Building a Virtual MSCS Server with VMWare ESX 3.5 Server, Microsoft Server Cluster Services (MSCS), SQL Server 2005 Cluster on same physical box With Windows 2008 Server Active Directory Domain Controllers and Group Policy and Lowest User Access Privileges Service Accounts for Audit Compliance

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It should be noted in the beginning that you can cluster across multiple ESX boxes with Fibre Channel shared LUNS. This example uses a local SCSI LUN made into a VMware VMFS shared filesystem on the same ESX server. You have to have a domain controller (virtual machine is ok). Note: This process does not work with Windows Server 2008 because it no longer supports clustering with parallel SCSI adapters. Support for virtual serial SCSI adapters is not included in VI 3.5. To create a cluster with shared disk in Windows Server 2008 on ESX, you should investigate using an ISCSI solution with software initiators running in each virtual machine. Please see "Caveats, Restrictions, and Recommendations" in the very first link above for MSCS.

Shared Storage Summary

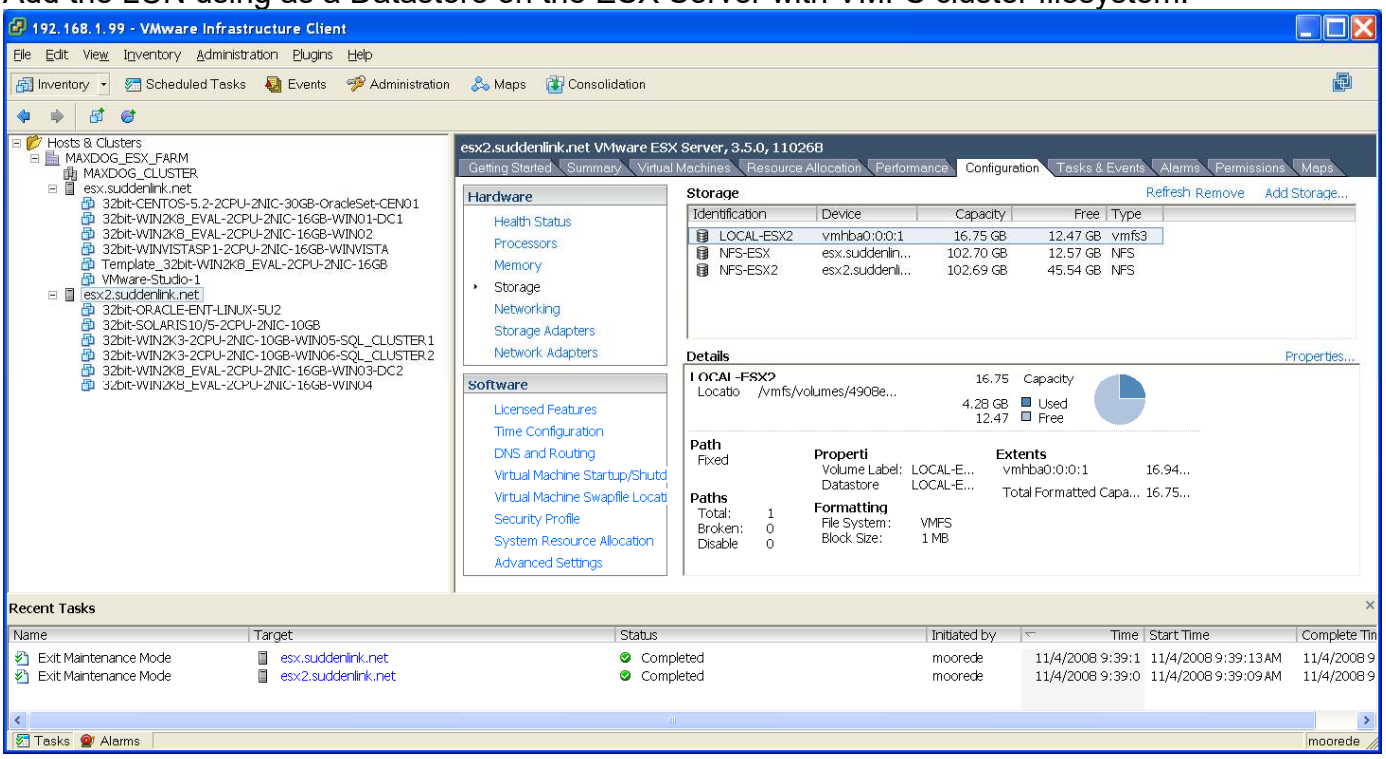
	Cluster in a Box	Cluster Across Boxes	Standby Host Clustering
Virtual disks	Yes	No	No
Pass-through RDM (physical compatibility mode)	No	Yes	Yes
Non-pass-through RDM (virtual compatibility mode)	Yes	Yes	No

Selecting Storage-Technologies and Functionalities

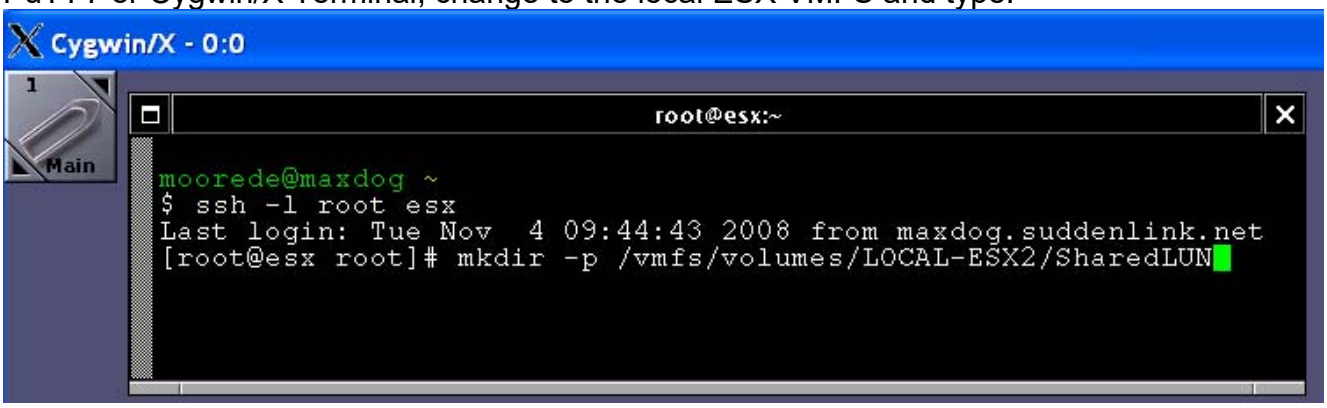
	VMFS	RDM	VMotion	HA	DRS	VCB	Boot VM	Boot from SAN	MSCS Cluster	MultiPath
Local	✓	No	No	No	No	No	✓	N/A	✓	No
Fibre Channel	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
NAS	No	No	✓	✓	✓	No	✓	N/A	No	✓
iSCSI (HW)	✓	✓	✓	✓	✓	No	✓	✓	No	✓
iSCSI (SW)	✓	✓	✓	✓	✓	No	✓	No	No	✓

1. Creating the first node of the cluster requires pre-creating an eagerzeroedthick virtual disk, and then creating a virtual machine using that pre-created disk, and lastly installing the operating system.

Add the LUN using as a Datastore on the ESX Server with VMFS cluster filesystem.



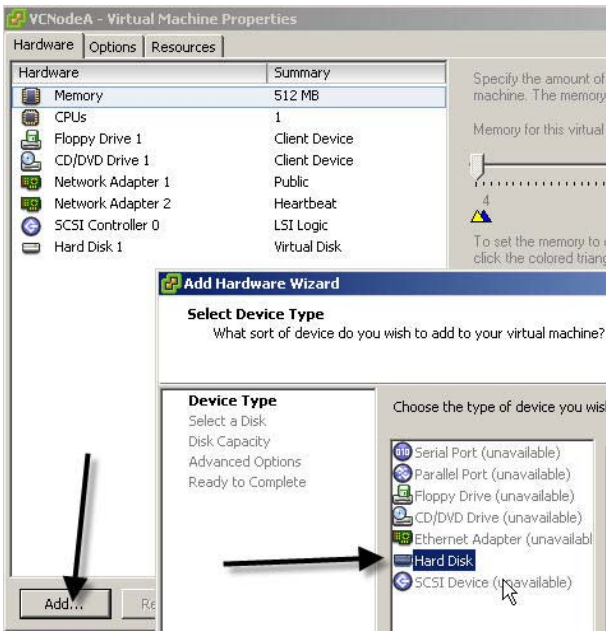
Next create the directory in the datastore to which the virtual machine's boot disk will reside. (HAS TO BE ON THE LOCAL SCSI VMFS LUN you just created OR FIBRE CHANNEL LUN VMFS FILE SYSTEM!!! These are to be your shared data and quorum drives for the cluster.) By default eagerzeroedthick is not the default format for the default VFMS filesystem. For example, using PuTTY or Cygwin/X Terminal, change to the local ESX VMFS and type:



mkdir -p /vmfs/volumes/LOCAL-ESX2/SharedLUN
cd /vmfs/volumes/LOCAL-ESX2/SharedLUN
vmkfstools -c 2500M -d eagerzeroedthick -a lsilogic /vmfs/volumes/LOCAL-ESX2/SharedLUN/data.vmdk
vmkfstools -c 1500M -d eagerzeroedthick -a lsilogic /vmfs/volumes/LOCAL-ESX2/SharedLUN/quorum.vmdk

