



## Step-by-Step Guide

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### Open-E JovianDSS Advanced Metro High Availability Cluster with 2 Rings (supported since version up28)

# Open-E JovianDSS Advanced Metro High Availability Cluster with 2 Rings *open-e*

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**The aim of this document is to demonstrate an example setup of an Advanced Metro High Availability Cluster with 2 Rings. The 2 Rings option is available as of version 1.0 up28.**

The Advanced Metro High Availability Cluster is using an Ethernet link for Disk Exports instead of SAS. It can work with JBOD-less hardware so that disks are present in both cluster nodes and are mirrored via an Ethernet path.

The Advanced Metro HA Cluster uses the same Ring-Ping design for Cluster Management as the Open-E JovianDSS Standard HA Cluster. But it enables an additional functionality – the “Remote disks mirroring paths for Cluster over Ethernet” – in order to configure a special Ethernet link for disk exports.

In this example (**setup on page 5**), 2 NICs are used for iSCSI Targets only.

The bond is preferred for NFS and SMB shares but for iSCSI path redundancy MPIO is a better choice. The Open-E JovianDSS works as a Unified Storage Appliance, providing NAS and SAN (iSCSI ,NFS, SMB). All services requiring path redundancy will need to configure 2 bonds. **Please refer to other examples shown on pages 46-52.**

In this document, two pools are created with 4 (2-local + 2-remote) disks in every mirror group. In case of the other node, reboots or failure, the mirror groups are still redundant with 2 disks in every mirror.

The 4-way mirror provides limited storage efficiency of only 25%. For increased storage efficiency, a hardware RAID controller and just a simple mirror over 2 disk units with a RAID array behind can be used. Open-E JovianDSS includes built-in all RAID tools and drivers for Broadcom (LSI) and Microsemi (Adaptec). In case of Areca, a driver is included as well but the Web-GUI has to be accessed via the controller's ETH-port.

# Open-E JovianDSS Advanced Metro High Availability Cluster with 2 Rings *open-e*

The software version 1.0 up28 supports NEW options for cluster configuration. Here is the comparison summary:

## The up27 and older versions:

- Cluster bind-ring and ping nodes must be on the same Active-Backup bond and MUST go via network switch.
- If node has lost all ping nodes signals, all pools on this node will be exported. The export is done because the node is most probably not reachable and must export pools so other node can import and failover will be possible.
- If node has lost all ping nodes and ring-heartbeat, the node will be rebooted immediately. The reason is similar as in the case of all pings lost but in the case of no ping nodes and no ring signal, it is assumed the node is fully isolated and reboot will be safer for other node to failover.

**Note:** It is not possible to use different bonding than Active-Backup for the cluster bind-ring.

## The up28 and newer versions:

- Everything what was valid and working in the up27 will also work in the up28 and newer.
- Up to 2 rings can be configured and ping nodes to be configured on the same path of the storage paths and not on the rings network.
- There is NO obligatory active-backup bond for the cluster bind-ring. Both rings can be configured on nonbonded NIC but optionally can work on an active-backup bond as well.
- The second ring can be configured via a mirror path if Advanced Metro Cluster is used but in such case the mirror path can work on a single NIC or an active-backup bond. If a round-robin bond is configured for the mirror path, it is not possible to configure the second ring on it. In such case, the second ring can be configured on extra point-to-point single path or an active-backup bond path.
- If a node has lost all ping node signals, all pools on this node will be exported. The export is done because the node is most probably not reachable and must export pools, so the other node can import and failover will be possible (**this works the same as in the up27**).
- If a node has lost all ping nodes and a ring-heartbeat, the node will be rebooted immediately. The reason is similar as in the case of all pings lost, but in the case of no ping nodes and no ring signal, it is assumed the node is fully isolated and a reboot will be safer for other node to perform a failover (**this works same as in the up27**).

**Note:** MS Hyper-V cluster as a storage client via iSCSI use Persistent-Reservations synchronization which works on bind-ring only. It does NOT work via a second ring. This is why for Hyper-V cluster it is still obligatory to use an Active-Backup bond for the bind-ring path.

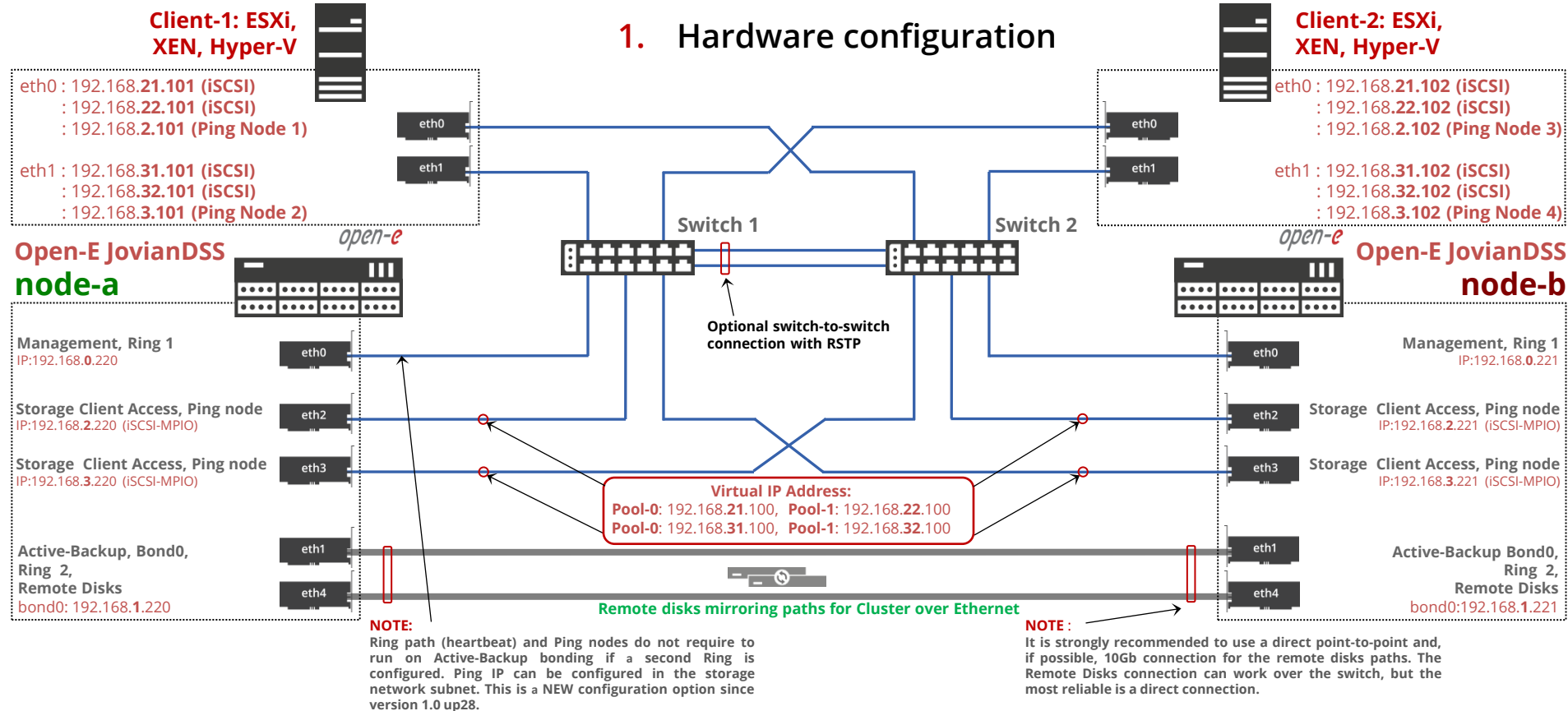
## To set up an Advanced Metro HA Cluster, perform the following steps:

1. Hardware configuration
2. Network configuration
  - 2.1. Create a mirroring path bond
  - 2.2. Select a default gateway
  - 2.3. Network configuration on node-b
3. Time and date settings
4. Nodes binding
5. Adding rings
6. Ping Nodes
7. Mirroring path
8. Start the cluster service
9. Create a new Pool
  - 9.1. Add a data group
  - 9.2. Add a write log
  - 9.3. Add a read cache
10. Enter a virtual IP
11. System monitoring setup
12. Failover test

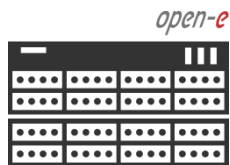
# Open-E JovianDSS Advanced Metro High Availability Cluster with 2 Rings and 2 multipath paths for SAN (iSCSI) storage clients.



## 1. Hardware configuration



## 2. Network configuration



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

Select **System Settings** from the main menu and next select the **Network** tab. Click the **Create bond interface** button.  
This will be the bond for the mirror path.

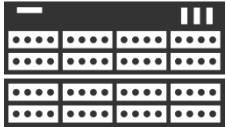
The screenshot shows the Open-E JovianDSS web interface. The left sidebar contains the following menu items: Storage, User Management, Failover Settings, Storage Settings, Backup & Recovery, System Settings (selected), and Diagnostics. The main content area is titled 'System Settings' and has tabs for Administration, Network (selected), MPIO, System, Settings management, and Update. Under the 'Network' tab, there is a section for 'Interfaces' with a '+ Add interface' button and a '+ Create bond interface' button. Below this is a table of interfaces:

Name	IP	DHCP	Vendor	Negotiated speed	Cable	Status	Options
eth0	192.168.0.220	No	VMware VMXNET3 Ethernet Controll...	10000 Mbps	cable	Active	Options
eth1	192.168.1.220	No	VMware VMXNET3 Ethernet Controll...	10000 Mbps	cable	Active	Options
eth2	192.168.2.220	No	VMware VMXNET3 Ethernet Controll...	10000 Mbps	cable	Active	Options
eth3	192.168.3.220	No	VMware VMXNET3 Ethernet Controll...	10000 Mbps	cable	Active	Options
eth4	192.168.4.220	No	VMware VMXNET3 Ethernet Controll...	10000 Mbps	cable	Active	Options

Below the table is a section for 'Static routing manager' with a search bar and a '+ Add static routing' button. At the bottom, there are sections for 'Default gateway' and 'Settings'.

## 2.1. Network configuration. Create a mirroring path bond

*open-e*



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

Enter all required details of the bond and click the **Apply** button.

The screenshot shows the 'Create new channel bonding interface' dialog in the Open-E JovianDSS web interface. The dialog is divided into two main sections: 'Available interfaces' and 'Bonding options'.

**Available interfaces:**

Name	IP	DHCP	Interface details	Cable	Active	Bond	Select
eth0	192.168.0.220	No	VMware VMXNET3 Ethernet Contr...	cable	Yes		<input type="checkbox"/>
eth1	192.168.1.220	No	VMware VMXNET3 Ethernet Contr...	cable	Yes		<input checked="" type="checkbox"/>
eth2	192.168.2.220	No	VMware VMXNET3 Ethernet Contr...	cable	Yes		<input type="checkbox"/>
eth3	192.168.3.220	No	VMware VMXNET3 Ethernet Contr...	cable	Yes		<input type="checkbox"/>
eth4	192.168.4.220	No	VMware VMXNET3 Ethernet Contr...	cable	Yes		<input checked="" type="checkbox"/>

**Bonding options:**

Mode: **Active-backup**

Primary interface: **eth1**

Primary reselect policy: **failure (default)**

MAC: **Custom**

MAC address: **b8:a3:9f:a9:1a:61** **Generate MAC**

Internet protocol: **Static**

IP: **192.168.1.220**

Netmask: **255.255.255.0**

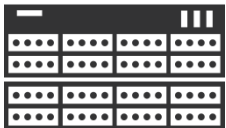
Broadcast: **automatic**

Gateway: **...**

**Buttons:** Cancel, Apply

## 2.2. Network configuration. Select a default gateway

*open-e*



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

A bond is created properly. Overview is shown in the **Interfaces** field.

Next, in the **Default gateway** field, click the **Change** button.

System Settings

Administration Network MPIO System Settings management Update

Interfaces

Name	IP	DHCP	Vendor	Negotiated speed	Cable	Status	Options
bond0	192.168.1.220	No	Ethernet Bonding Driver	10000 Mbps	cable	Active	Options
eth0	192.168.0.220	No	VMware VMXNET3 Ethernet Controll...	10000 Mbps	cable	Active	Options
eth1 (bond0)	N/A	No	VMware VMXNET3 Ethernet Controll...	10000 Mbps	cable	Bond slave	Options
eth2	192.168.2.220	No	VMware VMXNET3 Ethernet Controll...	10000 Mbps	cable	Active	Options
eth3	192.168.3.220	No	VMware VMXNET3 Ethernet Controll...	10000 Mbps	cable	Active	Options
eth4 (bond0)	N/A	No	VMware VMXNET3 Ethernet Controll...	10000 Mbps	cable	Bond slave	Options

Static routing manager

Default gateway

Interface: eth0

Interface details: VMware VMXNET3 Ethernet Controller (rev 01)

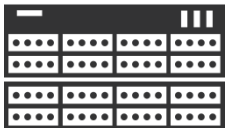
Gateway: static

Change



## 2.2. Network configuration. Select a default gateway

*open-e*



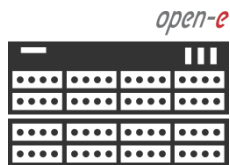
Open-E JovianDSS: **node-a**  
IP Address: 192.168.0.220

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

The screenshot shows the Open-E JovianDSS web interface. The 'System Settings' page is active, displaying a table of network interfaces. A modal dialog titled 'Select default gateway' is open, showing a list of available interfaces. The 'eth0' interface is selected. Red arrows indicate the selection of 'eth0' and the 'Apply' button.

Interface	Interface details	Gateway	Active	Select
1 bond0	Ethernet Bonding Driver	static	Yes	<input type="radio"/>
2 eth0	VMware VMXNET3 Ethernet Controller (rev 01)	static	Yes	<input checked="" type="radio"/>
3 eth2	VMware VMXNET3 Ethernet Controller (rev 01)	static	Yes	<input type="radio"/>
4 eth3	VMware VMXNET3 Ethernet Controller (rev 01)	static	Yes	<input type="radio"/>

## 2.3. Network configuration. Network configuration on node-b



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

Go to the **second cluster node** and create a bond interface accordingly.

