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Exchange 2003 – Implementing a two node Cluster with Windows 2003 Enterprise

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Abstract

In this article I will give you a high level overview about the installation of Exchange 2003 on a Windows 2003 two node Cluster. This article doesn't explain every necessary step for clustering Exchange, but it should give you an overview about the installation process and some basic handling.

Let's begin

What is a cluster – a definition!

A group of computers, called nodes that function as a single computer/system to provide high availability and high fault tolerance for applications or services. Windows 2003 Servers can participate in a cluster configuration through the use of Cluster Services. If one member of the cluster (the node) is unavailable, the other computers carry the load so that applications or services are always (with a small interruption) available.

All nodes of the cluster use a Shared Disk – an external disk or disk subsystem which is accessible for all nodes through SCSI (2 Nodes) or Fibre Channel (more than 2 nodes). All data will be stored on the shared disk or an external disk subsystem (for example Exchange databases).

Every node has a local Exchange 2003 installation with a unique configuration for every cluster node. Each Cluster with Exchange 2003 has at a minimum one Exchange Virtual Server (EVS). An EVS is the logical node that will be used for all cluster operations. An EVS contains an IP address, network name, physical disk and an application.

A cluster can be ...

- ? Active/Active or
- ? Active/Passive

Microsoft recommends only Active/Passive clusters – I will give you the reason later.

The number of cluster nodes supported by Windows 2003 Enterprise and Datacenter is 8 nodes. Windows Server 2003 Standard and Web Edition doesn't support a Cluster.

In an Active/Passive cluster - If one node in the cluster fails, the active cluster failover to another node which becomes Active. This is called **Failover**. If the failed node is back online, a **Failback** can be manually initiated or automatically configured in the Cluster Group properties.

Every cluster node must have two network interfaces. One network interface for the cluster communication called the **private LAN** and one network interface called the **public LAN**. You

can link a cluster with two nodes with a simple cross link cable. If more than two nodes exist in the cluster you have use a dedicated switch / hub.

The private NIC is used for the Heartbeat communication (Cluster communication). A Heartbeat is much like a ping which can be used to test if the other cluster node is still available. If the heartbeat fails, the Failover process occurs.

Clustering changes with Exchange 2003 SP1

In versions before Exchange 2003 SP1, regardless of the number of cluster nodes you could only have one instance of a Public Folder store that is associated with the MAPI folder tree.

In Exchange 2003 SP1, the Exchange development team has added the ability to have multiple MAPI Public Folder databases on a single multi node cluster.

This support was added because the Exchange team has seen that Outlook 2003 cached mode puts a greater load on Public Folders like the Outlook Address Book (the OAB will be loaded offline at the client). With the help of multiple Public Folder stores the load can be spread across these folders. This allows a better client performance.

Why Active/Active cluster is not recommended

Active / Active cluster is not recommended because of Virtual memory (VM) fragmentation—When two instances of the information store is running in one memory space, it might be possible that no sufficient VM exists to bring the resource online during a failover/failback.

For more information see here:

<http://support.microsoft.com/default.aspx?scid=kb;EN-US;816893>

There are three main concepts to reduce virtual memory fragmentation:

- ? Decrease the number of dynamic allocations when the system is started
- ? Increase the size of the virtual address space
- ? Allocate similar size allocations from common regions of memory

Exchange Server 2003 Cluster Requirements

- ? Microsoft Windows 2000 Advanced Server (up to two nodes)
- ? Windows 2000 Datacenter Server (up to four nodes)
- ? Windows 2000 must have SP3 + 329938 hotfix or SP4
- ? Windows Server 2003, Enterprise Edition (up to eight cluster nodes)
- ? Windows Server 2003, Datacenter Edition (up to eight cluster nodes)
- ? Hardware on cluster HCL
- ? Windows 2000 - Check lists for cluster service installation
<http://go.microsoft.com/fwlink/?LinkId=266>
- ? Windows Server 2003 – <http://go.microsoft.com/fwlink/?LinkId=17219>
- ? Microsoft Distributed Transaction Coordinator (MSDTC) installed

