NEC

EXPRESSCLUSTER X for Windows
Quick Start Guide for Microsoft SQL Server 2014

Version 1

EXPRESSCLUSTER X

NEC EXPRESSCLUSTER X 3.x for Windows
SQL Server 2014 Quick Start Guide

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About this Guide

Using this guide
This guide provides a hands-on "Quick Start" set of instructions for the EXPRESSCLUSTER X (ECX) for Windows. The guide assumes its readers to have Windows system administration knowledge and skills with experience in installation and configuration of Microsoft Windows operating systems, networks, and SQL Server 2014. The guide includes step-by-step instructions to install and configure EXPRESSCLUSTER X with SQL Server 2014.

This guide covers the following topics:

Chapter 1:   Overview **–** describes the general steps of setup procedure.

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:   Base System Setup – describes the configurations required for each system before installing target application.

Chapter 4:   Microsoft SQL Server 2014 Installation – describes the installation procedure for SQL SERVER 2014 on the Primary and Standby Servers.

Chapter 5:   EXPRESSCLUSTER X Server Installation – describes EXPRESSCLUSTER installation procedure on the Primary and Standby Servers.

Chapter 6:   Base Cluster Setup – describes required configuration to enable full cluster functionality.

Chapter 7:   Microsoft SQL Server 2014 Cluster Setup – describes the configuration steps to include Microsoft SQL Server 2014 in the EXPRESSCLUSTER cluster.

Chapter 8:   Final Deployment in a LAN Environment – describes steps to verify the cluster and complete the deployment on a Primary and a Standby server

Chapter 9:   Common Maintenance Tasks – describes how to perform common maintenance tasks using the EXPRESSCLUSTER Manager.

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

1 Overview

The general procedure of Microsoft SQL Server 2014 with NEC EXPRESSCLUSTER X on two server machines (Primary and Standby) for high availability of Microsoft SQL Server 2014 consists of the following major steps:

1. Perform system planning to determine requirements and specify configuration settings prior to start of actual system installation and configuration.
2. Prepare the Primary and Standby Servers including OS installation and configuration if necessary.
3. Install, configure, and verify Microsoft SQL Server 2014 on the Primary and Standby Servers respectively. If an existing production Microsoft SQL Server 2014 system exists already then it could be used as the Primary Server without reinstallation of SQL Server 2014.
4. Install and configure NEC EXPRESSCLUSTER Server on the Primary and Standby Servers.
5. Create and configure NEC EXPRESSCLUSTER failover group to enable continuous protection and automatic recovery for Microsoft SQL Server 2014.
6. Upload the configuration file on the server and start the cluster to complete the deployment.

2   System Requirements and Planning

1.1   SQL Server 2014 requirements

- SQL Server 2014
- .Net Framework 3.5
- .Net Framework 4.0

System Requirements
  Machine 1: Primary Server
  Machine 2: Standby Server
  Machine 3: Test Client Machine

	Machine 1 Primary Server	Machine 2 Standby Server	Machine 3 Test Machine
CPU	Pentium 4 – 3.0 GHz or better		Pentium 4 - 3.0 GHz or better
Memory	4GB or more		512 MB or more
Disk	1 physical disk OS partition: 20 GB or more space available(to include the installation of SQL SERVER 2014) Cluster partition: Partition of 17MB or more, available for EXPRESSCLUSTER X management The same size for each server system Data partition: enough partition space to store SQL Server 2014		1 physical disk with 1 GB or more space available
OS	Windows Server 2012 R2 (Standard or Enterprise) with latest update		Windows 7 or later
Software	Java 1.5 (or later) enabled web browser		Java 1.5 (or later) enabled web browser
Network	2 - 100Mbit or faster Ethernet network interface cards		1 - 100Mbit or faster Ethernet network interface card

1.2 System Planning

Review the requirements from the last section and then fill out the tables of the worksheet below. Use for reference in the following sections of this guide. See Appendix B: Example System Planning Worksheet.