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

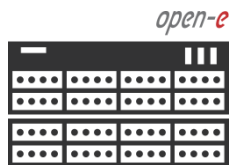
The screenshot displays the Open-E JovianDSS web interface on node-221 (IP: 192.168.0.221). The 'System Settings' menu is open, and the 'Network' tab is selected. The 'Interfaces' section shows a bond0 interface and its member interfaces (eth0, eth1, eth2, eth3, eth4). The 'Static routing manager' and 'Default gateway' sections are also visible.

Name	IP	DHCP	Vendor	Negotiated speed	Cable	Status	Options
bond0	192.168.1.221	No	Ethernet Bonding Driver	10000 Mbps	cable	Active	Options
eth0	192.168.0.221	No	VMware VMXNET3 Ethernet Controll...	10000 Mbps	cable	Active	Options
eth1 (bond0)	N/A	No	VMware VMXNET3 Ethernet Controll...	10000 Mbps	cable	Bond slave	Options
eth2	192.168.2.221	No	VMware VMXNET3 Ethernet Controll...	10000 Mbps	cable	Active	Options
eth3	192.168.3.221	No	VMware VMXNET3 Ethernet Controll...	10000 Mbps	cable	Active	Options
eth4 (bond0)	N/A	No	VMware VMXNET3 Ethernet Controll...	10000 Mbps	cable	Bond slave	Options

Network/Host IP	Netmask	Gateway	Interface
No items found.			

Interface
eth0

## 3. Time and date settings



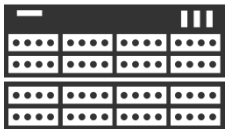
Open-E JovianDSS: **node-a**  
IP Address: 192.168.0.220

In the **System** tab, in **Time and date settings**, select the **Continuous NTP synchronization** and click apply.

Repeat this step for the second cluster node as well.

## 4. Nodes binding

*open-e*

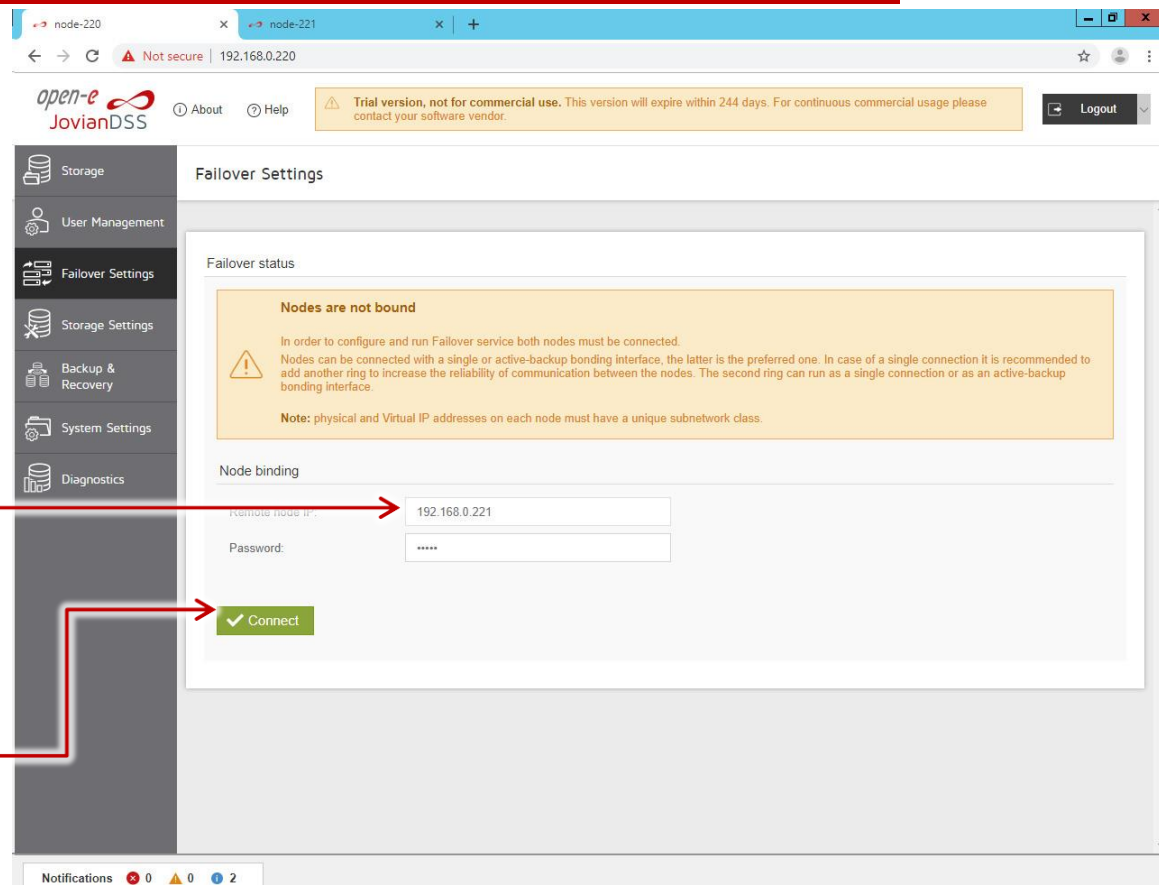


Open-E JovianDSS: **node-a**  
IP Address: 192.168.0.220

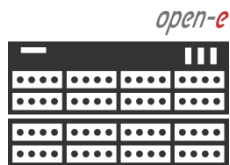
In the main menu, select **Failover Settings** and enter the IP address of the NIC interface of the second node and enter the current administrator password (default: admin) and click the **Connect** button.

### NOTE:

This is a new option. Version 1.0 up27 required to use Active-Backup bond for the cluster host binding.



## 5. Adding rings



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

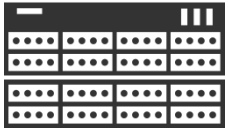
In **Failover Settings**, click the **Edit** button in the **Rings** section and select at least two rings.

### NOTE:

This is a new option. Version 1.0 up27 required to use an Active-Backup bond for the cluster host binding.

## 5. Adding rings

*open-e*

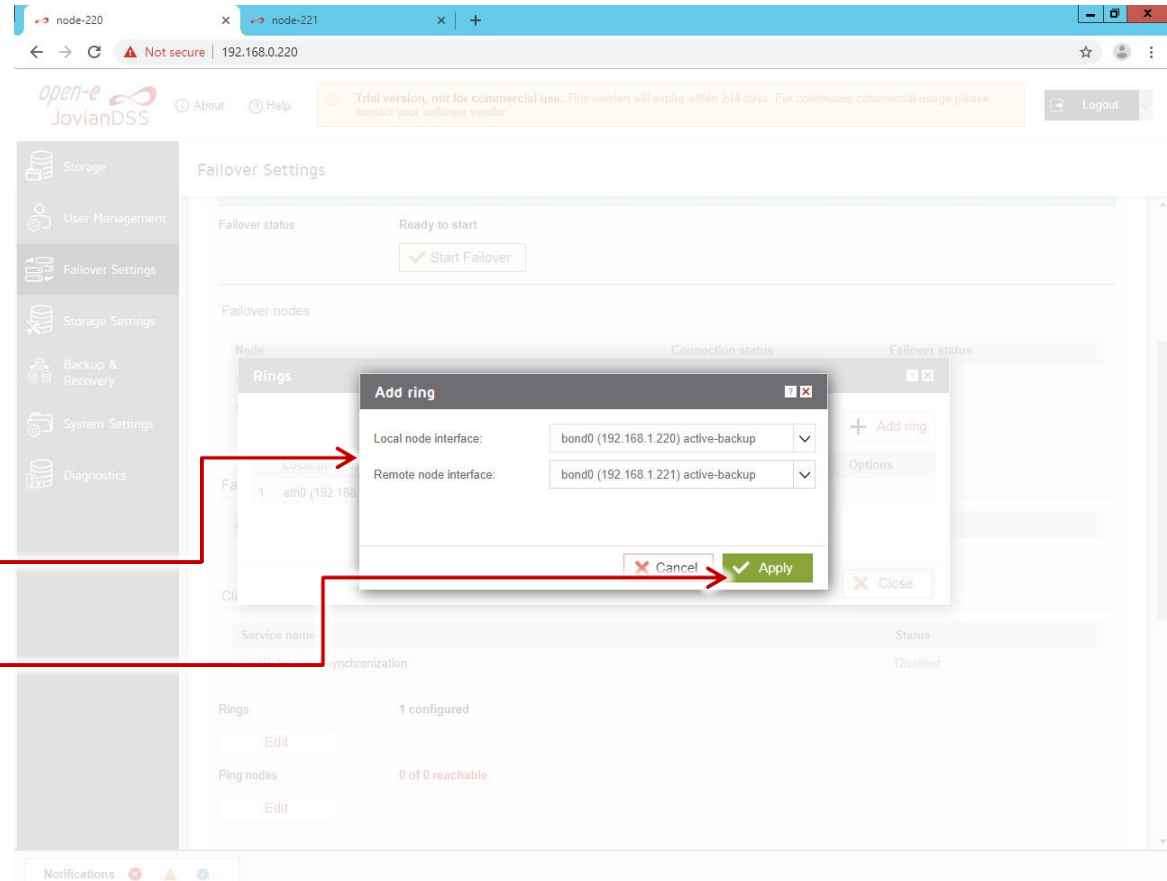


Open-E JovianDSS: **node-a**  
IP Address: 192.168.0.220

Next, select the interfaces for the ring for local and remote nodes and click the **Apply** button.

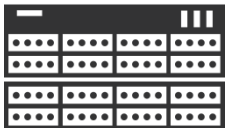
### NOTE:

The bond0 will be used for mirror path as well.



## 5. Adding rings

*open-e*



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

Two rings in local and remote nodes are selected. Now, click the **Close** button.

### NOTE:

Maximum number of 2 rings is allowed. If you need to add a new one, delete an existing ring.

The screenshot shows the Open-E JovianDSS web interface. The left sidebar contains navigation links: Storage, User Management, Failover Settings (selected), Storage Settings, Backup & Recovery, System Settings, and Diagnostics. The main content area is titled 'Failover Settings' and shows 'Failover status' as 'Ready to start' with a 'Start Failover' button. Below this is the 'Failover nodes' section, which is partially obscured by a 'Rings' dialog box.

The 'Rings' dialog box has a title bar with standard window controls. Inside, there is an information icon and a message: 'Maximum 2 rings allowed. Maximum number of rings reached. If you need to add a new one, please delete an existing ring.' Below the message is a table with two columns: 'Local node interface' and 'Remote node interface'. The table has two rows of data.

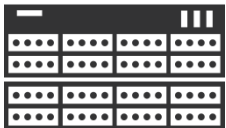
Local node interface	Remote node interface	Status	Options
1 eth0 (192.168.0.220)	eth0 (192.168.0.221)	N/A	
2 bond0 (192.168.1.220)	bond0 (192.168.1.221)	N/A	<a href="#">Delete</a>

Below the table is a 'Close' button. To the right of the table is an 'Add ring' button. At the bottom of the dialog is a 'Close' button with a red 'X' icon.

Below the dialog, the 'Rings' section shows '2 configured' and '0 of 0 reachable'. There are 'Edit' buttons for both sections. The 'Ping nodes' section also has an 'Edit' button.

## 6. Ping Nodes

*open-e*



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

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

### NOTE:

It is recommended to configure more than 2 ping nodes but NOT more than 6.

node-220 x node-221

Not secure | 192.168.0.220

open-e JovianDSS About Help

Trial version, not for commercial use. This version will expire within 244 days. For continuous commercial usage please contact your software vendor

Logout

Storage

User Management

Failover Settings

Storage Settings

Backup & Recovery

Diagnostics

Failover Settings

Failover status Ready to start

Start Failover

Ping nodes

Search + Add ping node

	IP	Local status	Remote status	Options
1	192.168.2.30	Reachable	Reachable	Delete
2	192.168.2.40	Reachable	Reachable	Delete
3	192.168.3.30	Reachable	Reachable	Delete
4	192.168.3.40	Reachable	Reachable	Delete

Close

Rings 2 configured

Ping nodes 4 of 4 reachable

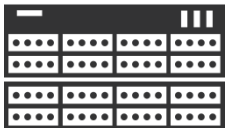
Edit

Notifications



## 7. Mirroring path

*open-e*



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

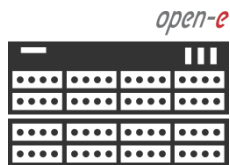
Next, click the **Add mirroring path** button.

The screenshot displays the Open-E JovianDSS web interface. The top navigation bar includes the Open-E logo, navigation links (About, Help), a trial version warning, and a Logout button. The left sidebar contains a menu with icons for Storage, User Management, Failover Settings (highlighted), Storage Settings, Backup & Recovery, System Settings, and Diagnostics. The main content area is titled 'Failover Settings' and contains several sections: 'Clustered services' with a table showing 'LDAP database synchronization' as 'Disabled'; 'Rings' showing '2 configured' with an 'Edit' button; 'Ping nodes' showing '4 of 4 reachable' with an 'Edit' button; and 'Remote disks mirroring paths for Cluster over Ethernet'. The 'Remote disks mirroring paths' section includes an information icon, a description, and a '+ Add mirroring path' button. A red arrow points from this button to the text box on the left. At the bottom, there is a 'Notifications' bar with icons for error, warning, and info.

Service name	Status
LDAP database synchronization	Disabled

Local node interface	Remote node interface	Local status	Remote status
No path added.			

## 7. Mirroring path

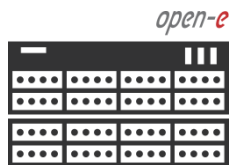


Open-E JovianDSS: **node-a**  
IP Address: 192.168.0.220

In **Add mirroring path**, select proper interfaces and click the **Apply** button.

