TAROX ParX R104s G5 system

Executive summary

After performing all tests, the TAROX ParX R104s G5 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 TAROX ParX R104s 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 TAROX ParX R104s G5 good iSCSI storage in SOHO environment:

➢ HW RAID5 or RAID6 for high performance and data safety.

➢ Two 1GbE interfaces for fast MPIO connection.

✓ **NAS filer**

For this application the following can be used:

➢ Four high capacity SATA hard drives provide a good amount of space for user files.

➢ Hardware RAID5 or RAID6 for fault tolerance and the most efficient use of available disk space or RAID10 for increased IOPS.

➢ Two 1GbE interfaces for independent connection to different networks or link aggregation for improved throughput.

✓ **Storage for CCTV**

The following features make TAROX ParX R104s G5 good storage for small video monitoring installations:

➢ Four high capacity SATA hard drives with high RAID level provide lots of redundant storage for CCTV records.

➢ Two 1GbE interfaces for independent connection to different networks or link aggregation for improved throughput.

Certification notes

For link aggregation, it is recommended to use balance-alb or 802.3ad bonding mode.

TAROX ParX R104s G5 hardware components

Technical specifications about the certified system are listed below:

Model	TAROX ParX R104s G5
Operating system	Open-E DSS V7 build 10529
Enclosure/chassis	TAROX Servergehause Rack SM813MTQ-441 CB
CPU	Intel Xeon Processor E3-1220 v3 3.10GHz
Motherboard	Supermicro X10SLH-F
Memory	2x 8GB Crucial CT102472BD160B DDR3 ECC
Network	2x Intel Ethernet Controller I210-AT (on-board)
HW RAID	LSI MegaRAID SAS 9271-4i
Hard disk drives	4x 2TB HGST Ultrastar 7K3000