Machine 1 Primary Server
Machine 2 Standby Server
Machine 3 Test Client Machine

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						

Floating IP (FIP) addresses:
Web Management Console FIP: (1) _____

Table 2: System OS and Disk Configuration

Machine	OS	Disk 0 (OS Disk)	Disk 1 (Data Disk)
1		**Boot Partition:** Drive Letter: Size:	**Cluster Partition:** Drive Letter: Size (>17MB) :
2		**Boot Partition:** Drive Letter: Size:	***Data Partition:** Drive Letter: Size:
3			

* The size must be large enough to store all data files for SQL Server 2014 to meet current and expected future needs.

Table 3: System Logins and Passwords

	Login	Password
Machine 1 Administrator		
Machine 2 Administrator		
Machine 3 Administrator		

2   Base System Setup

2.1   Setup the Primary Server (Machine 1)

1. If necessary, install required hardware components and a supported OS including any required service pack as specified in System Requirements and Planning.
2. Verify basic system boot and administrator login functionality and availability of required hardware components as specified in System Requirements and Planning.
3. Configure network interface names
   a. Rename the network interface to be used for network communication with client systems to **Public**.
   b. Rename the network interface to be used for internal EXPRESSCLUSTER management and data mirroring network communication between servers to **Interconnect**.
4. Configure network interface TCP/IP Settings:
   a. In the **Network Connections** window, right-click **Public** and then click on **Properties**.
   b. In the **Properties** dialog box, double-click **Internet Protocol Version 4 (TCP/IPv4)**.
   c. Click the **Use the following IP address:** option button.
   d. Type the **IP address**, **Subnet mask**, and Default **gateway** values (Refer to System Requirements and Planning).
   e. Click the **Use the following DNS server addresses:** option button and enter the **Preferred DNS server address** (Refer to System Requirements and Planning). Click **OK**. Click **OK**.
   f. Return to the **Network Connections** window. Right-click **Interconnect** and then click **Properties**.
   g. In the **Properties** dialog box, double-click **Internet Protocol Version 4 (TCP/IPv4)**.
   h. Click the **Use the following IP address:** option button.
   i. Type the **IP address** and **Subnet mask** values (Refer to System Requirements and Planning).
      Click **OK**. Click **OK**.
5. Configure network interface binding order:
   a. In the **Network Connections** window, click on the **Advanced** menu tab, and click **Advanced Settings** (press the **ALT** key if the menu is not visible).
   b. On the **Adapters and Bindings** tab, under **Connections:** use the up and down arrow buttons to move **Public** to the first (top) position. Click **OK**.
   c. Close the **Network Connections** window.
6. Connect the network interfaces:
   a. Connect the network interface **Interconnect** to the **Cluster Interconnect Network** and verify a healthy physical link status.

b. Connect the network interface **Public** to the **Public Network** and verify a healthy physical link status and connectivity to the Management Console/Test Client (Machine 3).

7. Configure the Data Disk:
   a. Make sure the disk device or LUN is initialized as a Windows Basic disk device
   b. Create a mirrored disk cluster partition on the disk with specified size in Table 2 and make sure it is 17MB or greater. Assign drive letter specified in Table 2 to the partition but do NOT format it.
   c. Create a mirrored disk data partition on the disk with specified size in Table 2. Assign the drive letter specified in Table 2 to the partition and format it as NTFS file system.
   d. Verify the mirrored disk cluster and data partitions are visible in **Windows Explorer** under their respective assigned drive letters.

2.2 Setup the Standby Server (Machine 2)

Perform steps 1-7 in Setup the Primary Server (Machine 1) on the Standby Server

3   Microsoft SQL Server 2014 Installation

**If Microsoft SQL Server 2014 is preinstalled, skip section 4 and follow the guide from
EXPRESSCLUSTER X Server Installation.