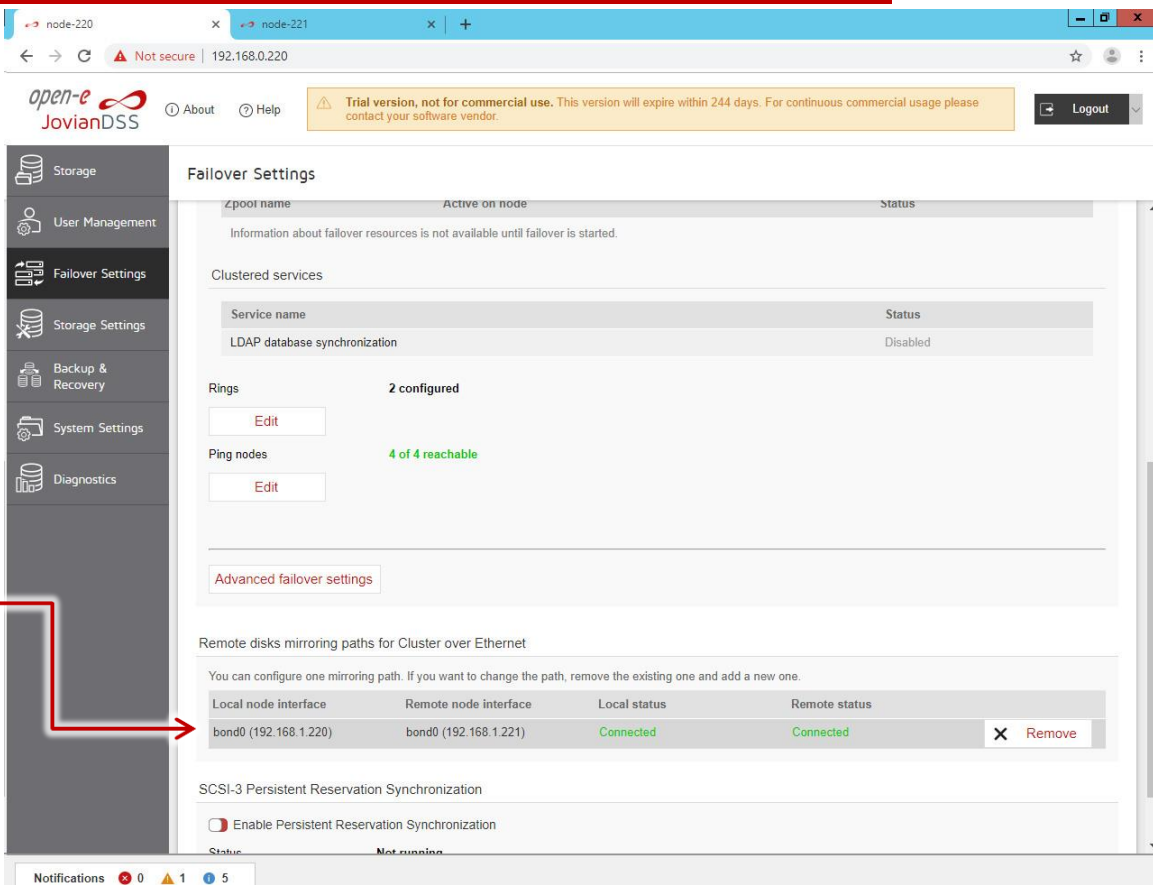
The screenshot shows the Open-E JovianDSS web interface in a browser window. The address bar shows '192.168.0.220'. The interface has a sidebar with navigation options: Storage, User Management, Failover Settings, Storage Settings, Backup & Recovery, System Settings, and Diagnostics. The 'Failover Settings' section is active, showing 'Fallover Settings' and 'Clustered services'. A modal dialog box titled 'Add mirroring path' is open, displaying '2 configured'. The dialog has two input fields: 'Local node interface' set to 'bond0 (192.168.1.220)' and 'Remote node interface' set to 'bond0 (192.168.1.221)'. At the bottom of the dialog are 'Cancel' and 'Apply' buttons. A red arrow points from the text box on the left to the 'Apply' button. Below the dialog, there is a section for 'Remote disks mirroring paths for Cluster over Ethernet' with a table that currently shows 'No path added'.

## 7. Mirroring path



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

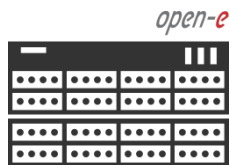
Mirroring path shows the **Connected** status.



The screenshot shows the Open-E JovianDSS web interface. The left sidebar contains navigation links: Storage, User Management, Failover Settings (selected), Storage Settings, Backup & Recovery, System Settings, and Diagnostics. The main content area is titled 'Failover Settings' and includes a warning banner about the trial version. Below the banner, there are sections for 'Clustered services' (showing 'LDAP database synchronization' as 'Disabled'), 'Rings' (showing '2 configured' with an 'Edit' button), 'Ping nodes' (showing '4 of 4 reachable' with an 'Edit' button), and 'Advanced failover settings'. The 'Advanced failover settings' section is expanded, showing 'Remote disks mirroring paths for Cluster over Ethernet'. This section contains a table with columns: Local node interface, Remote node interface, Local status, and Remote status. The table has one row: bond0 (192.168.1.220) | bond0 (192.168.1.221) | Connected | Connected. A red arrow points from the text 'Mirroring path shows the Connected status.' to the 'Connected' status in the table. At the bottom of the table, there is a 'Remove' button. Below the table, there is a section for 'SCSI-3 Persistent Reservation Synchronization' with a checkbox 'Enable Persistent Reservation Synchronization' which is currently unchecked. The status at the bottom is 'Not running'. The bottom of the interface shows a notifications bar with 0 errors, 1 warning, and 5 info messages.

Local node interface	Remote node interface	Local status	Remote status
bond0 (192.168.1.220)	bond0 (192.168.1.221)	Connected	Connected

## 8. Start the cluster service



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

Now, the cluster is ready to start.  
In order to start the cluster services,  
click the **Start Failover** button.

node-220 x node-221

Not secure | 192.168.0.220

open-e JovianDSS About Help

Trial version, not for commercial use. This version will expire within 244 days. For continuous commercial usage please contact your software vendor.

Logout

Storage

User Management

Failover Settings

Storage Settings

Backup & Recovery

System Settings

Diagnostics

### Failover Settings

Failover status

**Windows Failover Clustering**  
To ensure proper functioning of Windows Failover Clustering feature (including Hyper-V in cluster environment) it is required to enable SCSI-3 Persistent Reservation Synchronization.

Failover status: **Ready to start**

**Start Failover**

Failover nodes

Node	Connection status	Failover status
node-220 (IP: 192.168.0.220, node ID: 2349c36d)	Reachable	N/A
node-221 (IP: 192.168.0.221, node ID: e2dcb4bc)	Reachable	N/A

Disconnect nodes

Failover resources

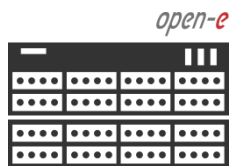
Zpool name	Active on node	Status
Information about failover resources is not available until failover is started.		

Clustered services

Service name	Status
LDAP database synchronization	Disabled

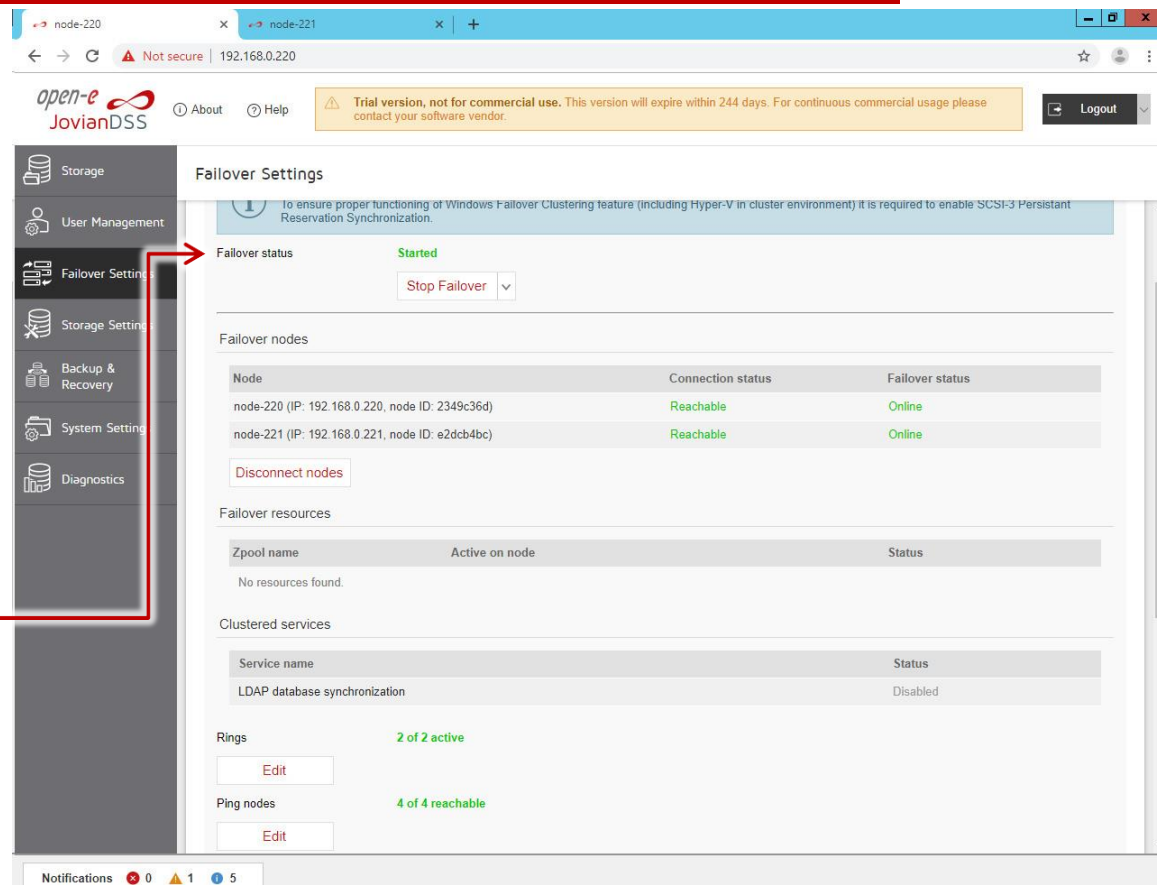
Notifications 0 1 5

## 8. Start the cluster service



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

In a short moment, the HA Cluster will be started and the status will show: **Started**.



node-220 x node-221 x +

Not secure | 192.168.0.220

open-e JovianDSS About Help

Trial version, not for commercial use. This version will expire within 244 days. For continuous commercial usage please contact your software vendor.

Logout

Storage

User Management

Failover Settings

Storage Settings

Backup & Recovery

System Settings

Diagnostics

### Failover Settings

To ensure proper functioning of Windows Failover Clustering feature (including Hyper-V in cluster environment) it is required to enable SCSI-3 Persistent Reservation Synchronization.

Failover status: **Started**

Stop Failover

Failover nodes

Node	Connection status	Failover status
node-220 (IP: 192.168.0.220, node ID: 2349c36d)	Reachable	Online
node-221 (IP: 192.168.0.221, node ID: e2dcb4bc)	Reachable	Online

Disconnect nodes

Failover resources

Zpool name	Active on node	Status
No resources found.		

Clustering services

Service name	Status
LDAP database synchronization	Disabled

Rings: 2 of 2 active

Edit

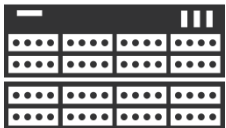
Ping nodes: 4 of 4 reachable

Edit

Notifications: 0 1 5

## 9. Create a new Pool

*open-e*



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

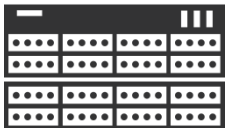
Go to the menu **Storage**. In the **Local disks** tab, all local disks are listed.

The screenshot shows the Open-E JovianDSS web interface. The left sidebar contains a menu with the following items: Storage, User Management, Failover Settings, Storage Settings, Backup & Recovery, System Settings, and Diagnostics. The main content area is titled 'Storage' and includes a 'Rescan' button and an 'Add zpool' button. A message states: 'No imported zpools have been found in the system. Import a zpool (if there are zpools available for import) or create a new zpool by clicking "Add zpool" button.' Below this, there is a 'Zpools available for import' section with a 'Rescan required' warning. The 'Unassigned disks' section is active, showing a table of local disks. A red arrow points from the 'Local disks' tab in the sidebar to the 'Local disks' tab in the 'Unassigned disks' section.

	Name	Serial number	Size	Model	Blink
1	sdc	6000c29af6d3cfff24bdec7c70dbbd71	16.00 GiB	Virtual disk	●
2	sdd	6000c2978bbacfe2edda580c6da04980	16.00 GiB	Virtual disk	●
3	sde	6000c290ba7256959cc9432635100b34	16.00 GiB	Virtual disk	●
4	sdf	6000c29156b425e79ddb645dec14b4df	16.00 GiB	Virtual disk	●
5	sdg	6000c296bed95f47221cccebc5daab1	16.00 GiB	Virtual disk	●
6	sdh	6000c2958aca3fe831b6cb36c5f95a60	16.00 GiB	Virtual disk	●
7	sdi	6000c29af3cee22280f324a14ca3a591	16.00 GiB	Virtual disk	●
8	sdj	6000c29fa8c7c2d5e59b7c8b3c739bd4	16.00 GiB	Virtual disk	●
9	sdk	6000c296a1ef6ef208308dd5b6c61053	16.00 GiB	Virtual disk	●
10	sdl	6000c2944f60671e709dbdf2c50861ae	16.00 GiB	Virtual disk	●

## 9. Create a new Pool

*open-e*



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

In the **Remote disks** tab, all disks from a remote node are listed.

The screenshot shows the Open-E JovianDSS web interface. The left sidebar contains navigation links: Storage, User Management, Failover Settings, Storage Settings, Backup & Recovery, System Settings, and Diagnostics. The main content area is titled 'Storage' and includes a 'Rescan' button and an 'Add zpool' button. A message states: 'No imported zpools have been found in the system. Import a zpool (if there are zpools available for import) or create a new zpool by clicking "Add zpool" button.' Below this, a 'Rescan required' message is displayed. The 'Unassigned disks' section has two tabs: 'Local disks' and 'Remote disks'. The 'Remote disks' tab is active, showing a table of 10 remote disks. A red arrow points from the text box on the left to the 'Remote disks' tab.