Adding Shared Quorum and Data Disk to the Cluster Nodes

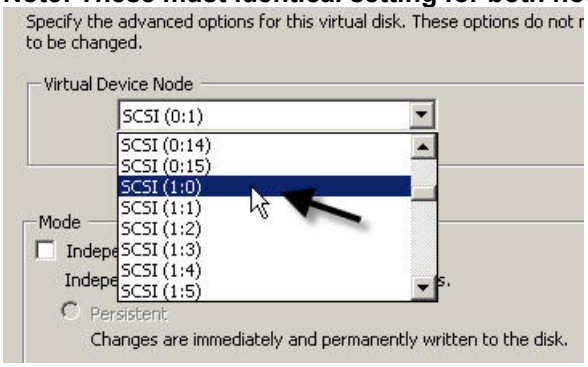
2. Power off both nodes if already created. Start with VCNodeA by going to VM > Edit Settings and click the Add.. button and select Hard Disk from the device listing. Click Next.



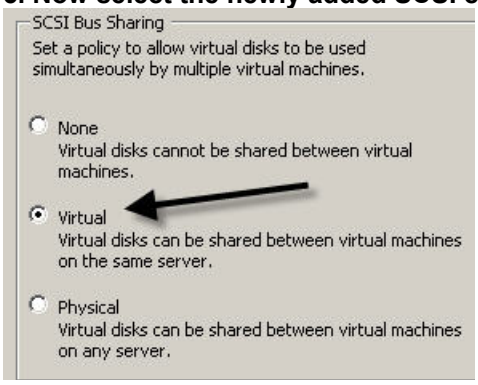
3. On the Select a disk page, choose the radio button, Use an existing disk and click Next. Browse to the location of the quorum disk, select it and click Next.

4. On the Specify Advanced Options page, choose a new SCSI device node. The quorum disk must reside on a different SCSI controller. Use SCSI(1:0), for example. Click Next, then Finish.

Note: These must identical setting for both nodes!



5. Now select the newly added SCSI controller. For the SCSI Bus Sharing, choose Virtual, then click Ok.



6. Adding diskLib lines in VMWare configuration file

This entire configuration is stored in the vmx file of your Virtual Machine. Edit it and take a look at it. You may want to do dome cleaning but make sure you did a backup of it before.

You'll need to add some line to make VMWare use a shared disk as it would do in real cluster hardware. Most of it should be added to you .VMX file, but you probably have to add the **BOLDED ITEMS**. You may use my sample code:

Shared Disk Config Info:
diskLib.dataCacheMaxSize = "0"
diskLib.dataCacheMaxReadAheadSize = "0"
diskLib.dataCacheMinReadAheadSize = "0"
diskLib.dataCachePageSize = "4096"
diskLib.maxUnsyncedWrites = "0"
disk.locking = "FALSE"

scsi1.present = "true"
scsi1.sharedBus = "virtual"
scsi1.virtualDev = "lsilogic"
scsi2.present = "true"
scsi2.sharedBus = "virtual"
scsi2.virtualDev = "lsilogic"
scsi1:0.present = "true"
scsi1:0.fileName = "/vmfs/volumes/4908e99b-6bc73f45-87e1-000d6014806f/SharedLUN/data.vmdk"
scsi1:0.mode = "independent-persistent"
scsi1:0.deviceType = "scsi-hardDisk"
scsi2:0.present = "true"
scsi2:0.fileName = "/vmfs/volumes/4908e99b-6bc73f45-87e1-000d6014806f/SharedLUN/quorum.vmdk"
scsi2:0.mode = "independent-persistent"
scsi2:0.deviceType = "scsi-hardDisk"

scsi1:0.redo = ""
scsi2:0.redo = ""

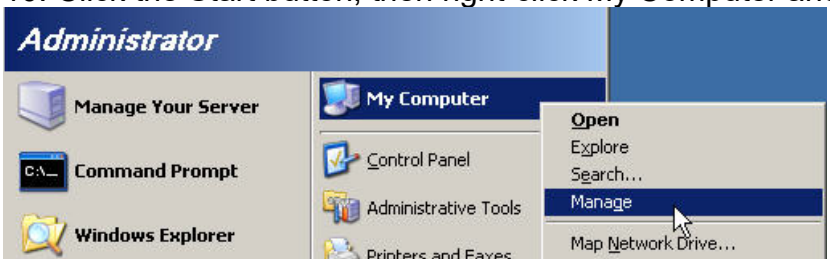
7. Make sure to install VMware Tools and disconnect CD-ROM. Shut down VCNodeA.

8. Join both nodes to the Active Directory domain AND SHUTDOWN

Creating the Second Node of the Cluster (i.e. WIN06.DOMAIN.COM)

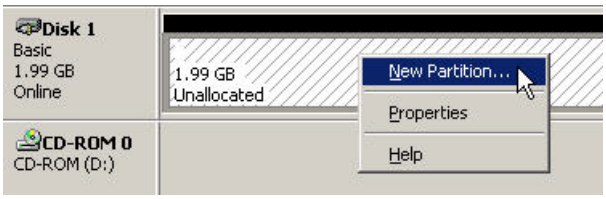
Cloning the first node and customizing it for uniqueness is the fastest way to create the second cluster node. Join both nodes to the Active Directory domain AND SHUTDOWN.

Ensure Drive connectivity from both Servers.

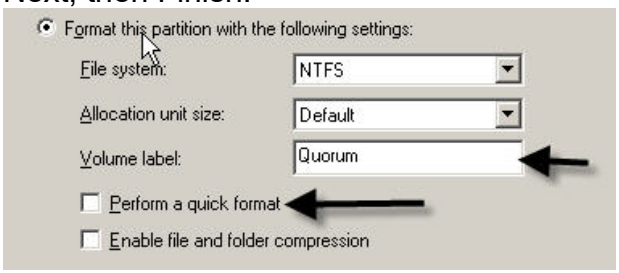
- 9. Power on VCNodeA.
- 10. Click the Start button, then right-click My Computer and choose Manage.
- 

- 11. Select Disk Management in the left pane. An Initialize and Convert Disk
- Wizard should begin. The quorum disk that was just added is not initialized nor
- formatted. Click Next to begin.

- 12. At this point, the quorum disk should be initialized, but not converted. To do this,
- click Next twice, then Finish.
- 13. Now that the disk is online, select the unallocated disk, right-click then New
- Partition…



- 14. Click Next four times. At the Format Partition dialog box, change the volume
- label to Quorum or whatever name and check Perform a quick format. Click
- Next, then Finish.



- 15. Close all windows and shut down VCNodeA.
- 16. Repeat steps 2-12 for VCNodeB, if necessary, making sure the same drive letter
- is assigned.
- Note: At this point, it is important to not allow both nodes to be powered on
- simultaneously. After the Cluster Services configuration is complete, both nodes
- with support running at the same time.

Network, Domain and DNS configuration

DELETING EXTRAC HIDDEN NIC's AFTER ADDING HARD DRIVES – VMWARE MOVES NIC PCI SLOTS AFTER ADDING HARD DRIVES and adds new network adapters to the OS. The OLD NIC's still there and hidden and need to be deleted because they retain old IP addresses. This happens

when you have the Windows Server OS and Static IP address configured installed before the new disks are added to the machine which is quite frequent when you clone a new server from template.

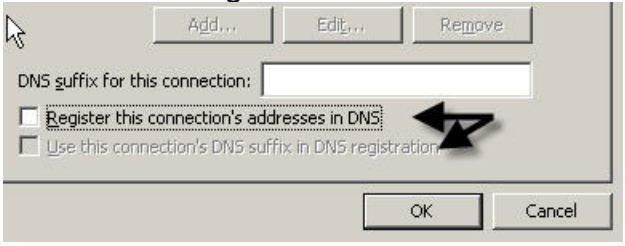
1. Click Start, click Run, type cmd.exe, and then press ENTER.
2. Type set devmgr_show_nonpresent_devices=1, and then press ENTER.
3. From the same DOS Prompt, Type 'Start DEVMGMT.MSC', and then press ENTER.
4. Click View, and then click Show Hidden Devices.
5. Expand the Network Adapters tree.
6. Right-click the dimmed network adapter, and then click Uninstall.

