Open-E High Availability Certification report for ICO Open-E Rack 2121 (yst2)

Executive summary

After successfully passing all the required tests, the ICO Open-E Rack 2121 (yst2) is now officially declared as Open-E High Availability Certified Storage Server.

The tests, conducted by Open-E's Quality Assurance team, prove that Open-E High Availability solution works effectively and efficiently on the certified system. The certification also signifies to customers that the ICO Open-E Rack 2121 (yst2) has met specific Open-E integration and interoperability standards.

The Open-E High Availability solution, based on the ICO Open-E Rack 2121 (yst2), is considered to be stable and secure with superb performance.

Certification notes

The HA Certification Document ICO Open-E Rack 2121 (yst2) has been certified according to Open-E High Availability Certified Hardware Guide v. 1.0.

High Availability solution hardware components

Technical specification of iSCSI Failover nodes is listed below:

Model	ICO Open-E Rack 2121 (yst2)
Operating system	Open-E DSS V7 build 6806
Enclosure/chassis	Chenbro RM23500-LE
CPU	Intel® Xeon® E5-2420 1,9 6/12 1333
Motherboard	Intel® Freemont Pass S1400FP4
Memory	3x 8GB Samsung DDR3 FSB1600 240-pin REG x4 2R
Network	4x Intel® Ethernet I350-T2 Server Adapter (on board)
Network	2x Intel® Ethernet Converged Network Adapter X540-T2
HW RAID	LSI 9271-4i 4Port 6Gb/s PCI-E3.0 x8 LP
Hard disk drives	12x HGST Ultrastar 300GB 15K600 SAS 6Gb/s

TABLE 1: Hardware components list of iSCSI Failover nodes

Both iSCSI Failover nodes have the same hardware configuration as listed above.

Auxiliary systems hardware components

Auxiliary systems with MS Windows installed, used in Open-E High Available solution Hardware Certification Process.

Model	Custom
Operating system	MS Windows Server 2008 R2
Enclosure/chassis	Chenbro RM23500-LE
Motherboard	MSI® B85M-E43 DASH mATX S1150
CPU	Intel® Core™ i3-4130 2/4 3,40GHz S1150
Memory	2x 4GB DDR3 FSB1600 240-pin CL11 (KVR16N11S8/4)
Network	2x Intel® Ethernet Converged Network Adapter X540-T2
HW RAID	Intel® B85 Express Chipset
Hard disk drives	Western Digital 500GB RE4 24x7 64MB (WD5003ABYX

TABLE 2: Hardware components of first Workstations with MS Windows

Model	Custom
Operating system	MS Windows Server 2008 R2
Enclosure/chassis	Chenbro RM23500-LE
Motherboard	MSI® B85M-E43 DASH mATX S1150
CPU	Intel® Core™ i3-4130 2/4 3,40GHz S1150
Memory	2x 4GB DDR3 FSB1600 240-pin CL11 (KVR16N11S8/4)
Network	2x Intel® Ethernet Converged Network Adapter X540-T2
HW RAID	Intel® B85 Express Chipset
Hard disk drives	Western Digital 500GB RE4 24x7 64MB (WD5003ABYX)

TABLE 3: Hardware components of second Workstations with MS Windows

Model	Custom
Operating system	MS Windows Server 2008 R2
Enclosure/chassis	Chenbro RM23500-LE
Motherboard	MSI® B85M-E43 DASH mATX S1150
CPU	Intel® Core™ i3-4130 2/4 3,40GHz S1150
Memory	2x 4GB DDR3 FSB1600 240-pin CL11 (KVR16N11S8/4)
Network	2x Intel® Ethernet Converged Network Adapter X540-T2
HW RAID	Intel® B85 Express Chipset
Hard disk drives	Western Digital 500GB RE4 24x7 64MB (WD5003ABYX)

TABLE 4: Hardware components of third Workstations with MS Windows

Model	Custom
Operating system	MS Windows Server 2008 R2
Enclosure/chassis	Chenbro RM23500-LE
Motherboard	MSI® B85M-E43 DASH mATX S1150
CPU	Intel® Core™ i3-4130 2/4 3,40GHz S1150
Memory	2x 4GB DDR3 FSB1600 240-pin CL11 (KVR16N11S8/4)
Network	2x Intel® Ethernet Converged Network Adapter X540-T2
HW RAID	Intel® B85 Express Chipset
Hard disk drives	Western Digital 500GB RE4 24x7 64MB (WD5003ABYX)

TABLE 5: *Hardware components of fourth Workstations with MS Windows*

Model	HP E5406 zl Switch
Description	24-ports 1GbE and 8-ports 10GbE switch

TABLE 6: *Network switches details*

Both Network switches used for performing certification tests are of the same type as listed above.

