



Open-E High Availability Certification report for SYS-Line fms-computer.com TurboRACK i5241-R2



Executive summary

After successfully passing all the required tests, the SYS-Line fms-computer.com TurboRACK i5241-R2 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 SYS-Line TurboRACK i5241-R2 has met specific Open-E integration and interoperability standards.

The Open-E High Availability solution, based on the SYS-Line fms-computer.com TurboRACK i5241-R2, is considered to be stable and secure with superb performance.

Certification notes

The HA Certification Document SYS-Line fms-computer.com TurboRACK i5241-R2 has been certified according to Open-E High Availability Certified Hardware Guide v. 1.0.





High Availability solution hardware components 4

Auxiliary systems hardware components..... 5

High Availability solution performance 7

 High Availability solution performance test topology..... 7

 Active-Passive iSCSI Failover data throughput performance test 8

 Active-Active iSCSI Failover data throughput performance test 9

 Active-Passive iSCSI Failover resource group switching time test 10

 Active-Active iSCSI Failover resource group switching time test 11

High Availability solution functionality 12

 High Availability solution functionality test topology..... 12

 High Availability solution functionality test 13



High Availability solution hardware components

Technical specification of iSCSI Failover nodes is listed below:

Model	SYS-Line fms-computer.com TurboRACK i5241-R2
Operating system	Open-E DSS V7 build 10529
Enclosure/chassis	Supermicro SuperChassis 216E16-R1200LPB
CPU	2x Intel Xeon E5-2609 v2 2.50GHz
Motherboard	Supermicro X9DRi-LN4F+
Memory	8x 8GB DDR3 ECC-REG Samsung M393B1K70DH0-YK0
Network	4x Intel Gigabit Server Adapter I350 (on-board)
Network	2x Intel Ethernet Converged Network Adapter X540-T2
HW RAID	LSI MegaRAID SAS 9271-4i
HW RAID	LSI SAS 9207-8e
Hard disk drives	20x 1TB Seagate Constellation.2 ST91000640SS
Hard disk drives	4x 240GB Intel Solid-State Drive DC S3500 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 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)
Network	2x Intel Ethernet Server Adapter X540-T2
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 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)
Network	2x Intel Ethernet Server Adapter X540-T2
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 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)
Network	2x Intel Ethernet Server Adapter X540-T2
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 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)
Network	2x Intel Ethernet Server Adapter X540-T2
Hard disk drives	1TB Hitachi Ultrastar A7K2000 HUA722010CLA330

TABLE 5: Hardware components of fourth Workstations with MS Windows

Model	Netgear ProSafe Plus X5708E
Description	8 ports 10GbE

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.