Your both nodes are running. It is now time to join the domain. We'll need them to be configured with fixed IP. The second NIC of each node should be configured with a 10.0.0.1/8 and 10.0.0.2/8 IPs. No need to put this in the DNS, this is just for the intra-cluster communication (aka Heart-Beat).

- For each of your SQL Server Nodes, you'll want to add a new NIC from the VM Hardware manager (just select **Settings** on the VM, and the use the **Add** button to launch the Add Hardware wizard).
- Bind the newly added NICs to a custom VMWare Network (I keep all of my VNICs bound to the VMnet2 network).
- Boot server1. Once it's booted, navigate to the network connections section of the control panel in Windows Explorer. Right click and rename your Area Connections to External and Heartbeat.
- Change the IP addy for External to something fixed on your network (like 192.168.235.11 or .12 for server2) with the appropriate subnet mask (255.255.255.0). Then specify the fixed **IP** of your **Domain Controller** as the **Preferred DNS IP Address** (i.e. 192.168.235.1).
- To change the binding order, select the menu option, Advanced > Advanced Settings…

Using the elevator buttons, adjust the network connections so that Public is listed first, followed by Private. Click Ok.

- Now change the **IP Address** for your HeartBeat NIC. Set it to something like **10.1.1.1 (or 10.1.1.2** for Server2**)**. Leave the Gateway empty. Leave DNS blank. Click the DNS tab and verify there are no DNs addresses. Make sure Register this connection's address is registered and Use this connection's DNS suffix in DNS registration boxes are deselected.



Click the **Advanced** button, and from the **WINS** tab, click **Disable netbios over tcpip**. Select the WINS tab and verify that Enable LMHOSTS lookup is unchecked.
 Do the same for Server2 (using different IP addresses, of course).
 Add both servers to your domain (Right Click **My Computer | Properties**, and then from the **Network Identification** tab click **Change**. Specify the credentials you provided when you created your Domain Controller in the previous steps as the credentials you need to add the box to the domain.)

Also you can prepare 1 IP and 1 name in the DNS for:
- Cluster
- SQL-Virtual SQL Server
- SQL-MSDTC (aka Distributed Coordinator)

SERVERS GROUPS, SQL SERVICE ACCOUNTS AND GROUP POLICY

Create the following:
CREATE WIN05_SQL_CLUSTER_GSG Global Security Group. SQL Install will add them to this group when changing permisssions during install.

CLUSTER Service Account for EACH SQL Server/CLUSTER (domain\WIN05_clusterserver)

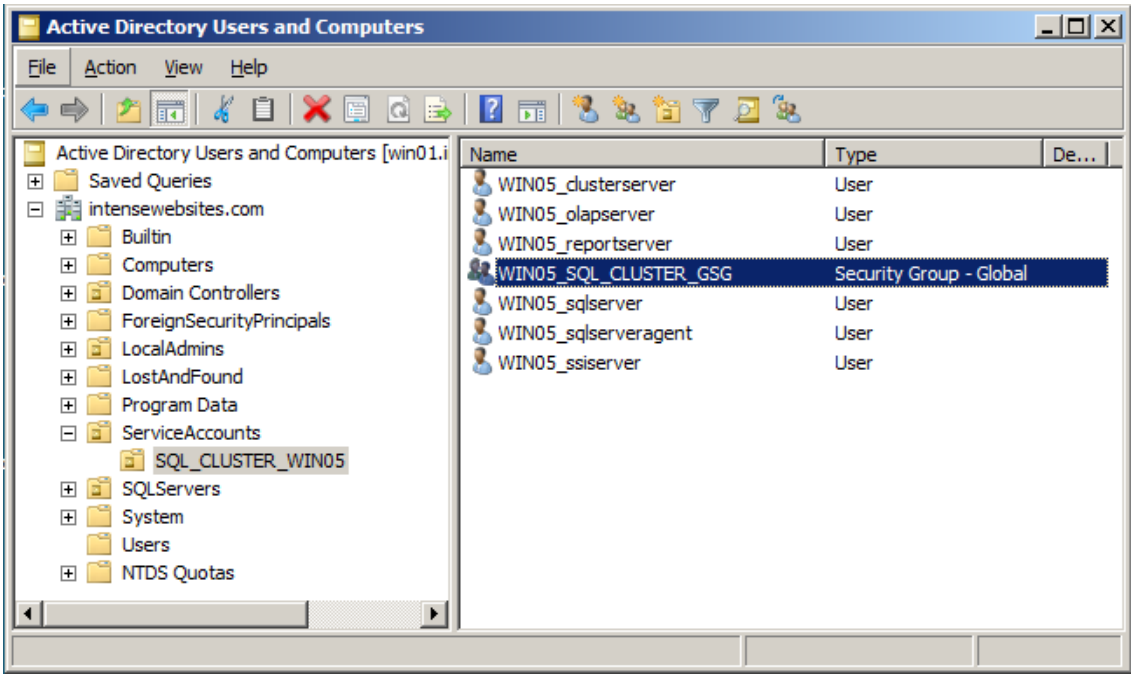
SQL Service Account for EACH SQL Server/CLUSTER (domain\ WIN05_sqlserver)

SQL AGENTService Account for EACH SQL Server/CLUSTER (domain\ WIN05_sqlserveragent)

Analysis Service Account for EACH SQL Server/CLUSTER (domain\ WIN05_olapserver)

REPORT Service Account for EACH SQL Server/CLUSTER (domain\ WIN05_reportserver)

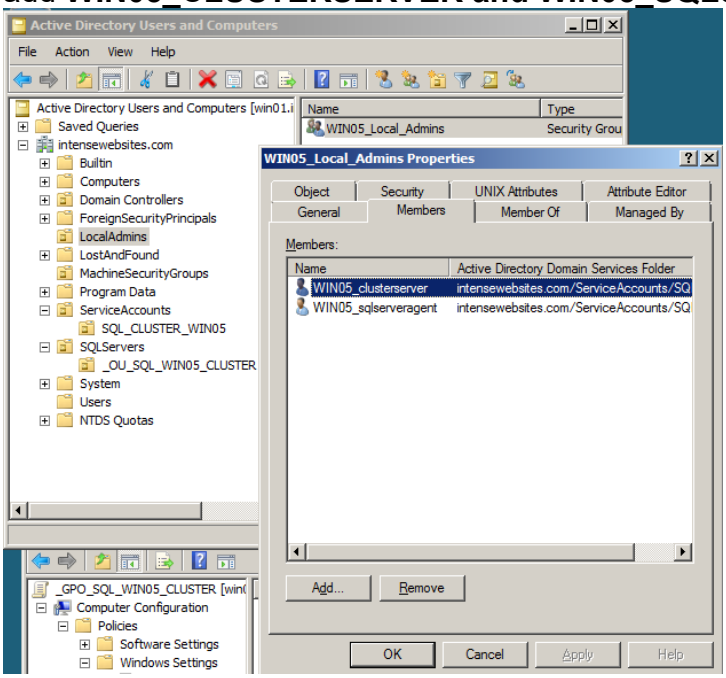
Integration Service Account for EACH SQL Server/CLUSTER (domain\ WIN05_ssiserver)



PERMISSIONS – CREATE GPO FOR MACHINES IN SQLServers OU

CLUSTERSERVER and SQLSERVERAGENT (to restart jobs) must be LOCAL ADMINISTRATORS!

1. In AD Users and Computers Create LocalAdmin OU and Universal (or Global) Security Group and add **WIN05_CLUSTERSERVER and WIN05_SQLSERVERAGENT**

