



## Step-by-Step Guide

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### Open-E JovianDSS High-Availability Cluster

**The aim of this document is to demonstrate how set up a High-Availability Cluster.**

Open-E JovianDSS includes failover functionality for SMB, NFS and iSCSI enabling you to set up High Availability Load-Balanced Storage Clusters.

By using the Open-E JovianDSS High Availability Cluster Feature Pack you can ensure reliability and redundancy through failover in case of a server crash.

The HA cluster management software enables you to quickly access all features related to your cluster setup. Whether for initial configuration or re-configuration after a failover – everything is in one place and guarantees ease of use for the storage administrator.

Data can be simultaneously accessed via SMB, NFS or iSCSI and via one more Virtual IP addresses. Independent VIP feature create a connection to the data which is independent of the physical network path.

High availability is achieved by detecting hardware failures and automatically moving the VIP from the primary to the secondary node without the client servers noticing a timeout.

To set up a High-Availability Cluster, perform the following steps:

1. Hardware configuration
2. Create new Pool
  - 2.1. Add write log (SLOG for ZIL)
  - 2.2. Add Read Cache
  - 2.3. Add Spare Disk
3. Create iSCSI Target
4. Network Configuration
  - 4.1. Create Bonds
  - 4.2. Select Default gateway
  - 4.3. Enter DNS
5. Time and date settings
6. Nodes Binding
7. Ping Nodes
8. Critical I/O handling setup
9. Start the Cluster Service
10. Enter Virtual IP
11. System Monitoring Setup
12. Failover test

## 1. Hardware configuration

**Client-1: ESXi,  
XEN, Hyper-V**

**Client-2: ESXi,  
XEN, Hyper-V**

**bond0 (active backup)**  
bond0: 192.168.21.101, 192.168.2.101  
**(SMB, NFS or iSCSI) (Ping Node)**

**bond0 (active backup)**  
bond0: 192.168.21.102, 192.168.2.102  
**(SMB, NFS or iSCSI) (Ping Node)**

**JovianDSS  
node-a**

**JovianDSS  
node-b**

Port used for WEB GUI management  
Storage Client Access,  
**bond0 (active backup)**  
eth0 IP:192.168.0.220

Port used for WEB GUI management  
Storage Client Access,  
**bond0 (active backup)**  
eth0 IP:192.168.0.221

Ring, Ping node  
**bond1 (active backup)**  
eth2 IP:192.168.2.220

Ring, Ping node  
**bond1 (active backup)**  
eth2 IP:192.168.2.221

SAS HBA

SAS HBA

**NOTE:**

Ring path (heartbeat) and Ping nodes must run on Active-Backup bonding. Ring and Ping IP must be configured in the same network subnet.

Virtual IP Address:  
192.168.21.100

JBOD

## **NOTE:**

Every cluster node must have set unique hostname. If more clusters are running in the same network, it is recommended to use following host names:

- First cluster hostnames:        node-a-00   node-b-00
- Second cluster hostnames :    node-a-01   node-b-01
- Third cluster hostnames :     node-a-02   node-b-02

And so on

If both cluster nodes are using same kind of 1Gbit and 10Gbit Ethernet ports but the port number sequence is different, it is possible to re-assign Ethernet port number sequence on console tools using hot-key: ctrl-alt-t and selecting function: Add-ons->NICs management.

## 2. Create new Pool

JovianDSS: **node-a**  
IP Address: 192.168.0.220

Go to menu Storage and click on **Add zpool** button. Add data groups by selecting the required amount of disks and select Mirror(multiple groups) from the pull-down menu and click on Add group button, then click on the **Next** button.

**Zpool wizard**

1. Add data group
2. Add write log
3. Add read cache
4. Add spare disks
5. Zpool properties
6. Summary

**Available disks**

Show only unused disks Rescan disks

Name	Id	Size	Blink
<input checked="" type="checkbox"/> sdb	scsi-SVMware_Virtual_disk_6000c291...	16.00 GiB	●
<input checked="" type="checkbox"/> sdc	scsi-SVMware_Virtual_disk_6000c29a...	16.00 GiB	●
<input checked="" type="checkbox"/> sdd	scsi-SVMware_Virtual_disk_6000c293...	16.00 GiB	●
<input checked="" type="checkbox"/> sde	scsi-SVMware_Virtual_disk_6000c295...	16.00 GiB	●
<input type="checkbox"/> sdf	scsi-SVMware_Virtual_disk_6000c291...	16.00 GiB	●
<input type="checkbox"/> sdg	scsi-SVMware_Virtual_disk_6000c29c...	16.00 GiB	●
<input type="checkbox"/> sdh	scsi-SVMware_Virtual_disk_6000c298...	16.00 GiB	●
<input type="checkbox"/> sdi	scsi-SVMware_Virtual_disk_6000c292...	16.00 GiB	●

Select redundancy for group: Mirror (multiple groups) ▼ + Add group

Cancel Next >

**Warning:** To add first Data Group to your zpool please select disks on the list on the left, select redundancy type and click "Add group" button.

Data groups: 

Data groups	Size
-------------	------

Zpool storage capacity: 0.00 B  
Used licensed storage capacity: 0.00 B

Other groups: 

Other groups	Size
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## 2.1. Add write log (SLOG for ZIL)

JovianDSS: **node-a**  
IP Address: 192.168.0.220

Select 2 disks for the write log and click on **Add group** button then click on the **Next** button.

The screenshot shows the JovianDSS Zpool wizard interface. The wizard is at step 2, "Add write log". The "Available disks" section shows a table of disks with checkboxes. Two disks, sdf and sdg, are selected. A red arrow points from the "Add group" button to the "Next" button. The "Data groups" panel on the right shows a "Mirror" group containing disks sdb, sdc, sdd, and sde. The bottom of the wizard has "Cancel", "Back", and "Next" buttons.

