Step-by-Step Guide
to
Open-E DSS V7 Active-Active Load Balanced iSCSI HA Cluster
(without bonding)
Software Version: DSS ver. 7.00 up10

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TO SET UP ACTIVE-ACTIVE iSCSI FAILOVER, PERFORM THE FOLLOWING STEPS:

1. Hardware configuration
2. Network Configuration
   - Set server hostnames and ethernet ports on both nodes (node-a, node-b)
3. Configure the node-b:
   - Create a Volume Group, iSCSI Volume
   - Configure Volume Replication mode (destination and source mode) – define remote mode of binding, create Volume Replication task and start the replication task
4. Configure the node-a
   - Create a Volume Group, iSCSI Volume
   - Configure Volume Replication mode (source and destination mode), create Volume Replication task and start the replication task.
5. Create targets (node-a and node-b)
6. Configure Cluster (node-a and node-b)
7. Start Failover Service
8. Test Failover Function
9. Run Failback Function
1. Hardware Configuration

**Storage client 1**
- IP: 192.168.21.101 (MPIO 1)
- IP: 192.168.22.101 (MPIO 2)
- IP: 192.168.1.101 (Ping Node)

**Storage client 2**
- IP: 192.168.21.102 (MPIO 1)
- IP: 192.168.22.102 (MPIO 2)
- IP: 192.168.1.102 (Ping Node)

**Data Server (DSS1)**
- **node-a**
  - IP Address: 192.168.0.220
  - RAID System 1
    - Port used for WEB GUI management
      - IP: 192.168.0.220
    - Storage Client Access, Multipath
      - Auxiliary connection (Heartbeat)
        - IP: 192.168.1.220
    - Storage Client Access, Multipath
      - Auxiliary connection (Heartbeat)
        - IP: 192.168.2.220
    - Volume Replication, Multipath
      - Auxiliary connection (Heartbeat)
        - IP: 192.168.3.220
    - Volume Groups (vg00)
    - iSCSI volumes (lv0000, lv0001)
    - iSCSI targets

**Data Server (DSS2)**
- **node-b**
  - IP Address: 192.168.0.221
  - RAID System 2
    - Port used for WEB GUI management
      - IP: 192.168.0.221
    - Storage Client Access, Multipath
      - Auxiliary connection (Heartbeat)
        - IP: 192.168.1.221
    - Storage Client Access, Multipath
      - Auxiliary connection (Heartbeat)
        - IP: 192.168.2.221
    - Volume Replication, Multipath
      - Auxiliary connection (Heartbeat)
        - IP: 192.168.3.221
    - Volume Groups (vg00)
    - iSCSI volumes (lv0000, lv0001)
    - iSCSI targets

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**Note:** It is strongly recommended to use direct point-to-point and if possible 10GbE connection for the volume replication. Optionally Round-Robin-Bonding with 1GbE or 10GbE ports can be configured for the volume replication. The volume replication connection can work over the switch, but the most reliable is a direct connection.

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After logging on to the Open-E DSS V7 (node-b), please go to SETUP and choose the „Network interfaces“ option. In the Hostname box, replace the "dss" letters in front of the numbers with „node-b“ server, in this example „node-b-59979144“ and click the apply button (this will require a reboot).
Next, select **eth0** interface and in the IP address field, change the IP address from 192.168.0.220 to 192.168.0.221. Then click **apply** (this will restart network configuration).
Afterwards, select **eth1** interface and change the IP address from 192.168.1.220 to 192.168.1.221 in the field **IP address** and click the **apply** button.

Next, change the IP addresses in **eth2** and **eth3** interfaces accordingly.
After logging in to node-a, please go to **SETUP** and choose the „**Network interfaces**“ option. In the **Hostname** box, replace the "dss" letters in front of the numbers with „node-a“ server, in this example „**node-a-39166501**“ and click **apply** (this will require a reboot).
3. Configure the node-b

IP Address: 192.168.0.221

Under **CONFIGURATION**, select "Volume manager", then click on "Volume groups".

