EUROstor ES-8724XDR-2U Storage system

Executive summary

After performing all tests, the EUROstor ES-8724XDR-2U 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 EUROstor ES-8724XDR-2U is stable and performs well.

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

✓ Storage for virtualization

The following features make EUROstor ES-8724XDR-2U great storage for virtualization:

➢ HW RAID5, RAID6, RAID50 and RAID60 for high performance and data safety.

➢ Six 10GbE network interfaces provides enough throughput for efficient network connections to virtualization systems.

➢ Redundant power supply for system reliability.

✓ NAS filer

For this application the following can be used:

➢ Twentyfour Enterprise SAS hard drives provide a plenty of space for user files.

➢ Hardware RAID5, RAID50, RAID6 and RAID60 for fault tolerance and the most efficient use of available disk space.

➢ Four 10GbE fiber and two 10GbE copper interfaces for independent connection to different networks or link aggregation for improved throughput.

✓ iSCSI storage

The following features make EUROstor ES-8724XDR-2U good iSCSI storage:

➢ Twentyfour Enterprise SAS drives with RAID50 or RAID60 ensure fast random data access and reliability.

➢ Four 10GbE fiber and two 10GbE copper interfaces for fast MPIO connection and flexible network topology.

➢ Redundant power supply for system reliability.

EUROstor ES-8724XDR-2U hardware components

Technical specifications about the certified system are listed below:

Model	EUROstor ES-8724XDR-2U
Operating system	Open-E DSS V7 build 16323
Enclosure/chassis	Supermicro SC216BE1C-R920LPB
CPU	Intel® Xeon® Processor E5 2623 v3 3.00 GHz
Motherboard	Supermicro X10DRi-T
Memory	4x 8GB Samsung DDR4-2133 REG ECC
Network	1x Intel® X540 Dual port 10GBase-T
Network	2x QLogic QLE3442-CU
HW RAID	Areca 1883LP
Hard disk drives	24x 600GB SEAGATE ST600MM0006