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

TAROX ParX R104s G5 photos

FIGURE 1: *Front photo*
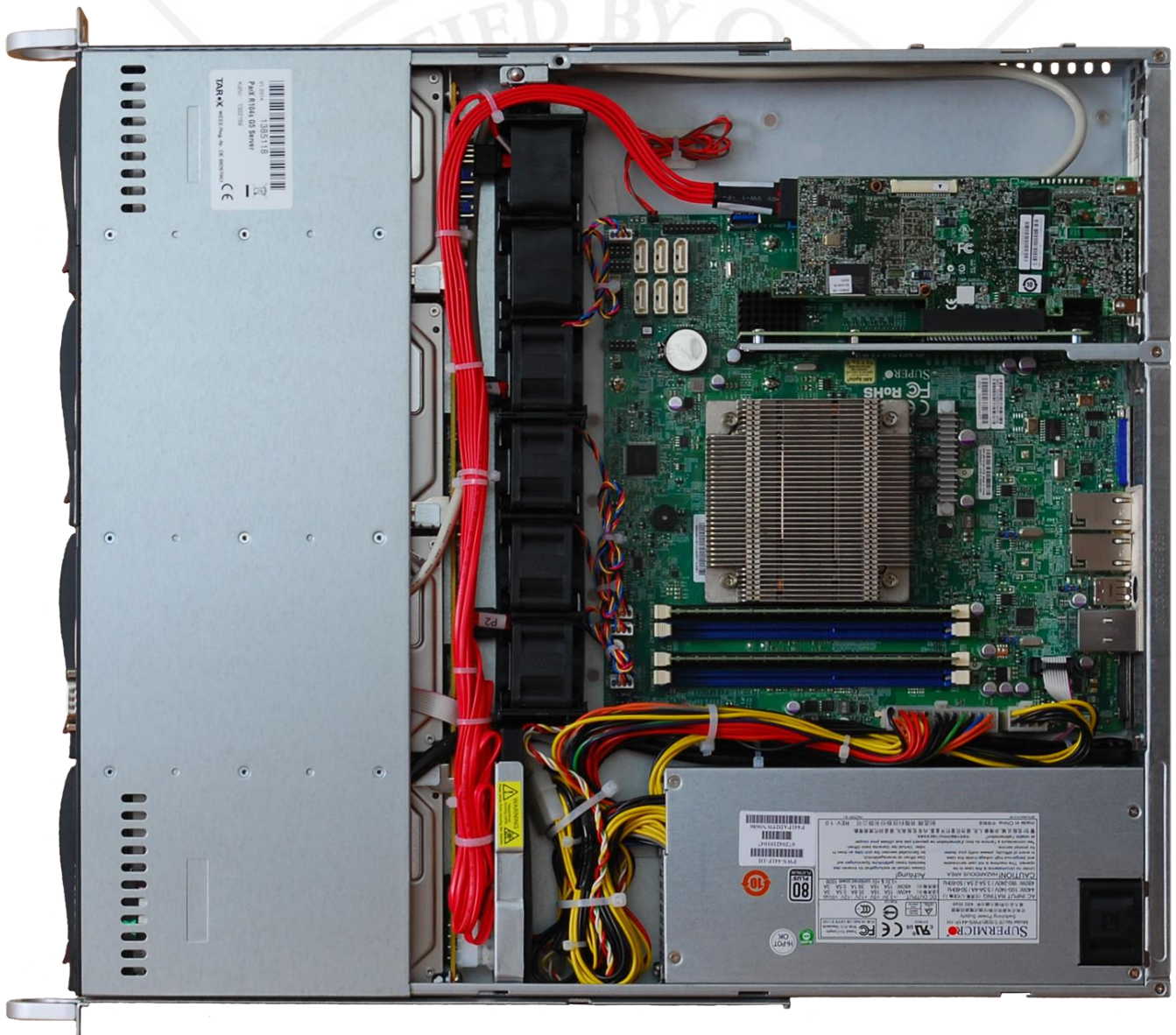

FIGURE 2: *Rear photo*

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	Custom
Operating system	MS Windows Server 2008 R2
Enclosure/chassis	Inter-Tech IPC 4088 4HE
Motherboard	Asus P8B-E/4L
CPU	Intel Xeon E3-1230 3.20 GHz
Memory	3x 4GB DDR3 Kingston KVR1333D3E9S/4G
Network	4x Intel 82574L Gigabit Ethernet Controller (on-board)
Hard disk drives	1TB Hitachi Ultrastar A7K2000 HUA722010CLA330

TABLE 2: Hardware components of first Workstation with MS Windows

Model	Custom
Operating system	MS Windows Server 2008 R2
Enclosure/chassis	Inter-Tech IPC 4088 4HE
Motherboard	Asus P8B-E/4L
CPU	Intel Xeon E3-1230 3.20 GHz
Memory	3x 4GB DDR3 Kingston KVR1333D3E9S/4G
Network	4x Intel 82574L Gigabit Ethernet Controller (on-board)
Hard disk drives	1TB Hitachi Ultrastar A7K2000 HUA722010CLA330

TABLE 3: Hardware components of second Workstation with MS Windows

Model	Custom
Operating system	Open-E DSS V7 build 10529
Enclosure/chassis	Inter-Tech IPC 4088 4HE
CPU	Intel Xeon Processor E3-1230 3.20 GHz
Motherboard	Asus P8B-E/4L
Memory	3x 4GB DDR3 Kingston KVR1333D3E9S/4G
Network	4x Intel 82574L Gigabit Ethernet Controller (on-board)
HW RAID	Intel RAID Controller RS2WC080
Hard disk drives	500GB Hitachi Deskstar 7K1000.C HDS721050CLA362
Hard disk drives	8x 1TB Hitachi Ultrastar A7K2000 HUA722010CLA330

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

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

TABLE 5: *Network switch details for 1GbE connections*

Administration functionality

The following functionality has been tested.

Drive identifier	OK
Power button	OK
Front and rear LEDs	OK

TABLE 6: *Administration functionality test results*

Network functionality

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

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

Network test topology

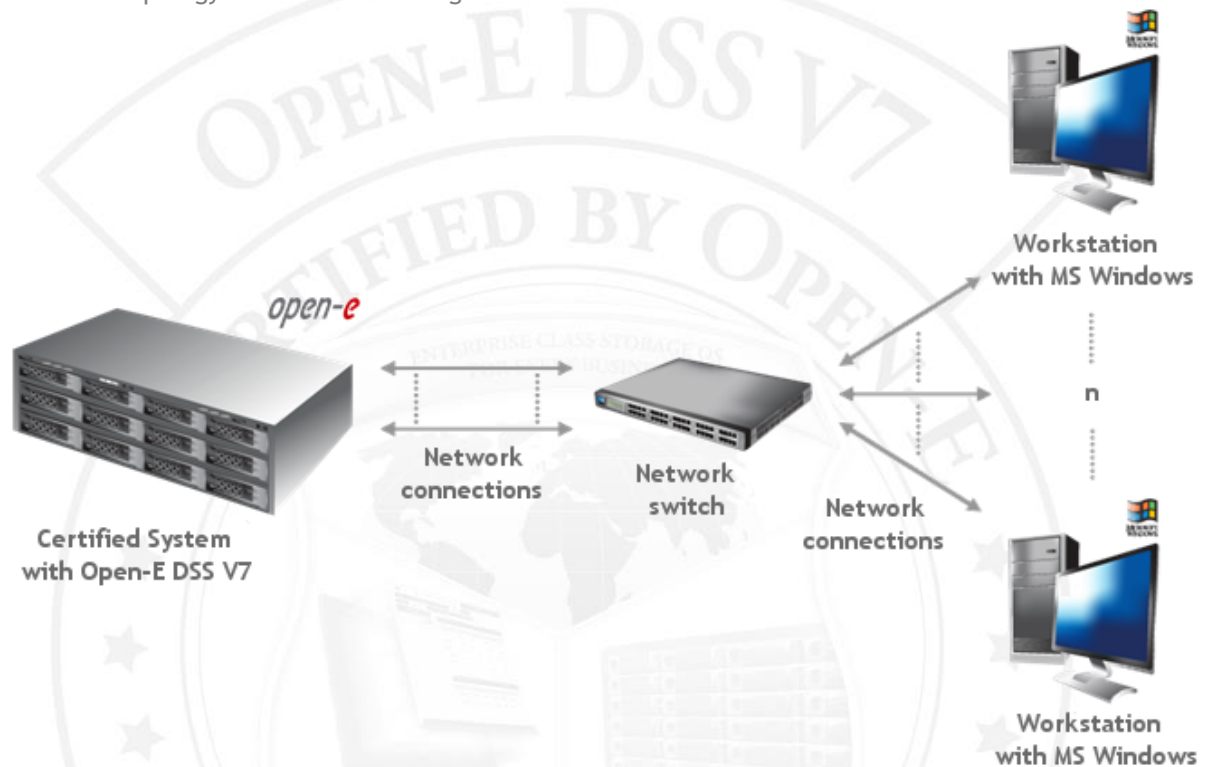Network topology for Network testing is shown below.