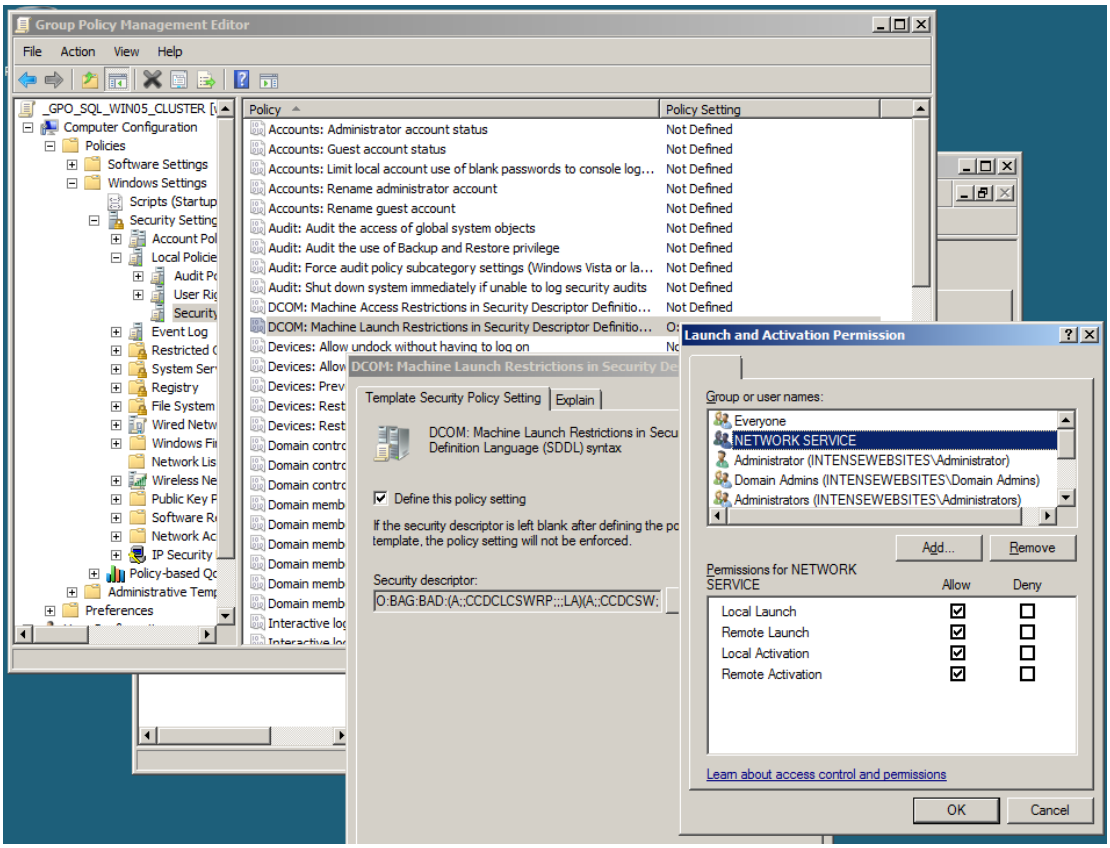


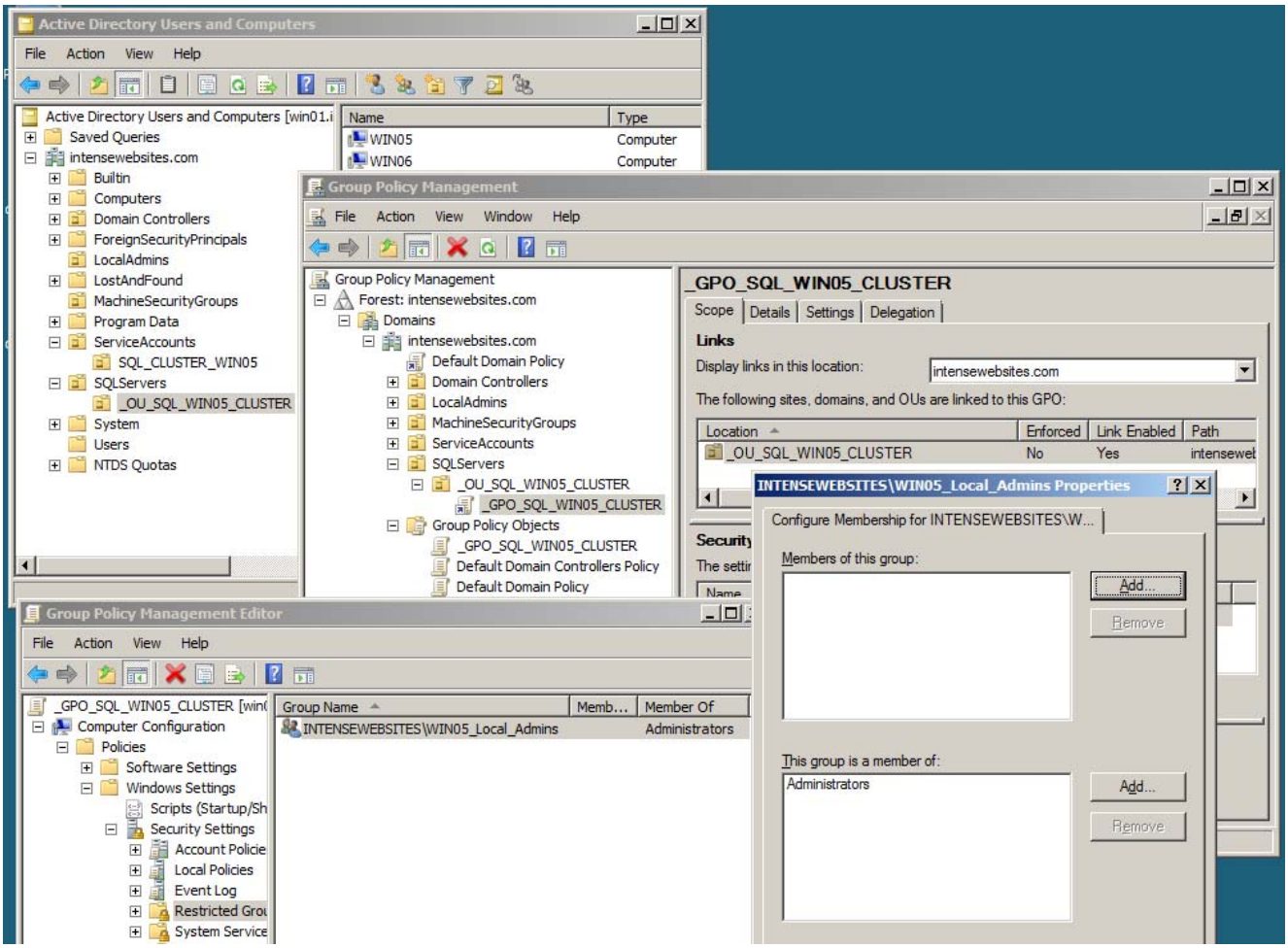
1. In AD Users and Computers Create SQLServers OU for EACH SQL Server/CLUSTER – Move SQL Servers into that OU
2. Open Group Policy Management Console and create new GPO LINK ON NEW OU in GPMC
3. Edit that Group Policy to add these settings for just those two machines in the cluster.

(IMPORTANT NOTE FOR INSTALLING OTHER PROGRAMS SINCE YOU ARE CREATING ANOTHER CUSTOM GPO FOR JUST THESE SERVERS) – You have to re-add Administrator, WIN05_LOCAL_ADMINS, ADMINISTRATORS, DOMAIN ADMINS and ENTERPRISE ADMINS to the FOLLOWING GPO settings also when making changes for the SQL service accounts. Add admin rights to the Following:

Back up files and directories
Manage auditing and security log
Restore files and directories

DOMAIN ADMINS FOR INSTALLATION NEED:
Act as part of the operating system
Login as a Service


Group Policy Management Editor
File Action View Help
Policy
Policy Setting
Accounts: Administrator account status
Accounts: Guest account status
Accounts: Limit local account use of blank passwords to console log...
Accounts: Rename administrator account
Accounts: Rename guest account
Audit: Audit the access of global system objects
Audit: Audit the use of Backup and Restore privilege
Audit: Force audit policy subcategory settings (Windows Vista or la...
Audit: Shut down system immediately if unable to log security audits
DCOM: Machine Access Restrictions in Security Descriptor Definitio...
DCOM: Machine Launch Restrictions in Security Descriptor Definitio...
Not Defined
Launch and Activation Permission
Template Security Policy Setting
Explain
DCOM: Machine Launch Restrictions in Security Definition Language (SDDL) syntax
Define this policy setting
Security descriptor:
Group or user names:
Everyone
NETWORK SERVICE
Administrator (INTENSEWEBSITES\Administrator)
Domain Admins (INTENSEWEBSITES\Domain Admins)
Administrators (INTENSEWEBSITES\Administrators)
Add...
Remove
Permissions for NETWORK SERVICE
Allow
Deny
Local Launch
Remote Launch
Local Activation
Remote Activation
Learn about access control and permissions
OK
Cancel


Active Directory Users and Computers
File Action View Help
Active Directory Users and Computers [win01.i
Saved Queries
intensewebsites.com
Builtin
Computers
Domain Controllers
ForeignSecurityPrincipals
LocalAdmins
LostAndFound
MachineSecurityGroups
Program Data
ServiceAccounts
SQL_CLUSTER_WIN05
SQLServers
_OU_SQL_WIN05_CLUSTER
System
Users
NTDS Quotas
Name
Type
WIN05
Computer
WIN06
Computer
Group Policy Management
File Action View Window Help
Group Policy Management
Forest: intensewebsites.com
Domains
intensewebsites.com
Default Domain Policy
Domain Controllers
LocalAdmins
MachineSecurityGroups
ServiceAccounts
SQLServers
_OU_SQL_WIN05_CLUSTER
_GPO_SQL_WIN05_CLUSTER
Group Policy Objects
_GPO_SQL_WIN05_CLUSTER
Default Domain Controllers Policy
Default Domain Policy
_GPO_SQL_WIN05_CLUSTER
Scope
Details
Settings
Delegation
Links
Display links in this location:
intensewebsites.com
The following sites, domains, and OUs are linked to this GPO:
Location
Enforced
Link Enabled
Path
_OU_SQL_WIN05_CLUSTER
No
Yes
Security
The setti
Name
INTENSEWEBSITES\WIN05_Local_Admins Properties
Configure Membership for INTENSEWEBSITES\W...
Members of this group:
Add...
Remove
This group is a member of:
Administrators
Add...
Remove
Group Policy Management Editor
File Action View Help
_GPO_SQL_WIN05_CLUSTER [win
Computer Configuration
Policies
Software Settings
Windows Settings
Scripts (Startup/Sh
Security Settings
Account Policie
Local Policies
Event Log
Restricted Grou
System Service
Group Name
Memb...
Member Of
INTENSEWEBSITES\WIN05_Local_Admins
Administrators

Cluster Server

Local Administrators Group (SQLServers GPO > Computer Configuration > Policies > Windows Settings > Security Settings > Restricted Groups)

(SQLServers GPO > Computer Configuration > Policies > Windows Settings > Security Settings > Security Options > DCOM: Machine Launch Permissions) You will need to make sure necessary users like DOMAIN ADMINS, SERVICE or NETWORK SERVICE have FULL CONTROL so WMI (DCOM) can launch remotely OR you will receive WMI errors during SQL Cluster install.