High Availability solution performance

Tests performed in this section compare the performance of Active-Passive iSCSI Failover with Active-Active iSCSI Failover available in the Open-E DSS V7 software running on the certified systems.

High Availability solution performance test topology

Network topology for High Availability solution performance testing is shown below.

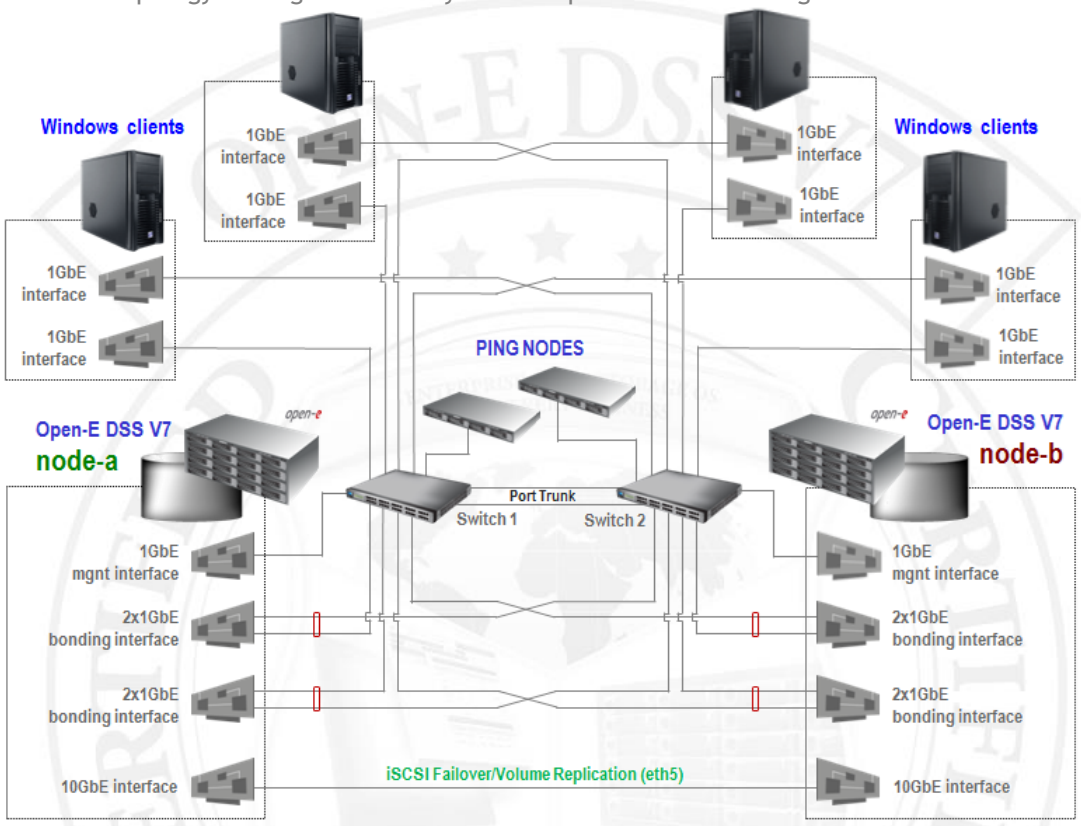

FIGURE 1: Network topology for High Availability performance testing

Active-Passive iSCSI Failover data throughput performance test

1. Test description

The test relies on using the iSCSI targets exported by Active-Passive iSCSI Failover running on certified systems. The data are copied from four *Workstations with MS Windows* equipped with two 10GbE interfaces each to iSCSI targets located on one active node using the Iometer tool. One 10GbE interface is used on each node for Volume replication.