FIGURE 4: Network topology for Network testing

802.3ad bonding mode test

1. Test description

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

2. Test results for 802.3ad bonding mode test performed on Intel Ethernet Controller I210-AT (on-board)

802.3ad bonding mode performance test results			
NIC model	Intel Ethernet Controller I210-AT (on-board)		
Workstations with MS Windows	Write speed [MB/s]	Read speed [MB/s]	Performance test results
1st Workstation	111.11	111.96	passed
2nd Workstation	112.13	111.97	passed

TABLE 7: *802.3ad bonding mode performance test results table for Intel Ethernet Controller I210-AT (on-board)*
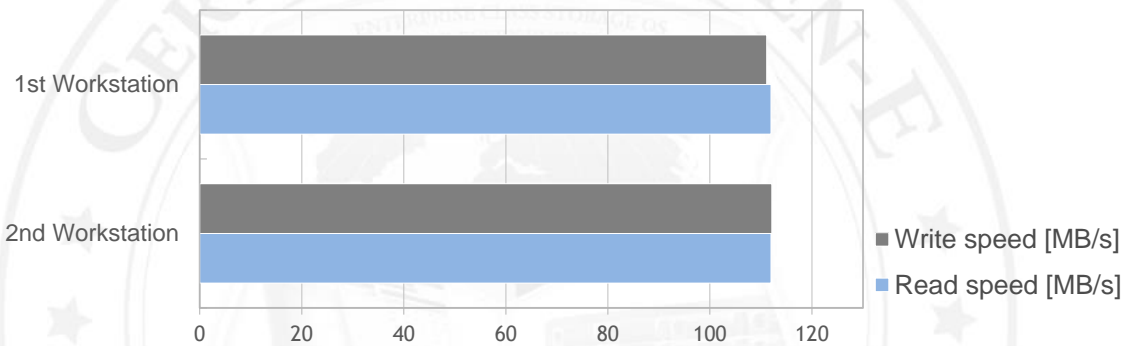

FIGURE 5: *802.3ad bonding mode performance test results chart for Intel Ethernet Controller I210-AT (on-board)*

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 Ethernet Controller I210-AT (on-board)

Balance-alb bonding mode performance test results			
NIC model	Intel Ethernet Controller I210-AT (on-board)		
Workstations with MS Windows	Write speed [MB/s]	Read speed [MB/s]	Performance test results
1st Workstation	112.27	109.81	passed
2nd Workstation	112.22	110.15	passed

TABLE 8: Balance-alb bonding mode performance test results table for Intel Ethernet Controller I210-AT (on-board)
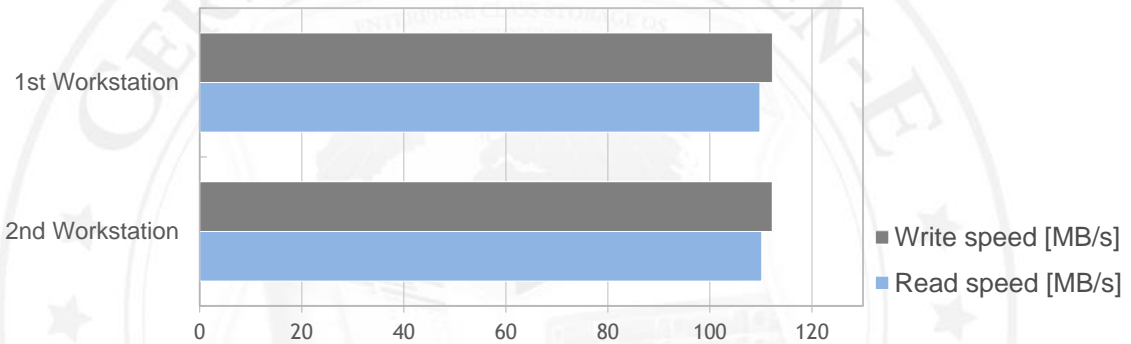
FIGURE 6: Balance-alb bonding mode performance test results chart for Intel Ethernet Controller I210-AT (on-board)