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

EUROstor ES-8724XDR-2U photos

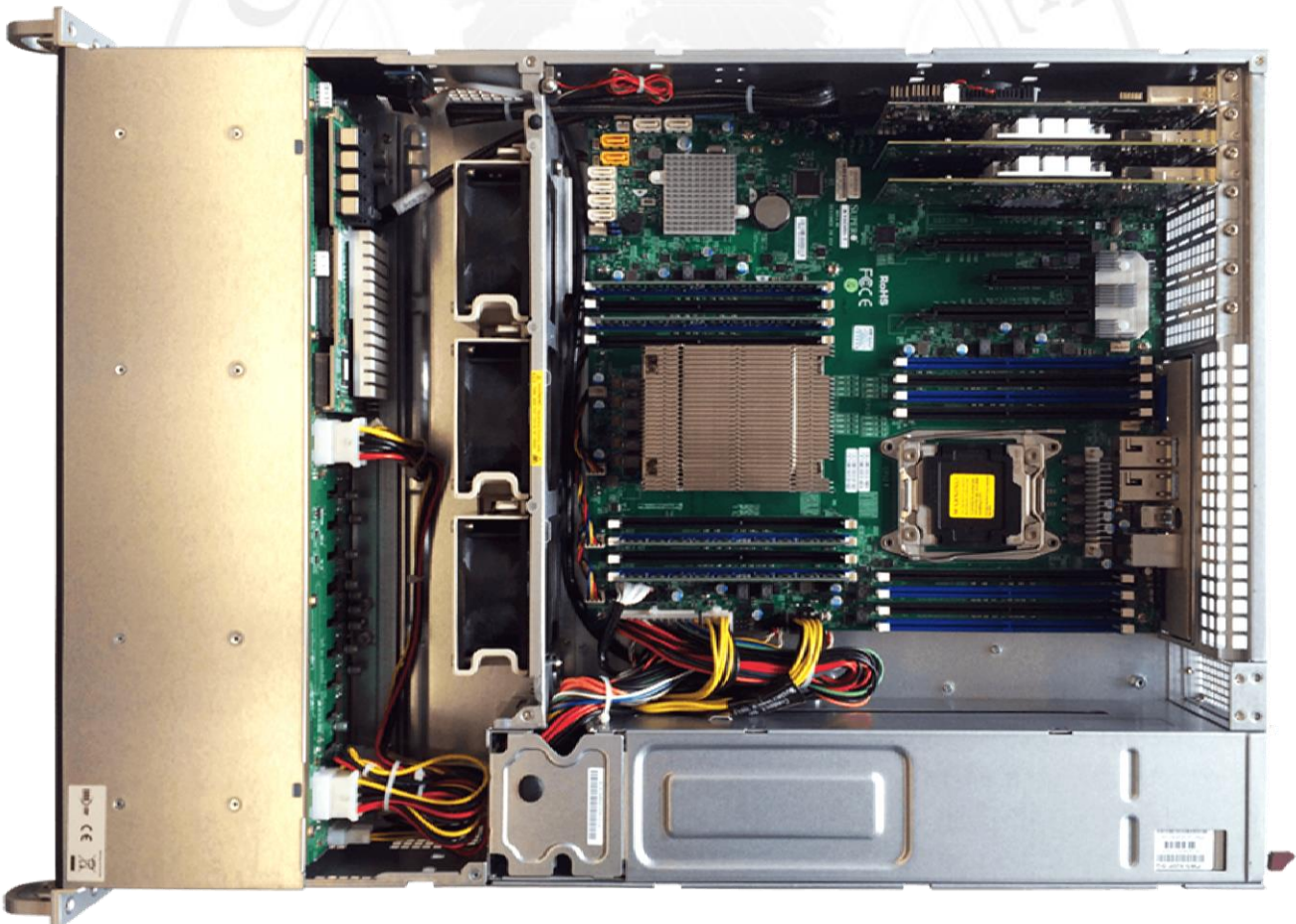*FIGURE 1: Front photo*

FIGURE 2: Rear photo

FIGURE 3: Top photo

Auxiliary systems hardware components

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

Model	Custom
Operating system	MS Windows Server 2012 R2
Enclosure/chassis	Supermicro CSE-819TQ-R700WB
Motherboard	Supermicro X9DRW-3LN4F+
CPU	Intel® Xeon® Processor E5-2609 v2 2.5GHz
Memory	4x 8GB Samsung DDR3-1600 REG ECC
Network	Intel I350 Quadport Gigabit
Network	QLogic QLE3442-CU
Hard disk controller	Intel® C606 chipset SAS Controller
Hard disk drives	2x 1TB SEAGATE ST1000NM0033

TABLE 2: Hardware components of first Workstation with MS Windows

Model	Custom
Operating system	MS Windows Server 2012 R2
Enclosure/chassis	Supermicro CSE-819TQ-R700WB
Motherboard	Supermicro X9DRW-3LN4F+
CPU	Intel® Xeon® Processor E5-2630 v2 2.6GHz
Memory	4x 8GB Samsung DDR3-1600 REG ECC
Network	Intel I350 Quadport Gigabit
Network	QLogic QLE3442-CU
Hard disk controller	Intel® C606 chipset SAS Controller
Hard disk drives	2x 1TB SEAGATE ST1000NM0033

TABLE 3: Hardware components of second Workstation with MS Windows

Model	EUROstor ES-8724XDR-2U
Operating system	Open-E DSS V7 build 16323
Enclosure/chassis	Supermicro SC216BE1C-R920LPB
CPU	Intel® Xeon® Processor E5 2623 v3 3.00 GHz
Motherboard	Supermicro X10DRi-T
Memory	4x 8GB Samsung DDR4-2133 REG ECC
Network	1x Intel X540 Dual port 10GBase-T
Network	2x QLogic QLE3442-CU
HW RAID	Areca 1883LP
Hard disk drives	24x 600GB SEAGATE ST600MM0006

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

Model	2x Brocade VDX6740
Description	48 x 10Gbit SFP+ Ports

TABLE 5: Network switch details for connection with 10GbE

Administration functionality

The following functionality has been tested.

Drive identifier	N/A
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

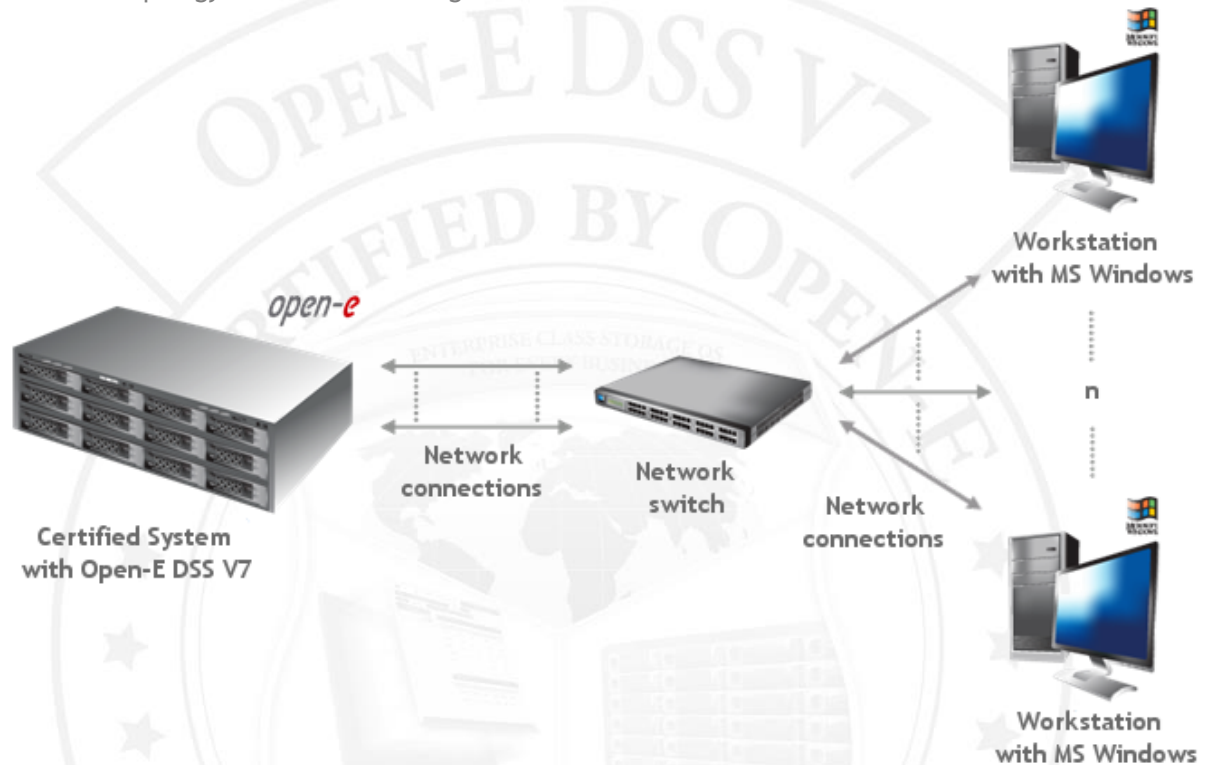Network topology for Network testing is shown below.