(SQLServers GPO > Computer Configuration > Administrative Templates, **Windows Components**, **Terminal Services > Terminal Server > Connections> Allows users to connect remotely using Terminal Services** > click **Enabled**)

ALL OTHER SQLServer GPO policies to be applied here: (SQLServers GPO > Computer Configuration > Policies > Windows Settings > Security Settings > Local Policies > User Rights Assignments)

Access this computer from the network
Act as part of the operating system
Adjust memory quotas for a process
Back up files and directories
Impersonate a client after authentication (SeImpersonatePrivilege) (ADD ADMINISTRATORS and SERVICE)
Increase scheduling priority
Log on as a service
Manage auditing and security log
Restore files and directories

SQL Server

Default instance: SQLServerMSSQLUser$ComputerName$MSSQLSERVER
Named instance: SQLServerMSSQLUser$ComputerName$InstanceName
Act as part of Operating System (SeTcbPrivilege)
Adjust memory quotas for a process (SeIncreaseQuotaPrivilege)
Bypass traverse checking (SeChangeNotifyPrivilege) (ADD NETWORK SERVICE)
Log on as a batch job (SeBatchLogonRight)
Log on as a service (SeServiceLogonRight)1
Lock Pages in Memory
Permission to read the Event Log service (Let SQL Install set)
Permission to read the Remote Procedure Call service (Let SQL Install set)
Permission to start SQL Server Active Directory Helper (Let SQL Install set)
Permission to start SQL Writer (Let SQL Install set)
Replace a process-level token (SeAssignPrimaryTokenPrivilege)

SQL Server Agent

Default instance: SQLServerSQLAgentUser$ComputerName$MSSQLSERVER
Named instance: SQLServerSQLAgentUser$ComputerName$InstanceName
Act as part of Operating System (SeTcbPrivilege)
Adjust memory quotas for a process (SeIncreaseQuotaPrivilege)

Bypass traverse checking (SeChangeNotifyPrivilege)
Lock Pages in Memory
Log on as a batch job (SeBatchLogonRight)
Log on as a service (SeServiceLogonRight)
Replace a process-level token (SeAssignPrimaryTokenPrivilege)

Analysis Services
Default instance: SQLServerMSOLAPUser$ComputerName$MSSQLSERVER
Named instance: SQLServerMSOLAPUser$ComputerName$InstanceName
Log on as a service (SeServiceLogonRight)

SQL Server Reporting Service
Default instance: SQLServerReportServerUser$ComputerName$MSRS10.MSSQLSERVER
Named instance: SQLServerReportServerUser$ComputerName$MSRS10.InstanceName
Log on as a service (SeServiceLogonRight)

Integration Services
Default or named instance: SQLServerDTSUser$ComputerName
Bypass traverse checking (SeChangeNotifyPrivilege)
Impersonate a client after authentication (SeImpersonatePrivilege) (ADD ADMINISTRATORS GROUP and SERVICE from domain)
Log on as a service (SeServiceLogonRight)
Permission to write to application event log.

Full-text search (USING sqlserver SERVICE ACCOUNT)
Default instance: SQLServerFDHostUser$ ComputerName$MSSQL10.MSSQLSERVER
Named instance: SQLServerFDHostUser$ComputerName$MSSQL10.InstanceName
Log on as a service (SeServiceLogonRight)

SQL Server Browser (USING sqlserver SERVICE ACCOUNT)
Default or named instance: SQLServerSQLBrowserUser$ComputerName
Log on as a service (SeServiceLogonRight)

SQL Server Active Directory Helper
Default or named instance: SQLServerMSSQLServerADHelperUser$ComputerName

SQL Writer

PERMISSIONS – SORTED BY RIGHTS

(IMPORTANT NOTE FOR INSTALLING OTHER PROGRAMS SINCE YOU ARE CREATING ANOTHER CUSTOM GPO FOR JUST THESE SERVERS)
– You have to re-add Administrator, WIN05_LOCAL_ADMINS, ADMINISTRATORS, DOMAIN ADMINS and ENTERPRISE ADMINS to the FOLLOWING GPO settings also when making changes for the SQL service accounts. Add admin rights to the Following:

Back up files and directories
Manage auditing and security log
Restore files and directories

DOMAIN ADMINS FOR INSTALLATION NEED Act as part of the operating system and Login as a Service

(SQLServers GPO > Computer Configuration > Policies > Windows Settings > Security Settings > Security Options > DCOM: Machine Launch Permissions) You will need to make sure necessary users like DOMAIN ADMINS, SERVICE or NETWORK SERVICE have FULL CONTROL so WMI (DCOM) can launch remotely OR you will receive WMI errors during SQL Cluster install.

(SQLServers GPO > Computer Configuration > Administrative Templates, Windows Components, Terminal Services > Terminal Server > Connections> Allows users to connect remotely using Terminal Services > click **Enabled**)

WIN05_clusterserver	**Local Administrators Group (WIN05_sqlservers GPO > Computer Configuration > Policies > Windows Settings > Security Settings > Restricted Groups)**

ALL OTHER WIN05_sqlserver GPO policies to be applied here: (WIN05_sqlservers GPO > Computer Configuration > Policies > Windows Settings > Security Settings > Local Policies > User Rights Assignments)

WIN05_clusterserver	**Access this computer from the network**
WIN05_sqlserver	**Act as part of Operating System (SeTcbPrivilege)**
WIN05_sqlserveragent	**Act as part of Operating System (SeTcbPrivilege)**
WIN05_clusterserver	**Act as part of the operating system**
WIN05_clusterserver	**Adjust memory quotas for a process**
WIN05_sqlserver	**Adjust memory quotas for a process (SeIncreaseQuotaPrivilege)**
WIN05_sqlserveragent	**Adjust memory quotas for a process (SeIncreaseQuotaPrivilege)**
WIN05_clusterserver	**Back up files and directories**
WIN05_sqlserver	**Bypass traverse checking (SeChangeNotifyPrivilege) (ADD NETWORK SERVICE ALSO)**
WIN05_sqlserveragent	**Bypass traverse checking (SeChangeNotifyPrivilege) (ADD NETWORK SERVICE ALSO)**
WIN05_ssiserver	**Bypass traverse checking (SeChangeNotifyPrivilege) (ADD NETWORK SERVICE ALSO)**
WIN05_clusterserver	**Impersonate a client after authentication (SeImpersonatePrivilege) (ADD ADMINISTRATORS GROUP and SERVICE from domain)**
WIN05_ssiserver	**Impersonate a client after authentication (SeImpersonatePrivilege) (ADD ADMINISTRATORS GROUP and SERVICE from domain)**
WIN05_clusterserver	**Increase scheduling priority**
WIN05_sqlserver	**Lock Pages in Memory**
WIN05_sqlserveragent	**Lock Pages in Memory**
WIN05_sqlserver	**Log on as a batch job (SeBatchLogonRight)**
WIN05_sqlserveragent	**Log on as a batch job (SeBatchLogonRight)**
WIN05_clusterserver	**Log on as a service (SeServiceLogonRight)**
WIN05_olapserver	**Log on as a service (SeServiceLogonRight)**
WIN05_reportserver	**Log on as a service (SeServiceLogonRight)**
WIN05_sqlserver	**Log on as a service (SeServiceLogonRight)**
WIN05_sqlserveragent	**Log on as a service (SeServiceLogonRight)**

WIN05_ssiserver	**Log on as a service (SeServiceLogonRight)**
WIN05_clusterserver	**Manage auditing and security log**
WIN05_sqlserver	**Permission to read the Event Log service**
WIN05_sqlserver	**Permission to read the Remote Procedure Call service**
WIN05_sqlserver	**Permission to start SQL Server Active Directory Helper**
WIN05_sqlserver	**Permission to start SQL Writer**
WIN05_ssiserver	**Permission to write to application event log.**
WIN05_sqlserver	**Replace a process-level token (SeAssignPrimaryTokenPrivilege)**
WIN05_sqlserveragent	**Replace a process-level token (SeAssignPrimaryTokenPrivilege)**
WIN05_clusterserver	**Restore files and directories**

(IMPORTANT NOTE - Impersonate a client after authentication (SeImpersonatePrivilege) (ADD 'ADMINISTRATORS' and 'SERVICE') when change the above, you may have to do the following on the local server where the policy is to be applied so the RPC server can start, otherwise you won't have network connections and cluster administrator will fail – you will have to change RPC to temporarily start from LOCALSYSTEM (SERVICE), reboot to gain connectivity, then fix your GPO, then do the following)

1. Open Group Policy editor.

ON DOMAIN CONTROLLER Group Policy for this SQL CLUSTER, Go to Computer Configuration - Windows Settings - Local Policies – User right Assignment- look for "Bypass traverse checking" Policy and add NETWORK SERVICE.