Exchange Server 2003 Cluster Setup Changes

- ? Block removal of node if an EVS is running on the cluster
- ? The /disasterrecovery switched is blocked
- ? Prevent Exchange 2003 from being first non-legacy server in a Exchange 5.5 site

- ? By default, POP3 and IMAP4 resource not created (as part of the Trustworthy Computing initiative from Microsoft)
- ? Cluster service account doesn't requires Exchange full admin rights
- ? IPSEC is now supported between front-end servers and back-end clusters

Exchange Server 2003 Cluster Disk Changes

Windows 2003 clusters now support Volume Mount points to overcome the limits of traditional drive letter assignments. This new feature is very useful for four and eight node Exchange clusters because the traditional drive letter assignment in Exchange was very limited in cluster environments when multiple storage groups and stores where used.

Windows 2003 Cluster Setup

I will not explain every step to install a Windows 2003 Cluster. For detailed information click the following [link](#).

I will show you only a few pictures.

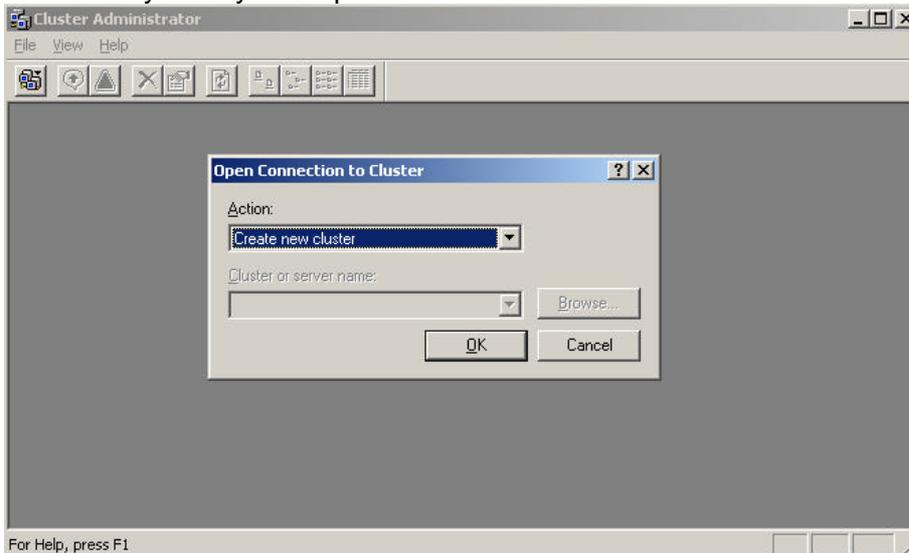


Figure 1: Create a new Cluster

The Windows 2003 Cluster administrator after successful installation.