Name	Id	Size	Blink
sdf	scsi-SVMware_Virtual_disk_6000c291...	16.00 GiB	●
sdg	scsi-SVMware_Virtual_disk_6000c29c...	16.00 GiB	●
sdh	scsi-SVMware_Virtual_disk_6000c298...	16.00 GiB	●
sdi	scsi-SVMware_Virtual_disk_6000c292...	16.00 GiB	●

Data groups	Size
Mirror	×
sdb	16.00 GiB
sdc	16.00 GiB
Mirror	×
sdd	16.00 GiB
sde	16.00 GiB

Zpool storage capacity: 32.00 GiB  
Used licensed storage capacity: 32.00 GiB

Other groups

Other groups	Size
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## 2.2. Add Read Cache

JovianDSS: **node-a**  
IP Address: 192.168.0.220

Select disk (or disks) for level-2 read cache and click on the **Add group** button then click on the **Next** button.

The screenshot shows the JovianDSS web interface with the 'Zpool wizard' modal open. The wizard is at step 3, 'Add read cache'. The 'Available disks' table lists two disks, 'sdh' and 'sdi', both 16.00 GiB in size and currently unused. The 'sdh' disk is selected. The 'Add group' button is highlighted with a red arrow. The wizard also shows a list of existing data groups: 'Mirror' (sdb, sdc, sdd, sde) and 'Mirrored write io' (sdf, sdg). The total pool storage capacity is 32.00 GiB, and the used licensed storage capacity is also 32.00 GiB. The 'Next' button is also highlighted with a red arrow.

Name	Id	Size	Blink	
<input checked="" type="checkbox"/>	sdh	scsi-SVMware_Virtual_disk_6000c298...	16.00 GiB	●
<input type="checkbox"/>	sdi	scsi-SVMware_Virtual_disk_6000c292...	16.00 GiB	●

Data groups	Size
Mirror	16.00 GiB
sdb	16.00 GiB
sdc	16.00 GiB
Mirror	16.00 GiB
sdd	16.00 GiB
sde	16.00 GiB
Mirrored write io	16.00 GiB
sdf	16.00 GiB
sdg	16.00 GiB



## 2.3. Add Spare Disk

JovianDSS: **node-a**  
IP Address: 192.168.0.220

Select spare disk (or disks) and click on the **Add group** button then click on the **Next** button.

**Zpool wizard**

1. Add data group
2. Add write log
3. Add read cache
4. Add spare disks
5. Zpool properties
6. Summary

**Available disks**

Show only unused disks Rescan disks

Name	Id	Size	Blink
<input checked="" type="checkbox"/> sdi	scsi-SVMware_Virtual_disk_6000c292...	16.00 GiB	<span style="color: green;">●</span>

Select redundancy for group: Single + **Add group**

Cancel Back Next

**Data groups**

Name	Size
Mirror	16.00 GiB
sdb	16.00 GiB
sdc	16.00 GiB
Mirror	16.00 GiB
sdd	16.00 GiB
sde	16.00 GiB

Zpool storage capacity: 32.00 GiB  
Used licensed storage capacity: 32.00 GiB

**Other groups**

Name	Size
Mirrored write lo	16.00 GiB
sdf	16.00 GiB
sdg	16.00 GiB
Read cache	16.00 GiB
sdh	16.00 GiB

## 2. Create new Pool

JovianDSS: **node-a**

IP Address: 192.168.0.220

To confirm the pool name click on the **Next** button then click on the next screen and click on the **Add pool** button.

Storage

User Manager

Failover Settings

Storage Settings

System Settings

Diagnostics

### Zpool wizard

1. Add data group
2. Add write log
3. Add read cache
4. Add spare disks
5. Zpool properties
6. Summary

Please set properties for zpool:

Zpool name:

Zpool name: Defines name of the zpool in the system.

Cancel Back Next

### 3. Create iSCSI Target

open-e

JovianDSS: node-a

IP Address: 192.168.0.220

The Pool menu can be open by clicking the **down arrow - icon** button.

The screenshot shows the Open-E JovianDSS web interface. The left sidebar contains navigation menus: Storage, User Management, Failover Settings, Storage Settings, System Settings, and Diagnostics. The main content area displays the 'Storage' configuration for 'Pool-0'. The pool is in an 'ONLINE' state. Key details include Zpool ID: 2005253826725532254, Total storage: 31.75 GiB, and 8 disks. A status message indicates the pool is functioning correctly. Below this, there are sections for 'Zpools available for import' (no external zpools found) and 'Unassigned disks' (no unassigned disks found). A red arrow points from a text box to a down arrow icon in the Pool-0 options menu.

Name	Serial number	Size	Model	Blink
No unassigned disks found.				

## 3. Create iSCSI Target

JovianDSS: **node-a**  
IP Address: 192.168.0.220

In the pool menu select **iSCSI targets** and click on the **Add new target** button.

The screenshot shows the Open-E JovianDSS web interface. The left sidebar contains navigation options: Storage, User Management, Failover Settings, Storage Settings, System Settings, and Diagnostics. The main content area displays the 'Storage' section for 'Pool-0', which is in an 'ONLINE' state. It shows details for Zpool ID (2005253826725532254), Total storage (31.75 GiB), and 8 disks. Below this, there are tabs for 'iSCSI targets', 'Snapshots', 'Shares', and 'Virtual IPs'. The 'iSCSI targets' tab is active, showing 'No targets found.' and a '+ Add new target' button. A red arrow points from the 'Add new target' button to the text box on the left. Another red arrow points from the 'iSCSI targets' tab to the same text box. A red box highlights the 'iSCSI targets' tab and the 'Add new target' button.

## 3. Create iSCSI Target

JovianDSS: **node-a**  
IP Address: 192.168.0.220

To confirm default iSCSI target name  
click the **Next** button.

## 3. Create iSCSI Target

JovianDSS: **node-a**  
IP Address: 192.168.0.220

In order to create a new volume assigned to the target click on the Add new zvol button.