3.1   Installing SQL Server 2014 on Primary Server

1. Insert the SQL Server 2014 disc into a disc drive.
2. Run **Setup.exe**.
3. Click on **System Configuration Checker**. Click on **OK** after reviewing the report.
4. Click on **Installation** in the left pane after all Global Rules have passed.
5. Click on **New SQL Server stand-alone installation or add features to an existing installation**.
6. Select the SQL Server 2014 edition to install. Click **Next.**
7. Click on **I accept the license terms**. Click **Next.**
8. If failures were detected in Global Rules report, correct them before continuing.
9. Check **Use Microsoft Update to check for updates**. Click on **Next.**
10. Select the **Setup Role** you wish to install and click **Next**.
11. Select the features you wish to install and click **Next**.
12. If **.Net Framework 3.5** is not installed, install it, and re-run the check**.**
13. Click **Default instance**. Click **Next.**
14. In Disk Usage Summary, Click **Next.**
15. Choose the **Account Name** for each SQL Server service and click **Next**.
16. Select the **Mixed mode** radio button.
17. In the password field enter a password for the SQL Server system administrator (sa) account.
18. Click **Add Current User**. Then click on the **Data Directories** tab.
19. Change the **Data root directory** to the drive of the mirrored data partition.
20. Click **Next**.
21. There may be additional setup screens depending on what installation selections were made. Continue to the **Ready to Install** screen.
22. Click **Install**.
23. Click **Close.**
24. Close the **SQL Server Installation Center**.
25. Once the installation is complete click on **Start > Programs > Microsoft SQL Server 2014 > Configuration Tools > SQL Server 2014 Configuration Manager**. Expand **SQL Server Network Configuration**. Click **Protocols for MSSQLSERVER**.
26. Enable the **Named pipes** and **TCP/IP** protocols. Stop and restart the newly enabled services.

3.2   Installing SQL Server 2014 on Standby Server

Perform steps 1-29 in Installing SQL Server 2014 on Primary Server on the Standby Server

4   EXPRESSCLUSTER X Server Installation

4.1   Install EXPRESSCLUSTER 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 select **NEC EXPRESSCLUSTER for Windows**.
3. Click on **NEC EXPRESSCLUSTER X 3.1 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. In the **Confirmation** window, click **Yes**.
10. In the **License Manager** window, click **Register**.
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 3.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 3.x for Windows** product license. Select **EXPRESSCLUSTER X Replicator 3.x for Windows** as the **Product Name** in step 12.
18. In the next window, 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 the Standby Server (Machine 2)

Perform the steps 1-20 in <u>Install EXPRESSCLUSTER X on the Primary Server (Machine 1)</u> on the Standby Server (Machine 2).

4.3   Restart the Primary and Standby Servers (Machines 1 & 2)

First restart the Primary Server and then restart the Standby Server.

5   Base Cluster Setup

This section describes the steps to create a cluster using EXPRESSCLUSTER Manager running on the Management Console/Test Client (Machine 3).

5.1   Install Java Runtime Environment (JRE)

Verify JRE v.1.5.0.6 or newer is installed on the Management Console/Test Client (Machine 3). If necessary, install JRE by performing the following steps:

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

5.2   Start the cluster manager

The **Cluster Manager** is started by accessing port 29003 from the web browser of any of the nodes (Machine1 or Machine 2). Example: http://localhost:29003.

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 with three options. Click "**Start cluster generation wizard**".
2. In the new window, type a **Cluster Name**. (Example: cluster).
3. Type the **Management IP Address**, and click **Next**.
4. In the next window, the server on which the cluster creation has started is already added. Click **Add** to add another server to this cluster.
5. Type the hostname or the IP address of the second server and click **OK**.
6. 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**.
7. EXPRESSCLUSTER X automatically detects the IP addresses of the servers. Select the network to use the Heartbeat path as **Kernel Mode**. Set the network for Mirroring by selecting **Mirror Communication** for the type and **MDC** as **mdc1**. Click **Next**.
8. For this guide, the **NP Resolution** resources are not configured. Click **Next**.