In the **Unit manager** function menu, add the selected physical units (Unit MD0 or other) to create a new volume group (in this case, vg00) and click the **apply** button.
Select the appropriate volume group (vg00) from the list on the left and create a **new iSCSI volume** of the required size. Please set 2 logical volumes in the Active-Active option. The 1st logical volume (lv0000) will be a destination of the replication process on node-b.

Next, check the box **Use volume replication**.

After assigning an appropriate amount of space for the iSCSI volume, click the **apply** button.
Next, create the 2nd logical volume on the node-b. Logical volume (lv0001) will be the source of the replication process on this node.

Next, check the box **Use volume replication**.

After assigning an appropriate amount of space for the iSCSI volume, click the **apply** button.
3. Configure the node-b

Data Server (DSS2) node-b
IP Address: 192.168.0.221

2 logical iSCSI Volume Block I/O are now configured.

iSCSI volume (lv0000) is set to destination

iSCSI volume (lv0001) is set to source
4. Configure the node-a

Under **CONFIGURATION**, select "Volume manager" and then click on "Volume groups".

Add the selected physical units (Unit S001 or other) to create a new volume group (in this case, vg00) and click **apply** button.

Data Server (DSS1)

**node-a**

IP Address: 192.168.0.220
4. Configure the node-a

Select the appropriate volume group (vg00) from the list on the left and create a new iSCSI volume of the required size. Please set 2 logical volumes in the Active-Active option. The 1st logical volume (lv0000) will be a source of the replication process on the node-a.

Next, check the box for “Use volume replication”.

After assigning an appropriate amount of space to the iSCSI volume, click the apply button.

**NOTE:**
The source and destination volumes must be of identical size.
Next, create the 2nd logical volume on the node-a. Logical volume (lv0001) will be a destination of the replication process on this node.

Next, check the box for "Use volume replication".

After assigning an appropriate amount of space to the iSCSI volume, click the apply button.

**NOTE:**
The source and destination volumes must be of identical size.
4. Configure the node-a

Data Server (DSS1)

node-a

IP Address: 192.168.0.220

2 logical iSCSI Volume Block I/O are now configured.

iSCSI volume (lv0000) is set to source

iSCSI volume (lv0001) is set to destination
3. Configure the node-b

Data Server (DSS2)
node-b
IP Address: 192.168.0.221

Now, on the node-b, go to „Volume replication“. Within Volume replication mode function, check the Destination box for lv0000 and check the Source box for lv0001. Then, click the apply button.

In the Hosts binding function, enter the IP address of node-a (in our example, this would be 192.168.3.220), enter node-a administrator password and click the apply button.

NOTE:
The remote node IP Address must be on the same subnet in order for the replication to communicate. VPN connections can work providing you are not using a NAT. Please follow example:
• node-a: 192.168.3.220
• node-b: 192.168.3.221
4. Configure the node-a

Next, on the node-a, go to "Volume replication". Within Volume replication mode function, check the Source box for lv0000 and check the Destination box for lv0001. Next, click the apply button.
In the Create new volume replication task, enter the task name in the Task name field, then click on the button. In the Destination volume field, select the appropriate volume (in this example, lv0000).

In the Bandwidth for SyncSource (MB) field you must change the value. In the example, 35MB is used. Next, click the create button.

**NOTE:**
The “Bandwidth for SyncSource (MB)” need to be calculated based on available Ethernet Network throughput and number of replication tasks and the limitation factor (about 0.7).
For example: 1 Gbit Ethernet and 2 replication tasks (assuming 1 Gbit provides about 100 MB/sec sustained network throughput)
- Bandwidth for SyncSource (MB): $0.7 \times 100 / 2 = 35$ 
For example: 10 Gbit Ethernet and 10 replication tasks (assuming 10 Gbit provides about 700 MB/sec sustained network throughput)
- Bandwidth for SyncSource (MB): $0.7 \times 700 / 10 = 49$
4. Configure the node-a

Now, in the Replication task manager function, click the corresponding "play" button to start the Replication task on the node-a.
In the Replication tasks manager function, information is available on currently running replication tasks. When a task is started, a date and time will appear.
4. Configure the node-a

Data Server (DSS1)
node-a
IP Address: 192.168.0.220

You can check the status of Volume Replication anytime in STATUS -> “Tasks” -> “Volume Replication” menu.