The screenshot shows the Open-E JovianDSS web interface. The main content area is titled 'Storage' and contains a 'Target Wizard' dialog box. The wizard is currently on step 2, 'Zvols', which is highlighted in red. The wizard has a sidebar with steps: 1. Target name, 2. Zvols, 3. Access, and 4. Summary. The main area of the wizard shows a search box and a table titled 'Zvols available for target'. The table has columns for Name, Type, Logical size, SCSI ID, LUN, and Access mode. A red arrow points to the '+ Add new zvol' button. The background shows the Storage page with a sidebar menu and a top navigation bar.

## 3. Create iSCSI Target

JovianDSS: **node-a**  
IP Address: 192.168.0.220

Enter the zvol name and size. Optionally you can Select Thin provisioning and other options if required and click on the **Add** button.

The screenshot shows the 'Add new zvol' dialog box in the Open-E JovianDSS web interface. The dialog is titled 'Add new zvol' and contains 'Zvol properties' with the following fields and values:

- Name: zvol-00
- Size: 1000 GIB (27.12 GIB physical available)
- Provisioning:  Thin provisioned (default)
- Deduplication: Disabled (default)
- Copies: 1 (default)
- Compression: lz4 (default)
- Volume block size: 128 KiB (default)
- Sync: Always (default)
- Log bias: Latency (default)
- Primary cache: All (default)
- Secondary cache: All (default)

A red box highlights the 'Name' and 'Size' fields, and a red arrow points from the text box to the 'Add' button.

### 3. Create iSCSI Target

JovianDSS: **node-a**

IP Address: 192.168.0.220

Now, click on the **Next** button.

On the next screen, in the access step of the wizard click on the **Next** button and finally in last step of the wizard click on the **Add** button.

The screenshot shows the Open-E JovianDSS web interface. A 'Target Wizard' dialog box is open, showing the '2. Zvols' step. The wizard has four steps: 1. Target name, 2. Zvols, 3. Access, and 4. Summary. The 'Zvols available for target' section contains a search bar and a table with the following data:

Name	Type	Logical size	SCSI ID	LUN	Access mode
<input checked="" type="checkbox"/> zvol-00	zvol	1000.00 GiB	P1XpxWimhYZHL...	0	Read-write (default)

At the bottom of the wizard, there are three buttons: 'Cancel', 'Back', and 'Next'. A red arrow points to the 'Next' button.



## 3. Create iSCSI Target

JovianDSS: **node-a**  
IP Address: 192.168.0.220

New iSCSI target with the assigned zvol-00 is up and running.

Optionally, also an SMB, NFS share can be created, but it is not shown in this document.

The screenshot shows the JovianDSS web interface. The left sidebar contains navigation options: Storage, User Management, Failover Settings, Storage Settings, System Settings, and Diagnostics. The main content area is titled 'Storage' and shows 'Pool-0' with a status of 'ONLINE'. Below this, there are tabs for 'Status', 'Disk groups', 'iSCSI targets', 'Snapshots', 'Shares', and 'Virtual IPs'. The 'iSCSI targets' tab is active, showing a table with one target: 'iqn.2015-10:dss.target0' with status 'Active' and 'Zvols: 1'. Below the target list, there is a section for 'Zvols not attached to targets' which is currently empty. A red arrow points from the text box on the left to the 'iSCSI targets' section in the screenshot.

## 4. Network Configuration

JovianDSS: **node-a**  
IP Address: 192.168.0.220

Select **System Settings** from main menu and next select **Network** tab. Click on the **Create Bond interface** button. Enter all required details of the Bond and click on the **Apply** button.

**Create new channel bonding interface**

You have selected interface (eth0) that you are currently connected through.

Name	IP	DHCP	Interface details	Cable	Active	Bond	Select
eth0	192.168.0.220	No	VMware VMXNET3 Ethernet Co...	cable	Yes		<input checked="" type="checkbox"/>
eth1	192.168.1.220	No	VMware VMXNET3 Ethernet Co...	cable	Yes		<input checked="" type="checkbox"/>
eth2	192.168.2.220	No	VMware VMXNET3 Ethernet Co...	cable	Yes		<input type="checkbox"/>
eth3	192.168.3.220	No	VMware VMXNET3 Ethernet Co...	cable	Yes		<input type="checkbox"/>

**Bonding options**

Type: Active-backup

Primary interface: eth0

MAC: 02:c3:23:aa:3a:45

Internet protocol:  DHCP  Static

IP: 192.168.0.220

Netmask: 255.255.255.0

Broadcast: automatic

Gateway: 192.168.0.2

Buttons: Cancel, Apply

## 4.1. Network Configuration. Create Bonds.



JovianDSS: **node-a**  
IP Address: 192.168.0.220

Next, please repeat the same steps for the second Bond.

Name	IP	DHCP	Interface details	Cable	Active	Bond	Select
eth0	N/A	No	VMware VMXNET3 Ethernet Contr...	cable	No	bond0	<input type="checkbox"/>
eth1	N/A	No	VMware VMXNET3 Ethernet Contr...	cable	No	bond0	<input type="checkbox"/>
eth3	192.168.3.220	No	VMware VMXNET3 Ethernet Contr...	cable	Yes		<input checked="" type="checkbox"/>

**Bonding options**

Type: Active-backup

Primary interface: eth2

MAC: 02:59:88:22:55:7b

Internet protocol:  Static

IP: 192.168.2.220

Netmask: 255.255.255.0

Broadcast: automatic

Gateway: none

Buttons: Cancel, Apply

## 4.2. Network Configuration. Select Default gateway

JovianDSS: **node-a**  
IP Address: 192.168.0.220

Both Bonds are created properly. Overview is shown in the Interfaces field. Next, in the Default gateway field, click on the **Change** button.