5.4   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: SQL_Failover). Click **Next**, and then click **Next**.
3. Select the default options for the Group Attribute Settings, and then click **Next**

5.5 Create floating IP and mirror disk resources

1. In the **Group Resource** section of the Cluster Generation Wizard, to add a resource, click **Add**.
2. In the next window, to add a Floating IP Resource (FIP), select **floating ip resource** from the drop down list. Click **Next**.
3. By default, the FIP resource is not dependent on any other resources. Follow the default dependency and click **Next**.
4. Use the default options and click **Next**.
5. Type a floating IP address that is not used by any other network element. Click **Finish**.
6. Click **Add** to add a mirror disk resource.
7. Click **Get License Info** to retrieve the active license for replication.
8. To add a Mirror Disk Resource (MD), select **mirror disk resource** from the drop down list. Click **Next**.
9. Verify the **Follow the default dependency** box is selected and click **Next**.
10. Use the default options and click **Next**.
11. Add both of the servers one by one. Click **Add** to add the first server. In the **Selection of partition** window, click on the **Connect** button to refresh the partition information. Select the Data and the Cluster partitions and click **OK**.
12. Repeat step 11 for the second server.
13. Click **Finish**.
14. Click **Add** to add a Virtual Computer Name.
15. Select **virtual computer name resource** from the drop down list. Click **Next**.
16. Click **Next** to Follow the default dependency.
17. Click **Next**.
18. Enter a **Virtual Computer Name** (Example: vsql) and select the **%fip resource%** that was created previously. Click **Finish**. Click **Finish**. (Two times total).
19. Click **Next**.
20. All the monitor resources are added automatically. Click **Finish** to add the monitors.

5.6 Upload the cluster configuration and initialize the cluster

1. In the Cluster Manager window, to apply the configuration, click the **File** menu and then click on **Apply the Configuration File**. Click **OK**. Click **OK**. (Two times total).
2. After the upload is complete, change to **Operation Mode**.
3. Restart **Cluster Manager**. Click the **Service** menu, and then click **Restart Manager**. Click **OK**.
4. Click the **Service** menu and click on **Start Cluster**. Click **OK**.

5. In the **Cluster Manager** window, in the left pane, expand the **%failover group%** section, right click **%mirror disk%**, and click **Details**. Mirror disk copy starts automatically, replicating data from the Primary to the Standby server. The copy screen would be similar to the following snapshot.
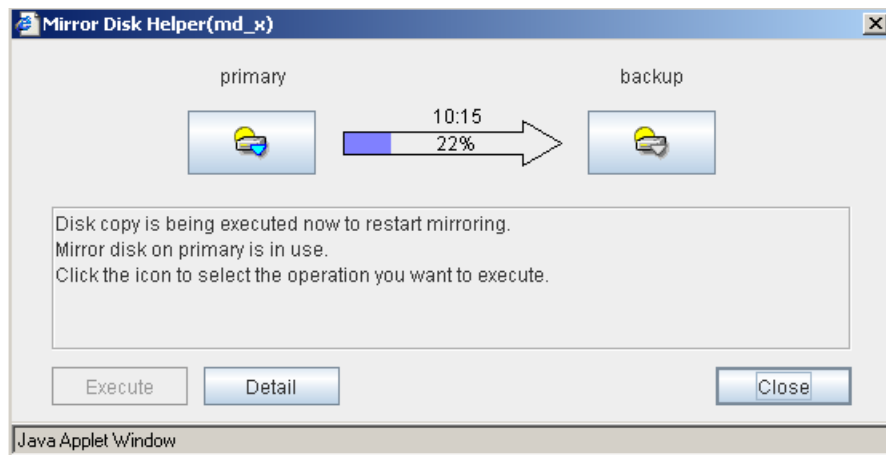
Note
This step may take a while depending on the size of the data in the mirrored disk data partition.

