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# NEC

EXPRESSCLUSTER X for Windows  
Quick Migration Guide for Microsoft Exchange Server 2010  
Migration from a single-node configuration to a three-node hybrid disk cluster

Version 1



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**NEC EXPRESSCLUSTER X 3.x for Windows  
Quick Migration Guide for Microsoft Exchange Server 2010  
Migration from a single-node configuration to a three-node hybrid disk cluster**

**Document Number ECX-Exchange2010-HD-QMG, Version 1, December 2015**  
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About this Guide

## Using this guide

This guide provides a hands-on “Quick Migration” set of instructions to install and configure EXPRESSCLUSTER X (EC X) for Windows with Microsoft Exchange Server 2010 SP3 UR8. The guide assumes users have Microsoft Windows system administration knowledge and skills with experience in installation and configuration of Microsoft Windows operating systems, networks, and Exchange. It is also assumed that the user has a minimal Exchange Server 2010 environment with the Mailbox, Client Access, and Hub Transport Roles on three separate servers on one site. The server with the Mailbox Role will be clustered with EC X on two other Mailbox servers in a hybrid disk configuration.

This guide covers the following topics:

**Chapter 1:** [Overview](#) – describes the general steps of setup procedures.

**Chapter 2:** [System Requirements and Planning](#) – describes the overall system and network requirements, and includes a set of tables for planning the installation and configuration.

**Chapter 3:** [System Setup Preparation](#) – describes the configurations required for each system before installing target application.

**Chapter 4:** [EC X Server Installation](#) – describes EC X installation on the Primary and two Standby Servers.

**Chapter 5:** [Base Cluster Setup](#) – describes the process of generating a cluster, creating a failover group, and uploading a configuration.

**Chapter 6:** [Preparing Servers to Execute Scripts](#) – describes configuration steps for preparing cluster nodes to execute EC X PowerShell failover scripts.

**Chapter 7:** [Microsoft Exchange Server 2010 Cluster Setup](#) – describes required configuration to enable full cluster functionality.

**Chapter 8:** [Test Cluster and Verify Functionality](#) – describes steps to verify and test the cluster and complete the deployment on a Primary and two Standby Servers.

**Chapter 9:** [Common Maintenance Tasks](#) – describes how to perform common maintenance tasks using the EC X Manager.

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## Where to go for more information

Refer to additional documentation under the “documentation” directory on the EC X distribution CD.

For more information, go to: <http://www.nec.com/expresscluster>

Other EC X guides are at:

<http://www.nec.com/expresscluster/en/support/manuals.html>

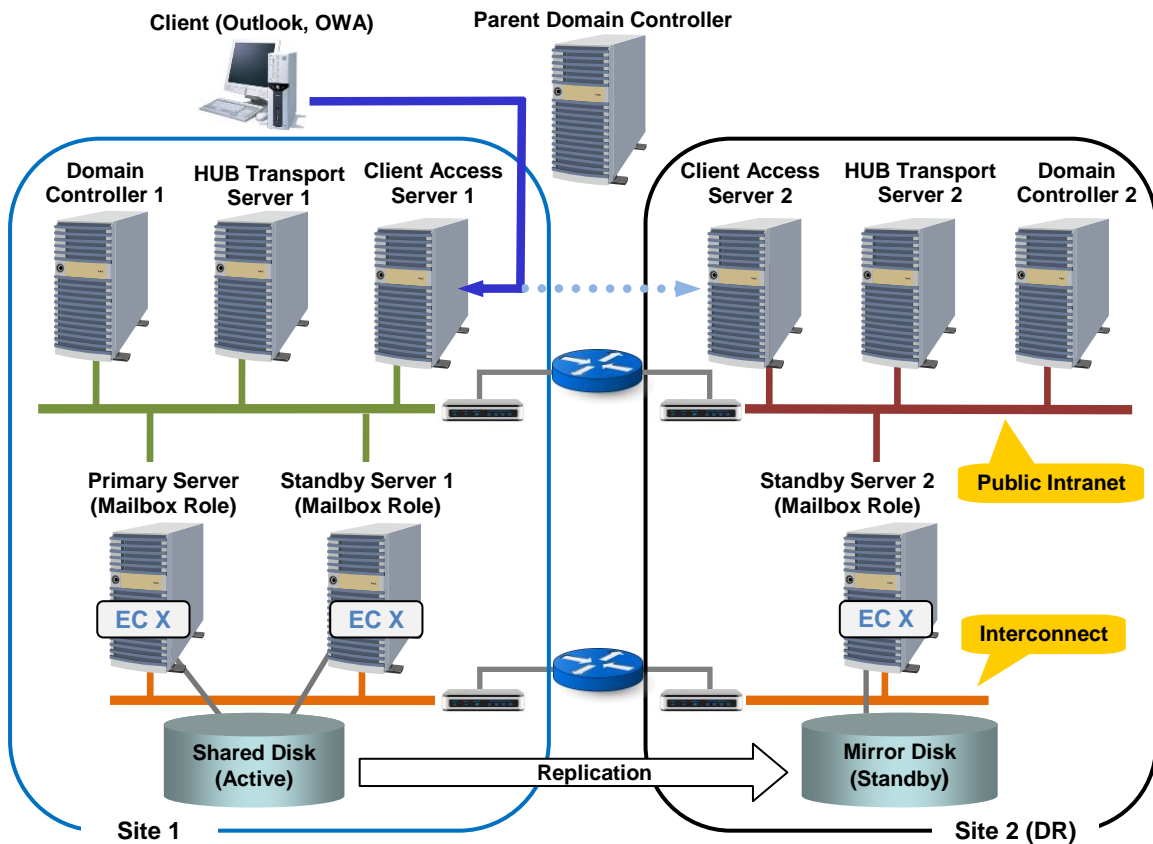
- **Getting Started Guide** – General cluster concepts and overview of EC X functionality.
- **Installation and Configuration Guide** – EC X installation and configuration procedures.
- **Reference Guide** – Commands for EC X scripts and maintenance commands to execute from the command prompt.