2. Test results for Active-Passive iSCSI Failover data throughput performance using Intel® Ethernet Converged Network Adapter X540-T2 on one active node

Active-Passive iSCSI Failover data throughput performance test results			
Block size [KB]	Total write throughput [MB/s]	Total read throughput [MB/s]	Performance test results
4	44.51	61.67	passed
32	282.62	394.74	passed
64	454.19	624.20	passed
128	660.41	921.90	passed
256	849.24	1069.17	passed
512	853.46	1178.29	passed
1024	918.09	1178.60	passed
4096	927.56	876.49	passed

TABLE 7: Active-Passive iSCSI Failover data throughput performance test results table for Intel® Ethernet Converged Network Adapter X540-T2 on one active node

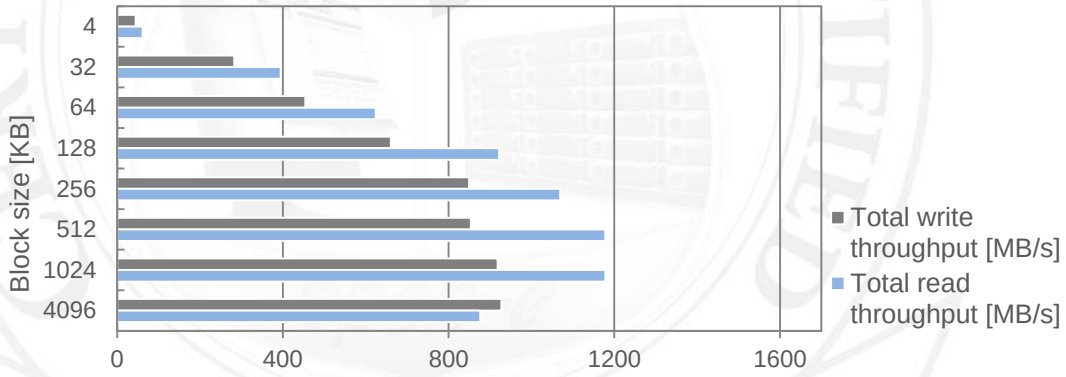

FIGURE 2: Active-Passive iSCSI Failover data throughput performance test results chart for Intel® Ethernet Converged Network Adapter X540-T2 on one active node

Active-Active iSCSI Failover data throughput performance test

1. Test description

The test relies on using the iSCSI targets exported by Active-Active iSCSI Failover running on certified systems. The data are copied from four *Workstations with MS Windows* equipped with two 10GbE interfaces each to iSCSI targets located on two active nodes using the Iometer tool. One 10GbE interface is used on each node for Volume replication.

2. Test results for Active-Active iSCSI Failover data throughput performance using Intel® Ethernet Converged Network Adapter X540-T2 on both active nodes

Active-Active iSCSI Failover data throughput performance test results			
Block size [KB]	Total write throughput [MB/s]	Total read throughput [MB/s]	Performance test results
4	45.08	62.10	passed
32	296.87	448.03	passed
64	454.73	692.50	passed
128	674.07	999.98	passed
256	956.15	1456.18	passed
512	1095.09	1579.96	passed
1024	1190.91	1463.42	passed
4096	1329.67	1146.26	passed

TABLE 8: Active-Active iSCSI Failover data throughput performance test results table for Intel® Ethernet Converged Network Adapter X540-T2 on both active nodes

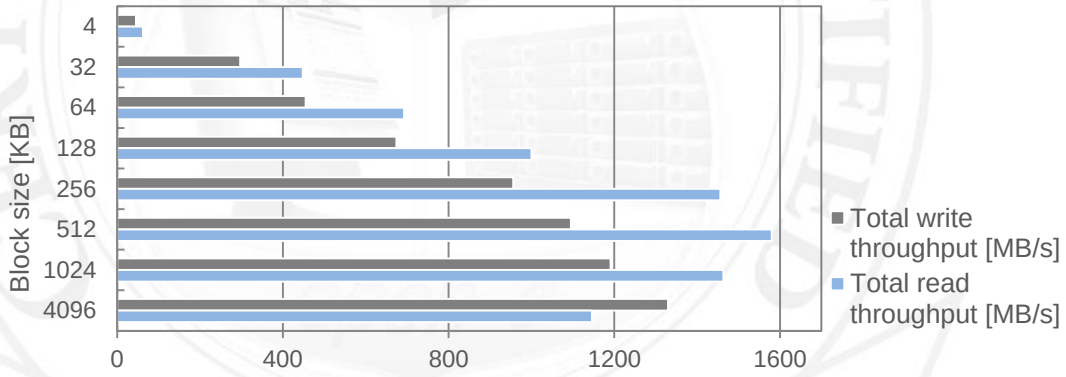

FIGURE 3: Active-Active iSCSI Failover data throughput performance test results chart for Intel® Ethernet Converged Network Adapter X540-T2 on both active nodes

Active-Passive iSCSI Failover resource group switching time test

1. Test description

The test relies on copying data of 4MB block size using the Iometer tool from four *Workstations with MS Windows* equipped with two 10GbE interfaces each to iSCSI targets located on one active node. The Resource group switching time is measured under high load for 2. 10 and 20 iSCSI targets located on one active node. One 10GbE interface is used on each node for Volume replication.

