

Step-by-Step Guide

Open-E JovianDSS Advanced Metro High Availability Cluster

Software Version: JovianDSS ver. 1.00 up19

Last update: December 2017

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The aim of this document is to demonstrate an example setup of an Advanced Metro High Availability Cluster.

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, a bond of 2 NICs is used for iSCSI Targets and SMB, NFS share exports. The bond is preferred for NFS and SMB shares, but for iSCSI path redundancy MPIO is the better choice. If Open-E JovianDSS works as a Unified Storage Appliance, providing NAS and SAN (iSCSI,NFS, SMB), and all services need path redundancy, it will be required to configure 2 bonds. In this case, the first iSCSI path is set up via the first bond and the second iSCSI path via the second bond. In this example we show a single bond for simplicity, so that iSCSI is not redundant.

In this document, the pool is created with 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.

The 4-way mirror provide 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. 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 has to be accessed via the controller's ETH-port.

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

- 1. Hardware configuration
- 2. Network Configuration:
 - 2.1. Create Ring and Management Bond.
 - 2.2. Create Storage Export bond.
 - 2.3. Select Default gateway
 - 2.4. Second cluster node
- 3. Time and date settings
- 4. Nodes Binding
- 5. Ping Nodes
- 6. Mirroring path
- 7. Create new Pool

- 8. Enter Virtual IP
- 9. Critical I/O handling setup
- 10. Start the Cluster Service
- 11. System Monitoring Setup
- 12. Failover test

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Network Configuration	open-e JovianDSS				(i) About (i) Help	🕞 Logout
	Storage	System Settings				
open-e	O O User Management					
JovianDSS: node-a	Failover Settings	Administration Network	MPIO System Settings ma	anagement Update		
IP Address: 192.168.0.220	Storage Settings	^ Interfaces ─────				? C
		Name IP	DHCP Vendor	Negotiated speed Cable	Status	bond interface
	Q		No VMware VMXNET3 Ethernet Co	10000 Mbps cable	Active	j Options 🗸
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		eth3 192.168.3.220	No VMware VMXNET3 Ethernet Co	10000 Mbps cable	Active	j Options 🗸
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ect System Settings from main enu and next select Network tab. ck on the Create bond interface		Default gateway Interface Interface details Gateway				?C
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2.1. Network Configuration. Create
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                                                                                                       Create new channel bonding interface
         Ring and Management Bond
                                                                                                        Available interfaces
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                                                                                                                             DHCP
                                                                                                                                  Interface details
                                                                                                                                                            Cable
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 Enter all required details of the Bond
 and click on the Apply button.
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    Static

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Logout

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2.3. Network Configuration. Select
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Select proper interface and click on
                                                                                                                              🗙 Cancel 🧹 🗸 Apply
the Apply button.
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2.4. Network Configuration (second cluster node)



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.

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-e							(i) About (?) He	p C	- Logout
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ser Management									
ailover Settings	Administration	Network	MPIO	System Settings mana	agement Upo	late			
orano Cottinor	^ Interfaces ────								<u> ?</u>
orage seconds							+ 0	reate bond	interface
ystem Settings	Name	Р	DHCP	Vendor	Negotiated speed	Cable	Status		
F	→ 🗷 bond0	192.168.0.221	No	Ethernet Bonding Driver	10000 Mbps	cable	Active	C Opti	ons 🗸
ignostics	⊡ bond1	192.168.2.221	No	Ethernet Bonding Driver	10000 Mbps	cable	Active	🕑 Opti	ons 🗸
		N/A	No	VMware VMXNET3 Ethernet Co	10000 Mbps	cable	Bond slave	🕑 Opti	ons 🗸
	eth1 (bond0)	N/A	No	VMware VMXNET3 Ethernet Co	10000 Mbps	cable	Bond slave	🕑 Opti	ons 🗸
	eth2 (bond1)	N/A	No	VMware VMXNET3 Ethernet Co	10000 Mbps	cable	Bond slave	🕑 Opti	ons 🗸
	eth3 (bond1)	N/A	No	VMware VMXNET3 Ethernet Co	10000 Mbps	cable	Bond slave	🕑 Opti	ons 🗸
	ı eth4	192.168.4.221	No	VMware VMXNET3 Ethernet Co	10000 Mbps	cable	Active	C Opti	ons 🗸
	↑ Default gateway	3 							- ?C
	Interface	bond0							
	Interface details	Ethernet	Bonding I	Driver					
	Gateway	static							
	Change								