Contact: [info@expresscluster.jp.nec.com](mailto:info@expresscluster.jp.nec.com)

## 1 Overview

The general procedure to deploy EC X on three servers (referred to as Primary, Standby 1, and Standby 2) with Microsoft Exchange Server 2010, Mailbox role only, consists of the following major steps:

1. Perform system planning to determine requirements and specify configuration settings *prior* to the start of actual system installation and configuration.
2. Prepare the Standby Servers, including OS installation and configuration, and Exchange Server 2010 Mailbox role installation and configuration. One Standby server to be installed on the same site as the Primary server. The other Standby server to be installed on a DR site, along with an additional Client Access server and Hub Transport server.
3. Install and configure EC X on the Primary and Standby Servers.
4. Create and configure the EC X failover group to enable continuous protection and automatic recovery for mailbox database.
5. Upload the configuration file and start the cluster to complete deployment in the hybrid disk configuration.



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## 2 System Requirements and Planning

### 2.1 System Requirements

Machine 1: Primary Server (with Exchange Server 2010 Mailbox role)

Machine 2: Standby Server 1 (with Exchange Server 2010 Mailbox role)

Machine 3: Standby Server 2 (with Exchange Server 2010 Mailbox role)

	<b>Machine 1 Primary Server</b>	<b>Machine 2 Standby Server 1</b>	<b>Machine 3 Standby Server 2</b>
<b>Memory</b>	4GB or more		
<b>Disk</b>	1 physical disk  <b>OS partition:</b> 50GB or more space available (to include the installation of Microsoft Exchange Server 2010)  <b>Cluster partition:</b> Partition of 17MB or more, available for EC X Management – the same size for each server system  <b>Data partition:</b> Enough partition space to store mailbox database		
<b>OS</b>	Windows Server 2008 R2 (Standard or Enterprise) with the latest Service Pack		
<b>Software</b>	Java Version 6.0 Update 20 (or later) enabled Web browser Microsoft Exchange Server 2010 SP3 UR8		
<b>Network</b>	2 – 100Mbit or faster Ethernet network interface cards		



## 2.2 System Planning

Review the requirements from the last section and then fill in the tables of the worksheet below. Refer to [Appendix B: Example System Planning Worksheet](#) for an example worksheet. This is useful when creating the cluster later.

Machine 1 Primary Server (with Mailbox role of Exchange Server 2010)

Machine 2 Standby Server 1 (with Mailbox role of Exchange Server 2010)

Machine 3 Standby Server 2 (with Mailbox role of Exchange Server 2010)

**Table 1: System Network Configuration**

Machine	Host name	Network Connection	IP Address	Subnet Mask	Default Gateway	Preferred DNS Server
1		Public:				
		Interconnect:				
2		Public:				
		Interconnect:				
3		Public:				
		Interconnect:				

**Mailbox Database Name:** \_\_\_\_\_

**Client Access Server 1 Name or CAS Array Name (site1):** \_\_\_\_\_

**Client Access Server 2 Name or CAS Array Name (site2):** \_\_\_\_\_

**Floating IP (FIP) address:**

Web Management Console FIP: \_\_\_\_\_

**Table 2: System OS and Disk Configuration**

Machine	OS	Disk 0 (OS Disk)	Disk 1 (Data Disk) (shared disk on machines 1 & 2, mirror disk on machine 3)
1		<b>Boot Partition:</b> Drive Letter: Size:	<b>Cluster Partition:</b> Drive Letter: Size (>20MB) :  <b>*Data Partition:</b> Drive Letter: Size:
2		<b>Boot Partition:</b> Drive Letter: Size:	
3		<b>Boot Partition:</b> Drive Letter: Size:	

\* The size must be large enough to store all data, and log files for a given Microsoft Exchange Server 2010 installation to meet current and expected future needs.

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**Table 3: System Logins and Passwords**

<b>Computer/Account</b>	<b>Login</b>	<b>Password</b>
<b>Machine 1 Administrator</b>		
<b>Machine 2 Administrator</b>		
<b>Machine 3 Administrator</b>		
<b>Domain Administrator</b>		

---

## 3 System Setup Preparation

### 3.1 Set up the Standby Servers (Machine 2 & Machine 3)

1. If necessary, install hardware components, OS, and Service Packs identical to the Primary Server (Machine 1).
2. Install and configure Exchange Server 2010 with the latest update rollup and only with the Mailbox Role.

### 3.2 Additional setup on Primary Server (Machine 1) and Standby Servers

#### Network Interface

1. The network interface to which each of the three servers connects to a network will be referred to as **Public**. If possible, set up a second network interface on all three servers to be used for internal EC X management and data mirroring network communication between these three servers. This second network interface will only be shared between these three servers and will be referred to as **Interconnect**.
2. In the **Network Connections** windows of each server, change the network interface binding order so that the **Public** network is in the first position.