	Name	Serial number	Size	Model	Blink
1	sdn (remote)	6000c29af6d3cfff24bdec7c70dbbd71	16.00 GiB	Virtual disk	●
2	sdo (remote)	6000c2978bbacfe2edda580c6da04980	16.00 GiB	Virtual disk	●
3	sdp (remote)	6000c290ba7256959cc9432635100b34	16.00 GiB	Virtual disk	●
4	sdq (remote)	6000c29156b425e79ddb645dec14b4df	16.00 GiB	Virtual disk	●
5	sdr (remote)	6000c296bed95f47221cccebc5daab1	16.00 GiB	Virtual disk	●
6	sds (remote)	6000c2958aca3fe831b6cb36c5f95a60	16.00 GiB	Virtual disk	●
7	sdt (remote)	6000c29af3cee22280f324a14ca3a591	16.00 GiB	Virtual disk	●
8	sdu (remote)	6000c29fa8c7c2d5e59b7c8b3c739bd4	16.00 GiB	Virtual disk	●
9	sdv (remote)	6000c296a1ef6ef208308dd5b6c61053	16.00 GiB	Virtual disk	●
10	sdw (remote)	6000c2944f60671e709dbdf2c50861ae	16.00 GiB	Virtual disk	●

## 9. Create a new Pool

*open-e*

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

In the Storage tab, click **Add zpool** button. Then, add data groups by selecting 4 (2 local and 2 remote) disks and select Mirror (single group) from the pull-down menu and click the Add group button, then click the **Next** button.

**NOTE:** It is recommended to set 4 (2-local + 2-remote) disks in every mirror group. In case of other node reboots or failure, the mirror groups are still redundant with 2 disks in every mirror.

node-220 x node-221 x +

Not secure | 192.168.0.220

open-e JovianDSS About Help

Trial version, not for commercial use. This version will expire within 244 days. For continuous commercial usage please contact your software vendor

Logout

Storage

Failover Settings

Storage Settings

Backup & Recovery

System Settings

Diagnostics

**Zpool wizard**

1. Add data group Available disks

2. Add write log

3. Add read cache

4. Add spare disks

5. Zpool properties

6. Summary

☐ Show only unused disks Rescan disks

	Name	Id	Size	Blink
<input type="checkbox"/>	sdh	wwn-0x6000c2958aca3fe831b6cb36c...	16.00 GiB	●
<input type="checkbox"/>	sdi	wwn-0x6000c29af3cee22280f324a14c...	16.00 GiB	●
<input type="checkbox"/>	sdj	wwn-0x6000c29fa8c7c2d5e59b7c8b3...	16.00 GiB	●
<input type="checkbox"/>	sdk	wwn-0x6000c296a1ef6ef208308dd5b...	16.00 GiB	●
<input checked="" type="checkbox"/>	sdi	wwn-0x6000c2944f60671e709dbdf2c5...	16.00 GiB	●
<input checked="" type="checkbox"/>	sdm	wwn-0x6000c2984830a6620c6eda383...	16.00 GiB	●
<input checked="" type="checkbox"/>	sdn (remote)	wwn-0x6000c29bdc1798069cf73e98dd...	16.00 GiB	●
<input checked="" type="checkbox"/>	sdo (remote)	wwn-0x6000c29727e00e513313d4df3...	16.00 GiB	●
<input type="checkbox"/>	sdp (remote)	wwn-0x6000c2986787edc246c9986f7...	16.00 GiB	●
<input type="checkbox"/>	sdq (remote)	wwn-0x6000c29c4d45460809082a17...	16.00 GiB	●
<input type="checkbox"/>	sdr (remote)	wwn-0x6000c29abd85a9867594a2fc0...	16.00 GiB	●
<input type="checkbox"/>	sds (remote)	wwn-0x6000c299b231836f2ef83eed0...	16.00 GiB	●
<input type="checkbox"/>	sdt (remote)	wwn-0x6000c29995bf3c859b3fec5781...	16.00 GiB	●
<input type="checkbox"/>	sdu (remote)	wwn-0x6000r29bfaf253aa307ef38d6f...	16.00 GiB	●

Select redundancy for group: Mirror (single group) Z-1 Z-2 Mirror (multiple groups) Mirror (single group) Single

+ Add group

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	Size
-------------	------

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

Other groups	Size	Blink
--------------	------	-------

Cancel Next

Notifications 0 0 1 5



## 9. Create a new Pool

*open-e*

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

Click the **Next** button.

### NOTE:

A 4-way mirror provides limited storage efficiency of only 25%. For increased storage efficiency, a hardware RAID controller can be used with a simple mirror over 2 disk units with a RAID array behind. Open-E JovianDSS includes built-in all RAID tools and drivers for Broadcom (LSI) and Microsemi (Adaptec). In case of Areca, a driver is included as well but the WebGUI of Areca has to be accessed via the controller's ETH-port.

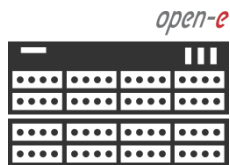
The screenshot shows the Open-E JovianDSS WebGUI interface. The main window displays the 'Zpool wizard' with a sidebar on the left containing navigation links: Storage, User Manager, Failover Settings, Storage Settings, Backup & Recovery, and Diagnostics. The wizard is currently at step 1, 'Add data group'. A list of 'Available disks' is shown, including sdb, sdc, sdd, sde, sdf, sdg, sdh, sdi, sdj, sdk, sdp (remote), sdq (remote), sdr (remote), and sds (remote). A 'Data groups' panel on the right shows a 'Mirror' group with a size of 16.00 GiB. The 'Next' button is highlighted in green. A red arrow points from the 'Next' button in the wizard to the 'Next' button in the 'Data groups' panel.

Name	Id	Size	Blink
sdb	wwn-0x6000c296a722a1553d31ccd1f...	16.00 GiB	●
sdc	wwn-0x6000c29af6d3cfff24bdec7c70d...	16.00 GiB	●
sdd	wwn-0x6000c2978bbacfa2edda580c6...	16.00 GiB	●
sde	wwn-0x6000c290be7256959cc943263...	16.00 GiB	●
sdf	wwn-0x6000c29156b425e79db645d...	16.00 GiB	●
sdg	wwn-0x6000c296be095f47221ccbec...	16.00 GiB	●
sdh	wwn-0x6000c2958aca3fe831b6cb36c...	16.00 GiB	●
sdi	wwn-0x6000c29af3cee22280f324a14c...	16.00 GiB	●
sdj	wwn-0x6000c29fa8c7c2d5e59b7c8b3...	16.00 GiB	●
sdk	wwn-0x6000c296a1ef6ef208308d5b...	16.00 GiB	●
sdp (remote)	wwn-0x6000c2986787edc246c9986ff7...	16.00 GiB	●
sdq (remote)	wwn-0x6000c29c4d4d5460809082a17...	16.00 GiB	●
sdr (remote)	wwn-0x6000c29abd85a9867594a2fc0...	16.00 GiB	●
sds (remote)	wwn-0x6000c299b231a36f2ef83aed0...	16.00 GiB	●

Select redundancy for group: Mirror (single group) + Add group

Cancel Next

## 9. Create a new Pool



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

Select 2 disks (**local + remote**) for the write log and click the **Add group** 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
sdb	wwn-0x6000c296a722a1553d31ccd...	16.00 GiB	<input type="checkbox"/>
sdc	wwn-0x6000c29af6d3cfff24bdec7c7...	16.00 GiB	<input type="checkbox"/>
sdd	wwn-0x6000c2978bbacfa2edda580...	16.00 GiB	<input type="checkbox"/>
sde	wwn-0x6000c290be7256959cc9432...	16.00 GiB	<input type="checkbox"/>
sdf	wwn-0x6000c29156b425e79ddb64...	16.00 GiB	<input type="checkbox"/>
sdg	wwn-0x6000c296be495f47221ccce...	16.00 GiB	<input type="checkbox"/>
sdh	wwn-0x6000c2958aca3fe831b6cb3...	16.00 GiB	<input type="checkbox"/>
sdj	wwn-0x6000c29af3cee22280f324a1...	16.00 GiB	<input type="checkbox"/>
sdj	wwn-0x6000c29fa8c7c2d5e59b7c8...	16.00 GiB	<input type="checkbox"/>
<input checked="" type="checkbox"/> sdk	wwn-0x6000c296a1eff6f208308dd...	16.00 GiB	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> sdp (remote)	wwn-0x6000c2986707edc246c9986...	16.00 GiB	<input checked="" type="checkbox"/>
sdq (remote)	wwn-0x6000c29c4d4d5460809082a...	16.00 GiB	<input type="checkbox"/>
sdr (remote)	wwn-0x6000c29abd85a9867594a2f...	16.00 GiB	<input type="checkbox"/>
sds (remote)	wwn-0x6000c299b231036f2ef83ee...	16.00 GiB	<input type="checkbox"/>

**Data groups**

Mirror

- sdl 16.00 GiB
- sdm 16.00 GiB
- sdn (remote) 16.00 GiB
- sdo (remote) 16.00 GiB

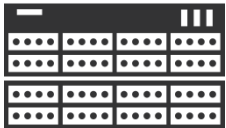
Zpool storage capacity: 16.00 GiB  
Used licensed storage capacity: 16.00 GiB

Other groups

Size

## 9. Create a new Pool

*open-e*



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

Click the **Next** button.

The screenshot shows the Open-E JovianDSS web interface. The main navigation menu on the left includes: Storage, User Manager, Failover Settings, Storage Settings, Backup & Recovery, System Settings, and Diagnostics. The 'Zpool wizard' is open, showing the following steps:

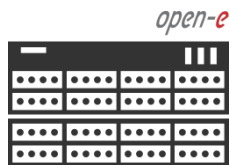
1. Add data group
2. Add write log (Current step)
3. Add read cache
4. Add spare disks
5. Zpool properties
6. Summary

The 'Add write log' step displays a table of available disks:

Name	Id	Size	Blink
sdb	wwn-0x6000c296a722a1553d31ccd...	16.00 GiB	●
sdc	wwn-0x6000c29af6d3cfff24bdec7c7...	16.00 GiB	●
sdd	wwn-0x6000c2978bbacfa2edda580...	16.00 GiB	●
sde	wwn-0x6000c290be7256959cc9432...	16.00 GiB	●
sdf	wwn-0x6000c29156b425e79ddb64...	16.00 GiB	●
sdg	wwn-0x6000c296be095f47221ccce...	16.00 GiB	●
sdh	wwn-0x6000c2958aca3fe831b6cb3...	16.00 GiB	●
sdi	wwn-0x6000c29af3cee22280f324a1...	16.00 GiB	●
sdj	wwn-0x6000c29fa8c7c2d5e59b7c8...	16.00 GiB	●
sdq (remote)	wwn-0x6000c29c4d4d5460809082a...	16.00 GiB	●
sdr (remote)	wwn-0x6000c29abd05a9867594a2f...	16.00 GiB	●
sds (remote)	wwn-0x6000c299b231836f2ef83ee...	16.00 GiB	●
sdt (remote)	wwn-0x6000c29995bf3c859b3fec57...	16.00 GiB	●
sdu (remote)	wwn-0x6000c29bfad253aa307ef38...	16.00 GiB	●

Below the table, there is a dropdown menu for 'Select redundancy for group:' set to 'Mirror', and an '+ Add group' button. To the right, a 'Data groups' panel shows a list of disks with their sizes (16.00 GiB each). At the bottom of the wizard, there are 'Cancel', 'Back', and 'Next' buttons. A red arrow points from the 'Next' button to the text 'Click the Next button.'

## 9. Create a new Pool



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

Select a local SSD disk for the level-2 read cache and click the **Add group** button.

The screenshot shows the Open-E JovianDSS web interface. The main content area displays the 'Zpool wizard' with the following steps:

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

Step 3, 'Add read cache', is currently active. It shows a table of available disks:

Name	Id	Size	Blink
<input checked="" type="checkbox"/> sdb	wwn-0x6000c296a722a1553d31ccd...	16.00 GiB	●
<input type="checkbox"/> sdc	wwn-0x6000c29af6d3cfff24bdec7c7...	16.00 GiB	●
<input type="checkbox"/> sdd	wwn-0x6000c2978bbacfe2edda580...	16.00 GiB	●
<input type="checkbox"/> sde	wwn-0x6000c290be7256959cc9432...	16.00 GiB	●
<input type="checkbox"/> sdf	wwn-0x6000c29156b425e79ddb64...	16.00 GiB	●
<input type="checkbox"/> sdg	wwn-0x6000c296be095f47221ccce...	16.00 GiB	●
<input type="checkbox"/> sdh	wwn-0x6000c2958aca3fe831b6cb3...	16.00 GiB	●
<input type="checkbox"/> sdi	wwn-0x6000c29af3cee22280f324a1...	16.00 GiB	●
<input type="checkbox"/> sdj	wwn-0x6000c29fa8c7c2d5e59b7c8...	16.00 GiB	●
<input type="checkbox"/> sdq (remote)	wwn-0x6000c29c4d4d5460809082a...	16.00 GiB	●
<input type="checkbox"/> sdr (remote)	wwn-0x6000c29abd85a9867594a2f...	16.00 GiB	●
<input type="checkbox"/> sds (remote)	wwn-0x6000c299b231836f2ef83ee...	16.00 GiB	●
<input type="checkbox"/> sdt (remote)	wwn-0x6000c29995bf3c859b3fec57...	16.00 GiB	●
<input type="checkbox"/> sdu (remote)	wwn-0x6000c29bfad253aa307ef38...	16.00 GiB	●

Below the table, there is a 'Select redundancy for group:' dropdown set to 'Single' and an '+ Add group' button. A red arrow points from the text box to this button.

On the right side of the wizard, there is a 'Data groups' section showing a list of groups:

Data groups	Size
Mirror	
sd1	16.00 GiB
sdm	16.00 GiB
sdn (remote)	16.00 GiB
sdo (remote)	16.00 GiB

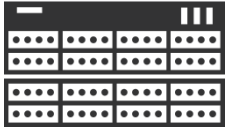
Below this, it shows 'Zpool storage capacity: 16.00 GiB' and 'Used licensed storage capacity: 16.00 GiB'. There is also an 'Other groups' section showing a list of groups:

Other groups	Size
Mirrored write log	
sdk	16.00 GiB
sdp (remote)	16.00 GiB

At the bottom of the wizard, there are buttons for 'Cancel', 'Back', and 'Next'.

## 9. Create a new Pool

*open-e*



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

Click the **Next** button.