2. Test results for Active-Passive iSCSI Failover resource group switching time using Intel® Ethernet Converged Network Adapter X540-T2 on both active nodes

Active-Passive iSCSI Failover resource switching time test results		
Total number of targets	Switching time [seconds]	Performance test results
2	1	passed
10	3	passed
20	4	passed

TABLE 9: Active-Passive iSCSI Failover resource group switching time test results table for Intel® X540T2 10GbE CNA on one active node

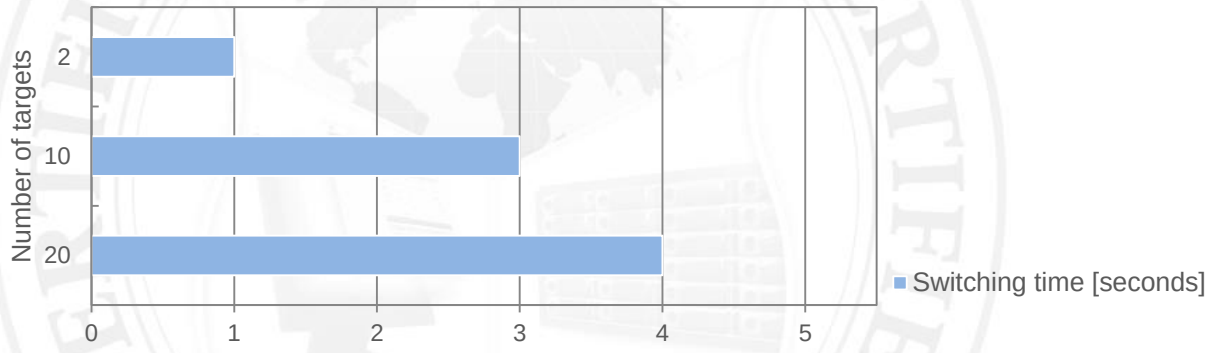

FIGURE 4: Active-Passive iSCSI Failover resource group switching time test chart for Intel® X540T2 10GbE CNA on one active node

Active-Active iSCSI Failover resource group switching time test

1. Test description

The test relies on copying data of 4MB block size using the Iometer tool from four *Workstations with MS Windows* equipped with two 10GbE interfaces each to iSCSI targets located on two active nodes. The Resource group switching time is measured under high load for 2. 10 and 20 iSCSI targets located on two active nodes. One 10GbE interface is used on each node for Volume replication.

2. Test results for Active-Active iSCSI Failover resource groups switching time using Intel® Ethernet Converged Network Adapter X540-T2 on both active nodes

Active-Active iSCSI Failover resource switching time test results		
Total number of targets	Switching time [seconds]	Performance test results
2	1	passed
10	1	passed
20	2	passed

TABLE 10: Active-Active iSCSI Failover resource groups switching time test results table for Intel® Ethernet Converged Network Adapter X540-T2 on both active nodes

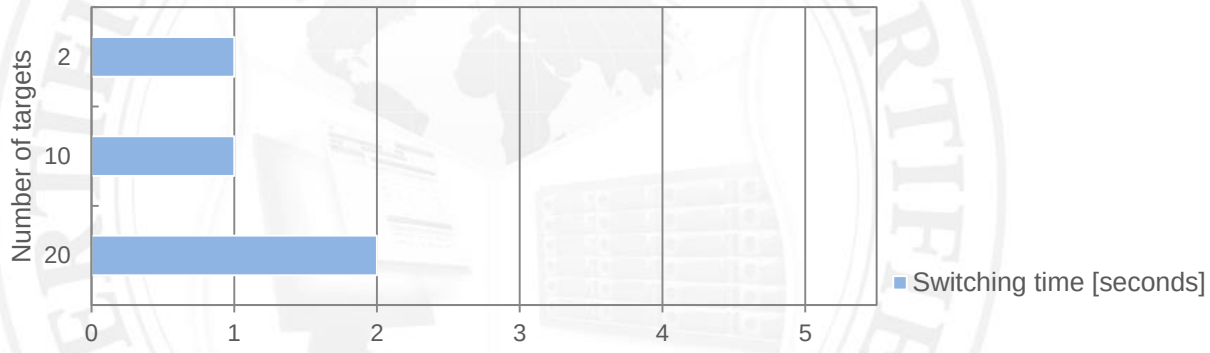

FIGURE 5: Active-Active iSCSI Failover resource groups switching time test chart for Intel® Ethernet Converged Network Adapter X540-T2 on both active nodes

High Availability solution functionality

Tests performed in this section analyze the functionality of High Availability solution configured as Active-Active iSCSI Failover. available in the Open-E DSS V7 product on the certified systems.