#### Data Disk (Shared Disk and Mirror Disk)

1. Acquire and set up a shared disk to be utilized by the **Primary Server (Machine 1)** and **Standby Server 1 (Machine 2)**. Ensure that both servers can access the disk.
2. Set up a disk or partition for mirroring on **Standby Server 2 (Machine 3)**.
3. Make sure that the disk device or LUN which will be used as the shared disk and mirror disk are initialized as a Windows Basic disk device.
4. Create a cluster partition for EC X management on each disk which is 17MB or greater. Assign a drive letter to the partition, but do NOT format (refer to [Table 2: System OS and Disk Configuration](#)). The size MUST be the same on both disks.
5. Create a data partition on the shared disk and the mirrored disk. Assign a drive letter to the partition and format to NTFS (refer to [Table 2: System OS and Disk Configuration](#)). The size MUST be the same on both disks.
6. Verify the cluster and data partitions are visible in Windows Explorer under their assigned drive letters.

---

## 4 EC X Server Installation

### 4.1 Install EC X on the Primary Server (Machine 1)

1. Insert the EXPRESSCLUSTER X CD-ROM into a CD-ROM drive on the server.
2. In the pop-up window, click **NEC EXPRESSCLUSTER for Windows**.
3. Click on **NEC EXPRESSCLUSTER X 3.x for Windows**.
4. In the **Welcome** window, click **Next**.
5. In the **Choose Destination Location** window, click **Next**.
6. In the next window, click **Install**.
7. In the **Port Number** window, if necessary, modify the default port numbers. Click **Next**.
8. In the **Filter Settings of Shared Disk** window  
**Machine 1** and **Machine 2**: Continue to step 9.  
**Machine 3**: Click **Next** and in the **Confirmation** window, click **Yes**. Skip to step 11.
9. Right-click the SCSI controller/FC HBA which is connected to the shared disk and select **Filtering**. The drives to which filtering will be applied will have a red check mark next to them. Click **Next**.

*Note that after filtering is set, these drives cannot be accessed until cluster construction is finished for disk protection.*

10. Click **Yes** to set filtering. Click **OK**.
11. In the **License Manager** window, click **Register**.
12. In the **License Registration** window, click **Register with License Information**.
13. In the **Product Selection** window, select the **OS** and **Product/Trial** types. For **Product Name**, click **EXPRESSCLUSTER X 3.x for Windows**. Click **Next**.
14. In the **License Unit Selection** window, depending on the type of license, enter the number of **CPU** or **Node Units**. Click **Next**.
15. In the **License Key Entry** window, enter the **Serial No.** and **License Key**. Click **Next**.
16. In the **License Registration Confirmation** window, confirm the information entered is correct. Click **Next**.
17. Click **OK**. If the license registration fails, start again from step 11.
18. Repeat steps 11-17 again for the **EXPRESSCLUSTER X Replicator DR 3.x for Windows** product license. Select **EXPRESSCLUSTER X Replicator DR 3.x for Windows** as the **Product Name** in step 13.
19. In the next window, click **Finish**.
20. On the **InstallShield Wizard Complete** window, click the **No, I will restart my computer later** option button, and then click **Finish**.
21. In the next window, click **Exit**. Click **Exit**. (Two times total).

---

#### **4.2 Install EC X on the Standby Servers (Machine 2 and Machine 3)**

Perform all of the steps in Section [4.1](#) on the **Standby Servers**.

#### **4.3 Restart the Primary and Standby Servers (Machines 1, 2, & 3)**

First restart the **Primary Server**, and then restart the **Standby Servers**.

#### **4.4 Confirm connectivity between servers in cluster**

Ping the servers in the cluster to verify that there are no issues in connectivity between the servers in the cluster. Also be sure that the ports used by EC on Machines 1, 2 & 3 are able to communicate through the Windows Firewall.

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## 5 Base Cluster Setup

### 5.1 Install Java Runtime Environment (JRE)

Verify JRE Version 6.0 Update20 or newer is installed on a machine to be used for cluster management. Also install on the nodes (Machine 1, Machine 2 and Machine 3) if they might be used for cluster management. If necessary, install JRE by performing the following steps:

1. Run **jre-<build and platform version>.exe** (a compatible JRE distribution is in the jre folder on the EXPRESSCLUSTER CD).
2. In the **License Agreement** window, verify the default **Typical setup** option button is selected. Click **Accept**.
3. On the **Installation Completed** window, click **Finish**.

### 5.2 Start the EC X Cluster Manager

Start by accessing port 29003 of the **Primary Server** from the Web browser of the cluster management machine, using the Primary Server's IP address. Example: <http://10.1.1.1:29003>. When the security warning window displays, select the **Always trust content from this publisher** check box. Click **Run**.

### 5.3 Create a cluster

For all of the steps below, refer to [Table 1](#) for the IP addresses and server names.

1. When the cluster manager is opened for the first time, there is a pop-up window with two options. Click **Start cluster generation wizard**.
2. In the confirmation window, click **Start Cluster Generation Wizard for standard edition**.
3. In the new window, type a **Cluster Name**. (Example: cluster).
4. Type the **Management IP Address**, and click **Next**.
5. In the next window, to add another server to the cluster, click **Add**.
6. Type the Server Name or the IP Address of **Standby Server 1**, and then click **OK**.
7. Click **Add** and type the Server Name or the IP Address of **Standby Server 2**, and then click **OK**.
8. Both new servers are now on the list. If the **Primary Server** is not in the top (Master Server) position, then move it up. Click **Next**.

### 5.4 Create a Server group

1. In the **Server Group** window, click **Add**.
2. Enter a name for the first server group and click **Next**. (Example: svg1)

- 
3. Add the **Primary Server** and **Standby Server 1** to the new group by selecting each in turn and clicking **Add**.
  4. Click **Finish**.
    1. In the **Server Group** window, click **Add**.
    2. Enter a name for the second server group and click **Next**. (Example: svg2)
    3. Select **Standby Server 2** and click **Add** to include it in this new group.
    4. Click **Finish**. Click **Close**.