The screenshot shows the JovianDSS System Settings interface. The 'Network' tab is selected, and the 'Interfaces' section is expanded. A table lists the following interfaces:

Name	IP	DHCP	Vendor	Negotiated speed	Cable	Active	Options
bond0	192.168.0.220	No	Ethernet Bonding Driver	10000 Mbps	cable	Yes	Options
bond1	192.168.2.220	No	Ethernet Bonding Driver	10000 Mbps	cable	Yes	Options
eth0 (bond0)	N/A	No	VMware VMXNET3 Ethernet Controller (rev 01)	10000 Mbps	cable	No	Options
eth1 (bond0)	N/A	No	VMware VMXNET3 Ethernet Controller (rev 01)	10000 Mbps	cable	No	Options
eth2 (bond1)	N/A	No	VMware VMXNET3 Ethernet Controller (rev 01)	10000 Mbps	cable	No	Options
eth3 (bond1)	N/A	No	VMware VMXNET3 Ethernet Controller (rev 01)	10000 Mbps	cable	No	Options

Below the table, the 'Default gateway' section is visible, showing fields for 'Interface', 'Interface details', and 'Gateway'. A 'Change' button is located at the bottom of this section.

## 4.2. Network Configuration. Select Default gateway

JovianDSS: **node-a**  
IP Address: 192.168.0.220

Select proper interface and click on the **Apply** button.

The screenshot shows the 'System Settings' page in the Open-E JovianDSS web interface. The 'Network' tab is selected, and the 'Default gateway' section is active. A modal dialog titled 'Select default gateway' is open, displaying a table of available interfaces. The table has columns for 'Interface', 'Interface details', 'Gateway', 'Active', and 'Select'. Two interfaces are listed: bond0 and bond1, both using the 'Ethernet Bonding Driver' and having a 'static' gateway. The 'Active' column shows 'Yes' for both, and the 'Select' column has radio buttons. A red arrow points to the radio button for bond1. Below the table, there are 'Cancel' and 'Apply' buttons. A red arrow points to the 'Apply' button. The background shows the 'System Settings' sidebar and the 'Default gateway' section of the main interface.

Interface	Interface details	Gateway	Active	Select
1 bond0	Ethernet Bonding Driver	static	Yes	<input type="radio"/>
2 bond1	Ethernet Bonding Driver	static	Yes	<input checked="" type="radio"/>

## 4. Network Configuration (second cluster node)

JovianDSS: **node-b**  
IP Address: 192.168.0.221

Go to the **second cluster node** and create both Bond interfaces accordingly.

The screenshot shows properly created Bonds and default gateway on the second node.

The screenshot shows the JovianDSS System Settings interface for node-b. The 'Network' tab is selected, showing the following configuration:

Name	IP	DHCP	Vendor	Negotiated speed	Cable	Active
bond0	192.168.0.221	No	Ethernet Bonding Driver	10000 Mbps	cable	Yes
bond1	192.168.2.221	No	Ethernet Bonding Driver	10000 Mbps	cable	Yes
eth0 (bond0)	N/A	No	VMware VMXNET3 Ethernet Controller (rev 01)	10000 Mbps	cable	No
eth1 (bond0)	N/A	No	VMware VMXNET3 Ethernet Controller (rev 01)	10000 Mbps	cable	No
eth2 (bond1)	N/A	No	VMware VMXNET3 Ethernet Controller (rev 01)	10000 Mbps	cable	No
eth3 (bond1)	N/A	No	VMware VMXNET3 Ethernet Controller (rev 01)	10000 Mbps	cable	No

Below the table, the 'Default gateway' is configured as follows:

- Interface: bond0
- Interface details: Ethernet Bonding Driver
- Gateway: static

A 'Change' button is visible below the gateway configuration.

### 4.3. Network Configuration. Enter DNS IP

JovianDSS: **node-a**  
IP Address: 192.168.0.220

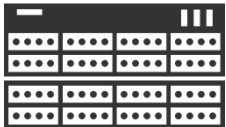
Assign a unique server name and configure DNS settings select the **System settings** from main menu and select **Network** tab. Next scroll down to **Settings** field. Enter the required server name, enter the DNS IP and click the **Apply** button.

Repeat the same steps on the second cluster node.

The screenshot shows the JovianDSS web interface. The sidebar menu includes Storage, User Management, Failover Settings, Storage Settings, System Settings (selected), and Diagnostics. The main content area is titled 'System Settings' and shows network configuration for interface 'bond0'. The 'Settings' section is expanded, showing fields for 'Server name' (node-a), 'Server description' (Open-E JovianDSS), 'Hostname' (node-a-JNFR0011), and 'DNS' (192.168.0.10). A green 'Apply' button is visible at the bottom of the settings section. Red arrows point from the text instructions to the 'System Settings' menu item, the 'Settings' section, and the 'Apply' button.

## 5. Time and date settings

open-e



JovianDSS: **node-a**  
IP Address: 192.168.0.220

Select **Continuous NTP synchronization** and click apply. Repeat this step for the second cluster node as well.

Administration Network System Settings management Update

Time and date settings

Time zone: Europe/Berlin

Set time and date:

Manual

Current time: 21 43 53

Current date: 2015-10-10

Continuous NTP synchronization

NTP server: 0.pool.ntp.org,1.pool.ntp.org,2. | Synchronize time now

Apply

Notifications 0 0 13



## 6. Nodes Binding

JovianDSS: **node-a**  
IP Address: 192.168.0.220

In main menu select **Failover settings** and enter IP address of the Bond interface of the second node and enter current administrator password (default: admin) and click on the **Connect** button.

The Bond interface will function as ring path (heartbeat) and as the persistent reservation synchronization path.

node-a-JNFR0011 x node-b-JNFR0012 x +

open-e JovianDSS

About Help Logout

Storage

User Management

Failover Settings

Storage Settings

System Settings

Diagnostics

### Failover Settings

Failover status

**Nodes are not bound**  
In order to configure and run Failover service both nodes must be connected.  
Note that interfaces used to bind the nodes must be Active-Backup bonding interfaces.

Node binding

Remote node IP: 192.168.2.221

Password: .....

Connect

Notifications 0 0 13

## 7. Ping Nodes



JovianDSS: **node-a**  
IP Address: 192.168.0.220

In Failover settings click on the **Edit** button in Ping nodes section and enter at least two ping nodes.

