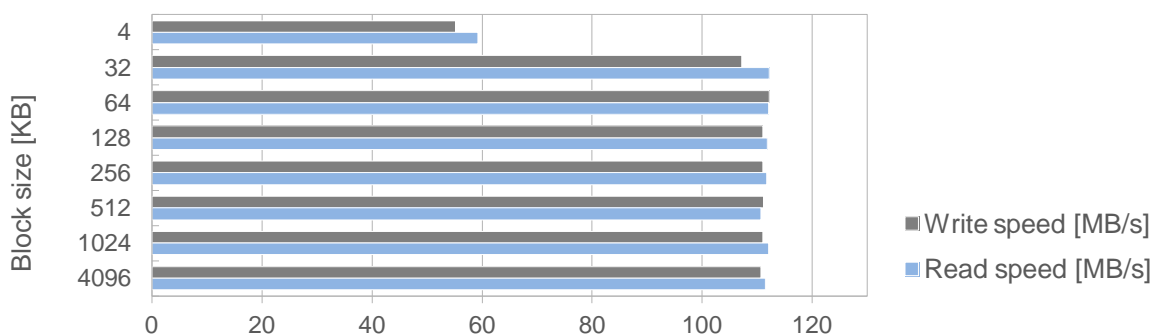


FIGURE 20: iSCSI Initiator performance test results chart for Intel Gigabit ET Dual Port Server Adapter (i82576) (on-board)

iSCSI Target test

1. Test description

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

2. Test results for iSCSI Target and Intel Gigabit ET Dual Port Server Adapter (i82576) (on-board)

iSCSI Target performance test results			
Block size [KB]	Write speed [MB/s]	Read speed [MB/s]	Performance test results
4	14.69	54.64	passed
32	88.66	104.50	passed
64	107.44	109.51	passed
128	108.58	110.90	passed
256	111.76	113.03	passed
512	112.73	113.02	passed
1024	112.85	113.00	passed
4096	112.90	112.89	passed

TABLE 19: iSCSI Target performance test results table for Intel Gigabit ET Dual Port Server Adapter (i82576) (on-board)

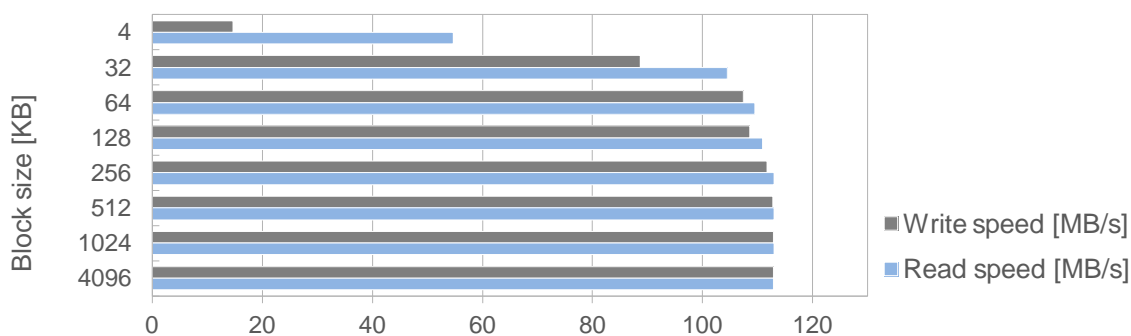


FIGURE 21: iSCSI Target performance test results chart for Intel Gigabit ET Dual Port Server Adapter (i82576) (on-board)