## 5.5 Set up the network configuration

1. In the **Server Definition** window, click **Next**.
2. EC X automatically detects the IP addresses of the servers. The primary network (**Interconnect**) is for heartbeat and mirroring the data; set the MDC as mdc1. And the secondary (**Public**) network is for heartbeat only. Click **Next**.
3. In the **NP Resolution** window, click **Next**.

## 5.6 Create a failover group

For all of the steps below, refer to [Table 1](#) for the IP addresses and server names.

1. To add a group, in the **Cluster Generation Wizard**, in the **Group** section, click **Add**.
2. In the next window, select **failover** for group Type. Name the group (Example: Exchange\_Failover)
3. Check the box **Use Server Group Settings** and click **Next**.
4. Select the first server group in the right pane (e.g. svg1) and click **Add**.
5. Select the second server group in the right pane (e.g. svg2) and click **Add**.
6. Click **Next**.
7. In the **Group Attribute Settings** window, change the **Startup Attribute** to **Manual Startup**.
8. Change the **Failover Attribute** to **Prioritize failover policy in the server group**.
9. Check the box **Enable only manual failover among the server groups** and then click **Next**. Click **Finish**.

## 5.7 Create Hybrid Disk Resource

1. In the **Group Resource** section of the **Cluster Generation Wizard**, to add a resource, click **Add**.
2. In the next window, Click **Get License Info** to retrieve the active license for replication.
3. To add a hybrid disk resource (hd), from the drop-down menu, select **hybrid disk resource**, and then click **Next**.
4. Verify the **Follow the default dependency** box is selected, and then click **Next**.
5. Verify the default options are correct, and then click **Next**.

- 
6. Enter the drive letter of the data partition for mirroring (Example: X) in the **Data Partition Drive Letter** box, and the drive letter of the cluster partition (Example: W) in the **Cluster Partition Drive Letter** box.

**Note**

Specify different partitions for data partition and cluster partition. If the same partition is specified, data on the shared disk or mirror disk may be corrupted.

7. Click **Obtain information** and the GUID information of the data and cluster partitions on each server will be displayed.
8. Click **Finish**.
9. Click **Finish**, and then click **Next**.
10. Click **Finish**.
11. Click **Yes** to enable recovery action when an error occurs in a monitor resource.

**Note**

For more information see **Installation and Configuration Guide**, Chapter 4 (Disabling recovery action caused by monitor resource error).

## 5.8 Upload the cluster configuration and initialize the cluster

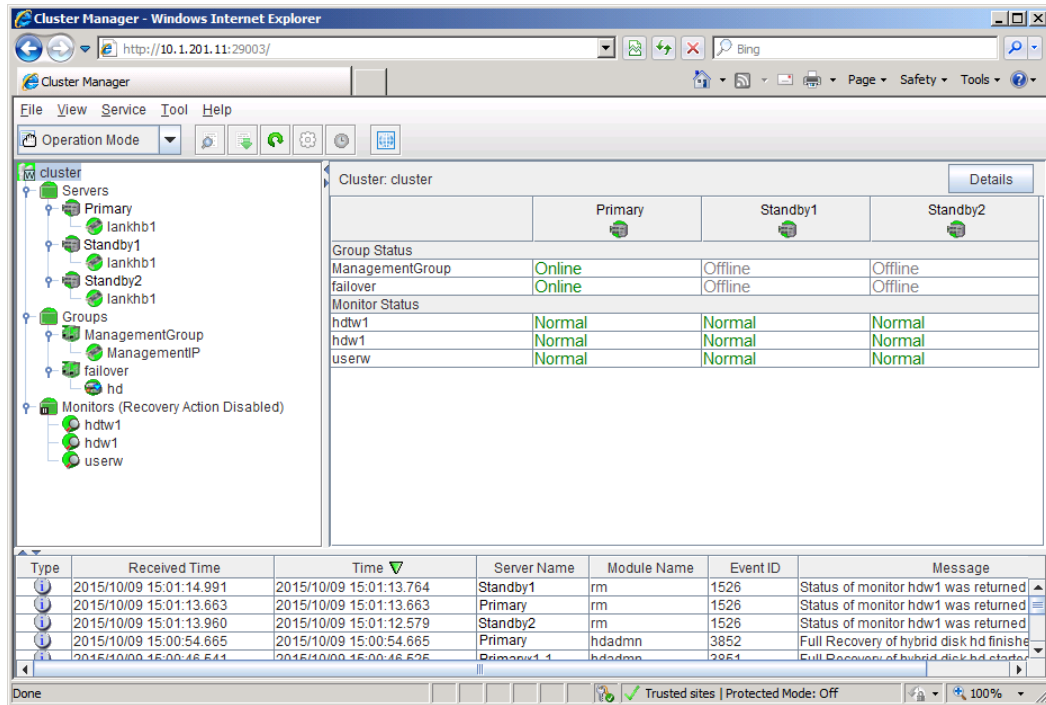
1. In the **Cluster Manager** window, click the **File** menu and then **Apply the Configuration File**. If a pop-up window appears which shows “There is HBA information that is not set up. Do you want to automatically set it up?”, click **Yes** to automatically set up the HBA information. Then click **OK**. Click **OK**. (Two times total).
2. After the upload is complete, change from **Config Mode** to **Operation Mode**.
3. Restart **Cluster Manager**. Click the **Service** menu, and then click **Restart Manager**. Click **OK**.
4. Click the **Service** menu, and then click **Start Cluster**. Click **OK**.
5. When the cluster tree displays after a few seconds, in the left pane of the **Cluster Manager** window, expand the **%failover group%** section, right click **%hybrid disk%**, and click **Details** to monitor the disk synchronization progress. Mirror disk copy starts automatically, replicating data from the **Primary Server** to **Standby Server 2**.