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 QLogic QLE3442-CU

802.3ad bonding mode performance test results			
NIC model	QLogic QLE3442-CU		
Workstations with MS Windows	Write speed [MB/s]	Read speed [MB/s]	Performance test results
1st Workstation	1174	1170	passed
2nd Workstation	1180	1172	passed

TABLE 7: 802.3ad bonding mode performance test results table for QLogic QLE3442-CU
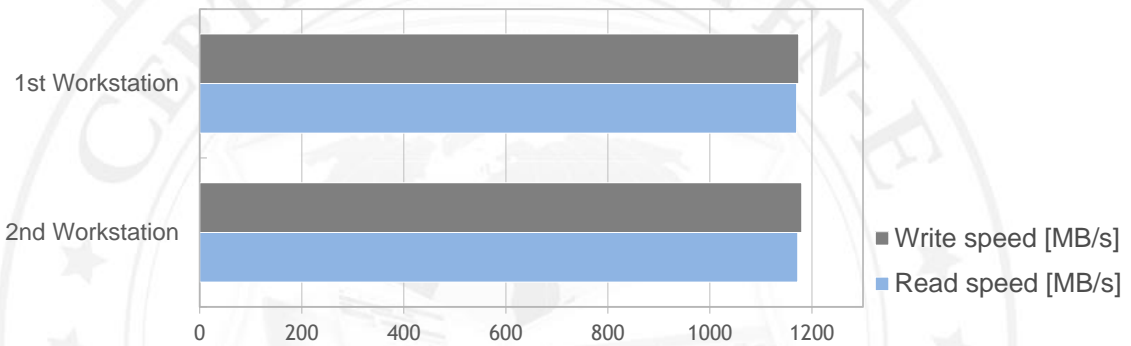

FIGURE 5: 802.3ad bonding mode performance test results chart for QLogic QLE3442-CU

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 QLogic QLE3442-CU

Balance-alb bonding mode performance test results			
NIC model	QLogic QLE3442-CU		
Workstations with MS Windows	Write speed [MB/s]	Read speed [MB/s]	Performance test results
1st Workstation	1185	1182	passed
2nd Workstation	1165	1164	passed

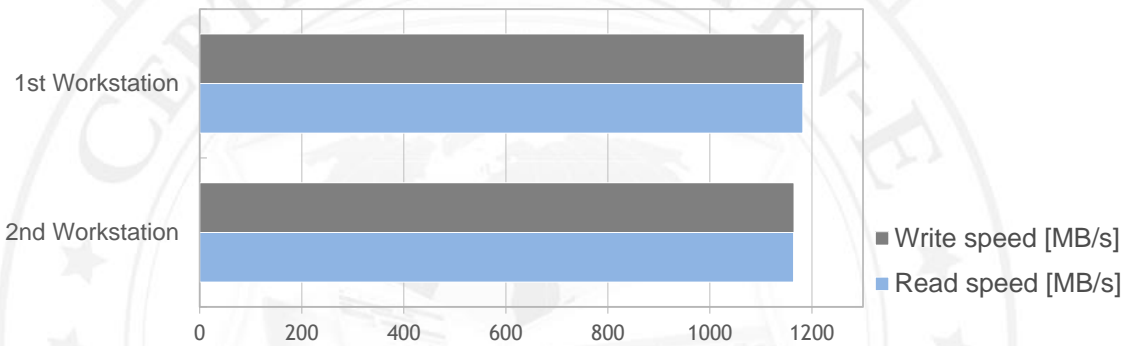*TABLE 8: Balance-alb bonding mode performance test results table for QLogic QLE3442-CU*

FIGURE 6: Balance-alb bonding mode performance test results chart for QLogic QLE3442-CU

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 QLogic QLE3442-CU

Balance-rr bonding mode performance test results			
NIC model	QLogic QLE3442-CU		
Workstations with MS Windows	Write speed [MB/s]	Read speed [MB/s]	Performance test results
1st Workstation	1153	344	passed
2nd Workstation	1169	353	passed

