



EXPRESSCLUSTER X for Windows

Quick Start Guide for Windows Server Backup

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April 8, 2020

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1 About This Guide

1.1 Purpose

This guide provides a more cost-effective simple clustering solution for companies who do not have the need to backup vast amounts of data. It utilizes Microsoft's Windows Server Backup technology in conjunction with NEC's EXPRESSCLUSTER X clustering software.

1.2 Using This Guide

This guide provides a hands-on "Quick Start" set of instructions to create your data cluster with Windows Server Backup and EXPRESSCLUSTER X for Windows. 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 Windows Server components.

1.3 Revision History

Version	Date	Description
1	April 8, 2020	Initial Version

1.4 Evaluation Environment

This clustering method has been evaluated with the following OS and software:

- Windows Server 2019
- Windows Server Backup
- EXPRESSCLUSTER X 4.1 for Windows

1.5 For More Information

We have the following guides for instant support.

- **Getting Started Guide** – This guide is intended for all users. The guide covers topics such as product overview, system requirements, and known problems.

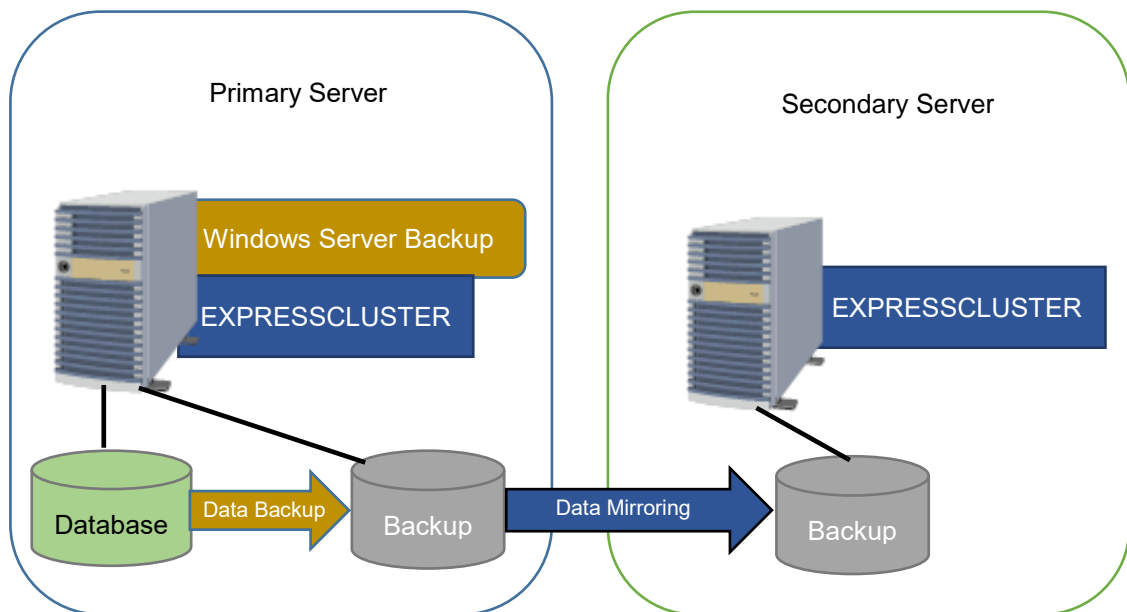
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- **Installation and Configuration Guide** – Instructions for designing, installing, and configuring a cluster system with EXPRESSCLUSTER are covered in this guide.
 - **Reference Guide** – The guide covers topics such as how to operate EXPRESSCLUSTER, function of each module, and troubleshooting.
 - **Maintenance Guide** – This guide is intended for administrators and system administrators who want to build, operate, and maintain. The guide describes maintenance-related information for EXPRESSCLUSTER.
 - **Hardware Feature Guide** – The guide describes features to work with specific hardware, serving as a supplement to the Installation and Configuration Guide.

The above stated guides can also be found at

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

2 Overview

- EXPRESSCLUSTER is installed on both servers.
- Windows Server Backup is only installed on the Primary server.
- Data on the Primary server, represented by the Database image, is backed up to the Backup drive on the same server using Windows Server Backup.
- The Backup drive on the Primary server is mirrored to the Secondary server using EXPRESSCLUSTER, adding redundancy to the data.