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 Ethernet Controller I210-AT (on-board)

Balance-rr bonding mode performance test results			
NIC model	Intel Ethernet Controller I210-AT (on-board)		
Workstations with MS Windows	Write speed [MB/s]	Read speed [MB/s]	Performance test results
1st Workstation	112,16	57,38	passed
2nd Workstation	111,96	58,08	passed

TABLE 9: Balance-rr bonding mode performance test results table for Intel Ethernet Controller I210-AT (on-board)
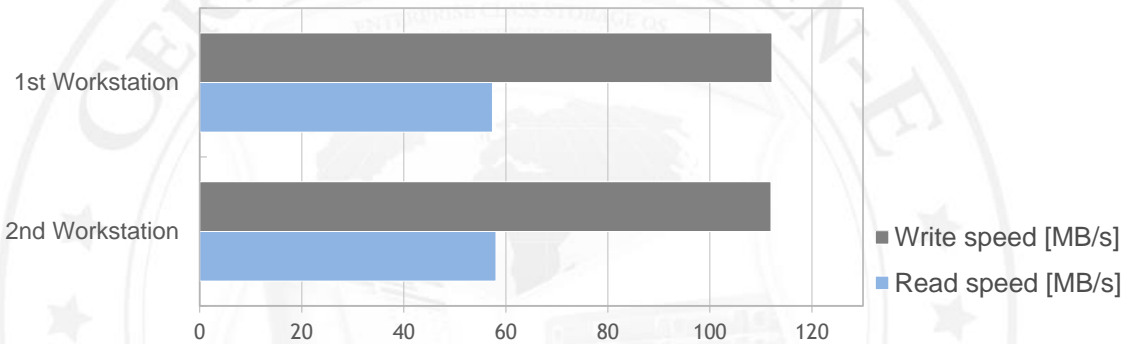

FIGURE 7: Balance-rr bonding mode performance test results chart for Intel Ethernet Controller I210-AT (on-board)

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 Ethernet Controller I210-AT (on-board)

Single NIC performance test results			
NIC model	Intel Ethernet Controller I210-AT (on-board)		
Workstations with MS Windows	Write speed [MB/s]	Read speed [MB/s]	Performance test results
1st Workstation	112.01	111.96	passed

TABLE 10: *Single NIC performance test results table for Intel Ethernet Controller I210-AT (on-board)*
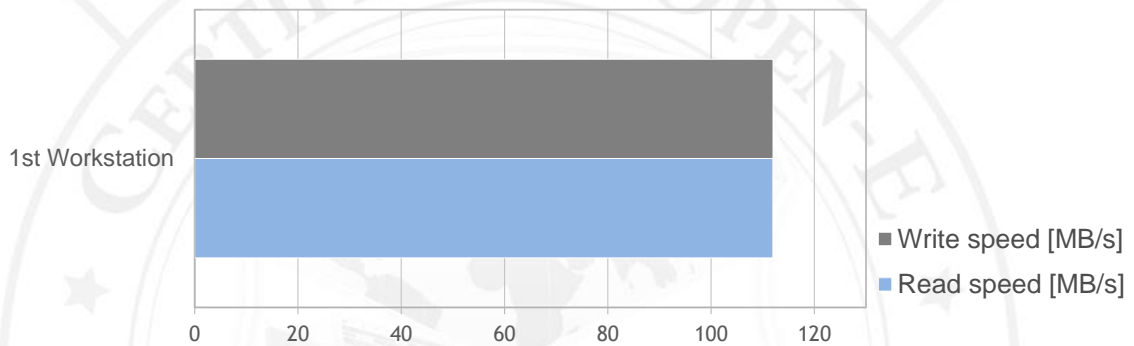

FIGURE 8: *Single NIC performance test results chart for Intel Ethernet Controller I210-AT (on-board)*