TABLE 9: Balance-rr bonding mode performance test results table for QLogic QLE3442-CU
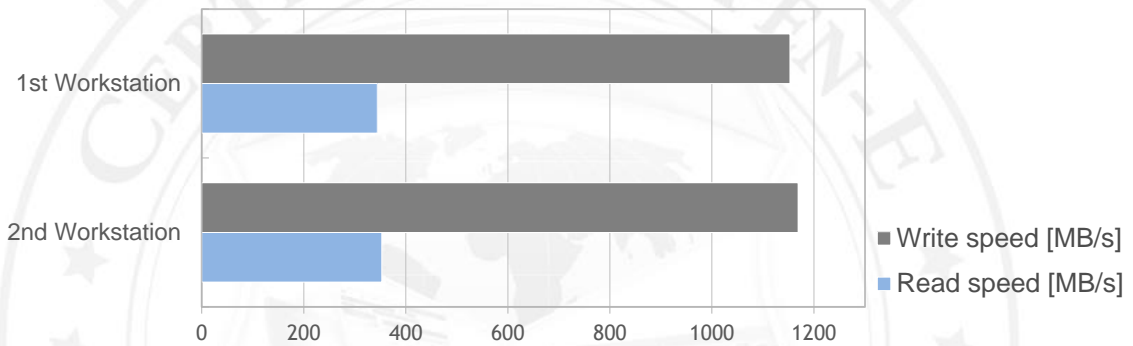

FIGURE 7: Balance-rr bonding mode performance test results chart for QLogic QLE3442-CU

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 QLogic QLE3442-CU

Single NIC performance test results			
NIC model	QLogic QLE3442-CU		
Workstations with MS Windows	Write speed [MB/s]	Read speed [MB/s]	Performance test results
1st Workstation	1185	1180	passed

TABLE 10: Single NIC performance test results table for QLogic QLE3442-CU
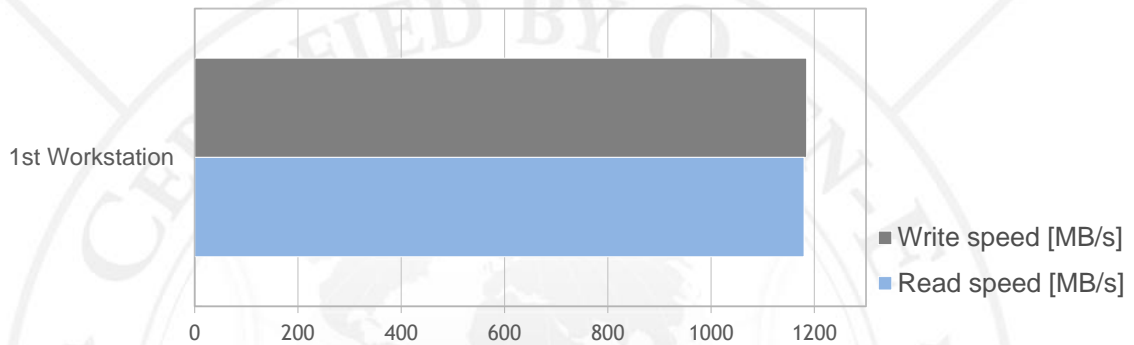

FIGURE 8: Single NIC performance test results chart for QLogic QLE3442-CU

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
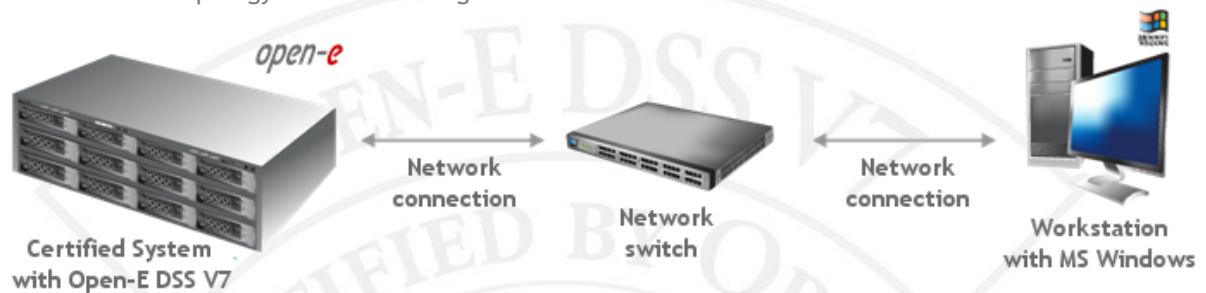
Network test topology for RAID testing is shown below

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 QLogic QLE3442-CU

RAID0 performance test results			
Block size [KB]	Write speed [MB/s]	Read speed [MB/s]	Performance test results
4	228	114	passed
32	1150	568	passed
64	1180	869	passed
128	1182	1173	passed
256	1185	1179	passed
512	1185	1181	passed
1024	1185	1181	passed
4096	1185	1181	passed