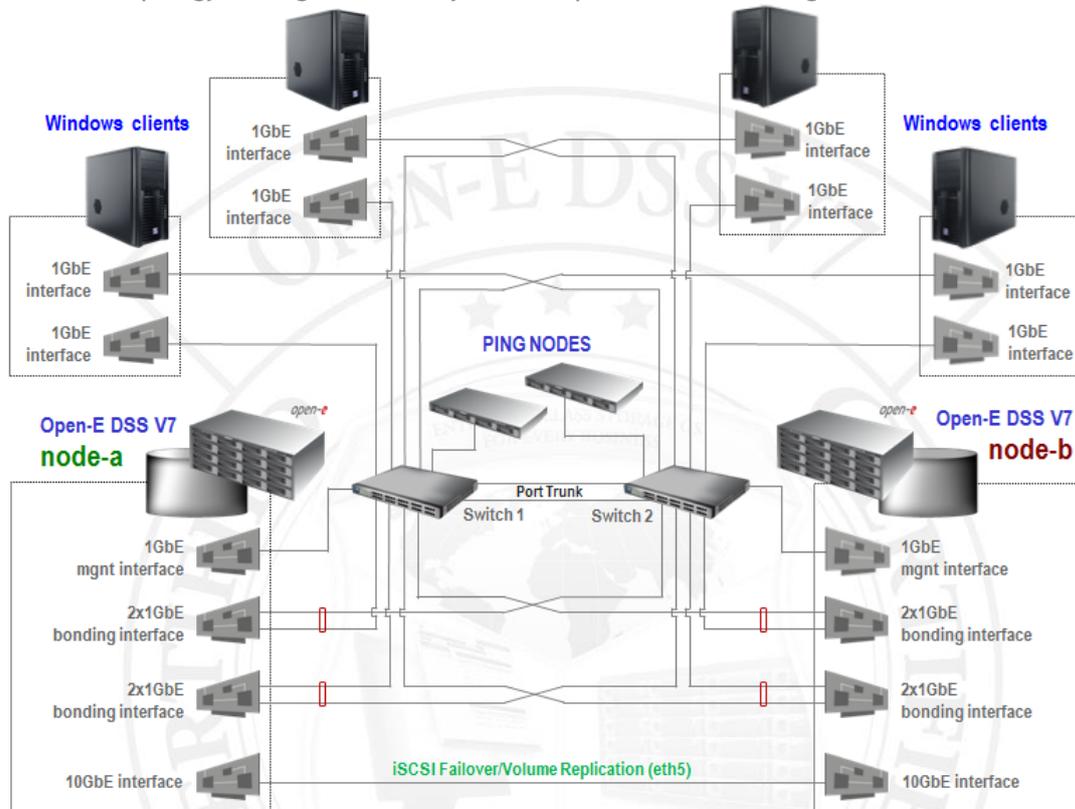


FIGURE 1: Network topology for High Availability performance testing

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 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	89.99	94.62	passed
32	204.45	219.73	passed
64	203.25	222.38	passed
128	216.35	223.39	passed
256	222.28	222.74	passed
512	223.34	222.43	passed
1024	222.75	222.71	passed
4096	223.63	222.36	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

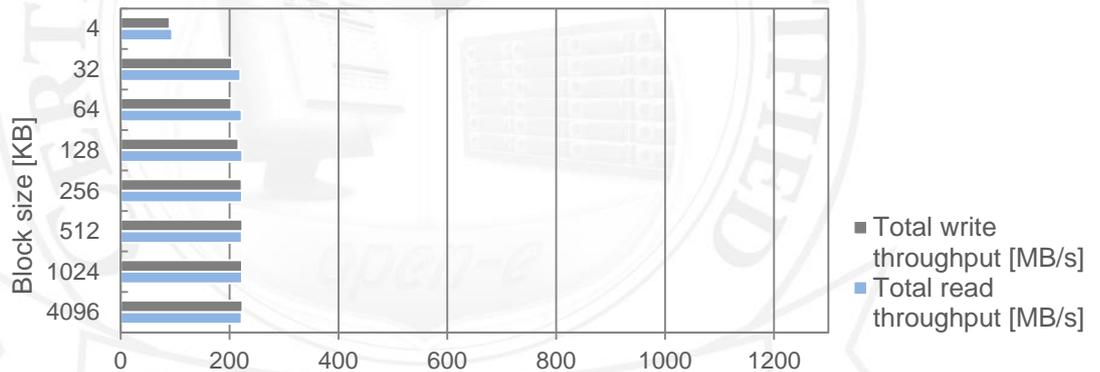


FIGURE 2: Active-Passive iSCSI Failover data throughput performance test results chart for Intel Ethernet Converged Network Adapter X540-T2 on one active node

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 1GbE interfaces each to iSCSI targets located on two active nodes using the lometer 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	105.28	179.64	passed
32	576.60	1106.65	passed
64	866.57	1634.88	passed
128	1208.32	2170.76	passed
256	1558.34	2090.08	passed
512	1646.86	2036.78	passed
1024	1669.30	1766.67	passed
4096	1709.39	1763.66	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