**Note**

This step may take a while depending on the size of the data in the shared disk data partition.

6. After the copy completes, in the **Mirror Disk Helper** window, click **Close**.
7. In the **Cluster Manager** window, all icons in the tree view are now green. Refer to the figure below.





8. Confirm that the cluster is functioning

- 8.1 Move the failover group to **Standby Server 1** (See Section 9.3).
- 8.2 Move the failover group to **Standby Server 2** (See Section 9.3).
- 8.3 Move the failover group back to the **Primary Server** (See Section 9.3).

**Note**

This test does not affect server functionality. It verifies that the mirror disks on each server in the cluster are functioning properly. The hybrid disk is now controlled by EC X and is only accessible from the active server.

---

## 6 Preparing Servers to Execute Scripts

### 6.1 Set PowerShell's Script Execution Policy

1. Launch **PowerShell** on the **Primary Server**.
2. Use **Get-ExecutionPolicy** to check the current script execution policy.
3. Set the execution policy to **RemoteSigned** or **Unrestricted** using **Set-ExecutionPolicy** in order to run EC failover scripts.

```
PS> Set-ExecutionPolicy RemoteSigned
```

4. Repeat this process on each of the **Standby Servers**.

### 6.2 Create Copy of RemoteExchange.ps1 and Modify the Copy

1. Navigate to the Exchange 'Bin' folder (e.g. C:\Program Files\Microsoft\Exchange Server\V14\Bin) on the **Primary Server**.
2. Copy the existing file, RemoteExchange.ps1, to the same folder and rename the copy to **RemoteExchange-ECX.ps1**.
3. Edit RemoteExchange-ECX.ps1 by adding the line **.\ControlMailboxDatabase.ps1** to the section where the functions are called. Comment out **get-banner** and **get-tip** in this section. Also add the error handling code as shown in the example below.

```
## now actually call the functions
```

```
#get-exbanner
```

```
#get-tip
```

```
$ErrorControlMailboxDatabase = 90
```

```
.\ControlMailboxDatabase.ps1
```

```
$bRet = $?
```

```
if ($bRet -eq $False)
```

```
{
```

```
    exit $ErrorControlMailboxDatabase
```

```
}
```

4. Repeat this process on each of the **Standby Servers**.

---

## 7 Microsoft Exchange Server 2010 Cluster Setup

To configure the Microsoft Exchange Server 2010 cluster, move the mailbox database to the data partition and change the path using the **Exchange Management Shell** on the **Primary Server** (Machine 1).

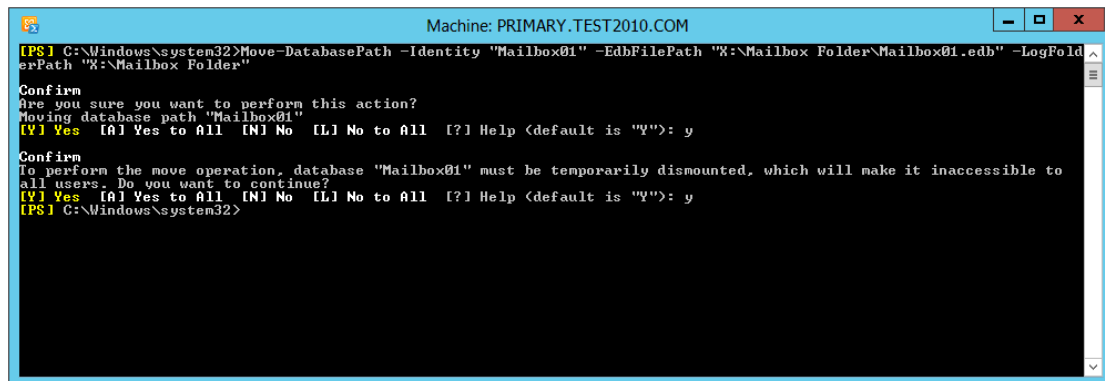
### 7.1 Move the Mailbox Database from Default Location to Data Partition

1. Create a folder (Mailbox Folder) on the Data Partition (example: X:\Mailbox Folder).
2. Before moving the Mailbox Database and LogFolderPath, make a backup copy of all files.
3. Once the backup is made, launch **Exchange Management Shell**.
4. Run the following command at the prompt:

```
Move-DatabasePath -Identity <Mailbox database name> -EdbFilePath <new path to .edb file> -LogFolderPath <new path to folder>
```

Example: Move-DatabasePath -Identity "Mailbox01" -EdbFilePath "X:\Mailbox Folder\Mailbox01.edb" -LogFolderPath "X:\Mailbox Folder"

Refer to the figure below.



```
Machine: PRIMARY.TEST2010.COM
[PS] C:\Windows\system32>Move-DatabasePath -Identity "Mailbox01" -EdbFilePath "%:\Mailbox Folder\Mailbox01.edb" -LogFolderPath "%:\Mailbox Folder"
Confirm
Are you sure you want to perform this action?
Moving database path "Mailbox01"
[Y] Yes [A] Yes to All [N] No [L] No to All [?] Help (default is "Y"): y
Confirm
To perform the move operation, database "Mailbox01" must be temporarily dismounted, which will make it inaccessible to all users. Do you want to continue?
[Y] Yes [A] Yes to All [N] No [L] No to All [?] Help (default is "Y"): y
[PS] C:\Windows\system32>
```

Note: This is a good opportunity to rename the mailbox database from the default name if not done previously.