6. After the copy is completed, the following screen is displayed:
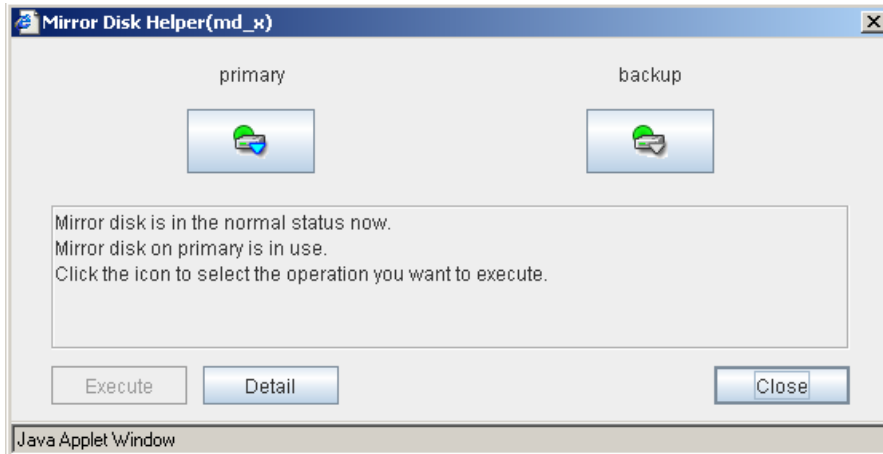
7. Click the **Close** button on the **Mirror Disk Helper** window.
8. In the **Cluster Manager** window, all icons in the tree view are now green. Refer to the figure below.

6   Microsoft SQL Server 2014 Cluster Setup

6.1   Moving the Master and Resource Database to Mirror Disk on Primary Server

**The following steps are only necessary if SQL Server is pre-installed on one of your systems. Otherwise the location of the data was already configured during SQL Server installation in [Installing SQL Server 2014 on Primary Server](#).

1.   Create a new directory on the mirror disk**: [your drive letter:]\MSSQL.**
2.   Inside MSSQL create another new directory: **[your drive letter:]\MSSQL\DATA.**
3.   Click on **Start > Programs > Microsoft SQL Server 2014 > Configuration Tools > SQL Server 2014 Configuration Manager.**
4.   Select **SQL Server Services** in the left panel, right-click on **SQL SERVER (MSSQLSERVER)**, and click on **Properties**.
5.   In the **SQL Server (MSSQLSERVER) Properties** dialog box, select the **Startup Parameters** tab**.**
6.   Edit the **Startup Parameters** values to point to the planned location for the master database data and log files, and click **OK** when done. (Moving the error log file is optional.)

   The parameter value for the data file must follow the –d parameter and the value for the log file must follow the –l parameter. The following example shows the parameter values for the default location of the master data and log files.

   -dC:\Program Files\Microsoft SQL
   Server\MSSQL12.MSSQLSERVER\MSSQL\DATA\master.mdf;
   -eC:\Program Files\Microsoft SQL
   Server\MSSQL12.MSSQLSERVER\MSSQL\LOG\ERRORLOG;
   -lC:\Program Files\Microsoft SQL
   Server\MSSQL12.MSSQLSERVER\MSSQL\DATA\mastlog.ldf

   If the planned relocation for the master data and log files is on the mirror disk: [your drive letter:]\MSSQL\DATA, the parameter values would be changed as follows:
   -d[your drive letter:]\MSSQL\DATA\master.mdf; -eC:\Program Files\Microsoft SQL Server\MSSQL12.MSSQLSERVER\MSSQL\LOG\ERRORLOG; -l: [your drive letter:]\MSSQL\DATA\mastlog.ldf

7.   Move the **master.mdf** and **mastlog.ldf** files to the mirror disk by using cut and paste. Any other databases must be detached, moved to the mirror disk with the accompanying log file, and attached.
8.   Set all Microsoft SQL services to Manual and make sure that they are stopped.

6.2 Configure SQL Server 2014 on the Standby Server

1. Move the cluster to the STANDBY server.
2. Perform all of the steps in [Moving the Master and Resource Database to Mirror Disk on Primary Server](#) on the Standby Server (Machine 2) except Step 7.
3. Move the cluster back to the PRIMARY server.

