Open-E High Availability Certification report for Intel® Server System R2224GZ4GC4

Executive summary

After successfully passing all the required tests, the Intel® Server System R2224GZ4GC4 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 Intel® Server System R2224GZ4GC4 has met specific Open-E integration and interoperability standards.

The Open-E High Availability solution, based on the Intel® Server System R2224GZ4GC4, is considered to be stable and secure with superb performance.

Certification notes

The HA Certification Document Intel® Server System R2224GZ4GC4 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	Intel® Server System R2224GZ4GC4
Operating system	Open-E DSS V7 build 10529
Enclosure/chassis	Intel® R2224GZ4GC4 2U Chassis
CPU	2x Intel® Xeon® Processor E5-2680 2.70GHz
Motherboard	Intel® Server Board S2600GZ4
Memory	8x 8GB Kingston DDR3 1600 ECC KVR1600D3D4R11S/8G
Network	1GbE Intel® I350 Quad Port Ethernet Controller
Network	10GbE Dual Port Intel® 82599EB I/O Module AXX10GBNIAIOM
Network	Intel® Ethernet Converged Network Adapter X520-SR2
HW RAID	Intel® Integrated RAID Module RMS25PB080
Hard disk drives	24x 900GB Western Digital XE WD9001BKHG
Hard disk drives	2x 100GB Intel® SSD DC S3700 series

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 2012 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
Network	Intel® Ethernet Converged Network Adapter X520-SR2
Hard disk drives	1TB Hitachi Ultrastar A7K2000 HUA722010CLA330

TABLE 2: *Hardware components of first Workstations with MS Windows*

Model	Custom
Operating system	MS Windows Server 2012 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
Network	Intel® Ethernet Converged Network Adapter X520-SR2
Hard disk drives	1TB Hitachi Ultrastar A7K2000 HUA722010CLA330

TABLE 3: *Hardware components of second Workstations with MS Windows*

Model	Custom
Operating system	MS Windows Server 2012 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
Network	Intel® Ethernet Converged Network Adapter X520-SR2
Hard disk drives	1TB Hitachi Ultrastar A7K2000 HUA722010CLA330

TABLE 4: *Hardware components of third Workstations with MS Windows*

Model	Custom
Operating system	MS Windows Server 2012 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
Network	Intel® Ethernet Converged Network Adapter X520-SR2
Hard disk drives	1TB Hitachi Ultrastar A7K2000 HUA722010CLA330

TABLE 5: Hardware components of fourth Workstations with MS Windows

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

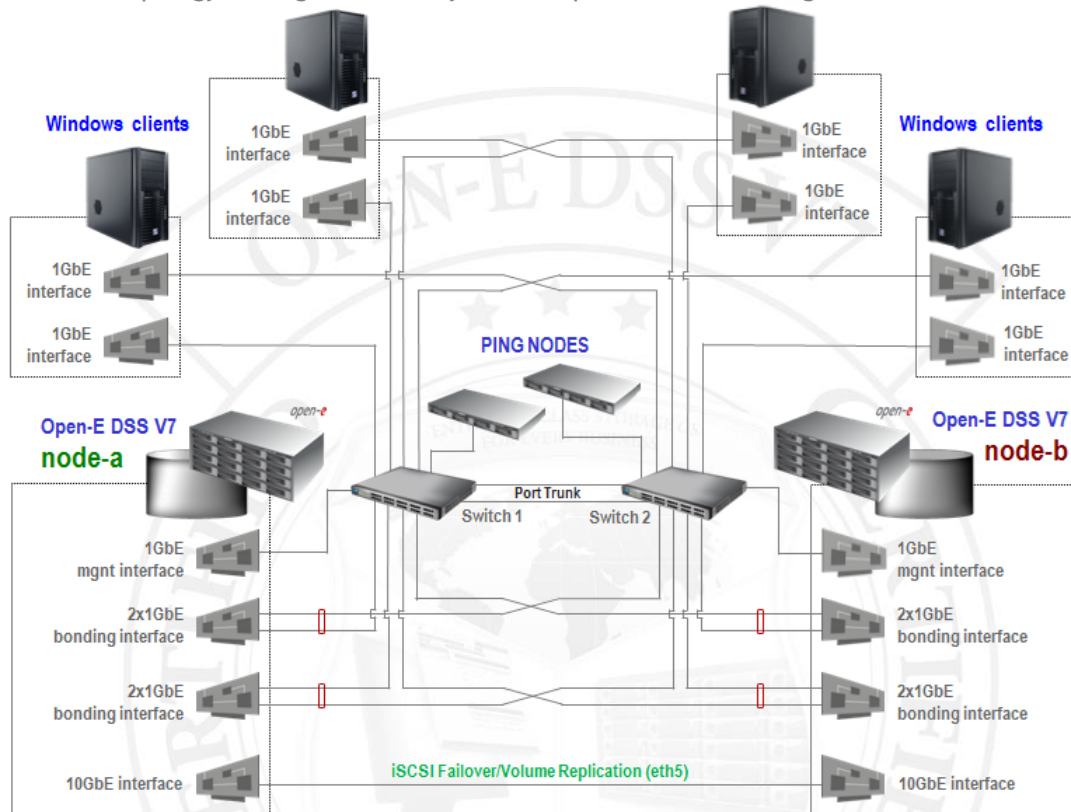Network topology for High Availability solution performance testing is shown below.