5. Run the following command at the prompt:  

```
Set-MailboxDatabase -Identity <Mailbox database name> -MountAtStartup $False
```
6. To verify the change, run the command (using mailbox name in example above):  

```
Get-MailboxDatabase <Mailbox database name> | FL Name,*Path*,MountAtStartup
```
7. Run the command below if the mailbox database needs to be mounted:  

```
Mount-Database -Identity <Mailbox database name>
```

---

## 7.2 Copy and configure failover scripts

1. Download the script files from NEC web site;  
<http://www.nec.com/en/global/prod/expresscluster/en/support/Setup.html>.
2. Copy all script files to the EXPRESSCLUSTER bin folder (example. C:\Program Files\EXPRESSCLUSTER\bin) on the **Primary Server**.
3. Open **SetEnvironment.bat** with a text editor and change the parameters to match your environment.
4. Repeat the previous two steps on each of the **Standby Servers**.

## 7.3 Adding Application Resources to Control a Mailbox Database

1. Start the EC X **Cluster Manager**.
2. In the **Cluster Manager** window, change to **Config Mode**.
3. Right-click on the **%failover group%**, and then click **Add Resource** to add the first application resource.
4. From the drop down list, select **application resource** for **Type**, and give a name to the resource (example: appli-check-service). Click **Next**.
5. Uncheck **Follow the default dependency** and click **Next**.
6. Click **Next** if the default values are acceptable. Make changes to **Retry Count** or **Failover Threshold** first if necessary.
7. Select **Non-Resident** and set the following parameter for **Start Path**.  
Start Path : CheckExchangeServices01.bat  
Stop Path : (NULL)
8. Click **Tuning** and set **0** for **Normal Return Value** and set a **Timeout** value of at least **3600** for **Start** on the **Parameter** tab (see Note below). Click **OK** and then click **Finish**.

### Note

The 1<sup>st</sup> application resource (example. appli-check-service) uses the following parameters in **SetEnvironment.bat** to wait for all Exchange services to be running.

RetryCount : 30

RetryInterval : 60

By default, the application resource waits 1800 (= RetryCount x RetryInterval) seconds for all Exchange services to be running. If any services are not running, the application resource starts them and waits 1800 seconds for them to be running. Services can take up to 3600 seconds to start. **It is recommended to set the Timeout value to 3600 or longer** (= RetryCount x RetryInterval + some buffer).

- 
9. Right-click on the **%failover group%**, and then click **Add Resource** to add the second application resource.
  10. From the drop down list, select **application resource** for **Type**, and give a name to the resource (example: appli-control-AD). Click **Next**.
  11. Uncheck **Follow the default dependency**. Click the first application resource (example: appli-check-service) and click **Add**. Click **Next**.
  12. Click **Next** if the default values are acceptable. Make changes to **Retry Count** or **Failover Threshold** first if necessary.
  13. Select **Non-Resident** and set the following parameter for **Start Path**.  
Start Path : ControlActiveDirectory01.bat <Mailbox database name>  
Stop Path : (NULL)
  14. Click **Tuning** and set **0** for **Normal Return Value** of **Start** on the **Parameter** tab.
  15. Click the **Start** tab and set the following parameters.  
Domain : your domain name (may need to be parent domain name)  
Account : a user belonging to the **Schema Admins** group  
Password : password for the above user
  16. Click **OK** and then click **Finish**.
  17. Right-click the hybrid disk resource (hd) and click **Properties**.
  18. Select the **Dependency** tab and uncheck **Follow the default dependency**. Click the second application resource just created (example: appli-control-AD) and click **Add**. Click **OK**.
  19. Right-click on the **%failover group%**, and then click **Add Resource** to add the third application resource.
  20. From the drop down list, select **application resource** for **Type**, and give a name to the resource (example: appli-control-DB). Click **Next**.
  21. Uncheck **Follow the default dependency**. Click the hybrid disk resource and click **Add**. Click **Next**.
  22. Click **Next** if the default values are acceptable. Make changes to **Retry Count** or **Failover Threshold** first if necessary.
  23. Select **Non-Resident** and set the following parameters for **Start Path** and **Stop Path**.  
Start Path : ControlMailboxDatabase01.bat <Mailbox database name> Mount  
Stop Path : ControlMailboxDatabase01.bat <Mailbox database name> Dismount
  24. Click **Tuning** and set **0** for **Normal Return Value** of both **Start** and **Stop** on the **Parameter** tab.
  25. Click the **Start** tab and set the following parameters.  
Domain : your domain name (may need to be parent domain name)

- 
- Account : a user belonging to the **Organization Management**<sup>1</sup> group
- Password : password of the above user
26. Click the **Stop** tab and set the following parameters.
- Domain : your domain name (may need to be parent domain name)
- Account : a user belonging to the **Organization Management** group
- Password : password of the above user
27. Click **OK** and then click **Finish**.
28. Click the **Entire Dependency** tab in the right pane and check the dependencies.  
See example below.

Depth	Resource	Name
0	1 <sup>st</sup> application resource	appli-check-service
1	2 <sup>nd</sup> application resource	appli-control-AD
2	Hybrid disk resource	hd
3	3 <sup>rd</sup> application resource	appli-control-DB

#### 7.4 Upload the cluster configuration and start the cluster

1. First dismount the mailbox database using **Exchange Management Console** or the following command in **Exchange Management Shell** before starting the cluster.

Dismount-Database -Identity <Mailbox database name>

2. Then in the **Cluster Manager** window, click the **File** menu, and then **Apply the Configuration File**. Click **OK**. Click **OK**.
3. After the upload is complete, change from **Config Mode** to **Operation Mode**.
4. Right-click on the **%failover\_group%** and select **Start**. Select the **Primary Server** to start the group on and click **OK**. The mailbox database will mount on this server. If the cluster is not running, click the **Service** menu, and then click **Start Cluster**. Click **OK**.