3 System Requirements and Planning

3.1 System Requirements

Two servers with Microsoft Windows 2019 Standard or Datacenter editions.

Two NICs per server, one for the cluster heartbeat and one for data mirroring.

Set up a Data Partition and Cluster Partition on the disk dedicated to data mirroring on both servers according to instructions in the EXPRESSCLUSTER X [For More Information](#).

3.2 System Planning

Fill out the tables of the worksheet below to use for reference in the configuration sections of this guide. See also [Appendix B: Example System Planning Worksheet](#) for an example worksheet.

Machine #1: Primary Server (with Windows Server Backup and EXPRESSCLUSTER X)

Machine #2: Secondary Server (with EXPRESSCLUSTER X)

Table 1: System Network Configuration

Machine	Hostname	Network	IP Address	Gateway	DNS
#1		NIC #1			
		NIC #2			
#2		NIC #1			
		NIC #2			

Table 2: System OS and Disk Configuration

Machine	OS	Disk 0 (OS)	Disk 1 (Data)
#1		Boot Partition: Drive Letter: Size:	Cluster Partition: Drive Letter: Size (>= 1024 MB):
#2		Boot Partition:	Data Partition:

		Drive Letter: Size:	Drive Letter: Size:
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Table 3: System Logins and Passwords

Machine	Login	Password
#1		
#2		

4 EXPRESSCLUSTER X Installation

4.1 Install EXPRESSCLUSTER X on Primary Server

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 4.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, click **Next**.
9. Click **Yes** in the **Confirmation** window to skip shared disk filtering.
10. In the **License Manager** window, click **Register**.
Note that license registration details can be found in the [For More Information](#).
11. In the **License Registration** window, click **Register with License Information**.
12. In the **Product Selection** window, select the **OS** and **Product/Trial** types. For **Product Name**, click **EXPRESSCLUSTER X 4.x for Windows**. Click **Next**.
13. In the **License Unit Selection** window, depending on the type of license, enter the number of **CPU** or **Node Units**. Click **Next**.
14. In the **License Key Entry** window, enter the **Serial No.** and **License Key**. Click **Next**.
15. In the **License Registration Confirmation** window, confirm the information entered is correct. Click **Next**.
16. Click **OK**. If the license registration fails, start again from step 10.
17. Repeat steps 10 – 16 again for the **EXPRESSCLUSTER X Replicator 4.x for Windows** product license. Select **EXPRESSCLUSTER X Replicator 4.x for Windows** as the **Product Name** in step 12.
18. When the licenses have been successfully registered, click **Finish**.
19. On the **InstallShield Wizard Complete** window, click the **No, I will restart my computer later** option button, and then click **Finish**.
20. In the next window, click **Exit**. Click **Exit**. (Two times total).

4.2 Install EXPRESSCLUSTER X on Secondary Server

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

4.3 Restart the Primary and Secondary Servers

First restart the **Primary Server**, and then restart the **Secondary Server**.

4.4 Confirm connectivity between servers in the cluster

Ping the servers in the cluster to verify that there are no issues in connectivity. Also be sure that the ports used by EXPRESSCLUSTER are able to communicate through the Windows Firewall.

5 Base Cluster Setup

5.1 Start Cluster Manager

See the installation requirements section of the EXPRESSCLUSTER X **For More Information** for a compatible web browser if not using a popular version. For this guide, use the **Primary Server** for cluster management. If a **Cluster Manager** icon is on the desktop, double click it to launch the **Cluster WebUI** dashboard. It can also be launched by accessing port 29003 (default port number) of the **Primary Server** from the web browser of the cluster management machine, using the **Primary Server's** IP address. Example: `http://10.0.0.3:29003`.

5.2 Create a Cluster

For all of the steps in the cluster creation project, refer to **Table 1** for the IP addresses and server names.

1. After the **Cluster WebUI** window opens, select **Config mode** from the dropdown menu of the tool bar. Click **Cluster generation wizard** to start the wizard.
2. In the new window, type a **Cluster Name** (Example: `wsb_cluster`), select the default **Language**, and click **Next**.
3. In the next window, to add another server to the cluster, click **Add**.
4. Type the **Server Name** or the **IP Address** of **Secondary Server**, and then click **OK**.
5. Both servers are now on the list. If the **Primary Server** is not in the top (Master Server) position, then move it up. Click **Next**.

