Open-E High Availability Certification report for Dell PowerEdge R720

Executive summary

After successfully passing all the required tests, the Dell PowerEdge R720 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 Dell PowerEdge R720 has met specific Open-E integration and interoperability standards.

The Open-E High Availability solution, based on the Dell PowerEdge R720, is considered to be stable and secure with superb performance.

Certification notes

The Dell PowerEdge R720 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	Dell PowerEdge R720
Operating system	Open-E DSS V7 build 7356
Enclosure/chassis	Dell PowerEdge R720
CPU	2x Intel Xeon E5-2640 2.50 GHz
Motherboard	Dell Power Edge R720 (based on Intel C600)
Memory	4x 8GB DDR3 ECC-REG Hynix HMT31GR7BFR4A-H9
Network	Broadcom NetXtreme II BCM57711 Dual-Port 10 GbE
Network	Broadcom 5720 Quad-Port 1GbE
HW RAID	Dell PERC H710 Integrated
Hard disk drives	16x 146GB Seagate Savvio 15K.2 ST9146852SS

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	Dell PowerEdge R720
Operating system	MS Windows Server 2008 R2
Enclosure/chassis	Dell PowerEdge R720
Motherboard	Dell Power Edge R720 (based on Intel C600)
CPU	Intel Xeon E5-2640 2.50 GHz
Memory	4x 8GB DDR3 ECC-REG Hynix HMT31GR7BFR4A-H9
Network	Broadcom NetXtreme II BCM57711 Dual-Port 10GbE
Network	Broadcom 5720 Quad-Port 1GbE
HW RAID	PERC H710 Integrated
Hard disk drives	2x 146GB Seagate Savvio 15K.2 ST9146852SS

TABLE 2: Hardware components of first Workstations with MS Windows

Model	Dell PowerEdge R720
Operating system	MS Windows Server 2008 R2
Enclosure/chassis	Dell PowerEdge R720
Motherboard	Dell Power Edge R720 (based on Intel C600)
CPU	Intel Xeon E5-2640 2.50 GHz
Memory	4x 8GB DDR3 ECC-REG Hynix HMT31GR7BFR4A-H9
Network	Broadcom NetXtreme II BCM57711 Dual-Port 10GbE
Network	Broadcom 5720 Quad-Port 1GbE
HW RAID	PERC H710 Integrated
Hard disk drives	2x 146GB Seagate Savvio 15K.2 ST9146852SS

TABLE 3: Hardware components of second Workstations with MS Windows

Model	Dell PowerEdge R620
Operating system	MS Windows Server 2008 R2
Enclosure/chassis	Dell PowerEdge R620
CPU	Intel Xeon E5-2640 2.50 GHz
Motherboard	Dell PowerEdge R620 (based on Intel C600)
Memory	4x 8GB DDR3 ECC-REG Samsung M393B1K70CH0-CH9
Network	Broadcom 5720 Quad-Port 1GbE
HW RAID	PERC H710 Integrated
Hard disk drives	4x 300GB Hitachi Ultrastar C10K600 HUC106030CSS600

TABLE 4: Hardware components of third Workstations with MS Windows

Model	Dell PowerEdge R620
Operating system	MS Windows Server 2008 R2
Enclosure/chassis	Dell PowerEdge R620
CPU	Intel Xeon E5-2640 2.50 GHz
Motherboard	Dell PowerEdge R620 (based on Intel C600)
Memory	4x 8GB DDR3 ECC-REG Samsung M393B1K70CH0-CH9
Network	Broadcom 5720 Quad-Port 1GbE
HW RAID	PERC H710 Integrated
Hard disk drives	4x 300GB Hitachi Ultrastar C10K600 HUC106030CSS600

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

Model	Dell PowerConnect 6224
Description	24-ports 1GbE managed 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

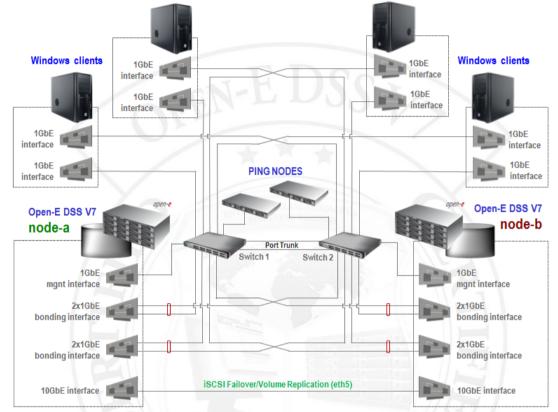Network topology for High Availability solution performance testing is shown below.