High Availability solution functionality test topology

Network topology for High Availability solution functionality testing is presented below.

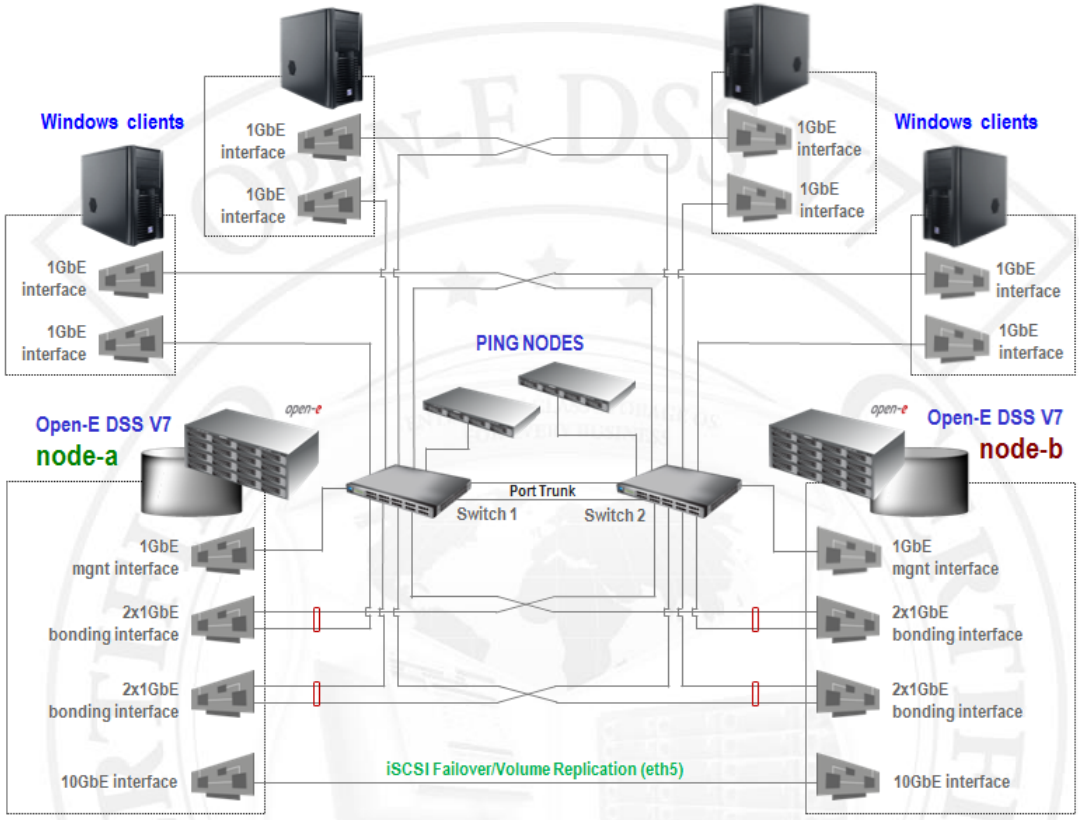

FIGURE 6: Network topology for High Availability solution functionality testing

High Availability solution functionality test

1. Test description

The test relies on performing various actions which should cause Resource group switching during copying data from four *Workstations with MS Windows* equipped with two 10GbE interfaces each to iSCSI targets exported by Active-Active iSCSI Failover. It tests whether failover occurs and if all resources are still reachable for 20 iSCSI targets located on two active nodes. One 10GbE interface is used on each node for Volume replication.

2. Test results for High Availability solution functionality

High Availability solution functionality test		
Total number of targets	**Test case**	**Test results**
20	Manual resources transfer test	passed
20	Network malfunction test	passed
20	Reboot test	passed
20	Shutdown test	passed
20	I/O error test	passed

TABLE 11: *High Availability solution functionality test results table*