5.3 Set up the network configuration

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

5.4 Create a Failover Group

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: **wsb_failover**), click **Next**, and then click **Next**. (Two times total).
3. Change the **Failover Attribute** from **Automatic failover** to **Manual failover** in the **Group Attributes** window. Click **Next**.

Note: the failover group will now only run on the **Primary** server.

5.5 Create mirror disk resource

1. In the **Group Resource** section of the **Cluster Generation Wizard**, to add a resource, click **Add**.
2. Click **Get License Info** to retrieve the active license for replication. (Note that there is no visible indication that it was successful).
3. To add a mirror disk resource, from the **Type** drop down menu, select **Mirror disk resource**, change **Name** to **wsb_md**, and then click **Next**.
4. Verify the **Follow the default dependency** box is selected, and then click **Next**.
5. Verify the default **Recovery Operation** options are correct, and then click **Next**.
6. Select the **Primary Server** name in the right pane and click **Add**.
7. Click **Connect** to populate the server partitions.
8. Select the drive letter of the data partition for mirroring (Example: **X**) in the **Data Partition** box, and the drive letter of the cluster partition (Example: **W**) in the **Cluster Partition** box. Click **OK**.

Note

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

9. Repeat steps 6 – 8 for the **Secondary Server**.
10. Click **Finish**.

5.6 Add Script Resource

1. Download the **Windows Server Backup** script files for mounting and dismounting a volume from this [link](#). Unzip the files into a local folder. Edit the file **Start.bat** and change the variable **dataPartitionLetter** to the same drive letter just set up for data mirroring (Example: **dataPartitionLetter=X**).
2. Click **Add** to add a script resource.
3. From the **Type** drop down menu, select **Script resource**, change **Name** to **wsb_script**, and click **Next**.
4. Verify the **Follow the default dependency** box is selected, and then click **Next**.
5. Verify the default **Recovery Operation** options are correct, and then click **Next**.
6. Select **start.bat** in the **Details** window and click **Replace**.
7. Browse to the files just downloaded, select **start.bat**, and click **Open**. Click **Yes** to replace the existing file.
8. Click **Add** to add the second script file.
9. Click **Browse**, change the file type from ***.bat** to **All File (*.*)**, select **start.ps1**, and click **Open**. Click **Save**. The new file should be in the list.
10. Click **Finish**.
11. Click **Finish**, and then click **Next**.
12. Click **Finish**.
13. Click **Yes** to enable recovery action when an error occurs in a monitor resource.

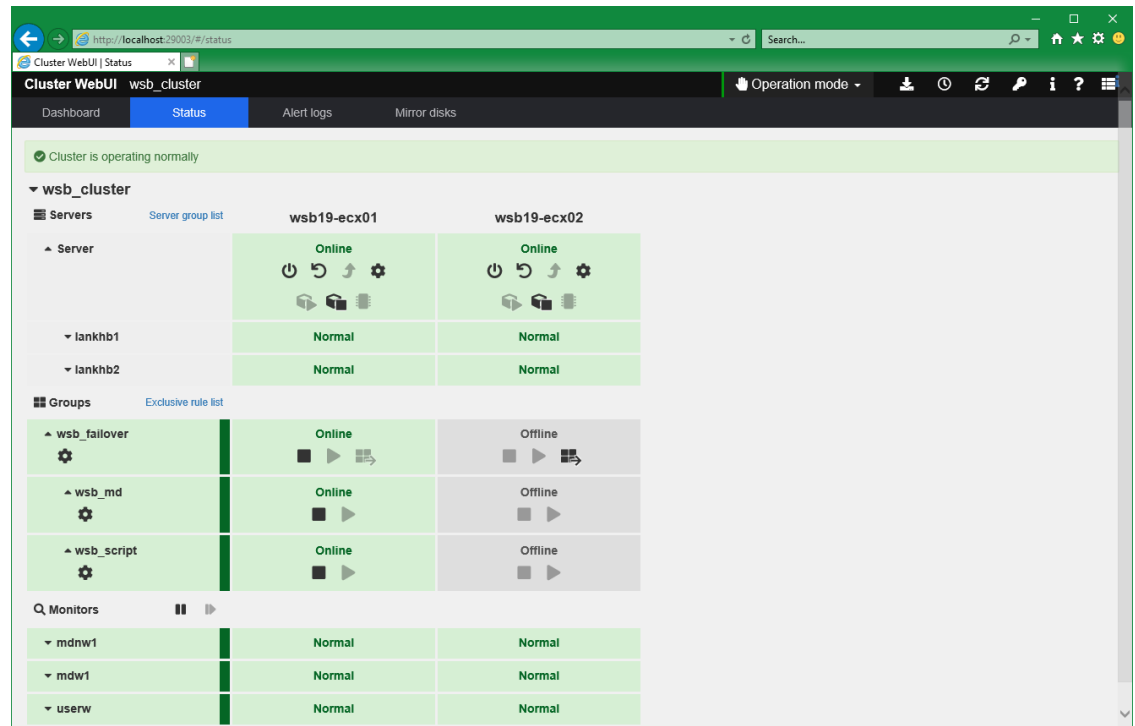
5.7 Upload the Cluster Configuration and Start Cluster