4. 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 ping-path. It MUST go via network switch and ping-nodes must be external to storage nodes. It is NOT allowed for the ring to use nodes point-to-point connection.

















7. Create new Pool



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

In menu Storage and click on **Add zpool button**. Add data groups by selecting 4 (or 2) disks and select Mirror (single group) from the pulldown menu and click on Add group button, then click on 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.

Po hode-220	X node-221		×											- 0	
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<i>pen-e 🔊</i> JovianDSS													6		
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39 Joinede	Zpool wizard											? 🗙	T		
User Man	1. Add data group	Ava	ailable disks	1						▲ To ad pleas	d first Data Grou e select disks o elect redundan	p to your zpool n the list on the			
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a			Name	Id				Size	Blink	Data groups	5	Size			
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Suctorn Settin			sdc	wwn-0x60	00c29013	42d6ba30792	2c2a	838.00 GiB	•						
			sdd	wwn-0x60	100c29495	d1f91ffcd2f2	00d	838.00 GiB	•						
Diagnostics			sde	wwn-0x60	00c29107	546e7 <mark>d49e</mark> fa	d <mark>d2</mark>	838.00 GiB	•						
			sdf	wwn-0x60	100c29159	8c75606c9b	3290	838.00 GiB	•						
			sdg	wwn-0x60	100c29094	a80f262ac36	ie41	838.00 GiB	•						
			sdh	wwn-0x60	00c29729	c1910755bbl	3354	838.00 GiB	•	Zpool stora	ge capacity: 0.0	DB			
			sdi	wwn-0x60	00c291d2	09881b5e57f	c23	838.00 GiB	•	Used licens	ed storage capa	city: 0.00 B			
		~	sdj (remote)	wwn-0x60	00c29a1d	d7e1986926	5069	838.00 GiB	•	Other group	os	Size		•	
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			sdl (remote)	wwn-0x60	00c2986f1	b85bf27f1b1	fb8	838.00 GiB	•						
			sdm (remote)	wwn-0x60	00c29647	d12bdd0bbe	593d	838.00 GiB	•						
			sdn (remote)	wwn-0x60	00c29feb6	65abc68e076	idb1	838.00 GiB	•					•	
			sdo (remote)	wwn-0x60	100c29f823	1edaff27b3c	c88	838.00 GiB	•						
		-	Select redundancy	for group:	Mirror (single group) 🗸	+ Add	group					•	
										-	X Cancel	Next >		•	
		-								-					

open-e

7. Create new Pool



Next, add the second mirror group.

NOTE:

A 4-way mirror provide 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. 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 has to be accessed via the controller's ETH-port.

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	Storage Zogol wizard		-		-	-	_	() Rescan	+ A
\rightarrow	1. Add data group	Ava	ailable disks	ĩ			Data groups	Size	
	2. Add write log	0	Show only unu	sed disks	🔿 Rescan	disks	G Mirror	× 838.00 GiB	
	3. Add read cache		Name	Id	Size	Blink	- 🗑 sdc	838.00 GiB 838.00 GiB	
	4. Add spare disks	2	sde	wwn-0x6000c29107546e7d49efadd24fd.		•	sdk (remote)	838.00 GiB	
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			sdo (remote) sdp (remote)	wwn-0x6000c29f8231edaff27b3cc8806 wwn-0x6000c296d1653f4cf5a46823e28.	. 838.00 GiB 838.00 GiB	•			
			sdq (remote)	wwn-0x6000c2981aaec5a1d1437245dfe	838.00 GiB	٠			
		83	Select redundanc	r for group: Mirror (single group) 🗸	+ Add g	roup	N A		