2. ON LOCAL SQL SERVER, Open Windows Explorer and Go to \Windows\Registration folder - go to properties - Security tab -
add the following accounts with permissions.

a.Administrator - Full rights

b.System - Full rights

c.everyone - Read / Modify(WRITE) and List

Then click "APPLY" and go to "General" tab and click on the "Advance"
button. Here click the "Inheritance option" and finally click "OK"

3. Open regedit

a.go to "My Computer\HKEY_CLASSES_ROOT_\CLSID". Right click on it and
select "Permissions" and add "Authenticated Users" with "Full Permissions"

b.Go to "My Computer\HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services".
Right click and select "Permissions" and add "Network Service" and "Local
Service" with "Full Permissions"

4.Finally go to "My
Computer\HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\RpcSs and set
the "ObjectName" to "NT Authority\NetworkService"

5.Reboot the promblematic server and check if the issue still exists.

CLUSTER INSTALLATION

- Fire up Server 1. Once it finishes booting, go to **Start | Administrative Tools | Cluster Administrator**.
- Select create a new cluster from the dropdown.
- Walk through the wizard which scans your configuration, makes sure that shareable resources exist, etc.
- Specify a name for the virtual/clustered server, as well as an IP. **192.168.235.3 (ON YOUR PUBLIC SUBNET)** works well, and Server3 works well as a name if you are going the bland route. (Note that the cluster itself ends up being represented as a virtual machine on the network, with an IP Address, a name, and 'resources' at its disposal. If you put SQL Server (or Exchange for that matter) then that 'server' will have its own name and IP address (and resources) in addition to the name and IP of the cluster. (In this manner, a clustered SQL Server with 2 nodes consumes 6 IP Addresses, and 4 Network names: 2 HeartBeat addresses (on a private networks). 2 IP addresses for use by the servers (upon which the cluster is built) along with 2 network names, and 1 name and IP for the cluster, as well as 1 name and IP for the Clustered SQL Server (or virtual server as it is called).
- When it comes time specify an account for the cluster service to run under, use the account you created up in step 3.
- At the final, summary, page of the wizard, there's a **Quorum** button. It should be its own screen, but it's just a button squirreled away on the very last page. **Pay attention for it.** Click it, and make sure that it is trying to use your **Quorum** drive for the **Quorum** drive (it's **NOT** smart enough to figure it out on its own).
- Once the wizard is complete, the cluster service installs.
- Once that's complete, bring Server 2 online. You can then either open the **Cluster Administrator** on Server 2 and **Add** Server 2 to an existing node, or return to Server 1 (now also called Server 3 - or the Active node in the cluster) and Add a new server to the Node (Server 2). The wizard is pretty similar, only there aren't as many steps.

You may get error when creating second node of cluster: 0x00138f Cluster resource not found

http://support.microsoft.com/kb/909968/en-us

CAUSE

This issue occurs in a complex storage area network (SAN) configuration.

This issue is caused by an interaction between two technologies: the new Cluster Setup Wizard and the SAN configuration. The new Cluster Setup Wizard contains heuristics to verify that all cluster nodes have access to the same disks. To perform this verification, the wizard determines whether all cluster nodes recognize the disks that use the same target ID (TID) and the same logical unit number (LUN). Typically, the wizard can successfully perform this verification when a cluster shared-disk array is configured correctly. However, with a complex SAN configuration, the wizard may not be able to perform this verification.

In a complex SAN environment, the "0x00138f Cluster resource not found" error message may indicate that the same set of disks have been detected on different TIDs and on different LUNs by individual nodes. In this scenario, Setup matches the resource name to verify that all cluster nodes have access to the same disk. Then, the setup process continues.

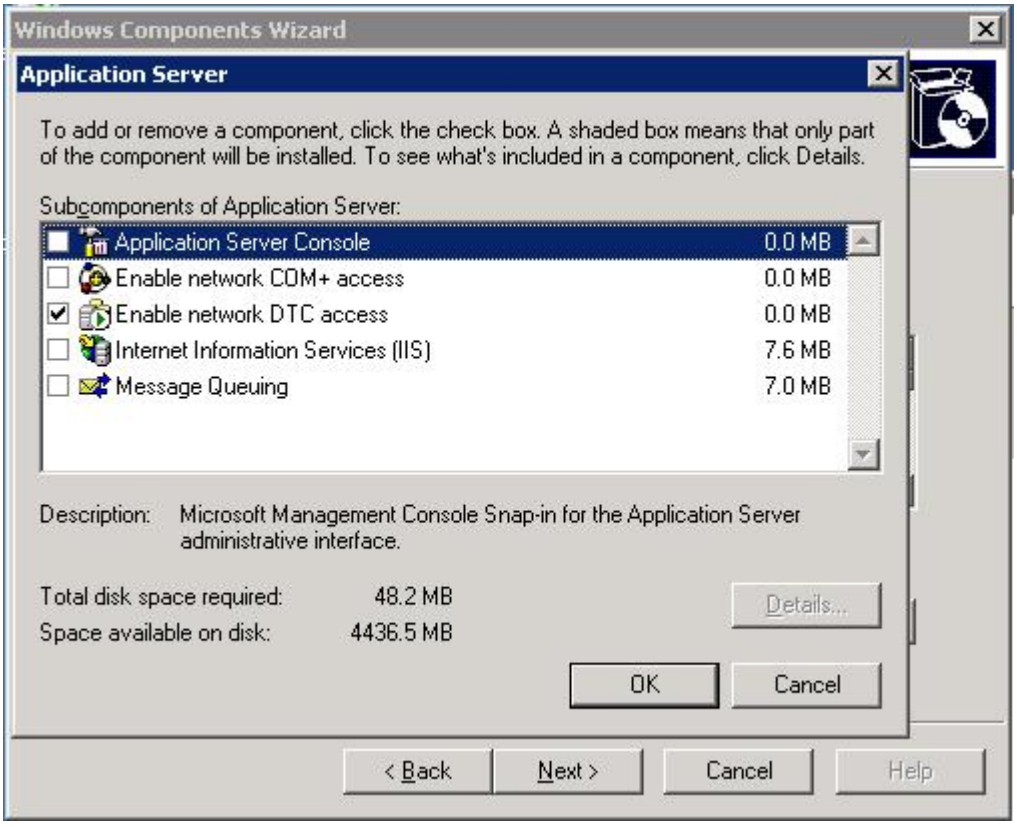
Note This issue may also occur when you run the new Cluster Setup Wizard for the first time when you create the first cluster node.

WORKAROUND: To work around this issue, let the Cluster Setup Wizard process continue. The second node does eventually join the cluster.