1. In the **Cluster WebUI** window, click **Apply the Configuration File**. Click **OK**. Click **OK**. (Two times total).
2. After the upload is complete, change from **Config mode** to **Operation mode** and click on the **Status** tab.
3. Select **Start cluster** and click **Start**. Cluster information will display in a few seconds.
4. Click on the **Mirror disks** tab to monitor the disk synchronization progress. Mirror disk copy starts automatically, replicating data from the **Primary Server** to the **Secondary Server**.

Note

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

- 5 After the copy completes, click on the **Status** tab.
- 6 In the cluster **Status** window, all icons in the tree view should now be green. Refer to the figure below:



If the mirror disk resource or script resource under the primary server did not start (still gray), start the resource by clicking on the triangle button.

- 7 Confirm that the cluster is functioning
 - 7.1 Move the **%failover group%** to the **Secondary Server**.
 - 7.2 Move the **%failover group%** back to the **Primary Server**.

Note

These tests do not affect server functionality. They verify that the mirror disks on each server in the cluster are functioning properly. The mirror disk is now controlled by EXPRESSCLUSTER X and is only accessible from the active server.

6 Windows Server Backup

6.1 Install on the Primary Server

1. Login to the **Primary** Server with an Administrator account.
2. Verify that the failover group is running on the **Primary** Server.
3. Windows Server Backup can be installed from **PowerShell** or Windows **Server Manager**.

PowerShell Installation (Option 1)

1. Launch **Windows PowerShell** as **Administrator**.
2. Enter the command **Install-WindowsFeature Windows-Server-Backup** and press Enter.

Server Manager Installation (Option 2)

1. From Windows **Server Manager** click **Add roles and features**.
2. Click **Next** on the **Before You Begin** page (if this page is not skipped by default).
3. Choose **Role-based or feature-based installation** for the **Installation Type**. Click **Next**.
4. Select the current server for the destination server. Click **Next**.
5. Select **Features** in the left pane and check **Windows Server Backup**. Click **Next**.
6. Click **Install** in the Confirmation window.

6.2 Configure Backup Schedule

1. Click the **Tools** menu in **Server Manager** on the **Primary** server and select **Windows Server Backup**.
2. When the wbadm console appears, click on **Local Backup** in the left pane. The right pane should display some actions to perform.
3. Click **Backup Schedule** to launch the **Backup Schedule Wizard**.
4. On the **Getting Started** page click **Next**.
5. For the **Backup Configuration** choose Custom and click **Next**.
6. Click **Add Items** to select files and folders to back up.
7. Navigate through the folders and check all files and folders to back up. Click **OK** when done.
8. Click **Advanced Settings** and add any files to exclude from backup if

necessary.