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 and 10 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
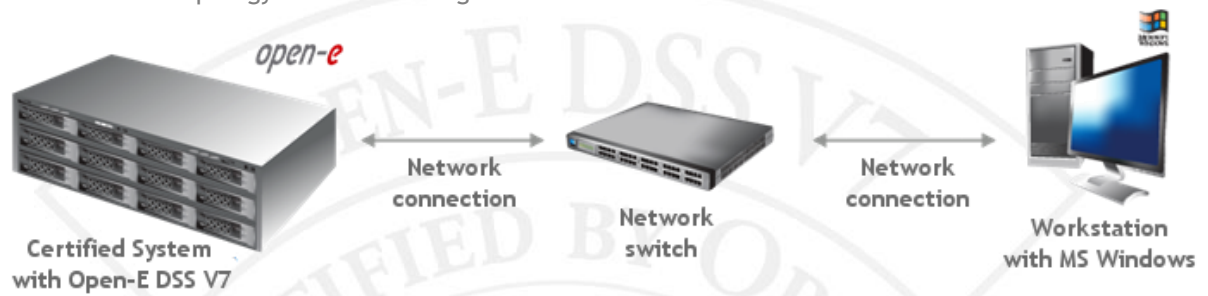
Network test topology for RAID testing is shown below

FIGURE 9: Network test topology for RAID testing

open-e

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 Controller I210-AT (on-board)

RAID0 performance test results			
Block size [KB]	Write speed [MB/s]	Read speed [MB/s]	Performance test results
4	33.00	48.50	passed
32	67.25	110.03	passed
64	75.31	111.79	passed
128	90.40	110.92	passed
256	107.84	112.04	passed
512	112.20	112.04	passed
1024	112.30	112.02	passed
4096	112.26	111.90	passed

TABLE 11: RAID0 performance test results table for Intel Ethernet Controller I210-AT (on-board)
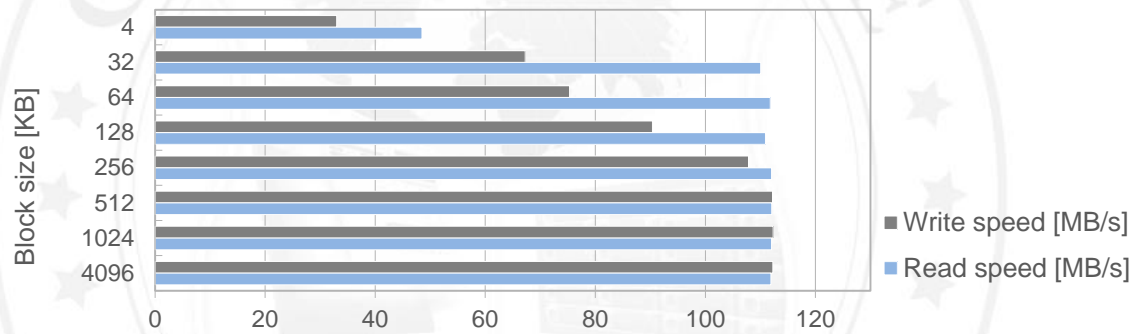

FIGURE 10: RAID0 performance test results chart for Intel Ethernet Controller I210-AT (on-board)

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 Ethernet Controller I210-AT (on-board)

RAID5 performance test results			
Block size [KB]	Write speed [MB/s]	Read speed [MB/s]	Performance test results
4	33.01	48.69	passed
32	61.14	110.39	passed
64	72.91	111.45	passed
128	87.31	111.74	passed
256	107.93	111.99	passed
512	112.17	112.03	passed
1024	112.24	112.02	passed
4096	112.12	111.88	passed

TABLE 12: RAID5 performance test results table for Intel Ethernet Controller I210-AT (on-board)
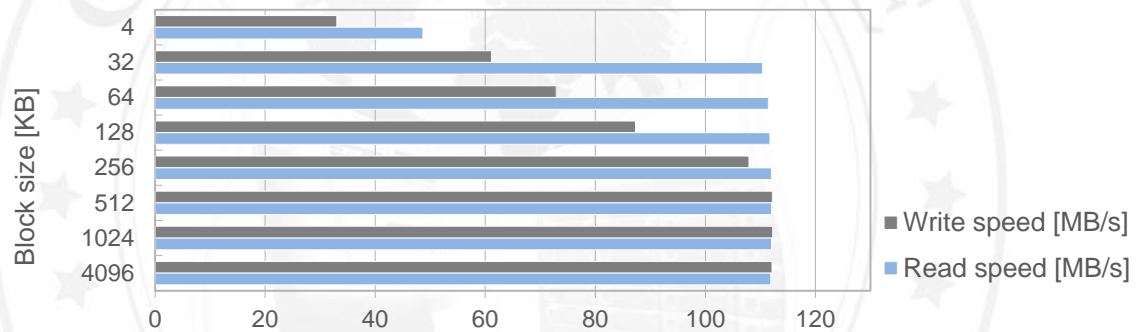

FIGURE 11: RAID5 performance test results chart for Intel Ethernet Controller I210-AT (on-board)

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 Ethernet Controller I210-AT (on-board)