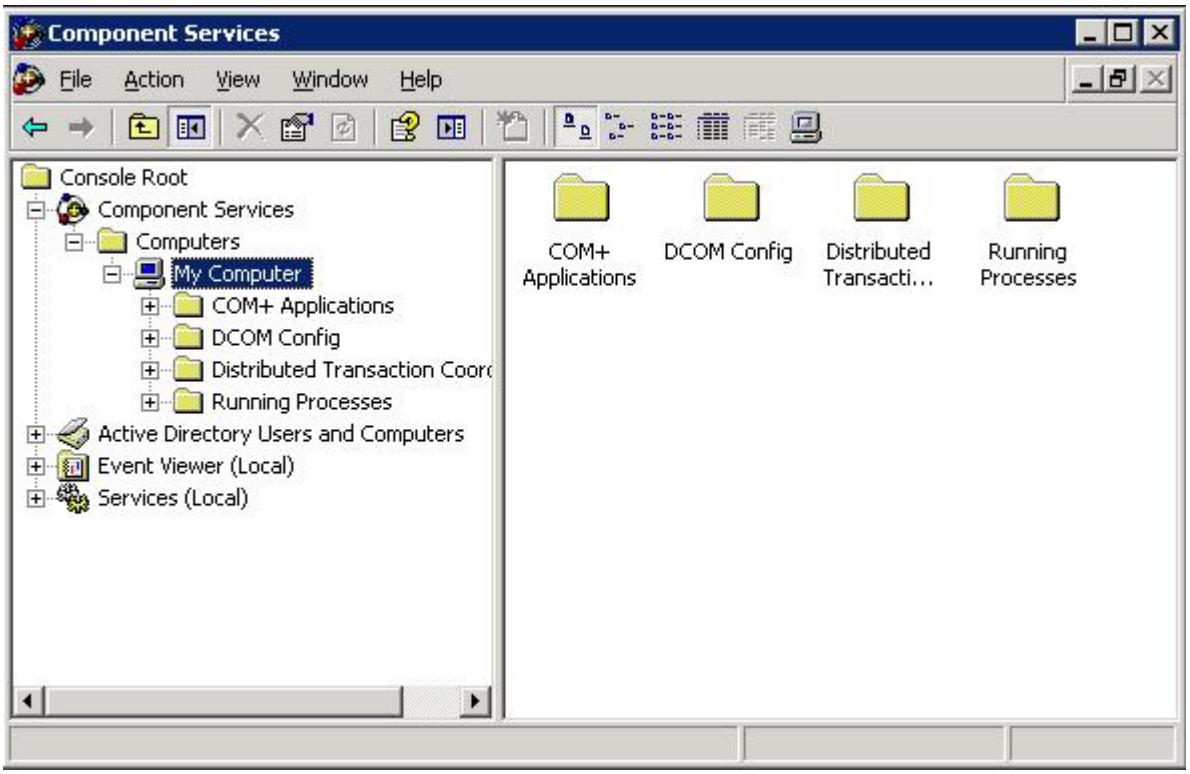
Prepare the Cluster Group for SQL

In your Cluster Administrator panel, you now have two groups: "Cluster Group" and "Disk1 Group". Rename "Disk1 Group" to "Database Group" or a name of your choosing.

The first thing that we need to do is install the network half of DTC. We do this in Add/Remove Programs under the Add/Remove Windows Components button. When the Windows Components Wizard opens select Application Server and click Details. You'll then want to check the "Enable network DTC access" check box.

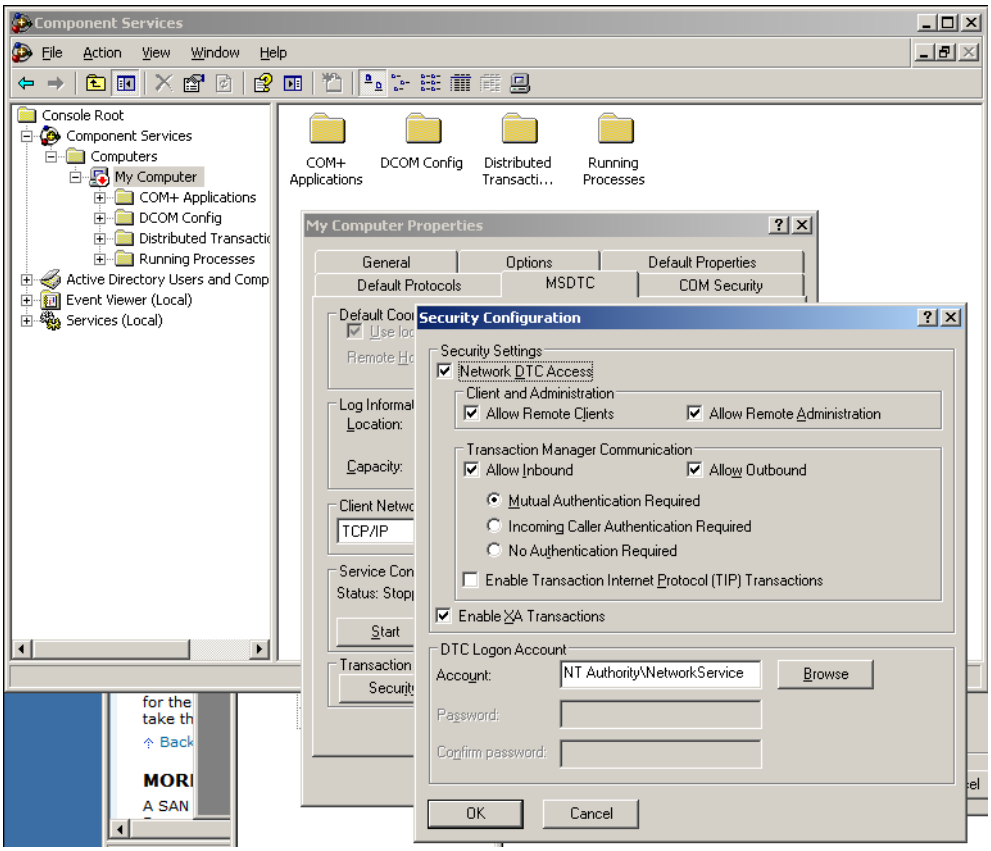


After that, finish running through the wizard and network DTC will be installed. Don't get to excited yet (Distributed transactions are exciting right?), we still need to configure DTC. To do this we need to open the Component Services MMC from the Administrative Tools menu.



From there, right click on My Computer and select properties and select the MSDTC tab. (If the network components aren't install this tab usually won't show up.) From the MSDTC tab select the Security Configuration button (bottom left). When the next screen opens all the check boxes will be unchecked. If you aren't sure what you need to enable, simply check everything and select No Authentication Required. If you have setup a DTC Logon Account which is a network account on all machines then you can require authentication if you would prefer. If any of the machines which are going to be involved with the transaction are clustered via Microsoft Cluster Service you must setup all machines in the transaction to No Authentication Required. DTC when setup as part of a cluster does not support Authentication.

When deciding which Authentication to use, every machine in the transaction should have the same authentication settings. So if any machine is clustered all machines using DTC that talk to the cluster, or that talk to machines which talk to the cluster, etc will need to be setup for No Authentication Required.



From here simply click OK, then OK. It will prompt you that DTC needs to be restarted. Don't restart it yet.

Create the MSDTC resource

MSDTC is a requirement for SQL Server when you need SSIS, Notification Services or Workstation. The Distributed Coordinator Service cannot be started on a Cluster Node. For this reason, it is required to create it as a Cluster Resource.

Proceed as explained in http://support.microsoft.com/kb/301600 - How to configure Microsoft Distributed Transaction Coordinator on a Windows Server 2003 cluster: in the "Database Group"

1.Start Cluster Administrator. To do so:

a. Click **Start**, and then point to **All Programs**

b. In **Administrative Tools**, click **Cluster Administrator**.

2.Create a Group Named "MSDTC Group" that contains a Physical Disk, Network Name, and an IP Address. To do so:

a. In the **File Menu** select **New**, and then click **Group**. The New Group Wizard is available.

b. Follow the instructions that the New Group Wizard provides to create the MSDTC Group.

Note When creating the MS DTC, moving the resource group into a group other than SQL Server or Exchange Server group is highly recommended. Creating the MS DTC resource in its own resource group and assigning it to a separate cluster group keeps the resource highly available.

Note If you create the resource in the same cluster group, and if Resource A has failed over, Resource B will also failover. When you create the resouce in a different cluster group, even when Resource A has failed over, the resource B does not failover. Creating Cluster Resouces in the different cluster groups decreases unnecessary failovers of the Cluster Resouces.

Important After the new group for MS DTC is created you must create the Network Name, IP address and Physical Disk for Msdtc. You may already have the physical disk resource that can be moved into the new group. After the MS DTC Group is created you must create the IP address resource, Network Name resource and the Physical disk resources. You may already have a physical disk resource that must be moved into the new MS DTC group. 3.Create an IP address resource:

a. Right-click the MS DTC group, and then click **New\Resource**.

b. Type a descriptive name such as MSDTC IP Address.

c. In **Resource Type**, click **IP Address**, click to select the **MSDTC Group** check box, and then click **Next**.

d. In **Possible Owners**, click **Next** unless you do not want MS DTC to run on a particular node.

e. In **Dependencies**, do not add any dependencies, and then click **Next**.

f. In **TCP/IP Address Parameters**, select the public network, type the unique static IP address for MS DTC, and then click **Next**.

g. Click **Finish**, and then click **OK** to confirm that the resource has been created.

4.Create a Network Name resource:

a. Right-click the MS DTC group, and then click **New\Resource**.

b. Type a descriptive name such as MSDTC Network name.

c. In **Resource Type**, click **Network name**, click to select the **MSDTC Group** check box, and then click **Next**.

d. In **Possible Owners**, click **Next** unless you do not want MS DTC to run on a particular node.

e. In **Dependencies**, add the MS DTC IP address as a resource dependency, and then click **Next**.

f. In **Name**, type the network name for the MS DTC resource, and then click **Next**.

g. Click **Finish**, and then click **OK** to confirm that the resource has been created.

5.Create a "Physical disk" resource.