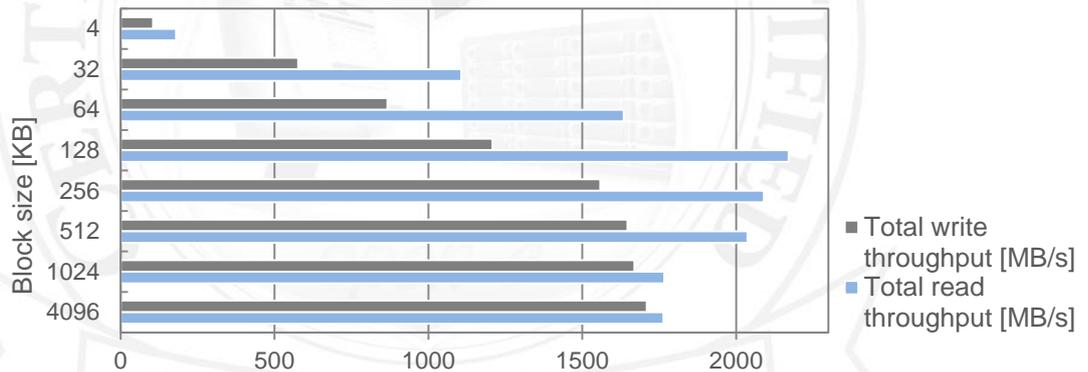


FIGURE 3: Active-Active iSCSI Failover data throughput performance test results chart for Intel Ethernet Converged Network Adapter X540-T2 on both active nodes

Active-Passive iSCSI Failover resource group switching time test

1. Test description

The test relies on copying data of 4MB block size using the lometer 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 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	2	passed
10	3	passed
20	4	passed

TABLE 9: Active-Passive iSCSI Failover resource group switching time test results table for Intel Ethernet Converged Network Adapter X540-T2 on one active node

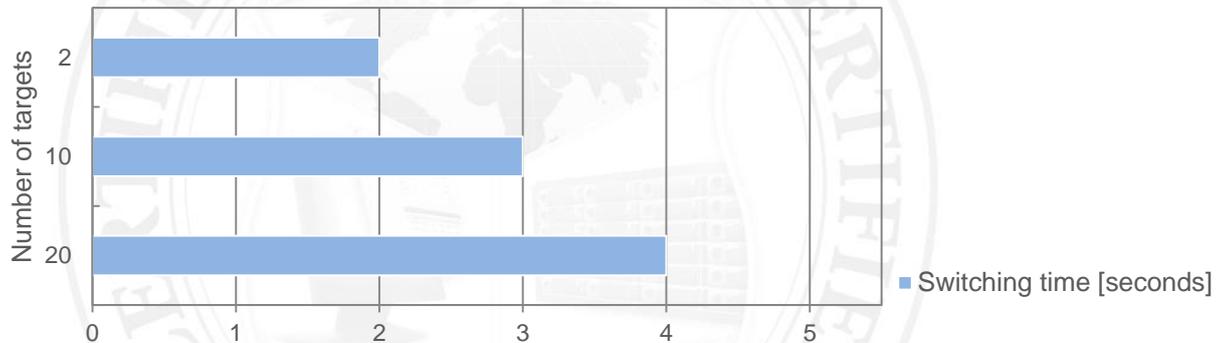


FIGURE 4: Active-Passive iSCSI Failover resource group switching time test chart for Intel Ethernet Converged Network Adapter X540-T2 on one active node



Active-Active iSCSI Failover resource group switching time test

1. Test description

The test relies on copying data of 4MB block size using the lometer 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 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	2	passed
20	4	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