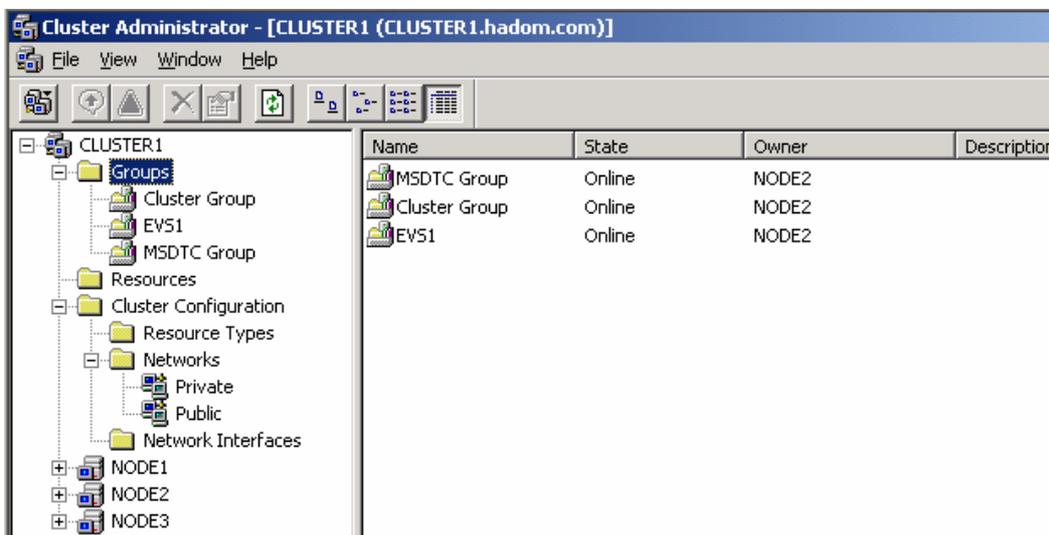


Figure 2: Cluster Administrator

Exchange 2003 Cluster Setup

Before we are going to install Exchange 2003, we must create a MS-DTC (Distribution Transaction Coordinator) resource.

In Windows 2003 Microsoft recommends installing the DTC as a separate Cluster Group containing a Physical Disk, Network Name and IP address resource and then add the MSDTC resource to the cluster group.

For more information how to setup the MS-DTC in a Windows 2003 Cluster, read the following Knowledge Base [article](#).

The second step is to install Exchange 2003 and all required hotfixes on each node. You MUST install Exchange one after each other. After installing Exchange, you can deploy Exchange 2003 SP1 on every cluster node. For more information how to deploy Exchange 2003 SP1 into a cluster environment read the following [article](#).

Once the Exchange 2003 binaries have been installed on the cluster Node we can now create an Exchange Virtual Server.

The Exchange Virtual Server creation process is much the same as for Exchange 2003. First we need to create a cluster group for the Exchange Virtual Server. The group must have at least one physical disk resource, at least one IP address resource, and a network name resource. The network name resource must have a dependency on the IP address resources in the cluster group.

When all resources are online, we must create the System Attendant resource. The System Attendant Resource (SA) creates all the other Exchange 2003 cluster resources automatically. To do this, right click the Exchange 2003 cluster group and choose **New Resource** and then choose the Microsoft Exchange System Attendant. You must name the SA.

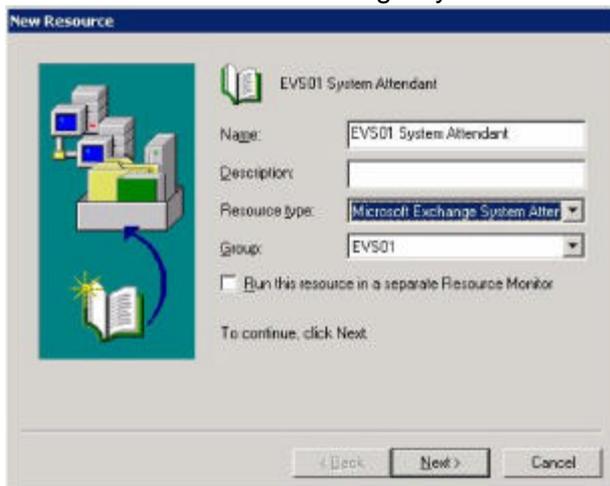


Figure 3: Exchange System Attendant

Add the Nodes that will be possible owners of the System Attendant Resource. A possible owner is a node in the cluster on which the resource can be brought online. These Nodes will also be added as a possible owner of all the other Exchange resources that are automatically created. A Node must be specified as a possible owner of a resource in order for us to failover to that Node.