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7. Create new Pool
                                                               open-e 
                                                                           Zpool wizard
                                                                                                                                                        ? ×
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                                                                           1. Add data group
                                                                                        Please set properties for zpool:
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                    JovianDSS: node-a
                                                                                        Zpool name:
                                                                                                         Pool-0
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                                                                           2. Add write loa
                    IP Address: 192.168.0.220
                                                                                                        Zpool name: Defines name of the zpool in the system
                                                                           3. Add read cache
. . . . | . . . . | . . . .
                                                                           4. Add spare disks
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                                                                           6. Summary
To confirm the pool name click on the
Next button then click on the next
screen, and click on the Add zpool
                                                                                                                                                               .
button.
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8.
      Enter Virtual IP
                                                                open-e
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JovianDSS: node-a
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....
                     IP Address: 192.168.0.220
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                                                                                                                 subnetwork than other physical and Virtual IPs on this
 .....
                                                                                                                 machine.
In main menu Storage, select Virtual
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                                                                                                                  vip21
IPs tab then click on the Add virtual
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IP button and enter the virtual IP
                                                                                                Network interface:
                                                                                                                  bond1 (192, 168, 2, 220)
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address and assign it to the required
                                                                                                 Remote network interface:
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interfaces. Next, click Apply button.
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9. Critical I/O handling setup





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

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12. Failover test



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.

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→ C A Not secure	BHDS://192.168.0.220	¥ 24
ene ovianDSS	() About	⑦ Help ☐ Logout
Storage	Storage	() Rescan + Add zpool
User Management		
Failover Settings	• Pool-0	Options v
Storage Settings	State: ONLINE Status: Zpool is functioning correctly.	Delete Zpool Export Zpool
System Settinos	Total storage: 2.44 TiB	Move
Diagnostics	Disks: 16 Statue Disk arguine iSCSI targete Snapshote Sharae Virtual IPe	
	O Virtual IPs	
	Search	+ Add virtual IP
	Virtual IP Name Netmask Network interface Remote network interface State	• Options
	1 192.168.21.100 vip21 255.255.255.0 bond1 (192.168.2.220) bond1 (192.168.2.221) Active	Options 🗸
	A	
;	Zpools available for import	
	(1) Rescan required Press Rescan storage button above to scan disks for new zpools.	
	Unassigned disks	





12. Failover test

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JovianDSS: node-a

The Pool was exported from Node-

Node-220 (node-a) GUI show the

Pool-0 is active on node-221 (node-b).

In order to move pool activity back to

node-220 (node-a), please click on

.....

220 and imported on Node-221.

Move to this node button.

IP Address: 192.168.0.220







Now, the failover test is completed. The **Pool-0** is active back on Node-220 (node-a)

Please create iSCSI target or NFS, SMB shares and connect storage clients. Once storage clients are connected, run one more failover test with reboot of the first node and next after successful failover, with reboot of the second node.

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← → C ▲ Not secure	bttps://192.168.0.220			☆	
open-e JovianDSS		(i) About	(?) Help	📑 Logou	~
Storage	Storage		() Rescan	+ Add z	pool
O User Management					_
	Pool-O			Options	<pre></pre>
Storage Settings	State: ONLINE Status: Zpool is functioning correctly. Zpool ID: 17476578527970846996 Action: None required				
System Settings	Total storage: 2.44 TiB				
Diagnostics					
	Zpools available for import				
	(j) No external zpools available for the import have been found.				
	Unassigned disks				
	Search				-
	Name Serial number Size Model			Blink	18
	No unassigned disks found.				
					*
Notifications 😣 0 🔺	0 35				

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NOTE:

The step-by-step guide is based on configuration from page 4, use VIP's addresses on bond1 for storage access this will work with SMB, NFS or iSCSI.

Next on page 42 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 43 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.

On page 44, the mirroring path use point-to-point Round-Robin bond instead of single Ethernet connection. The Round-Robin bond provide better reliability and better mirror performance.







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