Click on the button, located next to a task name (in this case Mirror_0000) to display detailed information on the current replication task.

NOTE:
Please allow the replication task to complete (similar to above with status being “Consistent”) before writing to the iSCSI Logical Volume.
3. Configure the node-b

Next, go to the node-b. Within **Create new volume replication task**, enter the task name in the **Task name** field, then click on the **create** button. In the **Destination volume** field, select the appropriate volume (in this example, lv0001).

As in the node-a, in the **Bandwidth for SyncSource (MB)** field you must change the value. In our example, 35 MB is used. Next click the **create** button.
In the Replication tasks manager function, click the corresponding "play" button to start the Replication task on the node-b: Mirror_0001. In this box you can find information about currently running replication tasks. When a task is started a date and time will appear.
Choose **CONFIGURATION**, „iSCSI target manager” and „Targets” from the top menu.

In the **Create new target** function, uncheck the box **Target Default Name**.
In the **Name** field, enter a name for the new target and click **apply** to confirm.

**NOTE:**
Both systems must have the same Target name.

**Data Server (DSS2)**
**node-b**
**IP Address:** 192.168.0.221
5. Create new target on the node-b

Next, you must set the 2nd target. Within the Create new target function, uncheck the box Target Default Name. In the Name field, enter a name for the 2nd new target and click apply to confirm.

NOTE:
Both systems must have the same Target name.
After that, select target0 within the Targets field.

To assign appropriate volume to the target (iqn.2013-05:mirror-0 -> lv0000) and click attach button located under Action.

NOTE:
Volumes on both sides must have the same SCSI ID and LUN# for example: lv0000 SCSI ID on node-a = lv0000 SCSI ID on node-b.
Next, select target1 within the Targets field.

To assign appropriate volume to the target (iqn.2013-05:mirror-1->lv0001) and click attach button located under Action.

NOTE:
Both systems must have the same SCSI ID and LUN#
On the node-a, choose **CONFIGURATION**, „iSCSI target manager“ and „Targets“ from the top menu.

Within the **Create new target** function, uncheck the box **Target Default Name**. In the **Name** field, enter a name for the new target and click **apply** to confirm.

**NOTE:**
Both systems must have the same Target name.
Open-E DSS V7 Active-Active Load Balanced iSCSI HA Cluster

Data Server (DSS1)

node-a
IP Address: 192.168.0.220

5. Create new target on the node-a

Next, you must set the 2nd target. In the Create new target function, uncheck the box Target Default Name. In the Name field, enter a name for the 2nd new target and click apply to confirm.

NOTE:
Both systems must have the same Target name.
Select the target0 within the Targets field.

To assign appropriate volume to the target (iqn.2013-05:mirror-0 -> lv0000) and click attach button located under Action.

NOTE:
Before clicking the attach button again, please copy & paste the SCSI ID and LUN# from the node-b.
Select the target1 within the Targets field.

To assign appropriate volume to the target (iqn.2013-05:mirror-1->lv0001) and click attach button located under Action.

NOTE:
Before clicking attach button again, please copy & paste the SCSI ID and LUN# from the node-b.
On the node-a, go to SETUP and select „Failover”.