The screenshot shows the Open-E JovianDSS web interface. The main menu on the left includes Storage, User Manager, Failover Settings, Storage Settings, Backup & Recovery, System Settings, and Diagnostics. The central panel displays the 'Zpool wizard' with the following steps:

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

The 'Available disks' table is shown with the following data:

Name	Id	Size	Blink
sdc	wwn-0x6000c29af6d3cf2f4bdec7c7...	16.00 GiB	●
sdd	wwn-0x6000c2978bbacf2edda580...	16.00 GiB	●
sde	wwn-0x6000c290be7256959cc9432...	16.00 GiB	●
sdf	wwn-0x6000c29156b425e79ddb64...	16.00 GiB	●
sdg	wwn-0x6000c296be95f47221ccce...	16.00 GiB	●
sdh	wwn-0x6000c2958aca3fe831b6cb3...	16.00 GiB	●
sdi	wwn-0x6000c29af3cee22280f324a1...	16.00 GiB	●
sdj	wwn-0x6000c29fa8c7c2d5e59b7c8...	16.00 GiB	●
sdq (remote)	wwn-0x6000c29c4d45460809082a...	16.00 GiB	●
sdr (remote)	wwn-0x6000c29abd85a9867594a2f...	16.00 GiB	●
sds (remote)	wwn-0x6000c299b231836f2ef83ee...	16.00 GiB	●
sdt (remote)	wwn-0x6000c29995bf3c859b3fec57...	16.00 GiB	●
sdu (remote)	wwn-0x6000c29bfad253aa307ef38...	16.00 GiB	●
sdv (remote)	wwn-0x6000c2941faed0df93e7ad...	16.00 GiB	●

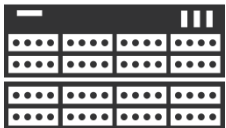
The 'Data groups' section on the right shows the following configuration:

- Mirror (16.00 GiB)
  - sdl (16.00 GiB)
  - sdm (16.00 GiB)
  - sdn (remote) (16.00 GiB)
  - sdo (remote) (16.00 GiB)
- Mirrored write log (16.00 GiB)
  - sdk (16.00 GiB)
  - sdp (remote) (16.00 GiB)
- Read cache (16.00 GiB)
  - sdb (16.00 GiB)

The 'Zpool storage capacity' is 16.00 GiB, and the 'Used licensed storage capacity' is 16.00 GiB. The 'Other groups' section shows the same configuration. The 'Select redundancy for group' dropdown is set to 'Single'. The 'Add group' button is visible. The 'Next' button is highlighted with a red arrow.

## 9. Create a new Pool

*open-e*



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

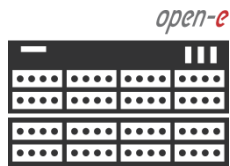
In this setup, we skip the **Add spare disks**. You can always add spares later if you need. Now, click the **Next** button.

The screenshot displays the Open-E JovianDSS web interface. The main navigation menu on the left includes Storage, User Manager, Failover Settings, Storage Settings, Backup & Recovery, System Settings, and Diagnostics. The 'Storage' section is active, showing a 'Zpool wizard' dialog box. The wizard is at step 4, 'Add spare disks', but the 'Add spare disks' step is skipped, and the 'Next' button is highlighted. The 'Available disks' table lists various disks with their names, IDs, sizes, and blink status. The 'Data groups' section on the right shows a 'Mirror' group with disks sdi, sdm, sdn (remote), and sdo (remote), each 16.00 GiB. The 'Zpool storage capacity' is 16.00 GiB, and the 'Used licensed storage capacity' is 16.00 GiB. The 'Other groups' section shows a 'Mirrored write io' group with disks sdk and sdp (remote), each 16.00 GiB, and a 'Read cache' group with disk sdb, 16.00 GiB. The 'Select redundancy for group' dropdown is set to 'Single'. The 'Add group' button is visible. The 'Next' button is highlighted with a red arrow.

Name	Id	Size	Blink
sdc	wwn-0x6000c29af6d3cfff24bdec7c7...	16.00 GiB	●
sdd	wwn-0x6000c2978bbacfe2edda580...	16.00 GiB	●
sde	wwn-0x6000c290be7256959cc9432...	16.00 GiB	●
sdf	wwn-0x6000c29156b425e79ddb64...	16.00 GiB	●
sdg	wwn-0x6000c296bed95f47221ccce...	16.00 GiB	●
sdh	wwn-0x6000c2958aca3fe831b6cb3...	16.00 GiB	●
sdi	wwn-0x6000c29af3cee22280f324a1...	16.00 GiB	●
sdj	wwn-0x6000c29fa8c7c2d5e59b7c8...	16.00 GiB	●
sdq (remote)	wwn-0x6000c29c4d4d5460809082a...	16.00 GiB	●
sdr (remote)	wwn-0x6000c29abd85a9867594a2f...	16.00 GiB	●
sds (remote)	wwn-0x6000c299b231836f2ef83ee...	16.00 GiB	●
sdt (remote)	wwn-0x6000c29995bf3c859b3fec57...	16.00 GiB	●
sdu (remote)	wwn-0x6000c29bfad253aa307ef38...	16.00 GiB	●
sdv (remote)	wwn-0x6000c2941a1aed0df93e7ad...	16.00 GiB	●

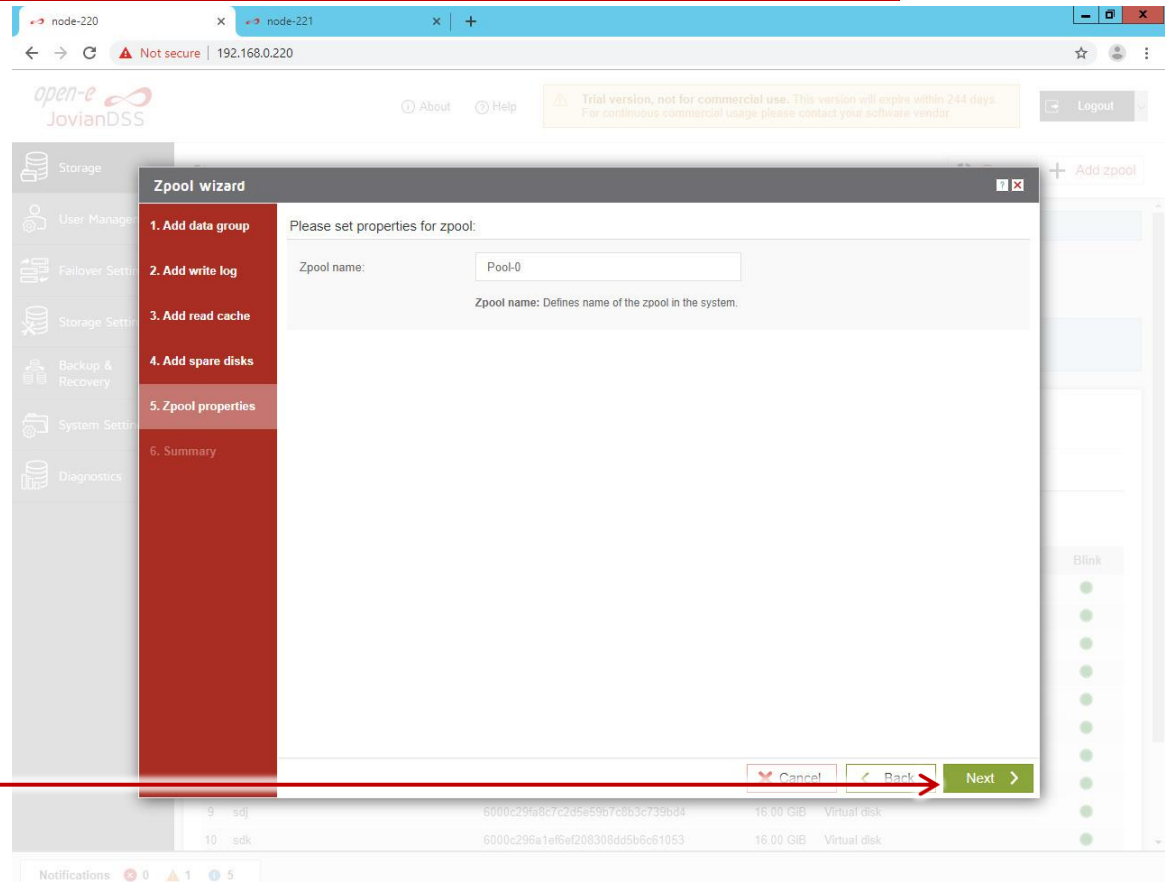


## 9. Create a new Pool

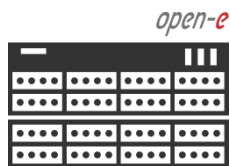


Open-E JovianDSS: **node-a**  
IP Address: 192.168.0.220

Confirm the pool name, then click the **Next** button.

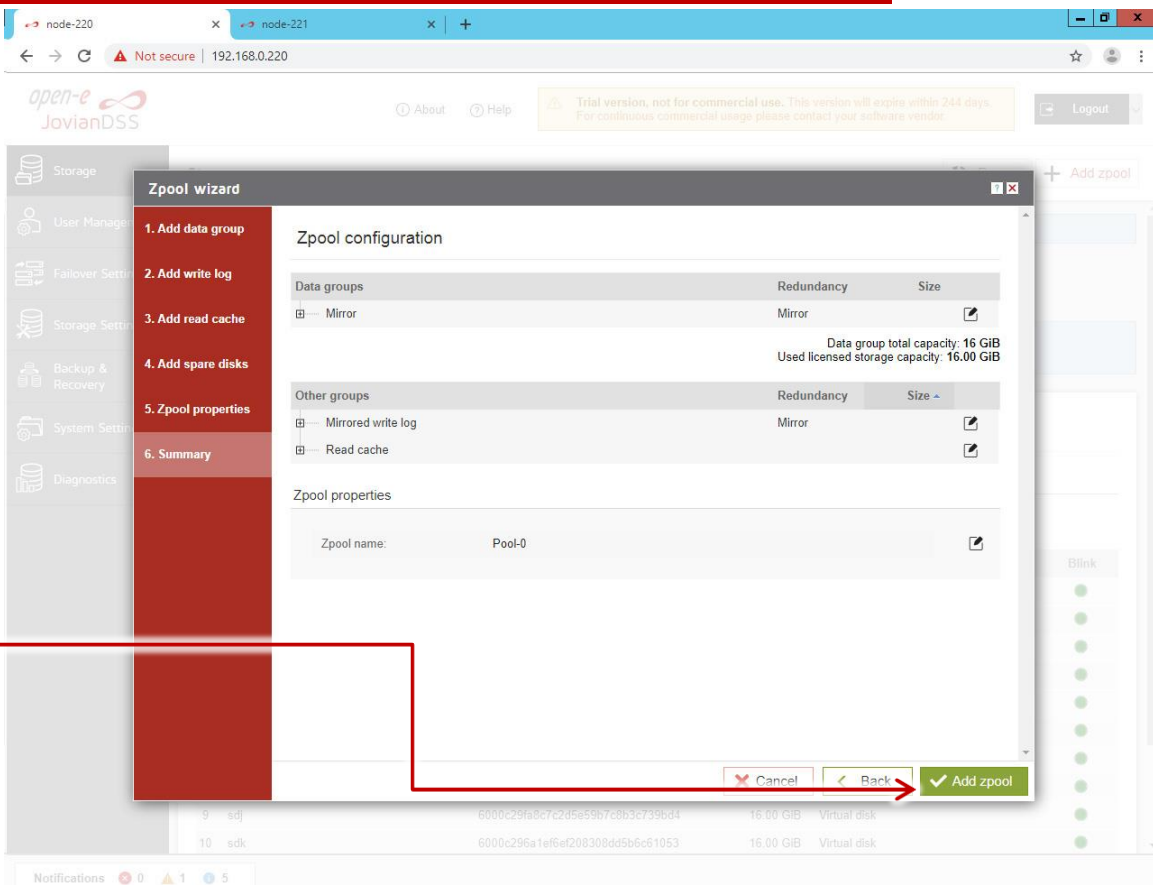


## 9. Create a new Pool



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

Summary of the **Zpool wizard** step,  
then click the **Add zpool** button.



The screenshot shows the Open-E JovianDSS web interface in a browser window. The 'Zpool wizard' is open, displaying the 'Summary' step. The wizard configuration is as follows:

Zpool configuration		
Data groups	Redundancy	Size
Mirror	Mirror	<input checked="" type="checkbox"/>
Data group total capacity: 16 GiB Used licensed storage capacity: 16.00 GiB		
Other groups		
Mirrored write log	Mirror	<input checked="" type="checkbox"/>
Read cache		<input checked="" type="checkbox"/>

**Zpool properties**

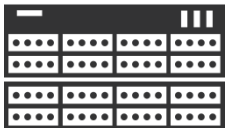
Zpool name: Pool-0

At the bottom of the wizard, there are three buttons: 'Cancel', 'Back', and 'Add zpool'. A red arrow points from the text box on the left to the 'Add zpool' button.



## 9. Create a new Pool

*open-e*



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

The **Pool-0** is now created.  
Accordingly, you can configure a  
second pool (**Pool-1**).

The screenshot shows the Open-E JovianDSS web interface. The left sidebar contains navigation links: Storage, User Management, Failover Settings, Storage Settings, Backup & Recovery, System Settings, and Diagnostics. The main content area is titled 'Storage' and shows 'Pool-0' with the following details:

- State: **ONLINE**
- Zpool ID: 6514485169002797111
- Total storage: 15.88 GiB
- Disks: 7

A status box indicates: Status: Zpool is functioning correctly. Action: None required.

Below this, a section titled 'Zpools available for import' shows a 'Rescan required' message with the instruction: 'Click Rescan button above to scan disks for new zpools.'

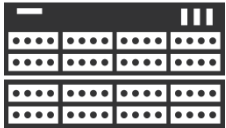
The 'Unassigned disks' section has tabs for 'Local disks' and 'Remote disks'. A search bar is present. Below is a table of unassigned disks:

	Name	Serial number	Size	Model	Blink
1	sdc	6000c29af6d3cff24bdec7c70dbbd71	16.00 GiB	Virtual disk	●
2	sdd	6000c2978bbacf2edda580c6da04980	16.00 GiB	Virtual disk	●

At the bottom, a notifications bar shows 0 errors, 1 warning, and 10 info messages.

## 10. Enter virtual IP

*open-e*



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

In the **Storage** menu, select the **Virtual IPs** tab. Next, click **Add virtual IP**.

The screenshot shows the Open-E JovianDSS web interface. The left sidebar contains the following menu items: Storage, User Management, Failover Settings, Storage Settings, Backup & Recovery, 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 'Virtual IPs' and 'Virtual IPs routing'. The 'Virtual IPs' tab is selected, and a red arrow points to the '+ Add virtual IP' button. The 'Virtual IPs routing' tab is also visible, with a red arrow pointing to the '+ Add static routing' button. The bottom of the interface shows a notification bar with 0 errors, 1 warning, and 10 info messages.