#### Note

There is no need to make changes to Microsoft Outlook or OWA.

---

<sup>1</sup> The Organization Management group belongs to **Microsoft Exchange Security Group**.

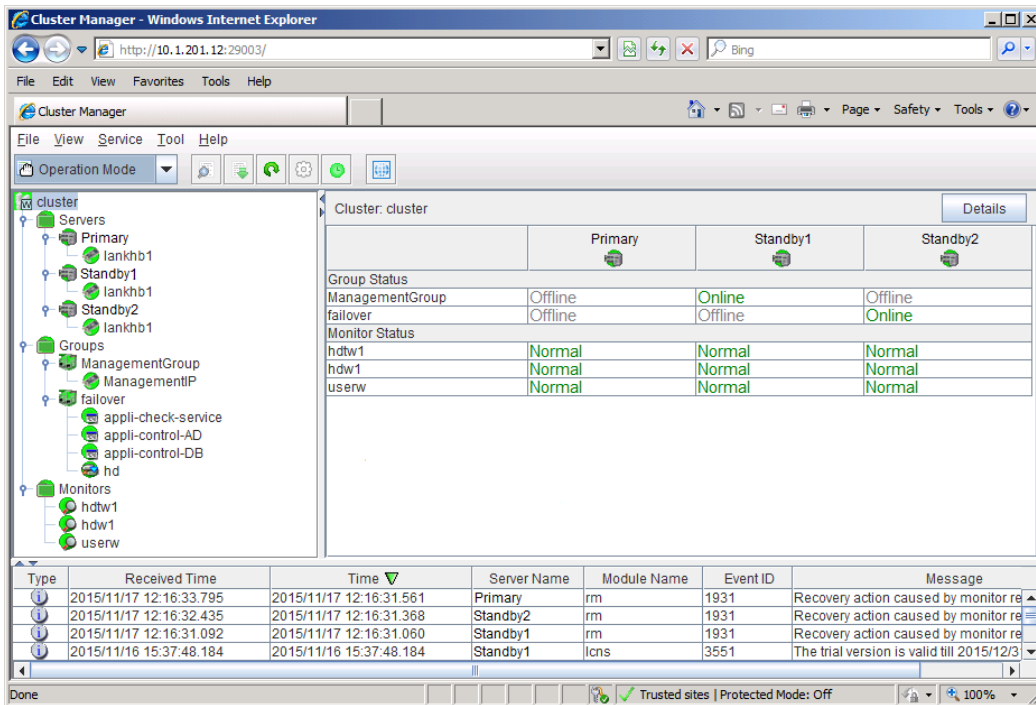


Figure of fully configured cluster

---

## 8 Test Cluster and Verify Functionality

1. Verify the **Primary Server** is running with the mailbox database mounted. Each of the **Standby Servers** should also be running, but with no mailbox database mounted. The status can be checked by using **Exchange Management Console** or the following command in **Exchange Management Shell**.

```
Get-MailboxDatabase -Status -Identity <Mailbox database name> | FL -Property  
Name,Mounted,MountedOnServer
```

2. With the cluster started on the **Primary Server**, try accessing the mailbox database from an email client such as Microsoft Outlook or OWA.

### Test 1: Move Failover Group to **Standby Server**

1. Move the failover group to **Standby Server 1** (refer to [9.3](#)). Monitor the failover process in the **Cluster Manager** window. Verify that email clients are still able to connect to the mailbox database.
2. Move the failover group to **Standby Server 2** (refer to [9.3](#)). Monitor the failover process in the **Cluster Manager** window. Verify that email clients are still able to connect to the mailbox database.
3. Move the failover group back to the **Primary Server** (refer to [9.3](#)). Verify that email clients are still able to connect to the mailbox database.

### Test 2 (Optional): Force Failover to a **Standby Server**

1. Shutdown the **Primary Server** (refer to [9.2](#)). This will initiate a failover to a **Standby Server**. Email clients should still be able to connect to the mailbox database. The default setting for server recover is to automatically rejoin the cluster. If manual recovery is preferred, refer to [9.4](#) to change this setting. Return the **Primary Server** to the cluster by turning on the power (refer to [9.5](#)).  
Move **%failover\_group%** back to the **Primary Server**.



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## 9 Common Maintenance Tasks

### 9.1 Start Cluster Manager

There are two methods to start/access **Cluster Manager** through a supported Java enabled Web browser.

Start **Internet Explorer** or any other supported Java enabled Web browser.

**Method 1:** Type the URL with the IP address of an active EC X clustered server; a colon (:); and then the cluster server port number.

Example: http://10.1.1.1:29003/

Use *during* or *after* the initial setup.

**Method 2:** Type the URL with the Management IP which was set up during EC X installation; a colon (:); and then the cluster server port number.

Example: http://10.1.1.3:29003/

Use *after* the initial setup and *while* the cluster is running.

### 9.2 Shutdown/Reboot one or all cluster servers

Start **Cluster Manager** (refer to [9.1](#)) and perform the following action.

- Shutdown one server.  
Right-click the **%machinename%**, and then click **Shutdown**.
- Shutdown all servers  
Right-click the **%cluster name%**, and then click **Shutdown**.
- Reboot one server  
Right-click the **%machinename%**, and then click **Reboot**.
- Reboot all servers  
Right-click the **%cluster name%**, and then click **Reboot**.