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 1GbE 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 X520-SR2 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	86.99	115.56	passed
32	331.65	553.67	passed
64	431.42	690.91	passed
128	525.77	814.45	passed
256	581.38	872.79	passed
512	609.44	910.23	passed
1024	633.33	906.82	passed
4096	653.59	902.64	passed

TABLE 7: *Active-Passive iSCSI Failover data throughput performance test results table for Intel® Ethernet Converged Network Adapter X520-SR2 on one active node*
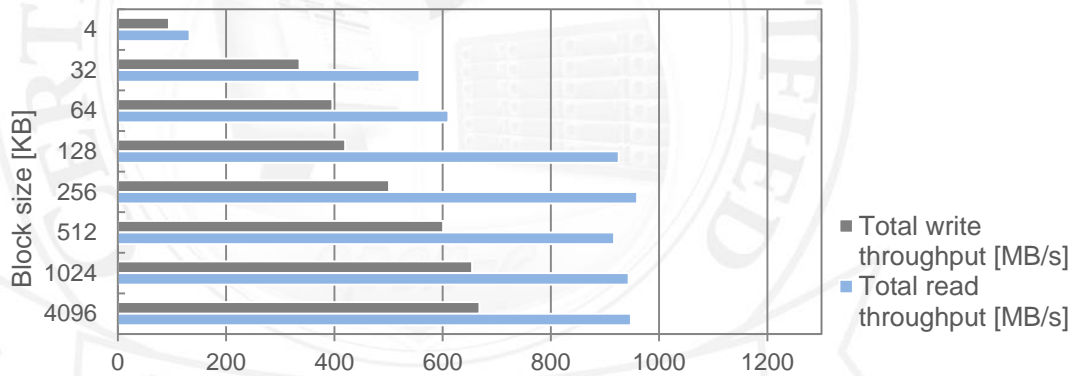

FIGURE 2: *Active-Passive iSCSI Failover data throughput performance test results chart for Intel® Ethernet Converged Network Adapter X520-SR2 on one active node*

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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 1GbE 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 X520-SR2 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	94.39	132.43	passed
32	335.59	557.08	passed
64	396.25	610.81	passed
128	420.04	925.43	passed
256	500.83	959.30	passed
512	600.80	916.70	passed
1024	654.52	943.63	passed
4096	667.96	947.79	passed