9. Click on the **VSS Settings** tab. Confirm that **VSS copy Backup** is selected and click **OK**. Click **Next**.
10. On the **Specify Backup Time** page set up a backup schedule. Click **Next**.
11. Select Backup to a volume on the Specify Destination Type page. Click Next.
Note: The option **Backup to a hard disk that is dedicated for backups** is not supported by EXPRESSCLUSTER.
12. Click **Add** on the **Select Destination Volume** page to list available volumes.
13. Select the mirror disk volume which is managed by EXPRESSCLUSTER. Click **OK** and then **Next**.
Example: Local disk (X:)
14. On the **Confirmation** page, verify that the backup items and the backup destination are correct. Click **Finish**.
15. The **Summary** page shows whether the backup schedule has been successfully configured or not. If successful, the time and date of the next backup will be shown. Click **Close** to exit the wizard.

7 Test backup and recovery

7.1 Quick backup

1. Launch the **Windows Server Backup** console.
2. Click on **Local Backup** in the left pane and then **Backup Once** in the right pane.
3. Select **Scheduled backup options** for **Backup Options**. Click **Next**.
4. If everything looks good, click **Backup**. The backup process can be monitored in the progress window. Backup time will vary depending on how much data is copied. EXPRESSCLUSTER will create a copy on the remote server in real time. Click **Close** when done.
5. The activity window of Windows Server Backup will show the status of the backup job.

Command line: **wbadmin start backup**

Enter 'Y' to use the scheduled backup configuration and return.

7.2 Recovery

1. Launch the **Windows Server Backup** console.
2. Click on **Local Backup** in the left pane and then **Recover** in the right pane to launch the recovery wizard.
3. Choose **This server** for the backup location and click **Next**.
4. In the **Select Backup Date** window select a backup date from the calendar and then a time. Available dates will be shown in bold. Click **Next**.
5. When prompted to **Select Recovery Type**, choose **Files and Folders**. Click **Next**.
6. Drill down through the folders under **Available items** and select the files or folders to recover in the **Select Items to Recover** window. Click **Next**.
7. In the **Specify Recovery Options** window, choose the **Recovery destination** and select other recovery options. Click **Next**.
8. Check the **Confirmation** window to verify that the items to recover are correct and then click **Recover**.
9. The **Recovery Progress** can be monitored in the next window. Click **Close** when done.

8 Appendix A: Useful Commands and Cmdlets

Included here are a few commands that are useful in testing to see the status of backups.

- Commands using [wbadmin utility](#)
 - **wbadmin get status** - Shows the status of the currently running backup or recovery operation. Returns error message if nothing is running.
- Commands using [PowerShell](#)
 - **Get-WBSummary** - Gets the history of backup operations on the computer.
 - **Get-WBJob** - Gets the current backup operation.

Although both PowerShell commands provide several data fields in their output, some of the more important ones and their values when a backup job, recovery job, or no job is running, are included in the table below.

Command	Output Field Name	Backup Job Running Output	Recovery Job Running Output	No Job Running Output
Get-WBSummary	<i>CurrentOperationStatus</i>	BackupInProgress	RecoveryInProgress	NoOperationInProgress
Get-WBJob	<i>JobType</i>	Backup	FileRecovery	None
	<i>JobState</i>	Running	Running	Unknown

Both commands output a numerical value for the result of the last backup (*LastBackupResultHR* and *HResult*). A 0-value indicates success.

The **Get-WBJob** command can also list the output from previous jobs. Syntax is: **Get-WBJob -Previous <number of jobs to retrieve>**

9 Appendix B: Example System Planning Worksheet

Machine #1: Primary Server (with Windows Server Backup and EXPRESSCLUSTER X)

Machine #2: Secondary Server (with EXPRESSCLUSTER X)

Table 1: System Network Configuration

Machine	Hostname	Network	IP Address	Gateway	DNS
#1	Primary	NIC #1			
		NIC #2			
#2	Secondary	NIC #1			
		NIC #2			

Table 2: System OS and Disk Configuration

Machine	OS	Disk 0 (OS)	Disk 1 (Data)
#1	Win Server 2019	Boot Partition: Drive Letter: C Size: 250 GB	Cluster Partition: Drive Letter: W Size (>= 1024 MB): 1 GB
#2	Win Server 2019	Boot Partition: Drive Letter: C Size: 250 GB	Data Partition: Drive Letter: X Size: 500 GB

Table 3: System Logins and Passwords

Machine	Login	Password
#1	Administrator	Admin1234
#2	Administrator	Admin1234