In the Auxiliary paths function, select the 1st New auxiliary path on the local and remote node and click the add new auxiliary path button.
6. Configure Cluster

In the Auxiliary paths function, select the 2nd New auxiliary path on the local and remote node and click the add new auxiliary path button.
6. Configure Cluster

Data Server (DSS1)
node-a
IP Address: 192.168.0.220

In the **Ping nodes** function, enter two ping nodes. In the **IP address** field enter IP address and click the **add new ping node** button (according to the configuration in the third slide). In this example, IP address of the first ping node is: 192.168.1.101, 192.168.2.101, 192.168.1.102, and the fourth ping node: 192.168.2.102.
Next, go to the Resources Pool Manager function (on node-a resources) and click the add virtual IP button. After that, enter Virtual IP, (in this example 192.168.21.100 according to the configuration in the third slide) and select two appropriate interfaces on local and remote nodes. Then, click the add button.
Now, still on node-a resources (local node) enter the next Virtual IP address. Click **add virtual IP** enter **Virtual IP**, (in this example 192.168.31.100), and select two appropriate interfaces on the local and remote nodes. Then, click the **add** button.
Open-E DSS V7 Active-Active Load Balanced iSCSI HA Cluster

6. Configure Cluster

Data Server (DSS1)

node-a
IP Address: 192.168.0.220

Then, go to node-b resources and click the add virtual IP button again and enter the Virtual IP (In this example 192.168.22.100 according to the configuration in the third slide) and select two appropriate interfaces on the local and remote nodes. Then, click the add button.
Data Server (DSS1)  
**node-a**  
IP Address: 192.168.0.220

Now, still on node-b resources, click the **add virtual IP** button and enter the next **Virtual IP**, (in this example 192.168.32.100, according to the configuration in the third slide) and select two appropriate interfaces on the local and remote nodes. Then, click the **add** button.
Now you have 4 Virtual IP addresses configured on two interfaces.
When you are finished with setting the virtual IP, go to the iSCSI resources tab on the local node resources and click the add or remove targets button. After moving the target mirror-0 from Available targets to Targets already in cluster, click the apply button.
Next, go to the iSCSI resources tab on the remote node resources and click the add or remove targets button. After moving the target mirror-1 from Available targets to Targets already in cluster, click the apply button.
After that, scroll to the top of the Failover manager function. At this point, both nodes are ready to start the Failover. In order to run the Failover service, click the start button and confirm this action by clicking the start button again.

**NOTE:**
If the start button is grayed out, the setup has not been completed.
After clicking the start button, configuration of both nodes is complete.

NOTE:
You can now connect with iSCSI Initiators. The first storage client, in order to connect to target0 please setup multipath with following IP on the initiator side: 192.168.21.101 and 192.168.31.101. In order to connect to target1 please setup multipath with following IP on the initiator side: 192.168.22.101 and 192.168.32.101.

For the next storage client please setup multipath accordingly: for access to target0: 192.168.21.102, 192.168.31.102 and for access to target1: 192.168.22.102, 192.168.32.102.
In order to test Failover, go to the Resources pool manager function. Then, in the local node resources, click on the move to remote node button and confirm this action by clicking the move button.
After performing this step, the status for **local node** resources should state “active on node-b (remote node)” and the **Synchronization status** should state “synced”.

Data Server (DSS1)

**node-a**
IP Address: 192.168.0.220

8. Test Failover Function
In order to test failback, click the **move to local node** button in the **Resources pool manager** box for local node resources and confirm this action by clicking the **move** button.

**Data Server (DSS1)**

**node-a**  
IP Address: 192.168.0.220

9. Run Failback Function
After completing this step, the status for node-a resources should state “active on node-a (local node)” and the Synchronization status should state “synced”. Then, you can apply the same actions for node-b resources.

NOTE:
The Active-Active option allows configuring resource pools on both nodes and makes it possible to run some active volumes on node-a and other active volumes on node-b. The Active-Active option is enabled with the TRIAL mode for 60 days or when purchasing the Active-Active Failover Feature Pack. The Active-Passive option allows configuring a resource pool only on one of the nodes. In such a case, all volumes are active on a single node only.

The configuration and testing of Active-Active iSCSI Failover is now complete.
Thank you!