RAID6 performance test results			
Block size [KB]	Write speed [MB/s]	Read speed [MB/s]	Performance test results
4	32.67	46.69	passed
32	66.97	110.30	passed
64	77.55	111.75	passed
128	90.13	111.12	passed
256	107.79	111.99	passed
512	112.14	111.96	passed
1024	112.26	112.01	passed
4096	112.11	111.89	passed

TABLE 13: RAID6 performance test results table for Intel Ethernet Controller I210-AT (on-board)
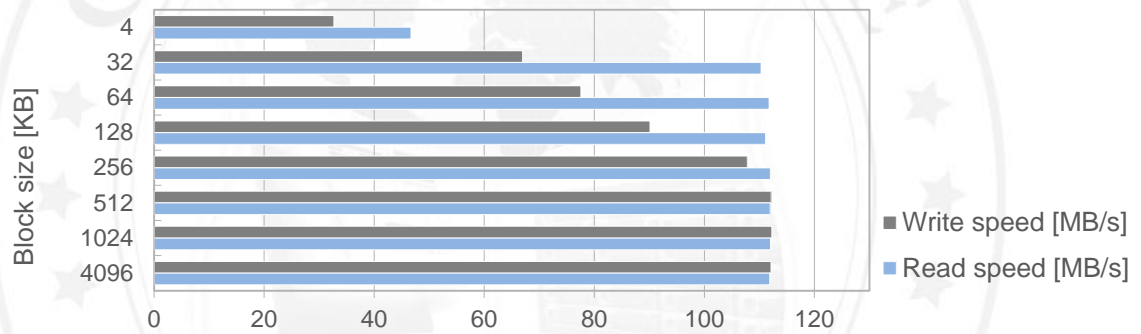

FIGURE 12: RAID6 performance test results chart for Intel Ethernet Controller I210-AT (on-board)

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 Ethernet Controller I210-AT (on-board)

RAID10 performance test results			
Block size [KB]	Write speed [MB/s]	Read speed [MB/s]	Performance test results
4	33,17	48,37	passed
32	64,14	108,68	passed
64	76,47	111,14	passed
128	89,01	111,63	passed
256	107,87	112,02	passed
512	112,19	112,03	passed
1024	112,28	112,03	passed
4096	112,28	111,91	passed

TABLE 14: RAID10 performance test results table for Intel Ethernet Controller I210-AT (on-board)
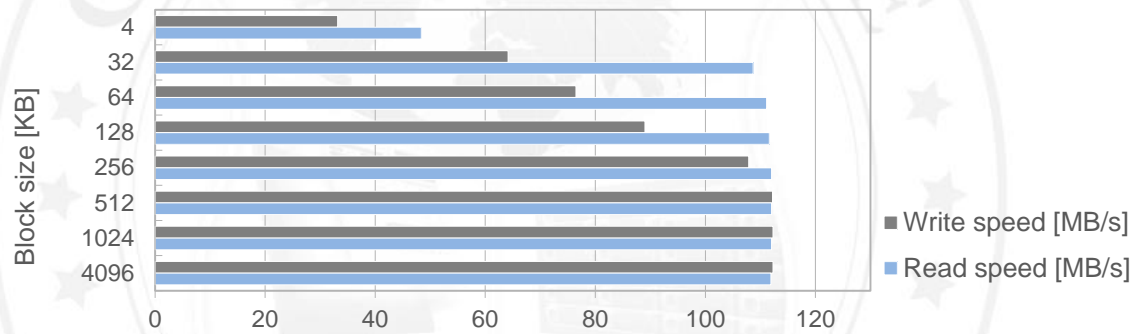

FIGURE 13: RAID10 performance test results chart for Intel Ethernet Controller I210-AT (on-board)

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

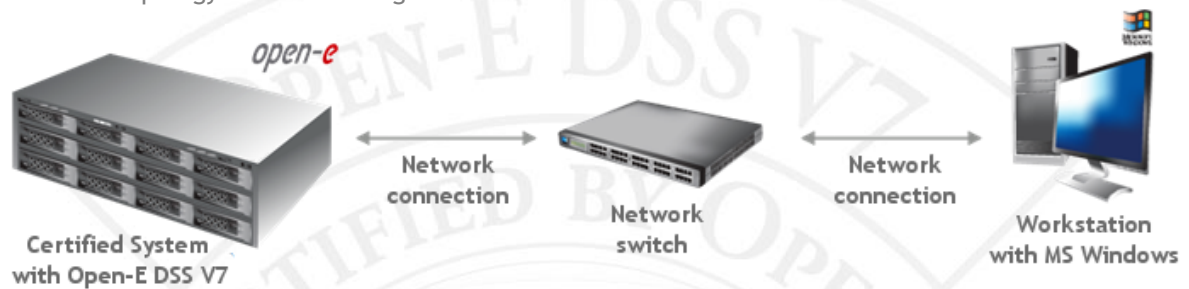Network topology for NAS testing is shown below.