TABLE 11: RAID0 performance test results table for QLogic QLE3442-CU
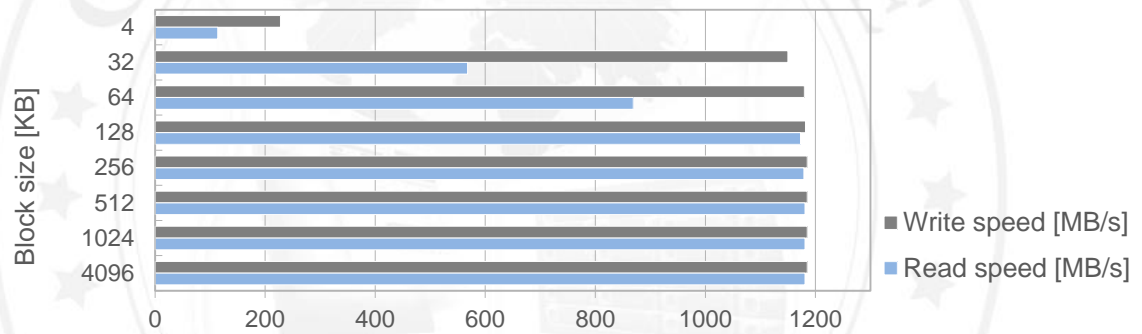

FIGURE 10: RAID0 performance test results chart for QLogic QLE3442-CU

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 QLogic QLE3442-CU

RAID5 performance test results			
Block size [KB]	Write speed [MB/s]	Read speed [MB/s]	Performance test results
4	228	112	passed
32	1130	577	passed
64	1158	874	passed
128	1163	1173	passed
256	1179	1178	passed
512	1180	1179	passed
1024	1178	1180	passed
4096	1180	1181	passed

TABLE 12: RAID5 performance test results table for QLogic QLE3442-CU
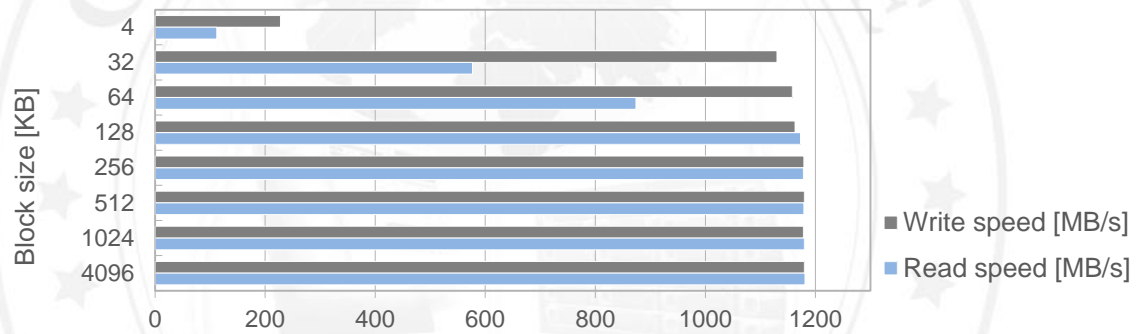

FIGURE 11: RAID5 performance test results chart for QLogic QLE3442-CU

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 QLogic QLE3442-CU

RAID6 performance test results			
Block size [KB]	Write speed [MB/s]	Read speed [MB/s]	Performance test results
4	230	113	passed
32	1137	582	passed
64	1161	881	passed
128	1166	1181	passed
256	1182	1183	passed
512	1182	1184	passed
1024	1182	1185	passed
4096	1182	1184	passed

TABLE 13: RAID6 performance test results table for QLogic QLE3442-CU
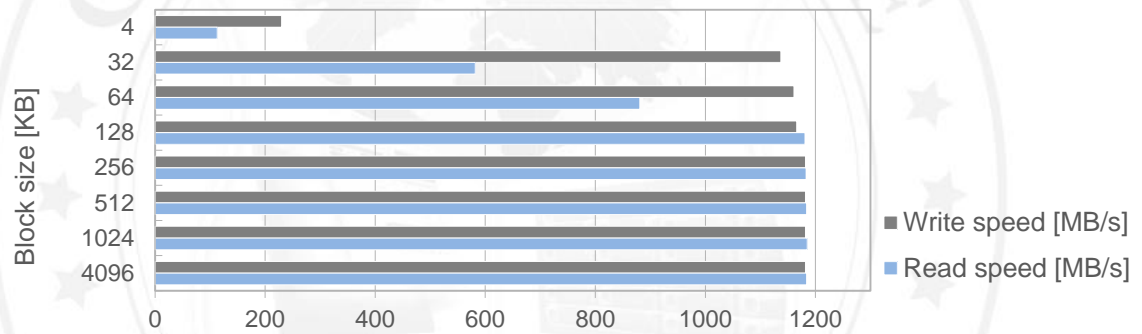

FIGURE 12: RAID6 performance test results chart for QLogic QLE3442-CU

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 QLogic QLE3442-CU

RAID10 performance test results			
Block size [KB]	Write speed [MB/s]	Read speed [MB/s]	Performance test results
4	222	110	passed
32	1149	557	passed
64	1180	857	passed
128	1182	1172	passed
256	1183	1177	passed
512	1183	1180	passed
1024	1184	1177	passed
4096	1184	1180	passed