Storage

Pool-0

State: ONLINE

Zpool ID: 6514485169002797111

Total storage: 15.88 GiB

Disks: 7

Status: Zpool is functioning correctly.

Action: None required.

Virtual IPs

+ Add virtual IP

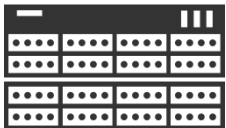
Virtual IPs routing

+ Add static routing

Notifications: 0 errors, 1 warning, 10 info

## 10. Enter virtual IP

*open-e*



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

Next, enter the virtual IP address and assign it to the required interfaces.  
Next, click the **Apply** button.

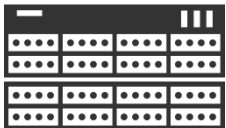
The screenshot shows the Open-E JovianDSS web interface. The left sidebar contains a menu with options: Storage, User Management, Failover Settings, Storage Settings, Backup & Recovery, and System Settings. The main content area displays the 'Storage' section with a 'Pool-0' status. A modal dialog box titled 'Add virtual IP' is open, showing the following fields:

- Virtual IP address: 192.168.21.10
- Name: vip21
- Netmask: 255.255.255.0
- Network interface: eth2 (192.168.2.220)
- Remote network interface: eth2 (192.168.2.221)

Below the fields are 'Cancel' and 'Apply' buttons. A red arrow points from the 'Apply' button in the dialog box to the 'Apply' button in the main interface. The background interface also shows a 'Virtual IPs' section with a search bar and a table with columns: Network/Host IP, Netmask, Gateway, and Virtual IP name.

## 10. Enter virtual IP

*open-e*



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

Both virtual IP addresses are created on **Pool-0**.

**Note:** the VIP's are in separate networks as this is recommended.

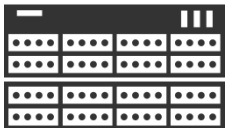
The screenshot shows the Open-E JovianDSS web interface. The left sidebar contains navigation links: Storage, User Management, Failover Settings, Storage Settings, Backup & Recovery, System Settings, and Diagnostics. The main content area is titled 'Storage' and shows the configuration for 'Pool-0'. The status is 'ONLINE'. A message box indicates 'Zpool is functioning correctly. None required.' Below this, there are tabs for Status, Disk Groups, iSCSI Targets, FC Targets, Shares, Snapshots, and Virtual IPs. The 'Virtual IPs' tab is active, showing a table with two entries:

Virtual IP	Name	Netmask	Network interface	Remote network int...	State	Options
1 192.168.21.100	vip21	255.255.255.0	eth2 (192.168.2.220)	eth2 (192.168.2.221)	Active	Options
2 192.168.31.100	vip31	255.255.255.0	eth3 (192.168.3.220)	eth3 (192.168.3.221)	Active	Options

Below the table is a section for 'Virtual IPs routing' with a search bar and an 'Add static routing' button. The routing table is currently empty, showing 'No items found.'

## 10. Enter virtual IP

*open-e*



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

Both virtual IP addresses are created on **Pool-1**.

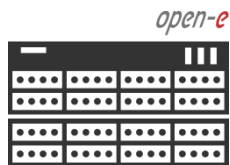
**Note:** the VIP's are in separate networks as this is recommended.

The screenshot shows the Open-E JovianDSS web interface. The left sidebar contains navigation links: Storage, User Management, Failover Settings, Storage Settings, Backup & Recovery, System Settings, and Diagnostics. The main content area is titled 'Storage' and shows the configuration for 'Pool-1'. The pool status is 'ONLINE'. Below this, there are tabs for Status, Disk Groups, iSCSI Targets, FC Targets, Shares, Snapshots, and Virtual IPs. The 'Virtual IPs' tab is selected, showing a table with two entries:

Virtual IP	Name	Netmask	Network interface	Remote network int...	State	Options
1 102.168.22.100	vip22	255.255.255.0	eth2 (192.168.2.220)	eth2 (192.168.2.221)	Active	Options
2 192.168.32.100	vip32	255.255.255.0	eth3 (192.168.3.220)	eth3 (192.168.3.221)	Active	Options

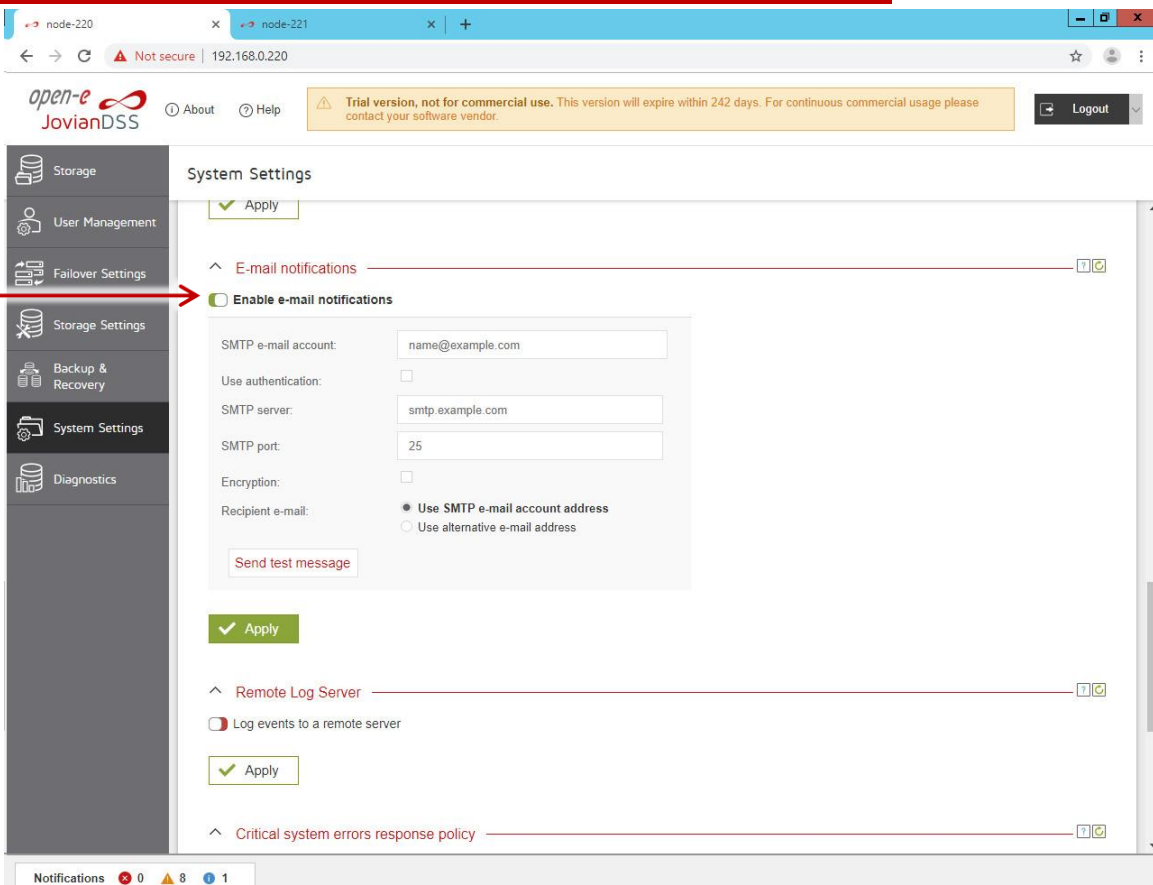
Below the table is a section for 'Virtual IPs routing' with a search bar and a table for static routing. The table is currently empty, showing 'No items found.'

## 11. System monitoring setup



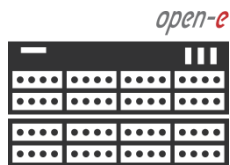
Open-E JovianDSS: **node-a**  
IP Address: 192.168.0.220

In the **System Settings** tab, set up the proper **E-mail notifications**.



The screenshot shows the Open-E JovianDSS web interface in a browser window. The address bar shows the URL `192.168.0.220`. The interface has a sidebar with navigation options: Storage, User Management, Failover Settings, Storage Settings, Backup & Recovery, System Settings (highlighted), and Diagnostics. The main content area is titled "System Settings" and contains several configuration sections. The "E-mail notifications" section is expanded, showing a toggle for "Enable e-mail notifications" which is currently turned on. Below this, there are input fields for "SMTP e-mail account" (filled with "name@example.com"), "Use authentication" (unchecked), "SMTP server" (filled with "smtp.example.com"), "SMTP port" (filled with "25"), "Encryption" (unchecked), and "Recipient e-mail" (with radio buttons for "Use SMTP e-mail account address" and "Use alternative e-mail address"). A "Send test message" button is also present. Below the email settings, there is a "Remote Log Server" section with a toggle for "Log events to a remote server" which is currently turned off. At the bottom, there is a "Critical system errors response policy" section. The top of the interface includes a trial version warning and a "Logout" button. The bottom status bar shows "Notifications" with counts for errors (0), warnings (8), and info (1).

## 11. System monitoring setup

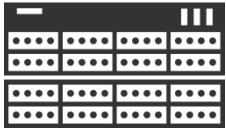


Open-E JovianDSS: **node-a**  
IP Address: 192.168.0.220

It is obligatory to use external monitoring software via SNMP or **Remote Log Server** or a built-in Checkmk agent.

## 12. Failover test

*open-e*



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

Now, in order to test failover, select **Storage** from the 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 Open-E JovianDSS web interface. The left sidebar contains the main menu with options: Storage, User Management, Failover Settings, Storage Settings, Backup &, System Settings, and Diagnostics. The 'Storage' section is selected, showing 'Pool-1' with a status of 'ONLINE'. A red arrow points from the 'Options' dropdown menu to the 'Move' option. Below the pool status, there are tabs for Status, Disk Groups, iSCSI Targets, FC Targets, Shares, Snapshots, and Virtual IPs. The 'Virtual IPs' tab is active, showing a table with two entries:

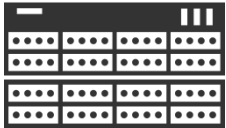
Virtual IP	Name	Netmask	Network interface	Remote network int...	State	Options	
1	102.168.22.100	vip22	255.255.255.0	eth2 (192.168.2.220)	eth2 (192.168.2.221)	Active	Options
2	192.168.32.100	vip32	255.255.255.0	eth3 (192.168.3.220)	eth3 (192.168.3.221)	Active	Options

Below the table, there is a section for 'Virtual IPs routing' with a search bar and a '+ Add static routing' button. The bottom of the interface shows a notifications bar with 0 errors, 1 warning, and 15 info messages.



## 12. Failover test

*open-e*



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

Click the **Move** button to start the failover.

node-220 x node-221 x +

Not secure | 192.168.0.220

open-e JovianDSS About Help

Trial version, not for commercial use. This version will expire within 242 days. For continuous commercial usage please contact your software vendor

Logout

Storage Rescan + Add zpool

User Management

Failover Settings

Storage Settings

Backup & Recovery

System Settings

Diagnostics

Pool-1

Options

State: ONLINE

Zpool ID: 6514485169002797111

Total storage: 15.88 GiB

Disks: 7

Status: Zpool is functioning correctly

Action: None required

Virtual IPs

Cancel Move

Virtual IP	Name	Netmask	Network interface	Remote network int...	State	Options	
1	192.168.21.100	vip21	255.255.255.0	eth2 (192.168.2.220)	eth2 (192.168.2.221)	Active	Options
2	192.168.31.100	vip31	255.255.255.0	eth3 (192.168.3.220)	eth3 (192.168.3.221)	Active	Options

Virtual IPs routing

Search + Add static routing

Network/Host IP	Netmask	Gateway	Virtual IP name
No items found.			

Notifications 0 5 1

## 12. Failover test

*open-e*



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

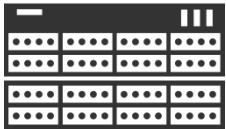
The **Pool-1** was exported from Node-220 and imported on Node-221. Node-220 (node-a) GUI will show the **Pool-1** is active on node-221 (node-b).

In order to move pool activity back to node-220 (node-a), click the **Move to this node** button.

The screenshot shows the Open-E JovianDSS web interface. The left sidebar contains navigation links: Storage, User Management, Failover Settings, Storage Settings, Backup & Recovery, System Settings, and Diagnostics. The main content area is titled 'Storage' and shows a notification about a disk configuration change. Below this, 'Pool-0' is listed as ONLINE with a Zpool ID of 6514485169002797111, 15.88 GiB total storage, and 7 disks. 'Pool-1' is listed as ONLINE and 'Active on node node-221'. A red arrow points from the 'Move to this node' button in the Pool-1 section to the text box on the left. The bottom of the interface shows a 'Zpools available for import' section with a message: 'No external zpools available for the import have been found.' The bottom status bar shows 'Notifications' with 0 errors, 1 warning, and 20 info messages.

## 12. Failover test

*open-e*



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

Click the **Move** button to start failover. It will start exporting the pool on Node-221 (**node-b**) and next it will be importing back to Node-220 (**node-a**).

The screenshot shows the Open-E JovianDSS web interface. The left sidebar contains navigation links: Storage, User Management, Failover Settings, Storage Settings, Backup & Recovery, System Settings, and Diagnostics. The main content area displays the 'Storage' section. A 'Pool-0' card is visible, showing its state as 'ONLINE' and various details. A 'Confirmation' dialog box is overlaid on the Pool-0 card, asking 'Are you sure you want to move the resource?'. The dialog has 'Cancel' and 'Move' buttons. A red arrow points from the 'Move' button in the dialog to the 'Move' button in the Pool-0 card. Below the Pool-0 card, there is a section for 'Zpools available for import' showing a 'Rescan required' message.

## 12. Failover test

*open-e*



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

The failover test is completed. The **Pool-1** is active back on Node-220 (node-a)  
Now, create an iSCSI target or NFS, SMB shares and connect storage clients to either of them. Once storage clients are connected, run one more failover test with a reboot of the first node and next after a successful failover, with reboot of the second node.