TABLE 8: *Active-Active iSCSI Failover data throughput performance test results table for Intel® Ethernet Converged Network Adapter X520-SR2 on both active nodes*
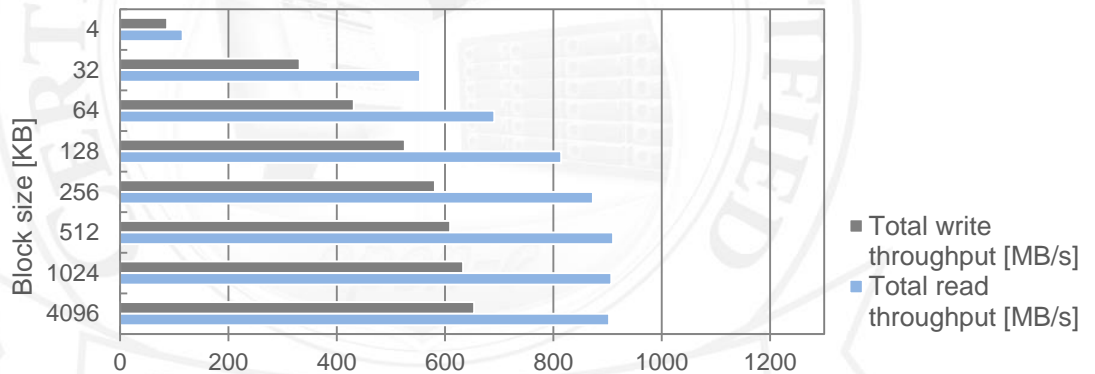

FIGURE 3: *Active-Active iSCSI Failover data throughput performance test results chart for Intel® Ethernet Converged Network Adapter X520-SR2 on both active nodes*

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 1GbE 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 X520-SR2 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	1	passed
20	2	passed

TABLE 9: *Active-Passive iSCSI Failover resource group switching time test results table for Intel® Ethernet Converged Network Adapter X520-SR2 on one active node*
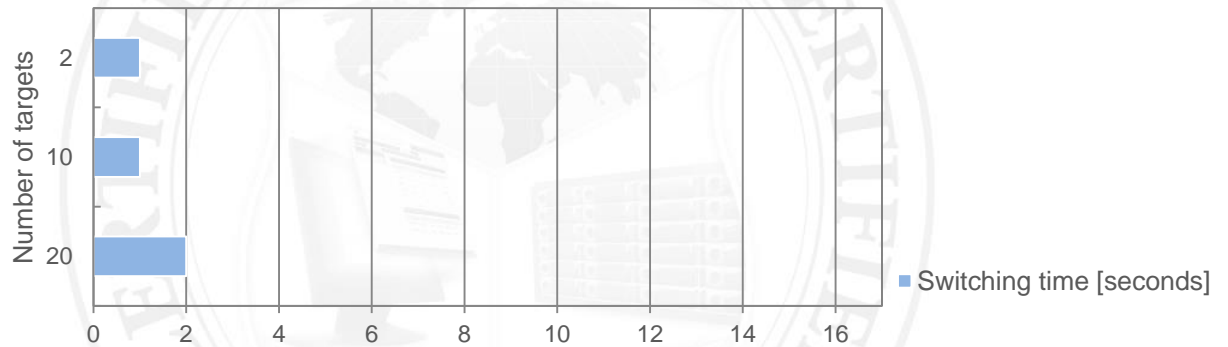

FIGURE 4: *Active-Passive iSCSI Failover resource group switching time test chart for Intel® Ethernet Converged Network Adapter X520-SR2 on one active node*