Ping nodes IP addresses must be reachable from Ring interfaces. So the ping node must use the same network subnet as ring interfaces.

The screenshot shows the JovianDSS web interface. The main page is titled "Failover Settings" and contains a table with columns for "Node", "Connection status", and "Failover status". Two nodes are listed: "node-a-JNFR0011" and "node-b-JNFR0012", both with a "Reachable" connection status. A "Ping nodes" dialog box is open in the foreground, showing a search bar and a table with columns for "IP", "Local status", and "Remote status". Two ping nodes are listed in the table, both with "Reachable" local and remote statuses. A red arrow points to the "+ Add ping node" button in the dialog box. The dialog box also has a "Close" button at the bottom right.

Node	Connection status	Failover status
node-a-JNFR0011 (IP: 192.168.2.220, node ID: 2580a627)	Reachable	N/A
node-b-JNFR0012 (IP: 192.168.2.221, node ID: 56c190c4)	Reachable	N/A

IP	Local status	Remote status
1 192.168.2.101	Reachable	Reachable
2 192.168.2.102	Reachable	Reachable

## 8. Critical I/O handling setup

JovianDSS: **node-a**  
IP Address: 192.168.0.220

It is strongly recommended to select **Immediate** option in order to execute immediate reboot in case of critical I/O error.

The screenshot shows the JovianDSS web interface. The left sidebar contains navigation options: Storage, User Management, Failover Settings, Storage Settings, System Settings (highlighted), and Diagnostics. The main content area is titled 'System Settings' and includes sections for 'Remote Log Server' and 'Critical I/O errors'. The 'Critical I/O errors' section is expanded to show the 'Reboot procedure' options. The 'Immediate' option is selected, with a red arrow pointing to it from the explanatory text box. Below the options is an 'Apply' button. At the bottom of the interface, there is a 'Notifications' bar showing 0 errors, 0 warnings, and 19 info messages.

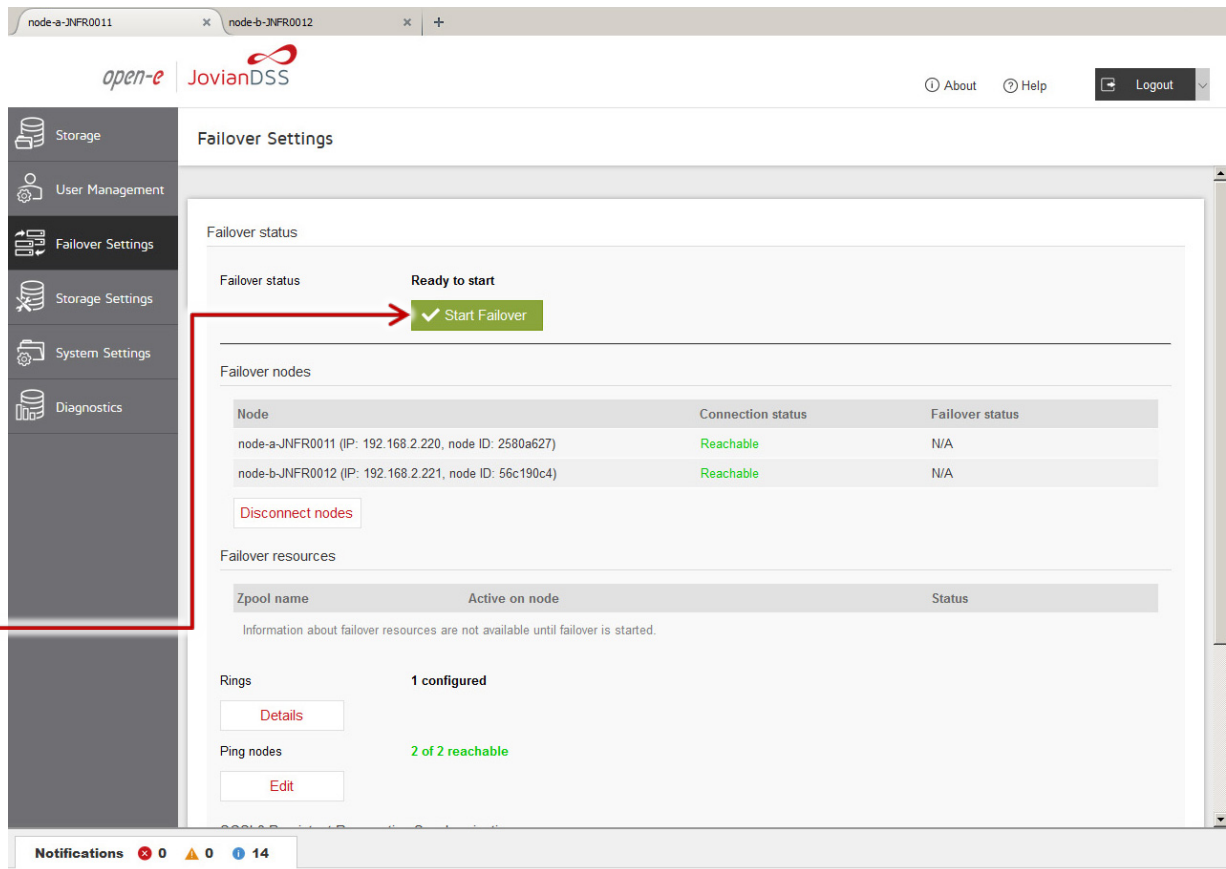
## 9. Start the Cluster Service

open-e

JovianDSS: **node-a**  
IP Address: 192.168.0.220

Now, all required settings are completed.

Click on **the Start Failover** button in order to start the HA-cluster service.



The screenshot shows the Open-E JovianDSS web interface. The left sidebar contains navigation options: Storage, User Management, Failover Settings (highlighted), Storage Settings, System Settings, and Diagnostics. The main content area is titled 'Failover Settings' and shows the following information:

- Failover status:** Ready to start. A green 'Start Failover' button is visible, with a red arrow pointing to it from the text box on the left.
- Failover nodes:** A table with columns for Node, Connection status, and Failover status.