The screenshot shows the Open-E JovianDSS web interface. The top navigation bar includes the Open-E logo, 'JovianDSS', and links for 'About' and 'Help'. A trial version notice is displayed. The left sidebar contains a menu with 'Storage', 'User Management', 'Failover Settings', 'Storage Settings', 'Backup & Recovery', 'System Settings', and 'Diagnostics'. The main content area is titled 'Storage' and shows a notification about a disk configuration change. Below this, 'Pool-1' is listed with a status of 'ONLINE'. A table shows details for Pool-1: Zpool ID (4323450794484349210), Total storage (15.88 GiB), and Disks (7). A status box indicates that the zpool is functioning correctly. Below the pool list, 'Zpools available for import' shows 'Pool-0' with a status of 'ONLINE'. A table shows details for Pool-0: Zpool ID (6514485169002797111). A status box indicates that the zpool is ready to import. At the bottom, there are buttons for 'Status' and 'Disk Groups', and a section for 'Data storage' and 'Disk groups health'.

# Open-E JovianDSS Advanced Metro High Availability Cluster with 2 Rings *open-e*

## NOTE:

The step-by-step guide is based on a configuration from **page 5**. It uses two storage access paths and two virtual IPs per pool. This setup can be used for iSCSI with a multipath for non-zero-point-of-failure cluster.

There are plenty of possible configurations. Next examples are shown on **page 46 and 52**.

On **page 46** instead of two storage paths, there is a single bond. This setup can be used for NFS or SMB as a bond, assuring redundancy on the storage path. This setup cannot be used for iSCSI, as iSCSI requires two storage paths for redundant iSCSI multipaths.

On **page 47** instead of just two storage paths, there are two bonds. This setup can be used also for iSCSI Initiators with multipath or for mixed iSCSI/SMB/NFS environments.

Both configurations on **page 46 and 47** have redundant mirroring path. It uses a point-to-point Active-Backup bond instead of a single Ethernet connection. The Round-Robin bond cannot be used if the ring 2 is also configured over the mirror path.

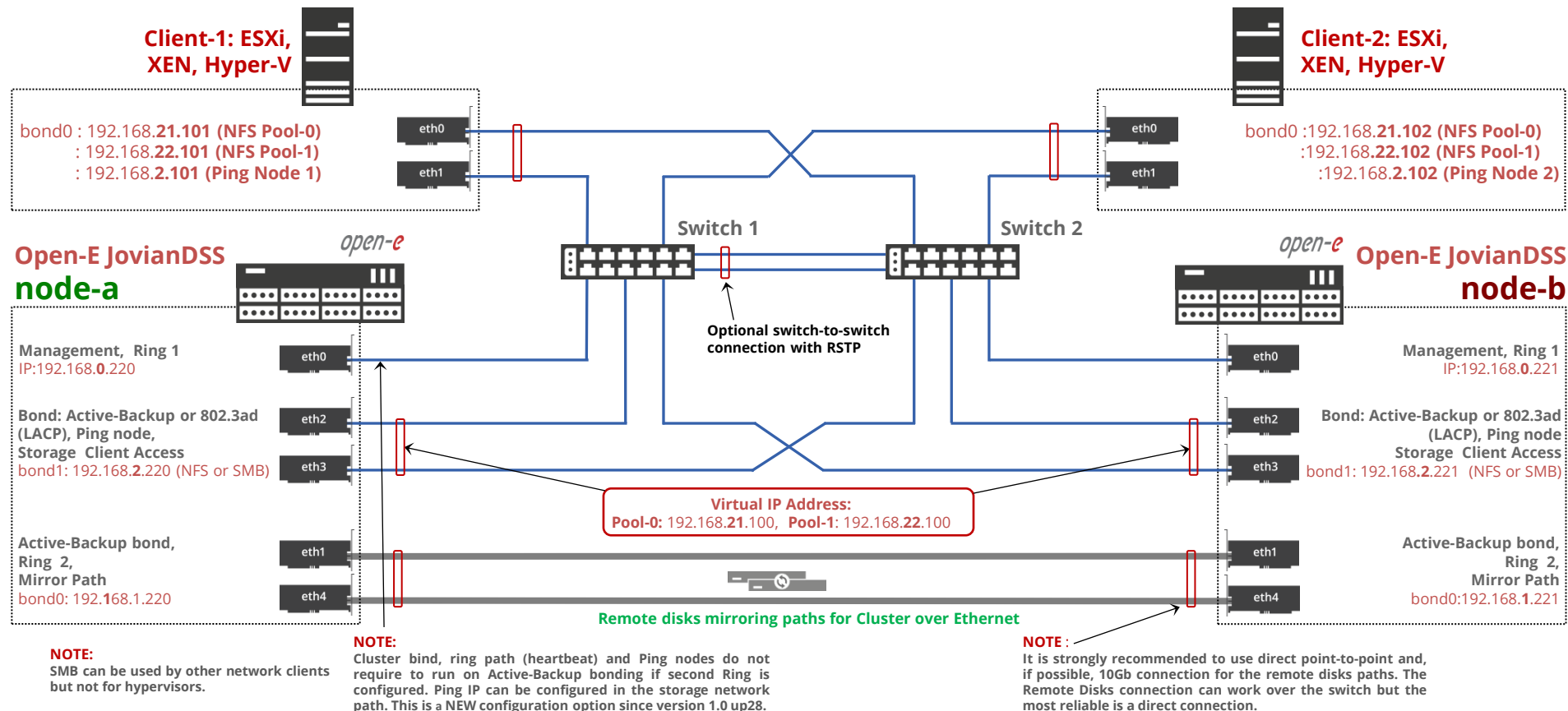
If mirror path is configured over a Round-Robin bond for better mirror performance, the second ring require extra dedicated path like shown on the configuration example on **page 48**. Here, the second ring path is configured over eth5-eth5 point-to-point path. It is strongly recommended to configure the second ring via point-to-point path as this will be switch failure independent and will not need both storage nodes to reboot in case of all Ethernet networks are down.

On **page 49** another example with 4 NICs only in every storage node. Here, the single point-to-point path is used for mirror path and second ring, 2 lines for iSCSI multipath and the first NIC pair is used for first ring, web management, and also for On- & Off-site Data Protection to another Open-E JovianDSS (not shown on the chart).

On **page 50..52** sites are connected via **limited number of connections**. On **page 50** connection between switches and direct point-to-point mirror path is available. On **page 51 and 52** only switch-to-switch connection is available. In such case, **ping nodes must be configured on one site only** so cluster will not force to import pools and split in case of lost connections between both sites. Such situation can happen if a switch failed or switch port used for site-to-site connection failed, or the cable was removed or damaged.

If the setup shown on **page 51 or 52** is used and **ping nodes are configured on both sites**, and connection between both sites is lost, both storage cluster nodes are obviously split. On both sites all pools will be imported in the degraded mode and cluster status on both nodes will be “separated”. The mirror path will show the “disconnected” status. This will be as long as the disconnected cluster status shows the “separated” mode. The reason for this behavior is to prevent auto-rejoin after restoring the connection between both sites. The re-join is impossible and the administrator must detach the lost (UNAVAILABLE) disks from mirrors on proper pools, delete wrong pools on the lost and detached disks. The cluster nodes must be disconnected using the “Disconnect” button in the GUI. After disconnect, the cluster must be re-configured, plus new and empty disks (after wrong pools are deleted) must be attached in order to re-mirror all data (GUI will show resilver running). It is required to restore the cluster after this split, **THIS KIND OF SETUP (no direct-point-to-point mirror path and switch-to-switch connection only, and ping nodes configured on both sites) IS STRONGLY NOT RECOMMENDED AND MUST BE AVOIDED**. This is why the setup on **page 51 and 52** shows ping nodes configured on one site only!

# Open-E JovianDSS Advanced Metro High Availability Cluster with 2 Rings and bonded storage path for NAS (NFS, SMB) storage clients.



# Open-E JovianDSS Advanced Metro High Availability Cluster with 2 Rings and bonded storage path for NAS (NFS, SMB) and iSCSI storage clients.



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

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

eth0 : 192.168.21.101 (iSCSI or NFS Pool-0)  
: 192.168.22.101 (iSCSI or NFS Pool-1)  
eth1 : 192.168.31.101 (iSCSI or NFS Pool-0)  
: 192.168.32.101 (iSCSI or NFS Pool-1)  
eth0 or eth1:192.168.1.101 (Ping Node)

eth0 : 192.168.21.102 (iSCSI or NFS Pool-0)  
: 192.168.22.102 (iSCSI or NFS Pool-1)  
eth1 : 192.168.31.102 (iSCSI or NFS Pool-0)  
: 192.168.32.102 (iSCSI or NFS Pool-1)  
eth0 or eth1 : 192.168.3.102 (Ping Node)

## Open-E JovianDSS node-a

## Open-E JovianDSS node-b

Management, Ring 1  
IP:192.168.0.220

Management, Ring 1  
IP:192.168.0.221

Bond: Active-Backup or  
802.3ad(LACP), Ping node  
Storage Client Access  
bond0: 192.168.1.220 (iSCSI, NFS or SMB)

Bond: Active-Backup or  
802.3ad(LACP), Ping node  
Storage Client Access  
bond0: 192.168.1.221 (iSCSI, NFS or SMB)

Bond: Active-Backup or  
802.3ad(LACP), Ping node  
Storage Client Access  
bond1: 192.168.3.220 (iSCSI, NFS or SMB)

Bond: Active-Backup or  
802.3ad(LACP), Ping node  
Storage Client Access  
bond1: 192.168.3.221 (iSCSI, NFS or SMB)

Active-Backup bond,  
Ring 2,  
Mirror Path  
bond2: 192.168.5.220

Active-Backup bond,  
Ring 2,  
Mirror Path  
bond2: 192.168.5.221

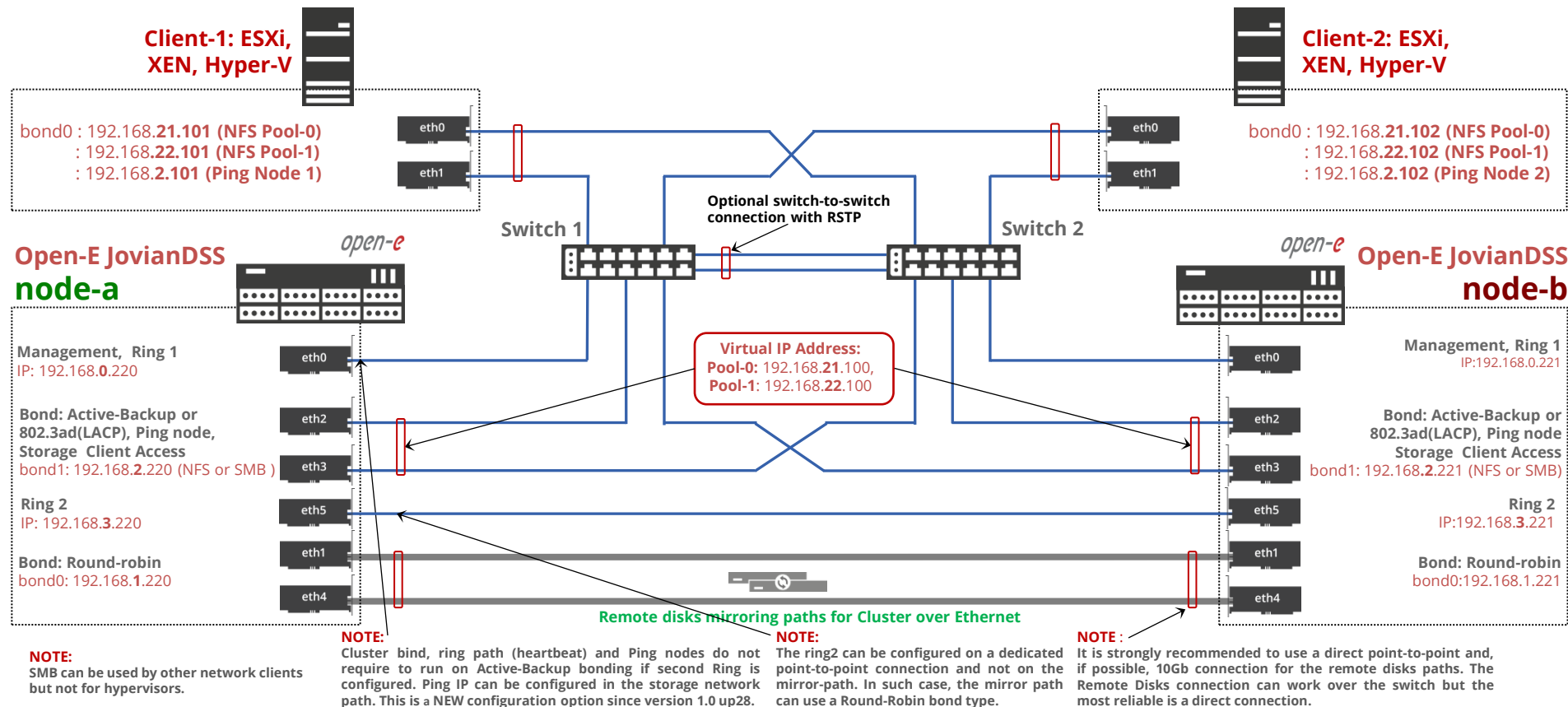
**NOTE:**  
SMB can be used by other network clients  
but not for hypervisors.

**NOTE:**  
Cluster bind, ring path (heartbeat) and Ping nodes do not  
require to run on Active-Backup bonding if second Ring is  
configured. Ping IP can be configured in the storage network  
path. This is a NEW configuration option since version 1.0 up28.