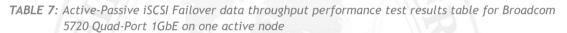FIGURE 1: *Network topology for High Availability performance testing*

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 Broadcom 5720 Quad-Port 1GbE 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	95.58	133.43	passed
32	221.41	305.81	passed
64	257.03	393.83	passed
128	357.57	440.05	passed
256	389.09	451.47	passed
512	415.79	464.34	passed
1024	424.49	473.36	passed
4096	438.59	468.82	passed

TABLE 7: *Active-Passive iSCSI Failover data throughput performance test results table for Broadcom 5720 Quad-Port 1GbE on one active node*
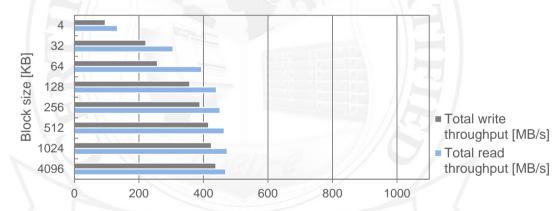

FIGURE 2: *Active-Passive iSCSI Failover data throughput performance test results chart for Broadcom 5720 Quad-Port 1GbE on one active node*
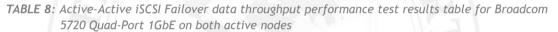
Active-Active iSCSI Failover data throughput performance test

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 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 Broadcom 5720 Quad-Port 1GbE 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	124.32	185.23	passed
32	471.61	643.47	passed
64	556.95	783.03	passed
128	776.81	865.52	passed
256	816.71	880.39	passed
512	853.85	896.08	passed
1024	855.81	895.43	passed
4096	855.28	891.20	passed

TABLE 8: *Active-Active iSCSI Failover data throughput performance test results table for Broadcom 5720 Quad-Port 1GbE on both active nodes*
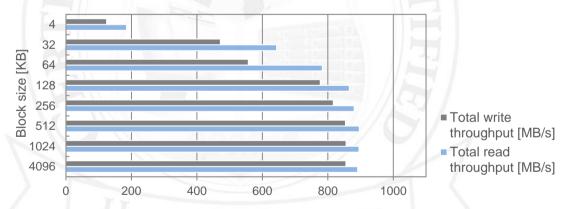

FIGURE 3: *Active-Active iSCSI Failover data throughput performance test results chart for Broadcom 5720 Quad-Port 1GbE on both active nodes*

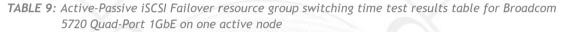# Active-Passive iSCSI Failover resource group switching time test

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 Broadcom 5720 Quad-Port 1GbE 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	2	passed
20	4	passed

TABLE 9: Active-Passive iSCSI Failover resource group switching time test results table for Broadcom 5720 Quad-Port 1GbE on one active node
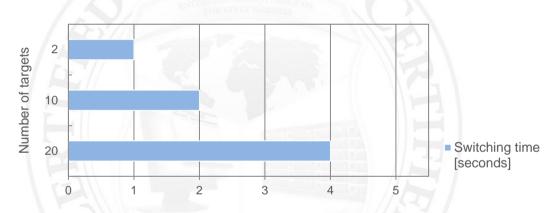

FIGURE 4: Active-Passive iSCSI Failover resource group switching time test chart for Broadcom 5720 Quad-Port 1GbE on one active node

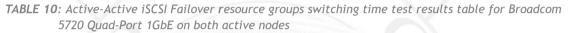# Active-Active iSCSI Failover resource group switching time test

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 Broadcom 5720 Quad-Port 1GbE 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 Broadcom 5720 Quad-Port 1GbE on both active nodes*
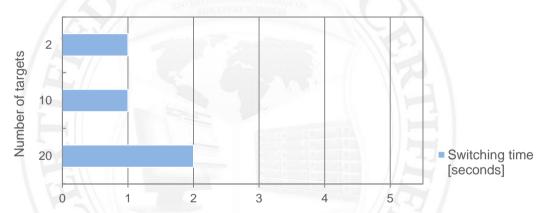

FIGURE 5: *Active-Active iSCSI Failover resource groups switching time test chart for Broadcom 5720 Quad-Port 1GbE on both active nodes*

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.
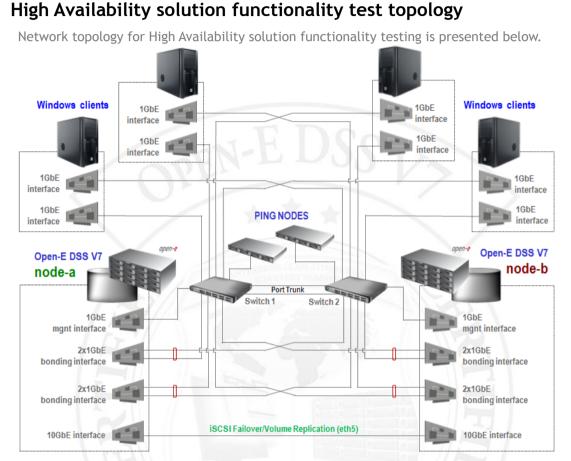
High Availability solution functionality test topology

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