Node	Connection status	Failover status
node-a-JNFR0011 (IP: 192.168.2.220, node ID: 2580a627)	Reachable	N/A
node-b-JNFR0012 (IP: 192.168.2.221, node ID: 56c190c4)	Reachable	N/A

Below the table, there is a 'Disconnect nodes' button. Further down, the 'Failover resources' section shows:

- Zpool name:** Active on node, Status
- Rings:** 1 configured (with a 'Details' button)
- Ping nodes:** 2 of 2 reachable (with an 'Edit' button)

At the bottom of the interface, there is a 'Notifications' bar showing 0 errors, 0 warnings, and 14 information messages.

## 10. Enter the Virtual IP

open-e

JovianDSS: **node-a**  
IP Address: 192.168.0.220

In main menu **Storage**, select **Virtual IPs** tab then click on the **Add virtual IP** button and enter the virtual IP address and assign it to the required interfaces.

The screenshot displays the Open-E JovianDSS web interface. The main menu on the left includes 'Storage', 'User Management', 'Failover Settings', 'Storage Settings', 'System Settings', and 'Diagnostics'. The 'Storage' section is active, showing 'Pool-0' with a state of 'ONLINE'. A modal dialog box titled 'Add virtual IP' is open, with a red arrow pointing to it from the 'Add virtual IP' button in the background. The dialog contains the following fields:

- Virtual IP address: 192.168.21.100
- Name: vip-00
- Netmask: 255.255.255.0
- Network interface: bond0 (192.168.0.220)
- Remote network interface: bond0 (192.168.0.221)

At the bottom of the dialog are 'Cancel' and 'Apply' buttons. The background interface also shows a 'Rescan' button and a notification for 'Rescan required'.

## 11. System Monitoring Setup

JovianDSS: **node-a**  
IP Address: 192.168.0.220

It is recommended to setup the system monitoring with **Remote Log Server** or **SNMP**.

The screenshot shows the JovianDSS web interface. The left sidebar contains navigation options: Storage, User Management, Failover Settings, Storage Settings, System Settings (highlighted), and Diagnostics. The main content area is titled 'System Settings' and includes several sections:

- Apply** (green button)
- Remote Log Server** section with a red border and a checkbox for 'Log events to a remote server'. A red arrow points from the text box on the left to this checkbox.
- Apply** (green button)
- Critical I/O errors** section with a red border and a checkbox for 'Critical I/O errors'.
- Reboot procedure** section with a text box: 'System may require reboot when critical I/O errors occur. Please select how such errors should be handled:'.
- Reboot policy:** with three radio button options:
  - Immediate** (selected): System will reboot the machine immediately after a pool has I/O suspended state. No event will be recorded about the reason of it. This option is recommended for cluster configurations because it immediately triggers the failover and therefore it's the fastest way to restore the access to the data.
  - Automatic**: System will restart in 30 seconds from when the errors appear.
  - Manual**: System will prompt for manual restart.
- Apply** (green button)

At the bottom, there is a 'Notifications' bar showing 0 errors, 0 warnings, and 19 info messages.

## 11. System Monitoring Setup

JovianDSS: **node-a**  
IP Address: 192.168.0.220

Setup proper E-mail notifications.

The screenshot shows the JovianDSS web interface. The left sidebar contains navigation options: Storage, User Management, Failover Settings, Storage Settings, System Settings (highlighted), and Diagnostics. The main content area is titled 'System Settings' and features several expandable sections. The 'E-mail notifications' section is expanded, showing a checkbox for 'Enable e-mail notifications' which is checked. Below this, there are input fields for 'E-mail:' (containing 'name@example.com'), 'SMTP server:' (containing 'smtp.example.com'), and 'SMTP port:' (containing '25'). There are also checkboxes for 'Use authentication:' and 'Encryption:'. Under 'Destination e-mail:', the 'Use default e-mail address' radio button is selected. A 'Send test message' button is located below the form. A green 'Apply' button is at the bottom of the section. Other sections like 'Remote Log Server' and 'Critical I/O errors' are partially visible. At the bottom of the page, a 'Notifications' bar shows 0 errors, 0 warnings, and 19 info messages.

## 12. Failover test

open-e

JovianDSS: **node-a**  
IP Address: 192.168.0.220

Now, in order to test failover, select **Storage** from main menu and in the **Options** drop-down menu select **Move**.

The pool will be exported on the current node and will be imported on the second node.

The screenshot shows the JovianDSS web interface. The sidebar menu on the left has 'Storage' selected. The main content area displays 'Storage' settings for 'Pool-0'. The pool is in an 'ONLINE' state. A 'Rescan required' notification is visible, with a 'Rescan' button. A dropdown menu is open over the pool details, showing options: 'Options', 'Delete Zpool', 'Export Zpool', and 'Move'. A red arrow points from the 'Storage' menu item to the 'Pool-0' section, and another red arrow points from the 'Move' option in the dropdown menu to the 'Rescan required' notification area.



## 12. Failover test

open-e

JovianDSS: **node-b**  
IP Address: 192.168.0.221

Go to the second node.

In order to move pool activity from the second node back to the first node, select the **Move** function from **Options** menu. Now the pool will be exported at the second node and next will be imported back on the first one.

**Node Reboot Test:** Once the failover is completed, go to the first node and select reboot option from drop-down menu next to the **Logout** button. Pool activity will be moved to other cluster node.

The screenshot displays the Open-E JovianDSS web interface. The top navigation bar includes 'About', 'Help', and 'Logout'. The left sidebar contains navigation items: Storage, User Management, Failover Settings, Storage Settings, System Settings, and Diagnostics. The main content area is titled 'Storage' and shows details for 'Pool-0'. The pool status is 'ONLINE'. Key information includes Zpool ID: 2005253826725532254, Total storage: 31.75 GiB, and Disks: 8. A status box indicates 'Zpool is functioning correctly' with the action 'None required'. An 'Options' menu is open, showing 'Move' as the selected option. Below the pool details, there is a 'Zpools available for import' section with a 'Rescan required' message. At the bottom, there is a table for 'Unassigned disks' which is currently empty. The bottom status bar shows 'Notifications' with 0 errors, 0 warnings, and 19 info messages.