6.3 Create a SQL Server 2014 database on the Primary Server

1. Click on **Start > Programs > Microsoft SQL Server 2014 > SQL Server 2014 Management Studio**. This launches the SQL Server Management Studio.
2. Connect to the server.
3. In the **Object Explorer** pane, expand the **Databases** folder. Right click   on the **Databases** folder and select **New Database**.
4. The **New Database** window is displayed. On the **General** page: In the **Database name** field, enter a name (this is the new database name and is case-insensitive)
5. Deselect the **Use full-text indexing** check box.
6. Set the **Initial Size (MB)** of the Database file to 50.
7. Set the **Initial Size (MB)** of the Log file to 10.
8. Click **OK**.

6.4 (Optional) Run Query Analyzer to test your database on the Primary Server

6.5 (Optional) Run Query Analyzer to test your database on the Standby Server

In order to run this utility, the failover group has to be moved to the Standby Server.

6.6 Set the SQL Server Services

After the SQL Server setup has completed on both servers, set all of the SQL Server Services to manual on the Primary and Standby servers, and make sure that they are stopped.

6.7 Cluster Services Setup

1. In the **Cluster Manager** window change the View from **Operation Mode** to **Config Mode**.
2. Right click on **%failover group%** and click **Add Resource**.
3. Choose **service resource** for the **Type**.
4. Enter a service name for the resource (Ex: **MSSQLSERVER**) and add optional comments if required. Click **Next**.

5. Choose to **Follow the default dependency**. Click **Next**. (To learn more about parameters please refer to the **ExpressCluster X 3.x Reference Guide**).

6. Click **Next** to accept the default values for **Recovery Operation at Activity Failure Detection**. (To learn more about parameters please refer to the **ExpressCluster X 3.x Reference Guide**).

7. Click on **Connect** and select the service **SQL Server MSSQLSERVER** from the drop down list.

8. Click **Tuning**. Set the **START** and **STOP** timeout values according to your requirements. The default value is 1800s. (To learn more please refer to the **ExpressCluster X 3.x Reference Guide**). Click **OK**.

9. Click **Finish**. Click **OK** on the warning dialog box.

10. Click the **File** menu and then click on **Apply the Configuration File**.

11. Click **OK** on all prompts to suspend and resume the cluster.

12. Change the view from **Config Mode** back to **Operation Mode**.

6.8 (Optional) Set up SQL Server monitor resource

Register ExpressCluster X Database Agent 3.x for Windows on Primary server.

1. Launch the License Manager within ExpressCluster (Start->Programs->NEC ExpressCluster Server->License Manager).

2. Click **Register** in the **License Manager** window to add the license.

3. On the **License Registration** window, select **Register with License Information** if entering the license key manually or select **Register with License File** if registering the license key via a file.

4. If registering with license file, copy the license file to a specific folder on the server.

5. On the **License File Specification** window, locate and select the license key file and click **Open**.

6. Click **OK** on the **License Registration** window.

7. Click **Finish** in the **License Manager** window.

8. Repeat steps 1 – 7 on the Standby server.

Add SQL Server monitor resource

1. In the **Cluster Manager** window change the View from **Operation Mode** to **Config Mode**.

2. Right-click on the **Monitors** folder and select **Add Monitor Resource**.

3. In the **Monitor Resource Definition** window, lick the **Get License Info** button to retrieve the SQL Server database monitor resource license.

4. In the **Monitor Resource Definition** window, for Type, select **SQL server monitor**. Click **Next**. *Note that if **SQL server monitor** option is not available, repeat step 3 above.

5. By the **Target Resource** field, click the **Browse** button. Select the SQL server service resource (Example: MSSQLSERVER), and click **OK**. Click **Next**.