Note You may already have a physical disk resource created. If so, you will have to move this physical disk resource into the MS DTC group and go to the next step. THIS IS THE DATABASE GROUP DISK. IT SHOULD ALREADY BE CREATED AND YOU CAN GO TO NEXT STEP OF CREATING MSDTC RESOURCE.

a. Right-click the MS DTC group, and then click **New\Resource**.

b. Type a descriptive name such as MSDTC Physical disk.

c. In **Resource Type**, click **Physical disk**, click to select the **MSDTC Group** check box, and then click **Next**.

d. In **Possible Owners**, click **Next** unless you do not want MS DTC to run on a particular node.

e. In **Dependencies**, do not add any dependencies, and then click **Next**.

f. In **Disk Parameters**, click the physical disk that you will use for MS DTC.

g. Click **Finish**, and then click **OK** to confirm that the resource has been created.

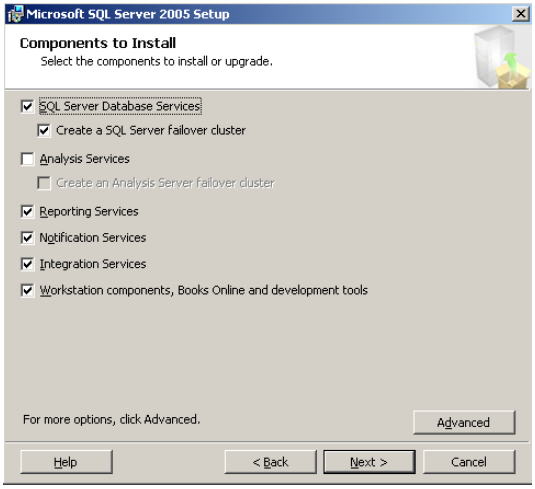
6. Right-click the MS DTC Group, and then click **New\Resource**.7.Type a name, such as MSDTC Resource.8.In **Resource Type**, click to select **Distributed Transaction Coordinator**, verify that the **MSDTC Group** is selected, and then click **Next**.9.In **Possible Owners**, click **Next** unless you do not want MS DTC to run on a particular node.10.In **Dependencies**, press and hold the CTRL key on the keyboard, select both the Physical Disk and Network Name that you created in step 2, and then click the **Add** button.11.Click **Finish**, and then click **OK** to confirm that the resource has been created.

Install your Virtual SQL Server

IF YOU GET WMI Errors, then the GPO from above is wrong.

When prompted:

- install SQL Server Database Services AND a SQL Server failover cluster

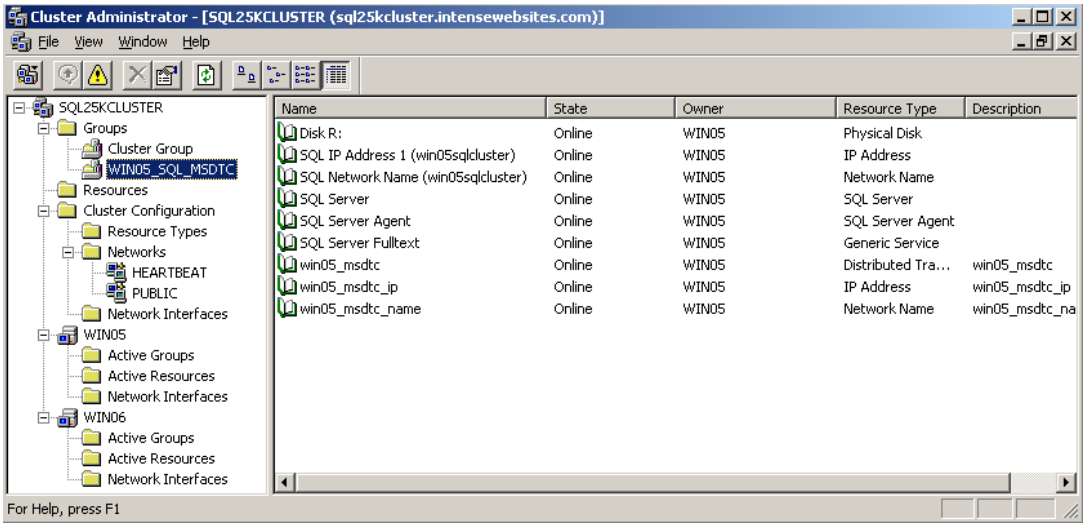


- select the public IP address to be added to DNS
- add your two nodes as part of the cluster
- select to create a default instance. If you want and active/active cluster, you will need to install a named instance afterward

If you receive this error during istall:
Failed to set registry settings for server network libraries. The action is SetDefaults. The error is 11001, then:

Add the 192.168.1.66 win05sqlcluster.intensewebsites.com win05sqlcluster to HOSTS file on both cluster nodes so it can find the virtual SQL server ;)

When finished, reboot your cluster and check your cluster when you get back.

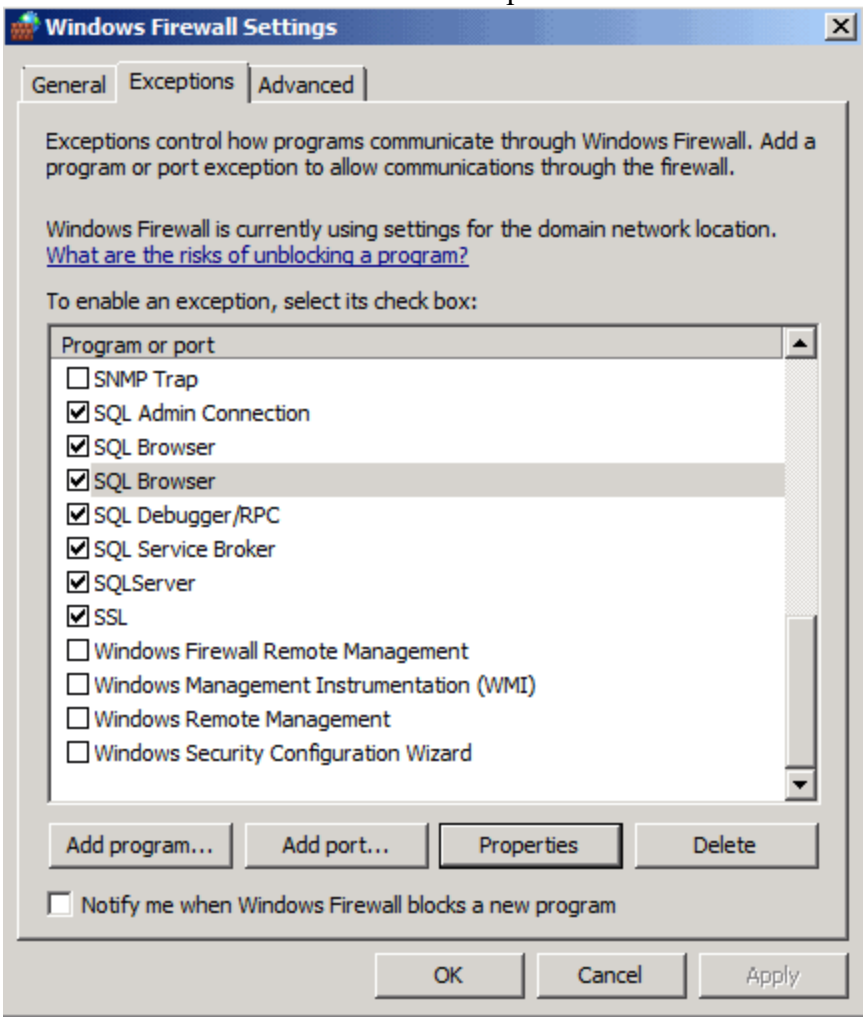


If your Integration Service (SSIS) doesn't start – change it to the service account you created. It doesn't get changed during the install.

IF YOU'RE USING WINDOWS FIREWALL:
[Configuring the Windows Firewall to Allow SQL Server Access]

This little script (batch file) adds SQL Server Ports to firewall that are in the exception list by default. Check the above link to make sure you have all the other necessary exceptions that are in the exception list.

```
netsh firewall set portopening TCP 1433 "SQLServer"
netsh firewall set portopening TCP 1434 "SQL Admin Connection"
netsh firewall set portopening TCP 4022 "SQL Service Broker"
netsh firewall set portopening TCP 135 "SQL Debugger/RPC"
netsh firewall set portopening TCP 2383 "Analysis Services"
netsh firewall set portopening TCP 2382 "SQL Browser"
netsh firewall set portopening TCP 80 "HTTP"
netsh firewall set portopening TCP 443 "SSL"
netsh firewall set portopening UDP 1434 "SQL Browser"
netsh firewall set multicastbroadcastresponse ENABLE
```



That's all; you have your Microsoft Cluster Server running a Virtual SQL Server instance.
Any remark or question is welcome.
derek moore 333 at hotmail dot com (remove spaces and replace characters)