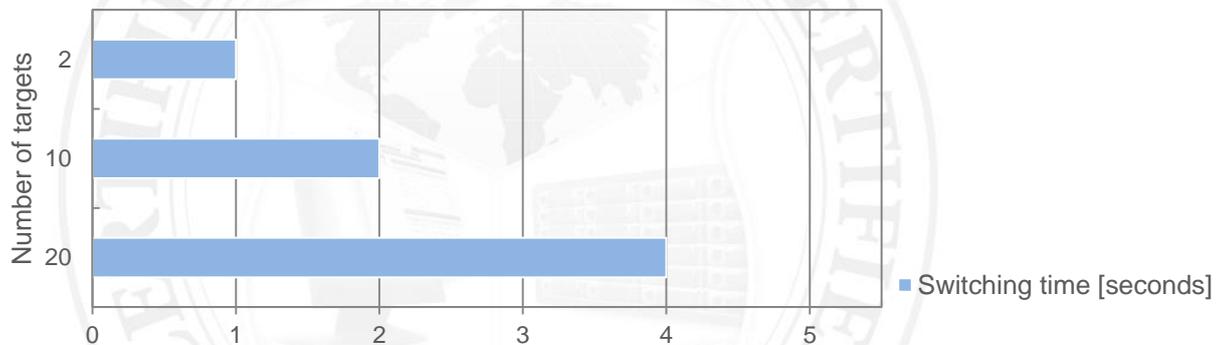


FIGURE 5: Active-Active iSCSI Failover resource groups switching time test chart for Intel Ethernet Converged Network Adapter X540-T2 on both active nodes

HIGH AVAILABILITY
READY

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.

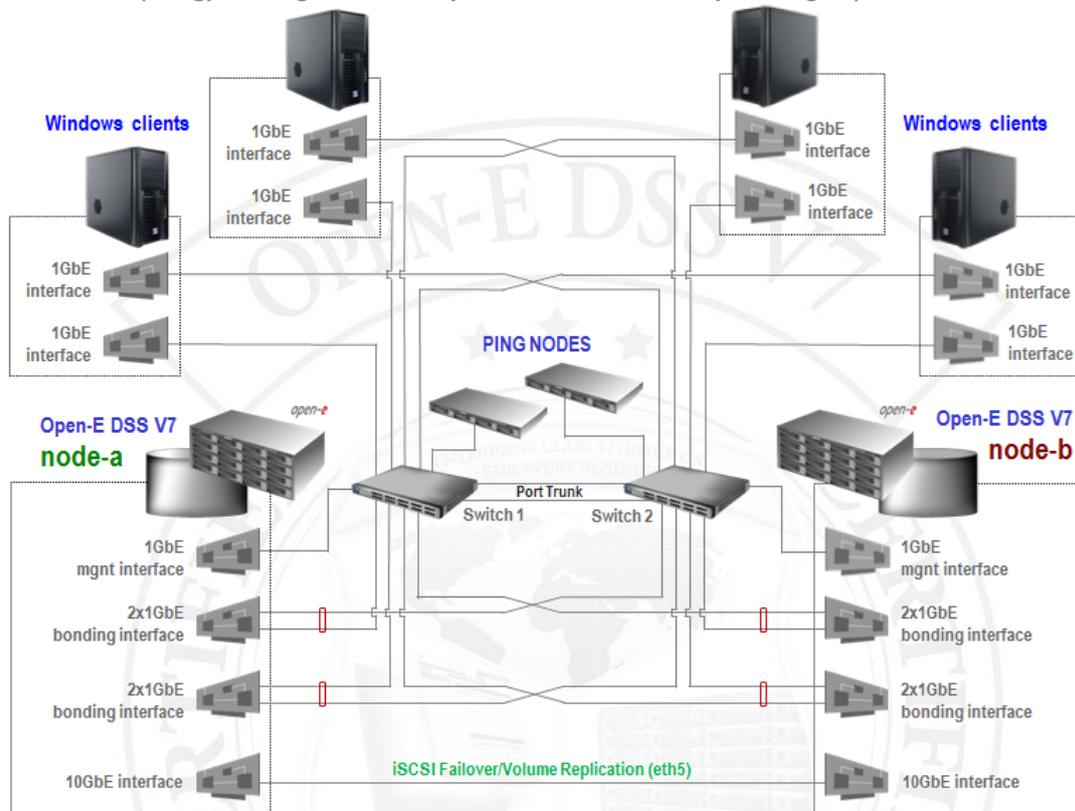


FIGURE 6: Network topology for High Availability solution functionality testing

open-e
HIGH AVAILABILITY
READY

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