FIGURE 14: Network topology for NAS testing

open-e

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 Ethernet Controller I210-AT (on-board)

SMB performance test results			
Block size [KB]	Write speed [MB/s]	Read speed [MB/s]	Performance test results
4	68.14	61.26	passed
32	112.60	112.72	passed
64	112.92	112.69	passed
128	112.86	112.54	passed
256	112.86	112.79	passed
512	112.93	112.81	passed
1024	112.90	112.79	passed
4096	112.78	112.61	passed

TABLE 15: SMB performance test results table for Intel Ethernet Controller I210-AT (on-board)
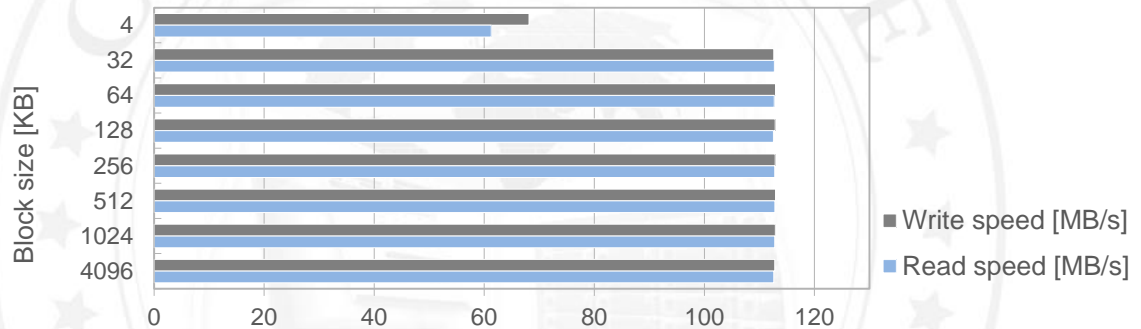

FIGURE 15: SMB performance test results chart for Intel Ethernet Controller I210-AT (on-board)

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

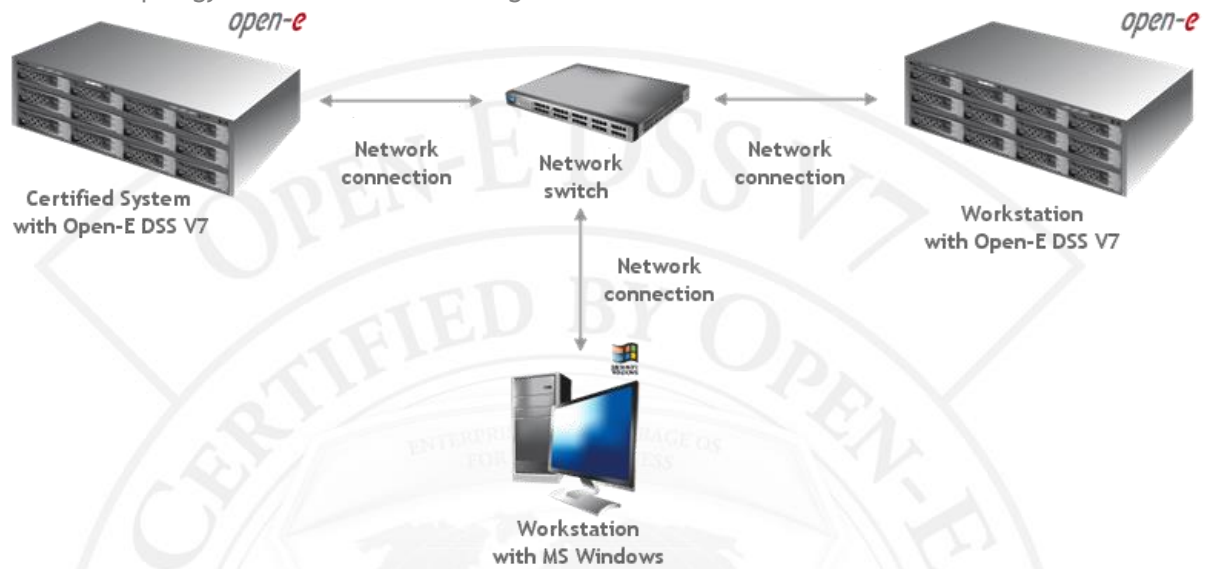Network topology for iSCSI Initiator testing is shown below.