Remote disks mirroring paths for Cluster over Ethernet

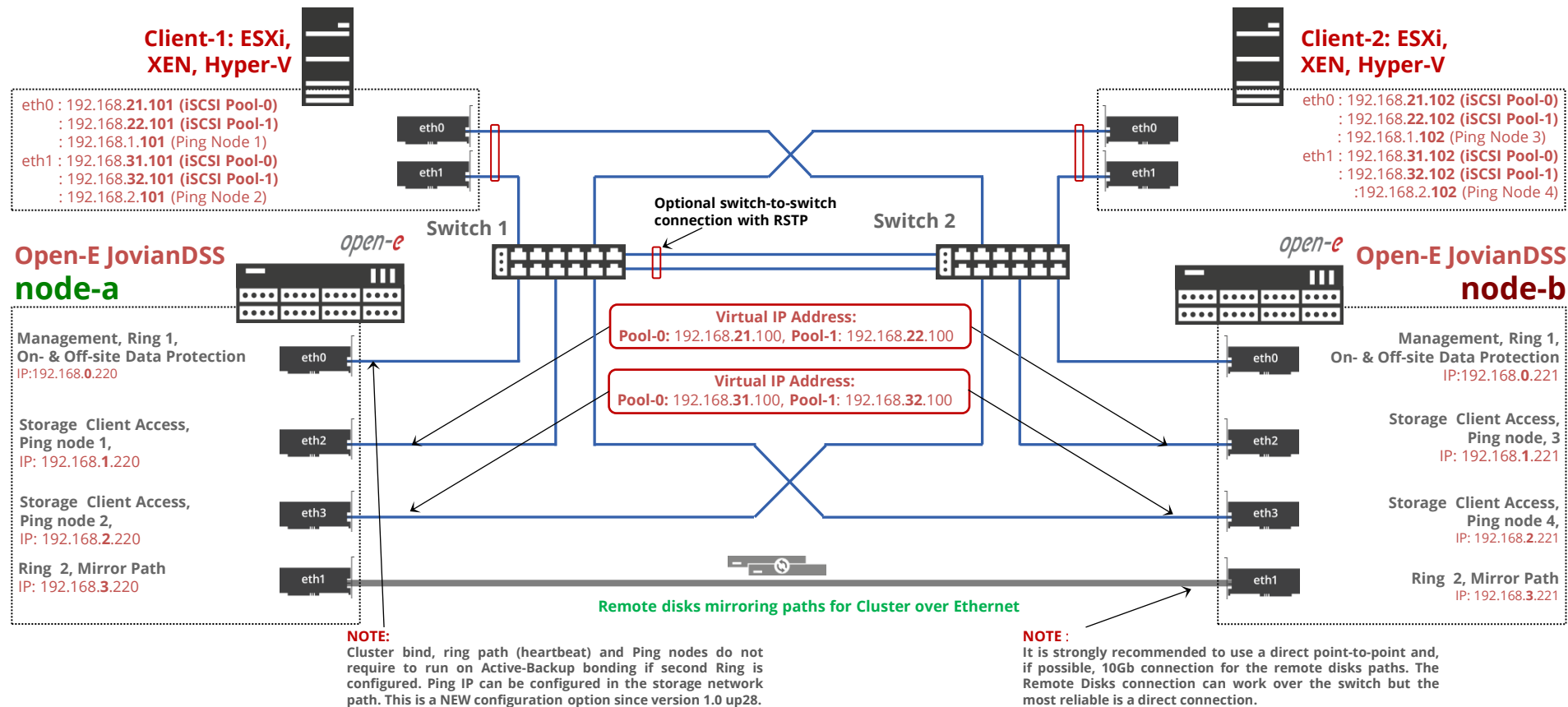
**NOTE:**  
It is strongly recommended to use a direct point-to-point and,  
if possible, 10Gb connection for the remote disks paths. The  
Remote Disks connection can work over the switch but the  
most reliable is a direct connection.

# Open-E JovianDSS Advanced Metro High Availability Cluster with 2 Rings and bonded storage path for NAS (NFS, SMB) storage clients.

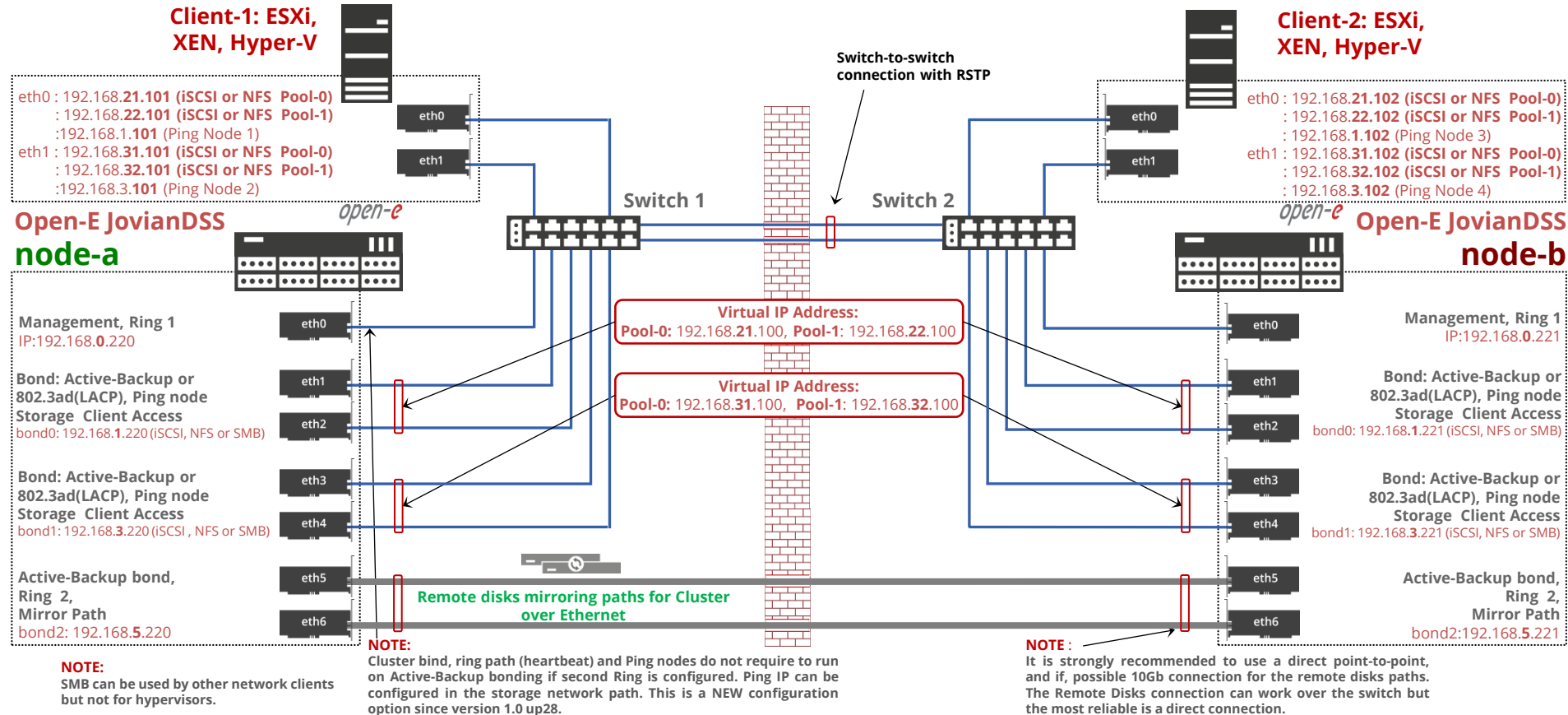




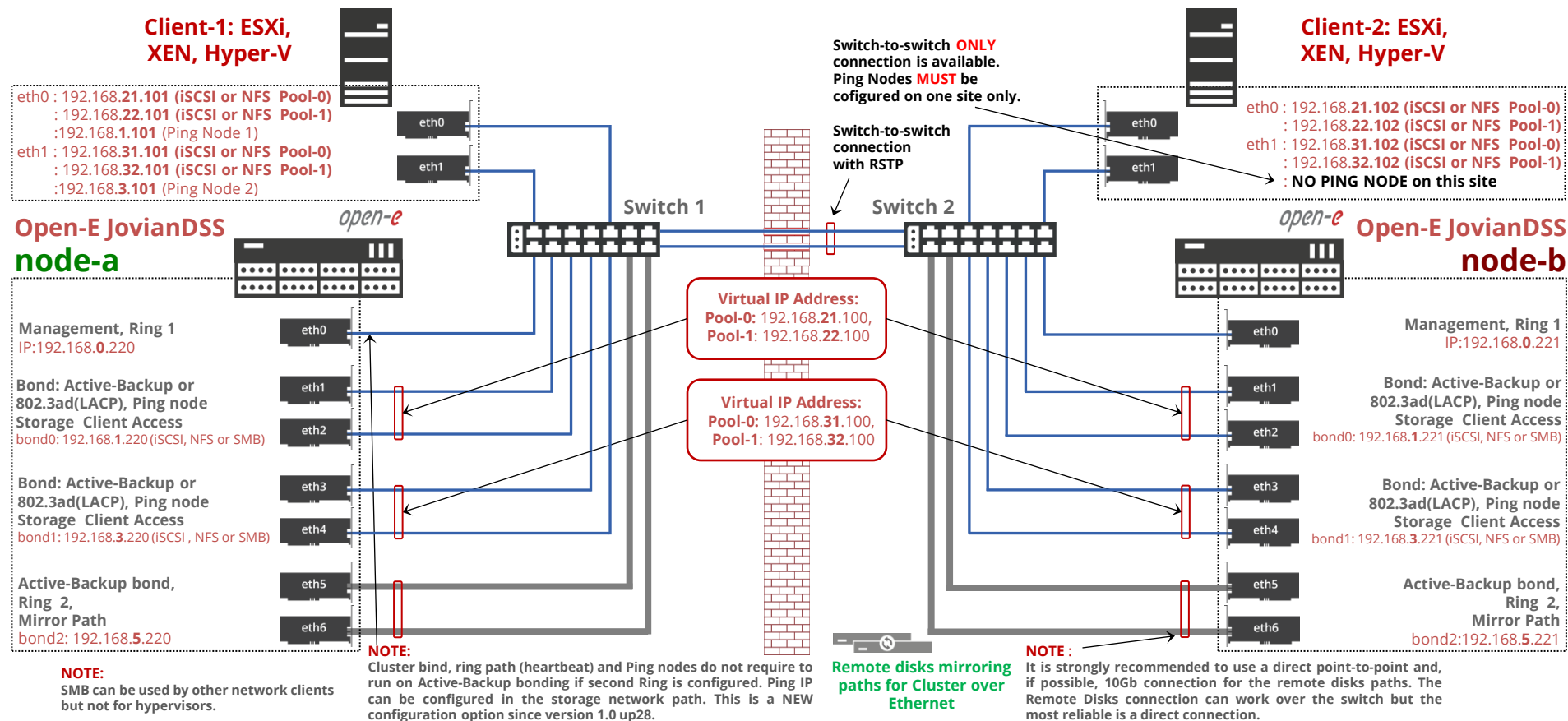
# Open-E JovianDSS Advanced Metro High Availability Cluster with 2 Rings and bonded storage path for iSCSI storage clients.



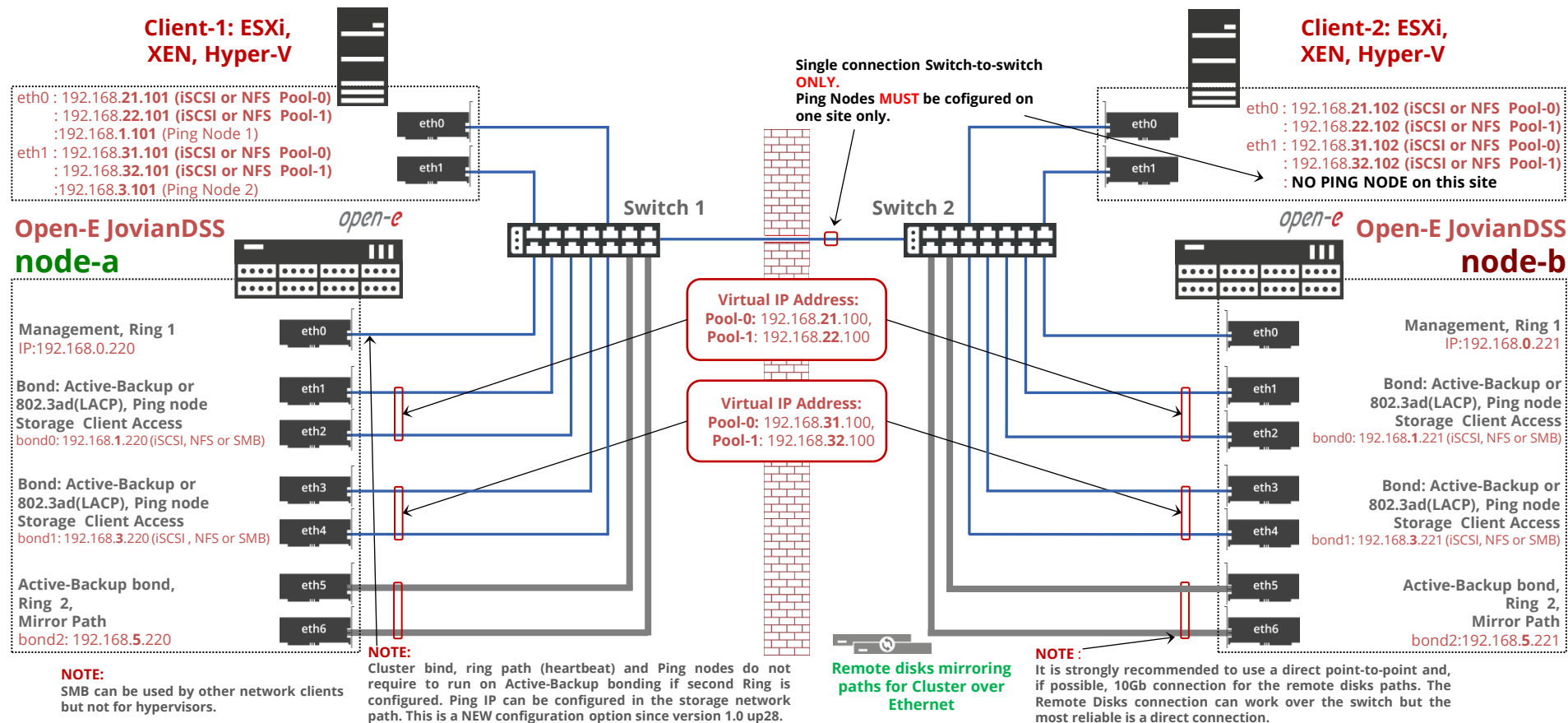
# Open-E JovianDSS Advanced Metro High Availability Cluster with 2 Rings and bonded storage path for NAS (NFS, SMB) and iSCSI storage clients.



# Open-E JovianDSS Advanced Metro High Availability Cluster with 2 Rings and bonded storage path for NAS (NFS, SMB) and iSCSI storage clients.



# Open-E JovianDSS Advanced Metro High Availability Cluster with 2 Rings and bonded storage path for NAS (NFS, SMB) and iSCSI storage clients.



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*open-e*

Thank You!

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