6. Set the **Monitor Level** as desired. Default is **Level 2 (monitoring by update/select)**.

7. Enter the SQL **Database Name** to be monitored.
8. Set the **User Name** with an account with SQL Server administrative rights.
9. Click the Change button and enter the user **Password** and **Confirmation Password** in the dialog box.
10. The **Monitor Table Name** can be left as SQLWATCH or changed. *Note that this name should NOT be the same name as an existing table in your database as it is edited and may be deleted by ExpressCluster X during monitoring operations.
11. Select **SQL Server Native Client 11.0** from the dropdown list for the **ODBC Driver Name**. This is the driver used in SQL Server 2012 and SQL Server 2014. *Note that if an older version of ExpressCluster X does not have the version 11.0 option, the field is editable and can be changed.
12. Click **Next**.
13. Click the **Browse** button to set the **Recovery Target**. Select the SQL Server service resource under the **%failover group%** (Example: MSSQLSERVER). Click **OK**.
14. Click **Finish**.
15. Click the **File** menu and then click on **Apply the Configuration File**.
16. Click **OK** to confirm the operations to be performed.
17. Click **OK** to resume the cluster.
18. In the **Cluster Manager** window change the View from **Config Mode** back to **Operation Mode**.

To verify that your SQL Server database is being monitored, open the database to see if a new table exists with the name designated above.

7 Final Deployment in a LAN Environment

This chapter describes the steps to verify a LAN infrastructure and to deploy the cluster configuration on the Primary and the Standby server.

1. Configure and verify the connection between the primary and standby servers to meet the following requirements:
   - Two logically separate IP protocol networks: one for the Public Network and one for the Cluster Interconnect.
   - The Public Network must be a single IP subnet that spans the Primary and Standby servers to enable transparent redirection of the client connection to a single floating server IP address.
   - The Cluster Interconnect should be a single IP subnet that spans the Primary and Standby servers to simplify system setup.
   - A proper IP network between client and server machines on the Public Network on both the Primary and Standby servers.

2. Make sure that the Primary server is in active mode with a fully functional target application and the Standby Server is running in passive mode.

3. Ping both Primary and Standby servers from the test system and make sure that the Standby server has all the target services in manual and stopped mode.

4. Start the cluster and try accessing the application from the Primary Server. Then move the cluster to the Standby server. Check the availability and functionality of the application on the Standby Server after failover.

5. Deployment is complete.

8   Common Maintenance Tasks

This section describes how to perform common EXPRESSCLUSTER maintenance tasks using the EXPRESSCLUSTER X WebManager.

8.1   Start Cluster Manager

There are two methods to start/access Cluster Manager through a supported Java enabled web browser. The first method is through the IP address of the physical server running the cluster management server application and the second method is through the floating IP address of the cluster management server within a cluster.

The first method is typically used during initial cluster setup before the cluster management server floating IP address becomes effective:

1. Start **Internet Explorer** or another supported Java enabled Web browser.
   Type the URL with the IP address of the active physical server followed by a colon and the cluster management server port number.

   Example:
   Assuming that the cluster management server is running on the active physical server (10.1.1.1) on port number 29003, http://10.1.1.1:29003/

2. The second method is more convenient and is typically used after initial cluster setup:
   Start **Internet Explorer** or another supported Java enabled Web browser.
   Type the URL with the cluster management server floating IP address followed by a colon and the cluster management server port number.

   Example: Assuming that the cluster management server is running with floating IP address (10.1.1.3) on port 29003, http://10.1.1.3:29003/

8.2   Reboot/shutdown one or all servers

8.2.1   Reboot all servers

1. Start **Cluster Manager**. (refer to 8.1)
2. Right-click the **%cluster name%** and click **Reboot**.
3. In the Confirmation window, click **OK**.

8.2.2   Shutdown all servers

1. Same as "Reboot all servers," except in step 2, click **Shutdown**.

8.2.3   Shutdown one server

1. Start **Cluster Manager**. (refer to 8.1)

2. Right-click the **%machine name%** and click **Shutdown**.
3. In the Confirmation window, click **OK**.

8.3   Startup/stop/move failover groups

1. Start **Cluster Manager**. (refer to 8.1)
2. Under **Groups**, right-click **%failover group%** and then click **Start/Stop/Move**.
3. In the Confirmation window, click **OK**.