## **NOTE:**

The step-by-step guide is based on configuration from page 4, use single bonding for storage access. This will work with SMB, NFS or iSCSI.

Next on page 35 will show setup with two storage access paths and two virtual IPs. This setup can be used for iSCSI Initiators with multipath. It can be used also without multipath, just to separate load on 2 separate network paths.

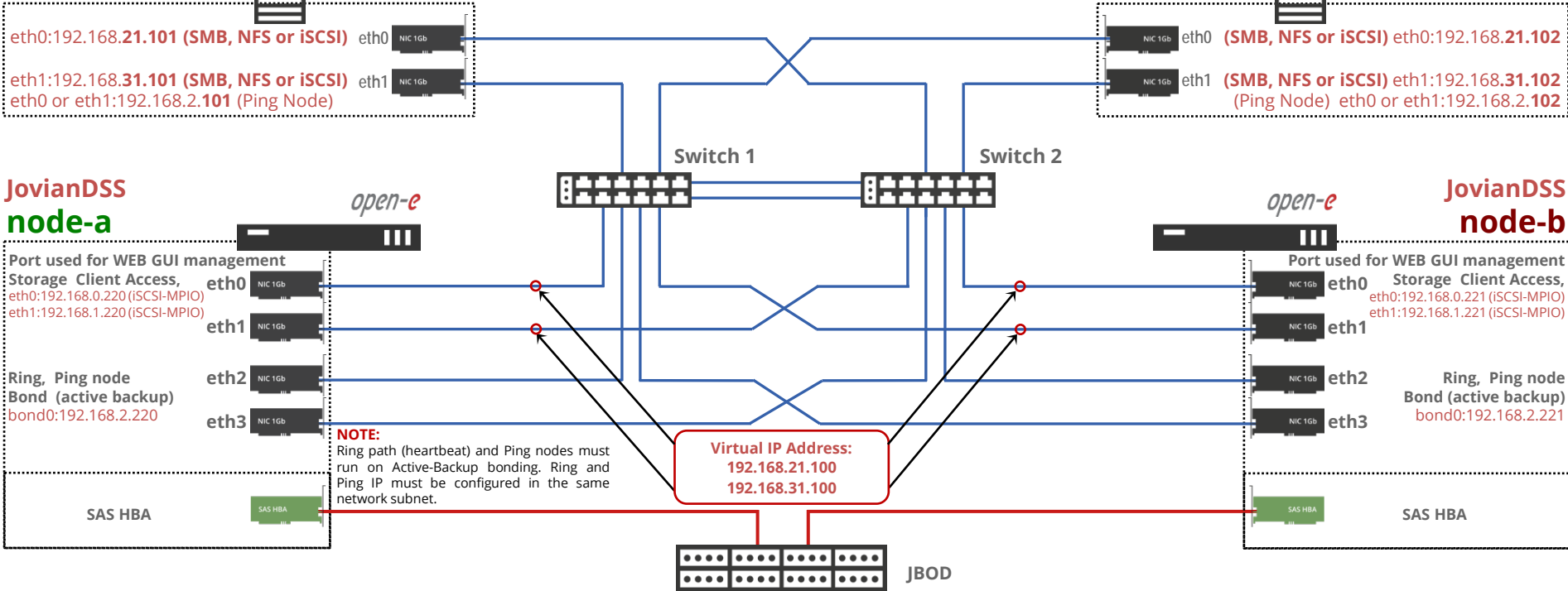
On page 36 instead of just two storage paths, there are two bonding. This setup can be used also for iSCSI Initiators with multipath or for mixed iSCSI/SMB/NFS environments.

Page 36 additionally shows 2 optional JBODs, which can be mirrored with mirrored disk groups in order to eliminate a JBOD as single point of failure.

On page 37 both JBODs are connected with double SAS paths for multipath.

**Client-1: ESXi,  
XEN, Hyper-V**

**Client-2: ESXi,  
XEN, Hyper-V**



# Open-E JovianDSS High-Availability Cluster



**Client-1: ESXi,  
XEN, Hyper-V**



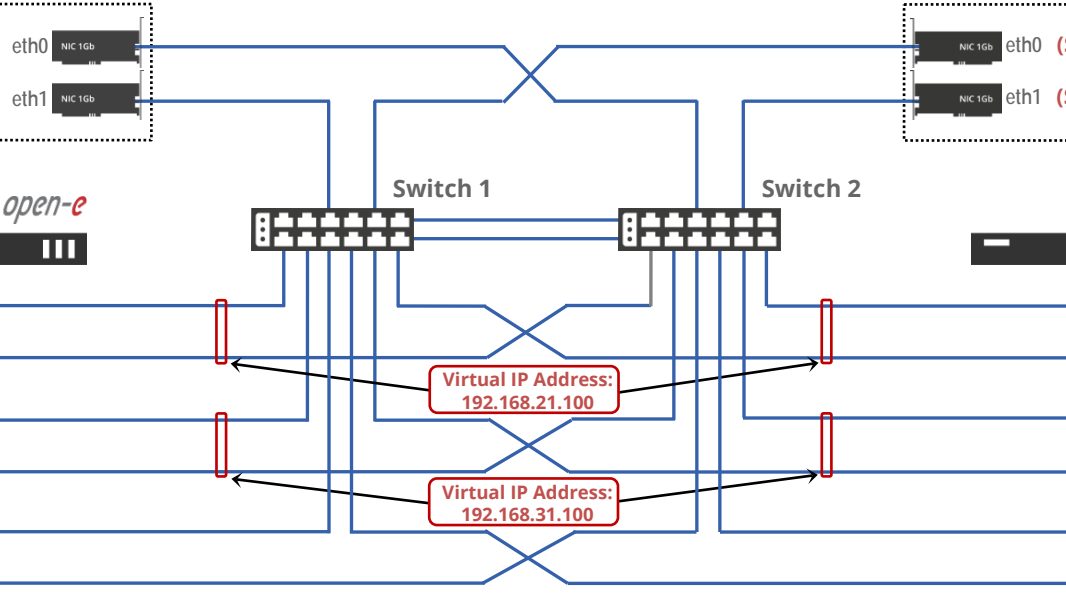
**NOTE:**

Ring path (heartbeat) and Ping nodes must run on Active-Backup bonding. Ring and Ping IP must be configured in the same network subnet.