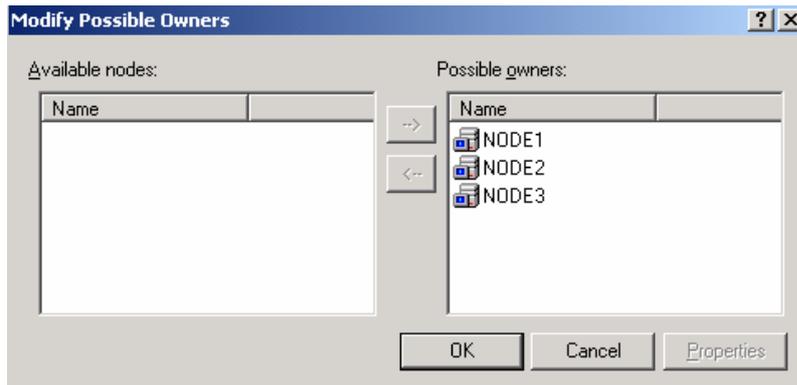


Figure 4: Possible owners of the EVS

You must set the dependencies on the System Attendant Resource. The dependencies are the following:

- ? Network Name resource
- ? All disk resources (that Exchange 2003 should use - this includes Mount Point disks which will contain Exchange 2003 data)

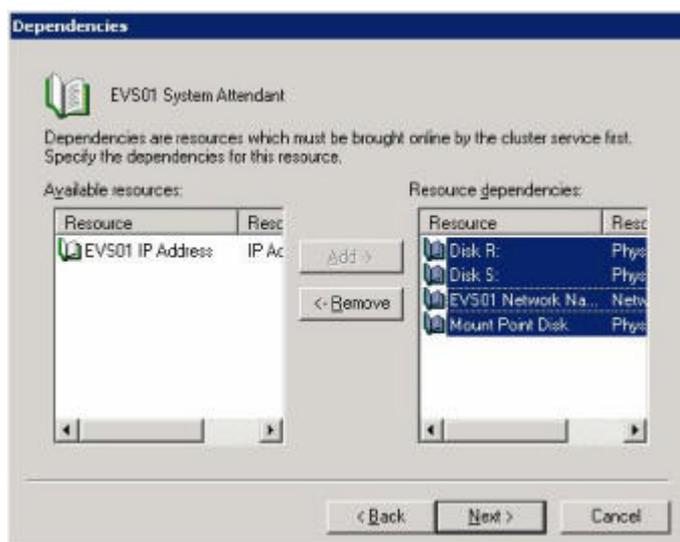


Figure 5: SA – Resource dependencies

Like a normal Exchange installation you must select the administrative group where the Exchange virtual server will be created.

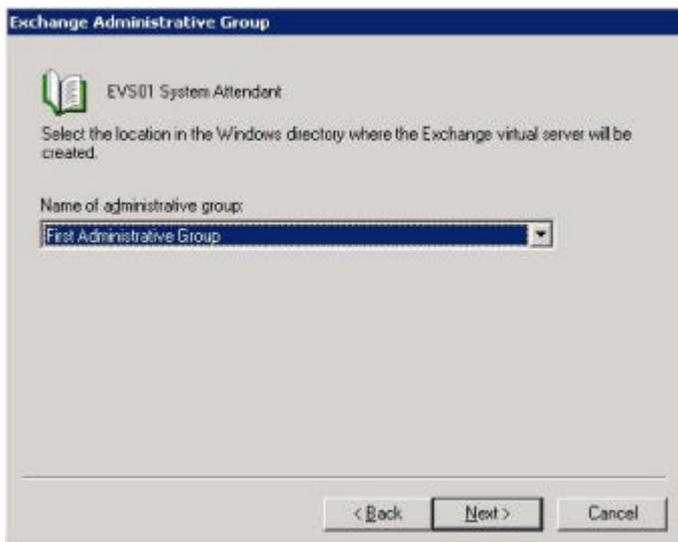


Figure 6: Chose the administrative Group for the EVS

Within the chosen Administrative Group you now have to choose a Routing Group where the Exchange Virtual Server will be located when more than one Routing Group exists at the time of EVS creation. You can change the server location in the Routing Group after installation.