8.4   Isolate a server for maintenance

1. Start **Cluster Manager**. (refer to 8.1)
2. In the Cluster Manager window, change to **Config Mode**.
3. Click the **%cluster name%** and then right-click **Properties**.
4. Click the **Auto Recovery** tab. If you would like 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 machine that is the server you wish to isolate for maintenance.
7. The server is now isolated and ready for maintenance tasks.

8.5   Return an isolated server to the cluster

Start with the server that was isolated in the steps listed above ("Isolate a server for maintenance").

8.5.1   Automatic Recovery

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

8.5.2   Manual Recovery

1. Turn the machine back on and wait until the boot process has completed.
2. Start **Cluster Manager**. (refer to 8.1)
3. In the **Cluster Manager** window, right click the name of the server which was isolated and select **Recover**. The server which was isolated will return to the cluster.

8.6   Rebuild a mirror disk

1. Start **Cluster Manager**. (refer to 8.1)
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 you want to copy files from [Primary Server (Machine 1)] and then click the button below the **%machine name%** of the machine you want to copy files to [Standby Server (Machine 2)].
5. Click the **Execute** button. In the **Confirmation** window, click **OK**.

Appendix A: EXPRESSCLUSTER X Server Un-installation

Follow the steps below to uninstall EXPRESSCLUSTER X from each of the server systems.

1. On the Management Console/Test Client, in **Cluster Manger**, click the **Service** menu, and the click **Stop Cluster**.
2. Close **Cluster Manger**.
3. On the server system that you are starting the uninstall process for EXPRESSCLUSTER, stop all EXPRESSCLUSTER services. To stop all services, follow the steps below:
   - On the **Start** menu, point to **Programs**, point to **Administrative Tools**, and double-click **Services**.
   - In the right pane, scroll down and double-click the entry for **EXPRESSCLUSTER**. Click the **Stop** button.
   - In the **Stop Other Services** dialog box, click **Yes**. Click **OK**.
   - Repeat steps 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, click **NEC ExpressCluster Server**. Click the **Uninstall**.
6. In the **Question** window, click **Yes** to start the uninstall process.
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
You must be logged on as an administrator or an account with administrator privileges to uninstall Express Cluster Server.

If a shared disk is used, unplug all disk cables connected to the server after un-installation is complete.

Appendix B: Example System Planning Worksheet

Machine 1 Primary Server
Machine 2 Standby Server
Machine 3 Test client Machine

Table 1: System Network Interfaces

Machine	Host name	Network Connection	IP Address	Subnet Mask	Default Gateway	Preferred DNS Server
1	Primary	Public	10.1.1.1	255.255.255.0	10.1.1.3	10.1.1.3
		Interconnect	192.168.1.1	255.255.255.0	----------	-----------
2	Standby	Public	10.1.1.2	255.255.255.0	10.1.1.3	10.1.1.3
		Interconnect	192.168.1.2	255.255.255.0	----------	----------

Table 2: System OS and Disks

Machine	OS	Disk 0 (OS Disk)	Disk 1 (Data Disk)
1	Windows Server 2012 R2 (Standard or Enterprise) with latest update	**Boot Partition:** Drive Letter: C Size: 75GB	*** Cluster Partition:** Drive Letter: W Size: 24MB
2	Windows Server 2012 R2 (Standard or Enterprise) with latest update	**Boot Partition:** Drive Letter: C Size: 75GB	**Data Partition:** Drive Letter: D Size: 50GB
3	Windows 7 or later	C: 20 GB	

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

Floating IP (FIP) addresses:
Web Management Console FIP: (1) <u>10.1.1.4</u>

Table 3: System Logins and Passwords

	Login	Password
Machine Administrator 1	Administrator	admin1234
Machine Administrator 2	Administrator	admin1234