**Client-2: ESXi,  
XEN, Hyper-V**



eth0:192.168.21.101 (SMB, NFS or iSCSI)  
eth1:192.168.31.101 (SMB, NFS or iSCSI)  
eth0 or eth1:192.168.4.101 (Ping Node)



eth0 (SMB, NFS or iSCSI) eth0:192.168.21.102  
eth1 (SMB, NFS or iSCSI) eth1:192.168.31.102  
(Ping Node) eth0 or eth1:192.168.4.102

**JovianDSS  
node-a**

*open-e*

Switch 1

Switch 2

*open-e*

**JovianDSS  
node-b**

Port used for WEB GUI management  
Storage Client Access  
bond0:192.168.0.220  
(iSCSI-MPIO)

eth0

eth1

Storage Client Access  
bond1:192.168.2.220  
(iSCSI-MPIO)

eth2

eth3

Ring, Ping node  
Bond (active backup)  
bond2:192.168.4.220

eth4

eth5

SAS HBA

SAS HBA

SAS HBA

JBOD 1

Virtual IP Address:  
192.168.21.100

Virtual IP Address:  
192.168.31.100

Port used for WEB GUI management  
Storage Client Access  
bond0:192.168.0.221  
(iSCSI-MPIO)

eth0

eth1

Storage Client Access  
bond1:192.168.2.221  
(iSCSI-MPIO)

eth2

eth3

Ring, Ping node  
Bond (active backup)  
bond2:192.168.4.221

eth4

eth5

SAS HBA

SAS HBA

SAS HBA

JBOD 2

**Client-1: ESXi,  
XEN, Hyper-V**



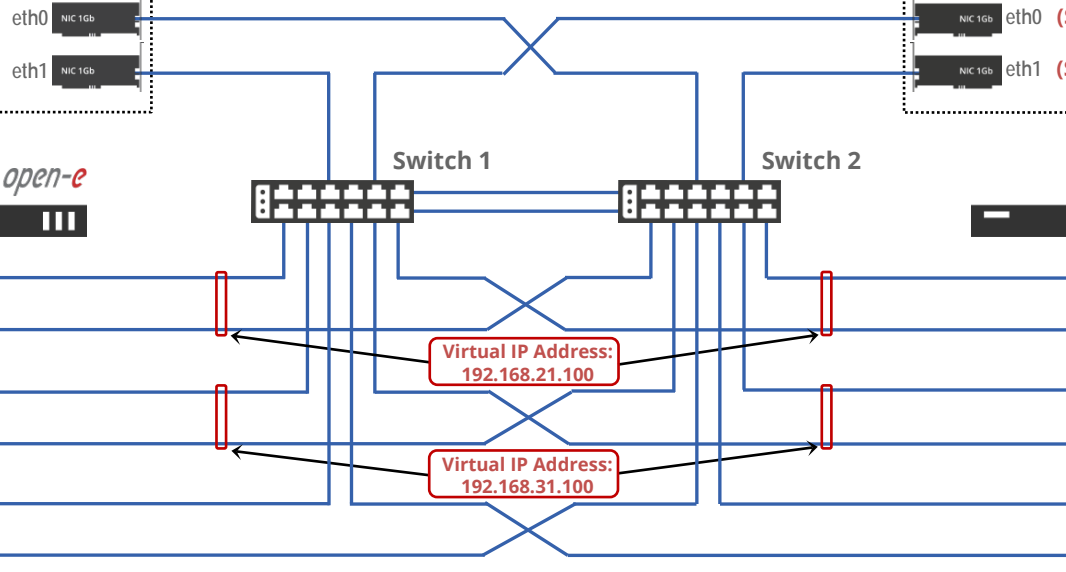
**NOTE:**

Ring path (heartbeat) and Ping nodes must run on Active-Backup bonding. Ring and Ping IP must be configured in the same network subnet.

**Client-2: ESXi,  
XEN, Hyper-V**



eth0:192.168.21.101 (SMB, NFS or iSCSI)  
eth1:192.168.31.101 (SMB, NFS or iSCSI)  
eth0 or eth1:192.168.4.101 (Ping Node)



eth0 (SMB, NFS or iSCSI) eth0:192.168.21.102  
eth1 (SMB, NFS or iSCSI) eth1:192.168.31.102  
(Ping Node) eth0 or eth1:192.168.4.102

**JovianDSS  
node-a**

*open-e*

Switch 1

Switch 2

*open-e*

**JovianDSS  
node-b**

Port used for WEB GUI management

Storage Client Access  
bond0:192.168.0.220  
(iSCSI-MPIO)

eth0

eth1

Storage Client Access  
bond1:192.168.2.220  
(iSCSI-MPIO)

eth2

eth3

Ring, Ping node  
Bond (active backup)  
bond2:192.168.4.220

eth4

eth5

SAS HBA



JBOD 1



Virtual IP Address:  
192.168.21.100

Virtual IP Address:  
192.168.31.100

Port used for WEB GUI management

Storage Client Access  
bond0:192.168.0.221  
(iSCSI-MPIO)

eth0

eth1

Storage Client Access  
bond1:192.168.2.221  
(iSCSI-MPIO)

eth2

eth3

Ring, Ping node  
Bond (active backup)  
bond2:192.168.4.221

eth4

eth5

SAS HBA



JBOD 2



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Thank You!

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