TABLE 14: RAID10 performance test results table for QLogic QLE3442-CU
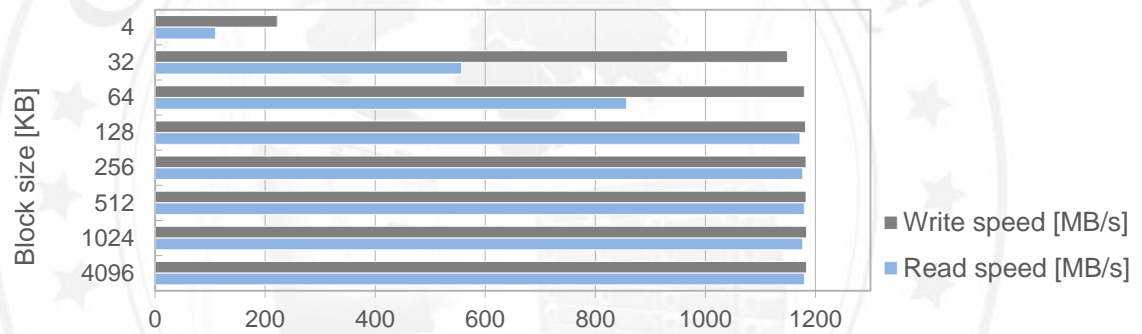

FIGURE 13: RAID10 performance test results chart for QLogic QLE3442-CU

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 QLogic QLE3442-CU

RAID50 performance test results			
Block size [KB]	Write speed [MB/s]	Read speed [MB/s]	Performance test results
4	228	113	passed
32	1130	576	passed
64	1163	870	passed
128	1174	1173	passed
256	1183	1179	passed
512	1182	1179	passed
1024	1183	1180	passed
4096	1184	1181	passed

TABLE 15: RAID50 performance test results table for QLogic QLE3442-CU
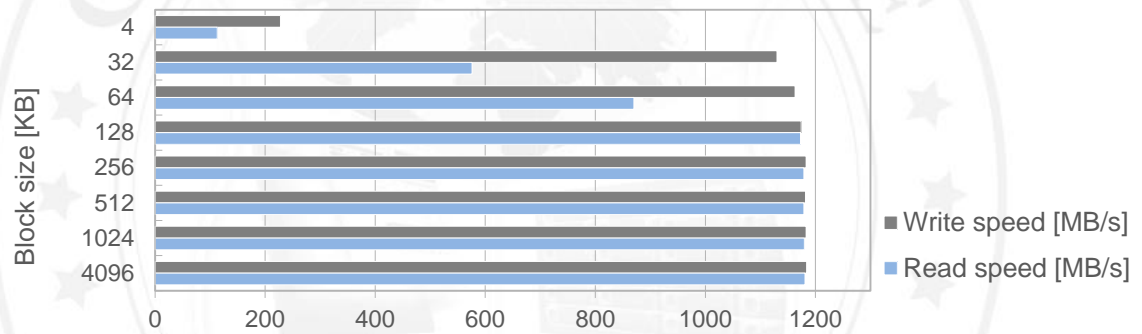

FIGURE 14: RAID50 performance test results chart for QLogic QLE3442-CU

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 QLogic QLE3442-CU

RAID60 performance test results			
Block size [KB]	Write speed [MB/s]	Read speed [MB/s]	Performance test results
4	220	110	passed
32	1128	551	passed
64	1164	854	passed
128	1177	1173	passed
256	1185	1179	passed
512	1185	1180	passed
1024	1185	1181	passed
4096	1185	1180	passed

TABLE 16: RAID60 performance test results table for QLogic QLE3442-CU
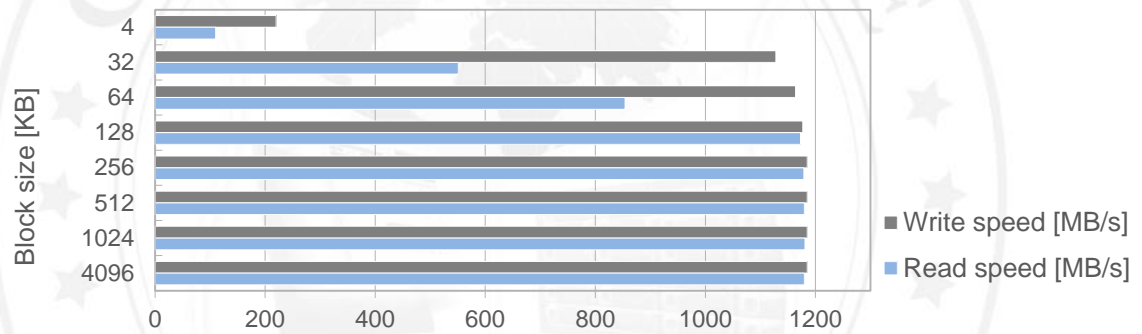