FIGURE 16: Network topology for iSCSI Initiator testing

iSCSI Target test topology

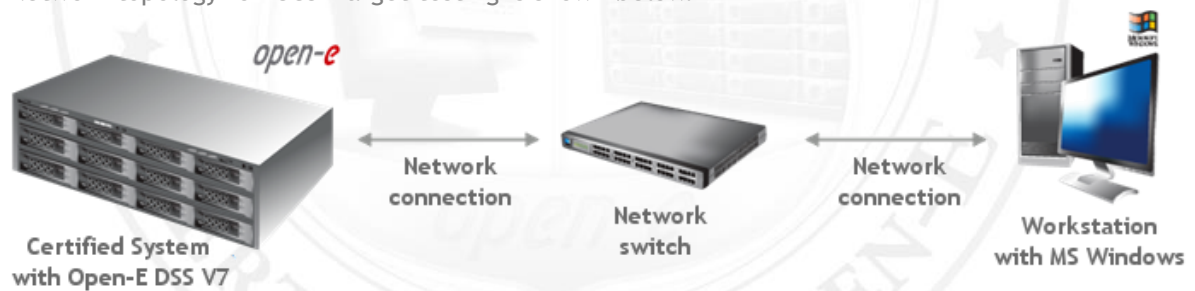Network topology for iSCSI Target testing is shown below.

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 Controller I210-AT (on-board)

iSCSI Initiator performance test results			
Block size [KB]	Write speed [MB/s]	Read speed [MB/s]	Performance test results
4	62.77	60.63	passed
32	109.47	112.67	passed
64	109.86	112.69	passed
128	110.26	112.77	passed
256	110.60	112.78	passed
512	109.81	112.82	passed
1024	111.29	112.78	passed
4096	110.23	112.57	passed

TABLE 16: iSCSI Initiator performance test results table for Intel Ethernet Controller I210-AT (on-board)
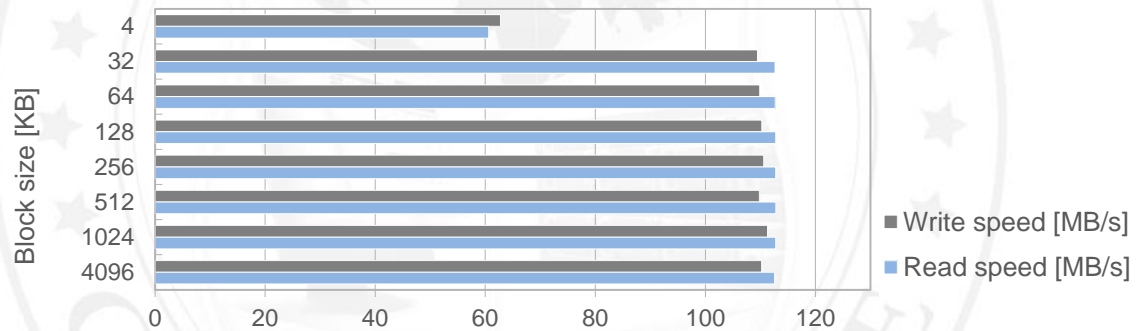

FIGURE 18: iSCSI Initiator performance test results chart for Intel Ethernet Controller I210-AT (on-board)

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 Ethernet Controller I210-AT (on-board)

iSCSI Target performance test results			
Block size [KB]	Write speed [MB/s]	Read speed [MB/s]	Performance test results
4	33.86	56.85	passed
32	103.50	111.83	passed
64	111.18	111.88	passed
128	110.16	110.16	passed
256	109.10	111.99	passed
512	112.26	112.03	passed
1024	112.31	112.02	passed
4096	112.18	111.91	passed

TABLE 17: iSCSI Target performance test results table for Intel Ethernet Controller I210-AT (on-board)
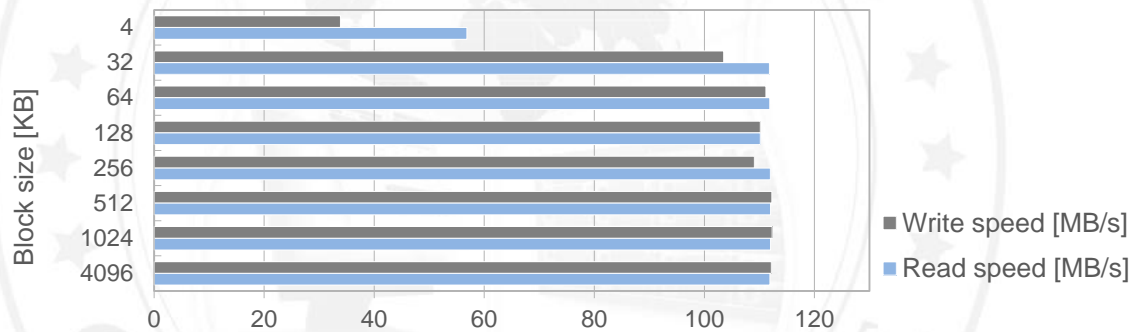

FIGURE 19: iSCSI Target performance test results chart for Intel Ethernet Controller I210-AT (on-board)