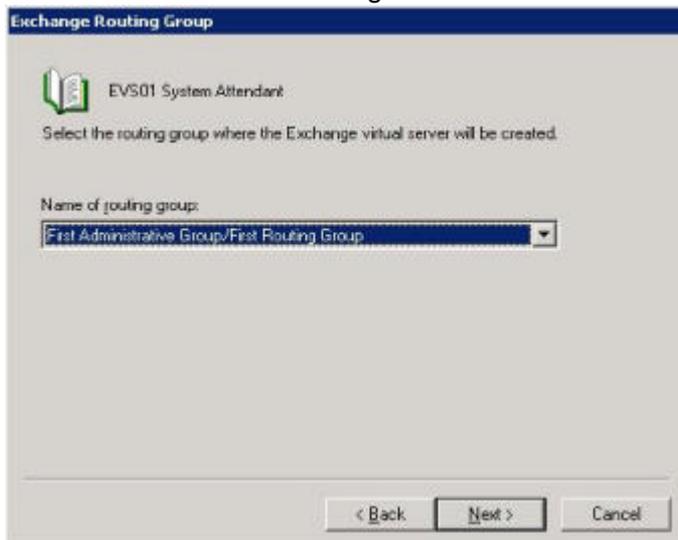


Figure 7: Select the routing group for the EVS

Please read the wizards summary carefully.

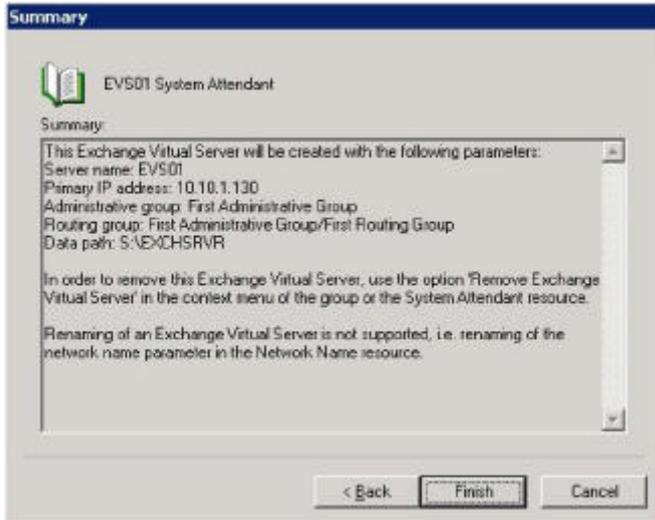


Figure 8: Exchange 2003 Wizard summary

Click Finish to start the creation process. This may take a while because the setup process actually creates all Exchange 20003 cluster resources. When the process is complete you will see the following message:

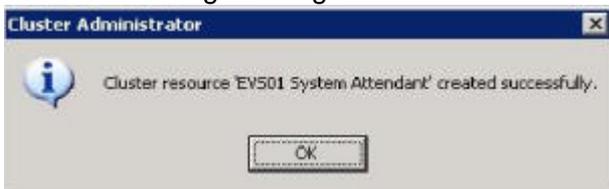


Figure 9: DONE

The following picture shows the Cluster Administrator tool after EVS installation. Note that all Exchange resources are **NOT** online.