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 1GbE 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 X520-SR2 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 X520-SR2 on both active nodes*
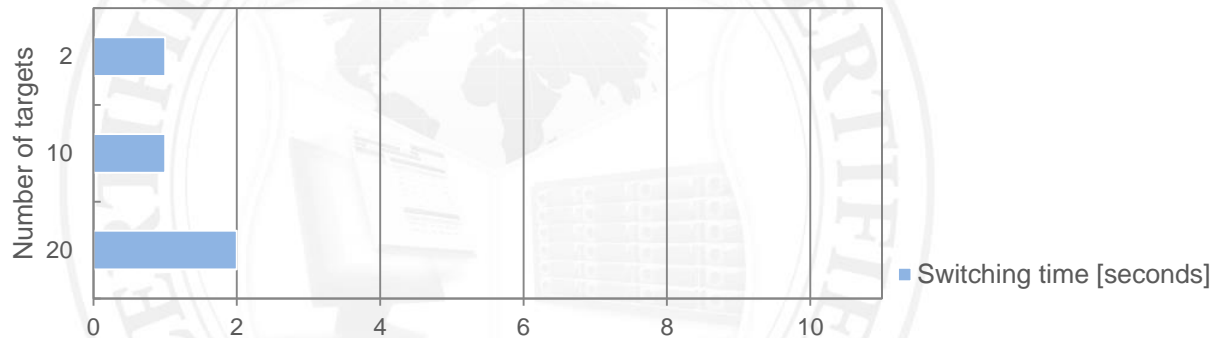

FIGURE 5: *Active-Active iSCSI Failover resource groups switching time test chart for Intel® Ethernet Converged Network Adapter X520-SR2 on both active nodes*

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

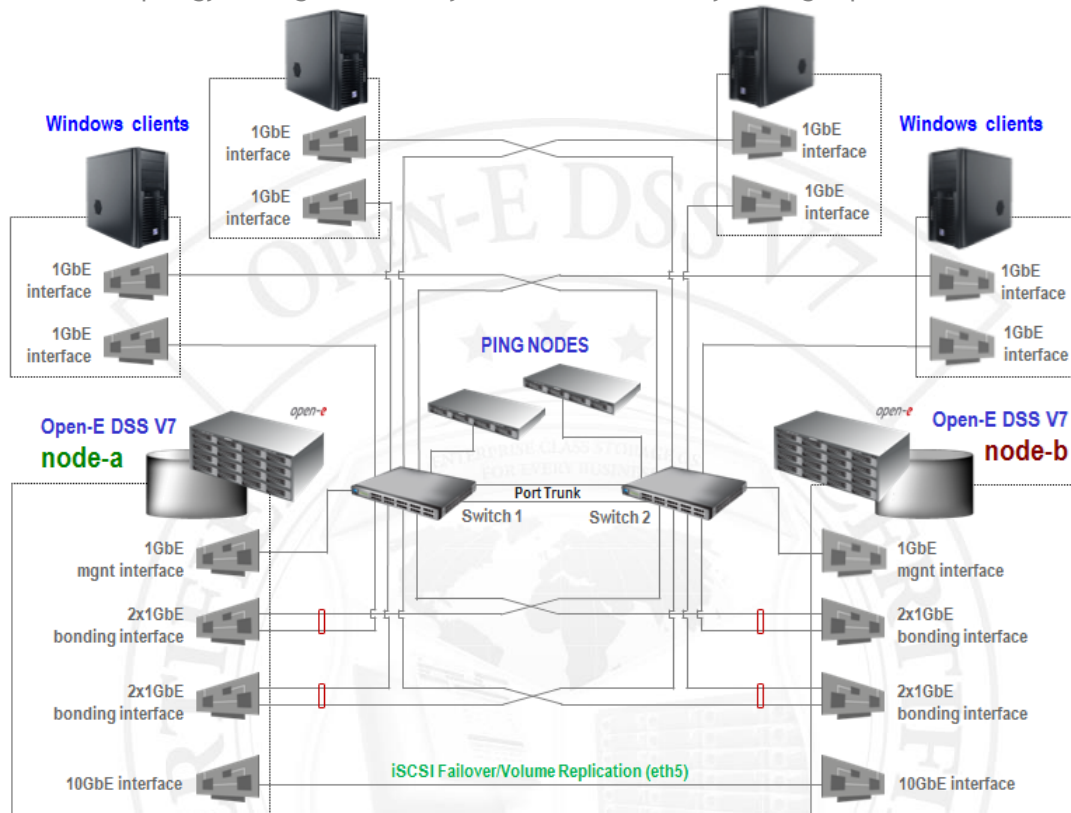Network topology for High Availability solution functionality testing is presented below.

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 1GbE 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