FIGURE 15: RAID60 performance test results chart for QLogic QLE3442-CU

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

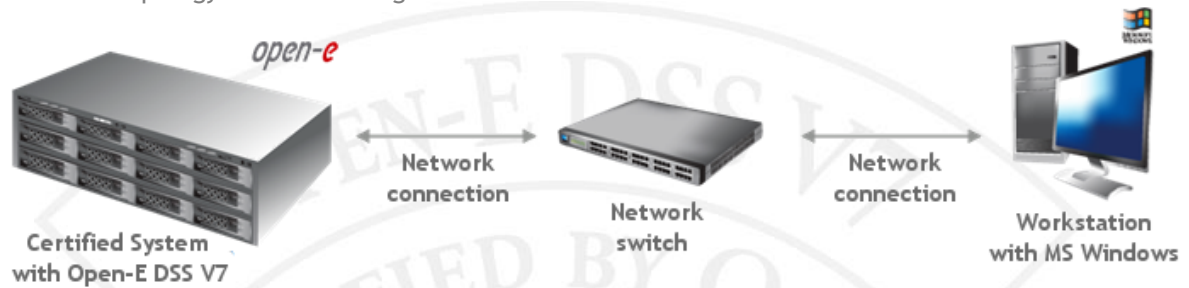Network topology for NAS testing is shown below.

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 QLogic QLE3442-CU

SMB performance test results			
Block size [KB]	Write speed [MB/s]	Read speed [MB/s]	Performance test results
4	243	104	passed
32	1154	546	passed
64	1175	607	passed
128	1178	771	passed
256	1180	867	passed
512	1183	916	passed
1024	1184	902	passed
4096	1184	919	passed

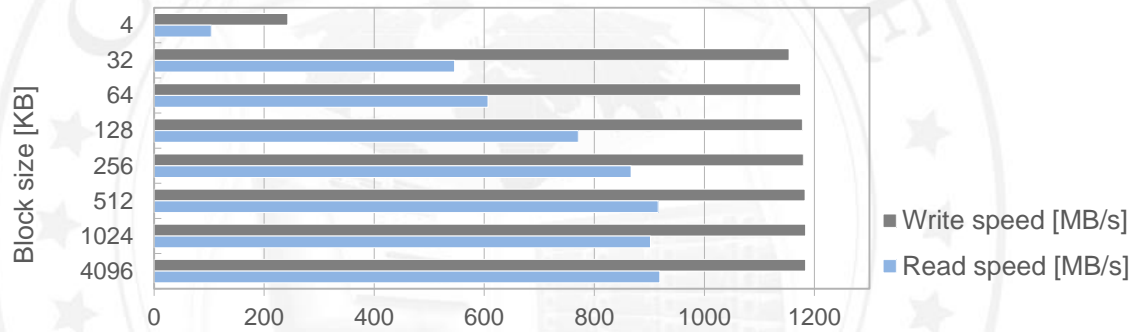*TABLE 17: SMB performance test results table for QLogic QLE3442-CU*

FIGURE 17: SMB performance test results chart for QLogic QLE3442-CU

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

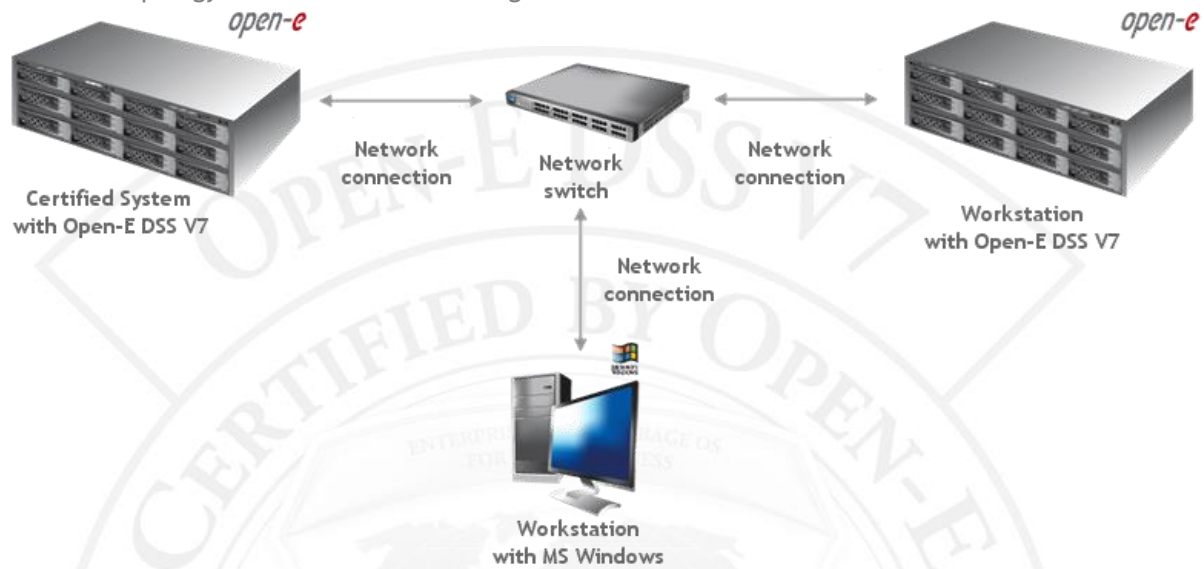Network topology for iSCSI Initiator testing is shown below.