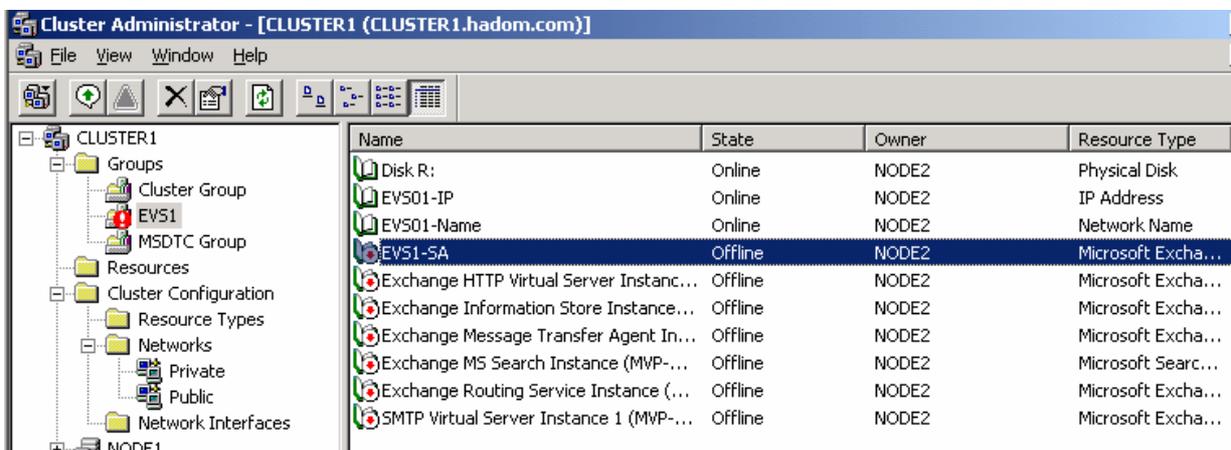


Figure 10: Cluster Administrator after EVS installation

Exchange 2003 no longer creates a POP3 and SMTP cluster resource. This is part of Microsoft's Trustworthy initiative and it is also true for a "normal" Exchange 2003 installation. Next, we have to bring the System Attendant resource online. To do so, right click the EVS System Attendant and click "Bring Online".

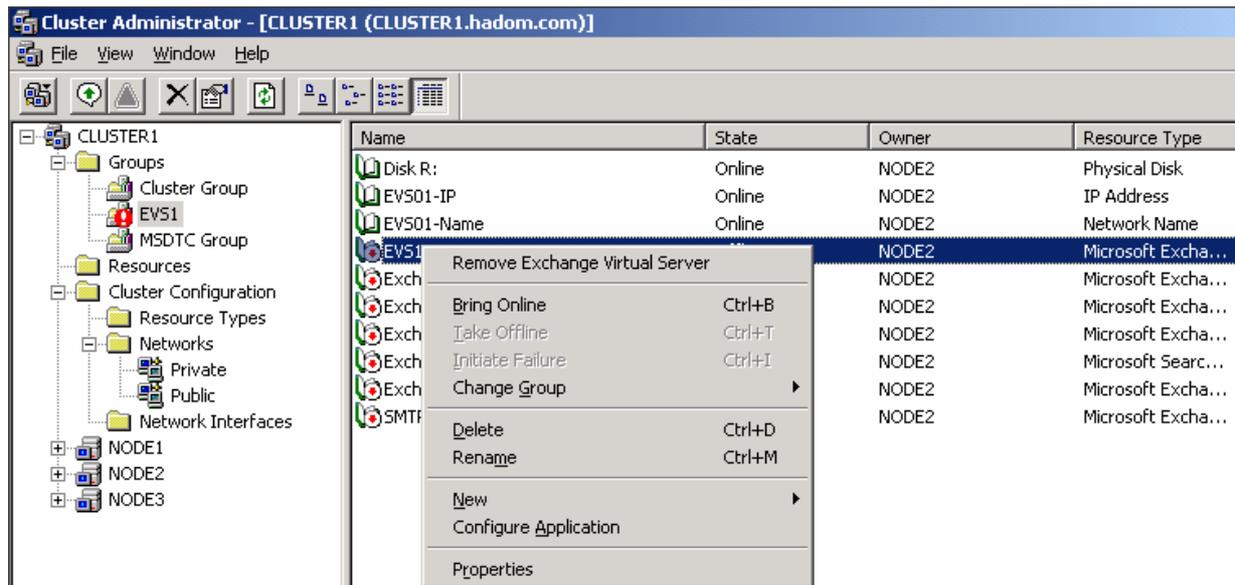


Figure 11: You have to bring the System Attendant Online.

Exchange 2003 Resource dependencies

Microsoft has changed the Exchange 2003 resource dependencies to allow a faster failover/failback.