### 9.3 Startup/stop/move failover groups

1. Start **Cluster Manager** (refer to [9.1](#)).
2. Under **Groups**, right-click **%failover group%** and then click **Start/Stop/Move**.
3. In the **Confirmation** window, click **OK**.

---

## 9.4 Isolate a server for maintenance

1. Start **Cluster Manager** (refer to [9.1](#)).
2. In the **Cluster Manager** window, change to **Config Mode**.
3. Right-click the **%cluster name%**, and then select **Properties**.
4. Click the **Auto Recovery** tab. To manually return the server to the cluster, select **Off** for the **Auto Return** option. Otherwise, leave it set to **On** for automatic recovery when the server is turned back on. Click **OK**.
5. If a change was made, upload the configuration file.
6. Shut down the server to isolate for maintenance (refer to [9.2](#)). The server is now isolated and ready for maintenance tasks.

## 9.5 Return an isolated server to the cluster

Refer to [9.4](#) for setting recovery options.

### 9.5.1 Automatic Recovery

1. Turn the machine back on.
2. Recovery starts automatically to return the server to the cluster.

### 9.5.2 Manual Recovery

1. Turn the machine back on and wait until the boot process is complete.
2. Start **Cluster Manager**.
3. In the **Cluster Manager** window, right-click the name of the isolated server, and then select **Recover**. The isolated server returns to the cluster.

## 9.6 Rebuild a mirror disk

1. Start **Cluster Manager** (refer to [9.1](#)).
2. In the **Cluster Manager** window, in the left pane, right-click **Servers** and then click **Mirror Disks**.
3. In the **Mirror Disks** window, click the **Details** button.
4. In the next window, click the button below the **%machine name%** of the machine to copy files from [Primary Server (Machine 1)] and then click the button below the **%machine name%** of the destination server to copy files to [Standby Server 2 (Machine 3)].
5. Click the **Execute** button. In the **Confirmation** window, click **OK**.

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## Appendix A: EC X Server Uninstallation

1. In the EC X **Cluster Manager** window of the web browser click the **Service** menu, and then click **Stop Cluster**.
2. Close the web browser running **Cluster Manager**.
3. Stop all EC X services on the server where the uninstall process will be run. To stop all services, follow the steps below:
  - a. On the **Start** menu, point to **Administrative Tools**, and then click **Services**.
  - b. In the right pane, scroll down and double-click the entry for **EXPRESSCLUSTER**. Click the **Stop** button.
  - c. In the **Stop Other Services** window, click **Yes**. Click **OK**.
  - d. Repeat step 3.b. above for the entry for **EXPRESSCLUSTER EVENT**, and then click **OK**.
4. On the **Start** menu, click **Control Panel**. Click **Uninstall a program**.
5. In the **Uninstall or change a program** window, under the list of **Currently installed programs**, click **NEC EXPRESSCLUSTER Server**. Click **Uninstall**.
6. To start the uninstall process, in the **Confirmation** window, click **Yes**.
7. In the next window, click **Yes** to reset the registry settings to disable the media sense functions of TCP/IP disconnect detection.
8. In the first **Install Wizard Complete** window, click **Finish**.
9. On the next **Install Wizard Complete** window, select the **Yes, I want to restart my computer now** option button. Click **Finish**. This completes the uninstall process for an individual server system.

### Note

To uninstall an EC X Server, you must be logged on as an administrator or have an account with administrator privileges.

After the installation is complete, if any shared disks are in use, unplug all disk cables connected to the servers.

## Appendix B: Example System Planning Worksheet

Machine 1 Primary Server (with Mailbox Role of Exchange Server 2010)

Machine 2 Standby Server 1 (with Mailbox Role of Exchange Server 2010)

Machine 3 Standby Server 2 (with Mailbox Role of Exchange Server 2010)

**Table 1: System Network Interfaces**

Machine	Host name	Network Connection	IP Address	Subnet Mask	Default Gateway	Preferred DNS Server
1	Primary	Public Interconnect	10.1.1.1 192.168.1.1	255.255.255.0 255.255.255.0	10.1.1.5 -----	10.1.1.5 -----
2	Standby1	Public Interconnect	10.1.1.2 192.168.1.2	255.255.255.0 255.255.255.0	10.1.1.5 -----	10.1.1.5 -----
3	Standby 2	Public Interconnect	10.1.2.1 192.168.1.3	255.255.255.0	10.1.2.5	10.121.5

**Table 2: System OS and Disks**

Machine	OS	Disk 0 (OS Disk)	Disk 1 (Data Disk)
1	Win Server 2008 R2 Std. Ed. or later	<b>Boot Partition:</b> Drive Letter: C Size: 75GB	* <b>Cluster Partition:</b> Drive Letter: W Size: 24MB  <b>Data Partition:</b> Drive Letter: X Size: 50GB
2	Win Server 2008 R2 Std. Ed. or later	<b>Boot Partition:</b> Drive Letter: C Size: 75GB	
3	Win Server 2008 R2 Std. Ed. or later	<b>Boot Partition:</b> Drive Letter: C Size: 75GB	

\* Must be a raw partition and larger than 17MB.

**Mailbox Database Name:**     Mailbox01

**Client Access Server 1 Name or CAS Array Name (site1):**     CAS1

**Client Access Server 2 Name or CAS Array Name (site2):**     CAS2

**Floating IP (FIP) address:**

Web Management Console FIP:     10.1.1.3

**Table 3: System Logins and Passwords**

Computer/Account	Login	Password
<b>Machine 1 Administrator</b>	Administrator	admin1234
<b>Machine 2 Administrator</b>	Administrator	admin1234
<b>Machine 3 Administrator</b>	Administrator	admin1234