FIGURE 18: Network topology for iSCSI Initiator testing

iSCSI Target test topology

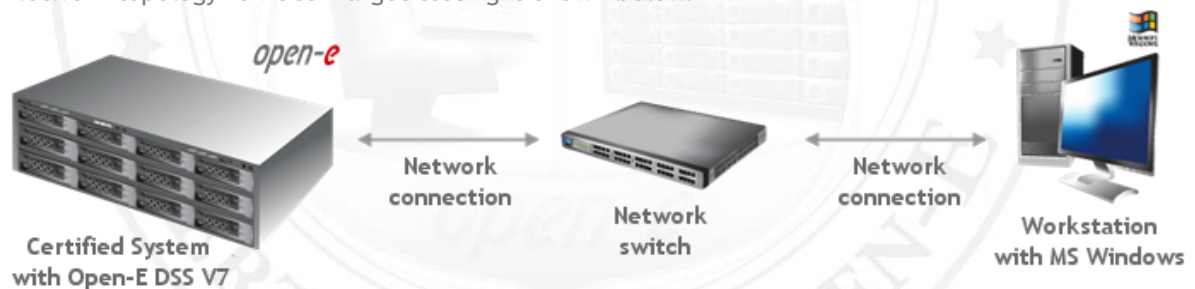Network topology for iSCSI Target testing is shown below.

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 QLogic QLE3442-CU

iSCSI Initiator performance test results			
Block size [KB]	Write speed [MB/s]	Read speed [MB/s]	Performance test results
4	243	103	passed
32	1151	546	passed
64	1173	605	passed
128	1176	763	passed
256	1180	860	passed
512	1183	907	passed
1024	1184	894	passed
4096	1184	915	passed

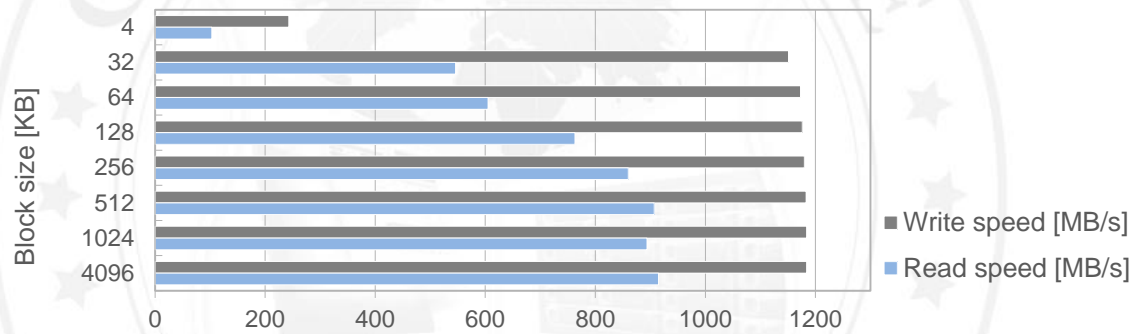TABLE 18: iSCSI Initiator performance test results table for QLogic QLE3442-CU

FIGURE 20: iSCSI Initiator performance test results chart for QLogic QLE3442-CU

open-e

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 QLogic QLE3442-CU

iSCSI Target performance test results			
Block size [KB]	Write speed [MB/s]	Read speed [MB/s]	Performance test results
4	230	111	passed
32	1153	572	passed
64	1182	873	passed
128	1182	1174	passed
256	1185	1180	passed
512	1185	1181	passed
1024	1185	1181	passed
4096	1185	1181	passed

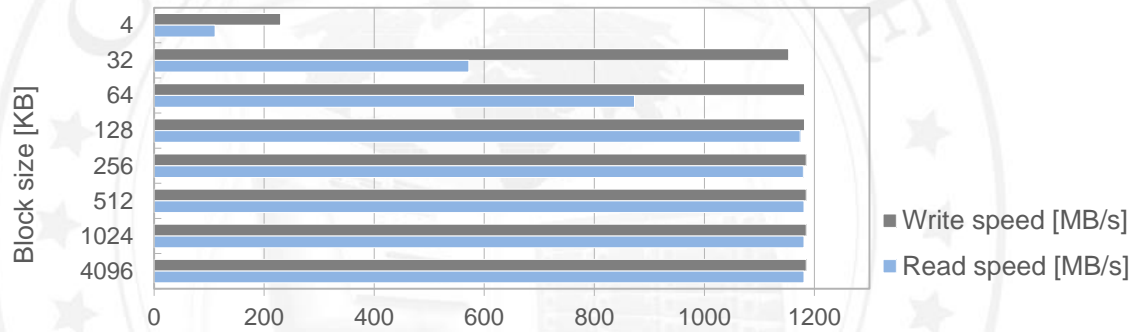TABLE 19: iSCSI Target performance test results table for QLogic QLE3442-CU

FIGURE 21: iSCSI Target performance test results chart for QLogic QLE3442-CU