In Exchange 2000 there are the following dependencies:

- IP Address ↗ Network Name ↗ System Attendant
- Physical Disk ↗ System Attendant
- Routing Engine ↗ System Attendant
- Information Store ↗ System Attendant
- MTA ↗ System Attendant
- MS Search ↗ Information Store
- POP3 ↗ Information Store
- SMTP ↗ Information Store
- IMAP4 ↗ Information Store

Beginning with Exchange 2003 Microsoft has changed the Resource dependencies:

- IP Address ↗ Network Name ↗ System Attendant
- Physical Disk ↗ System Attendant
- Routing Engine ↗ System Attendant
- Information Store ↗ System Attendant
- MTA ↗ System Attendant

MS Search ☞ System Attendant
POP3 ☞ System Attendant
SMTP ☞ System Attendant
IMAP4 ☞ System Attendant

Kerberos support

Beginning with Windows 2000 SP3 Kerberos authentication against clustered virtual servers was added. Before Windows 2000 SP3, all authentications against clustered virtual servers were NTLM or NTLMv2. Before Windows 2000 SP3, a clustered virtual server did not have a corresponding Active Directory computer object.

Exchange 2003 now supports Kerberos authentication. This is done automatically by the setup process for non-clustered servers. In a cluster environment, these properties are set during the creation of the Exchange virtual server (EVS). This means that a computer object exists in Active Directory for each virtual Exchange server.

Conclusion

It is relative easy to deploy a Windows 2003 cluster with Exchange 2003. Microsoft has made many extensions and enhancements in Windows 2003 and Exchange 2003 to ease the Cluster Administrators life.

Don't forget to pay attention for the rest of your cluster environment. A comprehensive Cluster solution should deal with certified hardware (at a minimum have a look in the HCL), cluster aware applications and 24/7 support and defined SLAs (Service Level Agreements). It is important to ensure that the infrastructure also supports High Availability. This means that you should have redundant networking equipments (Routers, Switches), USV support and much more.

Related Links

Cluster Configuration Checklist from IT Showcase for Exchange 2003

<http://www.microsoft.com/downloads/details.aspx?FamilyId=0E9B809D-2A7A-4ADF-9FDE-897210A461DB&displaylang=en>

Windows Server 2003 Clustering Services Technology Center

<http://www.microsoft.com/windowsserver2003/technologies/clustering/default.mspx>

Guide to Creating and Configuring a Server Cluster under Windows Server 2003

<http://www.microsoft.com/technet/prodtechnol/windowsserver2003/technologies/clustering/confcl us.mspx>

Windows Clustering is not supported on front-end servers in Exchange Server 2003

<http://support.microsoft.com/default.aspx?scid=kb;en-us;837852>

High Availability Guide for Exchange 2003

<http://www.microsoft.com/technet/prodtechnol/exchange/2003/library/highavailgde.mspx>

Server Consolidation with Exchange 2003

<http://www.microsoft.com/downloads/details.aspx?FamilyId=BC3A8D76-FC58-4E3C-9152-1CE35E9466EA&displaylang=en>

How to install Exchange Server 2003 Service Pack 1 in a clustered Exchange environment

<http://support.microsoft.com/default.aspx?scid=kb;en-us;867624>

Support WebCast: Clustering Microsoft Exchange Server 2003

<http://support.microsoft.com/default.aspx?scid=kb;en-us;823894>

Considerations when deploying Exchange on an Active/Active cluster

<http://support.microsoft.com/default.aspx?scid=kb;en-us;815180>

<http://support.microsoft.com/default.aspx?scid=kb;en-us;301600>

[How to configure Microsoft Distributed Transaction Coordinator on a Windows Server 2003 cluster](#)

Exchange Server 2003 and Exchange 2000 Server require NetBIOS name resolution for full functionality

<http://support.microsoft.com/default.aspx?scid=kb;en-us;837391>

Security Setting Changes and Updates That Are Introduced in Exchange Server 2003

<http://support.microsoft.com/default.aspx?scid=kb;en-us;824111>

Deploying Exchange 2003 SP1 in a cluster environment

<http://support.microsoft.com/default.aspx?scid=kb;en-us;867624>