

05 Cluster Configuration

Create a 2 node virtual SQL Server 2005 Cluster Configuration

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This document exprains now to create a virtual 2 node SQL Server cluster using VMWare Server 2.0.1 (you could also use Microsoft Virtual Server 2005 R2 SP1), Windows 2003 Enterprise 32bit and SQL Server 2005 Enterprise 32 bit (you may 64 bit if desired). For the purposes of this document the following apply;

Fail-Over	A Microsoft Cluster implementation method
SSMS	SQL Server Management Studio
T-SQL	Transact_SQL (the native SQL Server command language)
MSCS	Microsoft Cluster Services. The underlying technology for SQL
	Server Fail-Over clustering
NIC	Network interface card
Virtual Server	A unique computer name in the domain. During fail-over this
Name	computername is passed from one node to another
Virtual IP Address	A unique IP Address in the network. During fail-over this IP
	Address is passed from one node to another
OS	Operating System
Node	A host which participates in a cluster
Quorum	The centralised repository used by MSCS
Heartbeat	A segregated private network for communication detection between
	nodes
Active\Passive	A cluster configuration which involves an active node and a passive
	node. The passive node becomes active on Fail-Over.

1.1 AUDIENCE

The document is intended for administrators wishing to simulate a SQL Server cluster environment for testing or as a tool when expressing a wish to learn more about Windows\SQL Server clustering. It is not expected that the reader is familiar with the Windows operating system and MSCS.

2 CLUSTERING BRIEF OVERVIEW

MSCS involves 2 or more computers (they dond have to be physical you can use virtual machines too) configured into a cluster relationship. This technology requires a central, shared storage (it cannot exist on the machine itself). Clusters use Virtual Server Names and Virtual IP Addresses to create a reference for the network connection to the clustered application. For example SQL Node 1 has a computername of SQLCLNODE01 and IP Address of 10.10.10.120. SQL Server instance INST1 has a computername of SQLCL01 and IP Address of 10.10.10.126. All network calls to the SQL Server instance 1 are made through the virtual server name and IP address, not the Nodes actual name or IP Address. During fail-over this virtual name and IP address are passed to the partner Node like a ticket, re directing network calls to the new Node.



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Install VMware Server 2.0.1 and then create the following folder structure locally

C:\ _____Virtual Machines



Use the commands listed below to create the virtual disks required. The **vmware-vdiskmanager.exe** resides in the following folder if a default installation of VMware Server was used;

C:\Program Files\VMware\VMware Server

Open a command prompt and paste the commands, in turn, into the shell window (ensure you set the directory path first as shown in the screenshot below).



Create the drives as shown below





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 d Expanded Features
 512MB -a Isilogic -t 2 "C:\Virtual

 Macnines\Quorum\Quorum.vmdk"

Create the drives for the SQL Server clustered instance data, logs and DTC

vmware-vdiskmanager -c -s 5GB -a Isilogic -t 2 "C:\Virtual Machines\INST1\INST1_Data.vmdk"

vmware-vdiskmanager -c -s 5GB -a Isilogic -t 2 "C:\Virtual Machines\INST1\INST1_Logs.vmdk"

vmware-vdiskmanager -c -s 2GB -a Isilogic -t 2 "C:\Virtual Machines\DTC\DTC_Data.vmdk"

Ensure you add your Windows domain\local account to the following local group on your pc

__vmware__

Log into the Vmware Server console supplying your Windows account and password and you will see the following;

C VMware Infrastructure Web Access		Windows Internet Explo	er			
	ostSystem ha-host",w:{t:true,i:I	D}}		💌 😵 Certific	ate Error 😽 🗙 💿	ogle UK 🖉 🗧
Elle Edit View Favorites Tools Help						
😤 🏟 🖉 Wiware Infrastructure Web Access					<u>≬</u> •	🕥 - 🚔 - 🕞 Bage - 🎯 Tgols - 🏅
Si VM	(018)				
Application Virtual Machine Administ	ration	916)			Help I Victo	al Appliance Marketelace Log Out
Application trical recrime Semiliar					neip 1 virte	an Appliance Hanketplace 1 Log Out
Inventory	D-95918.					
D-95918	Summary Virtual Machin	nes Tasks Events Permiss	ons			
	General				Commands	
	Hostname	D-95918			Create Virtual M	achine
	Manufacturer	Dell Inc.			Add Virtual Mach	ine to Inventory
	Model	OptiPlex 745			Configure Options	
	C Descarrows	Intel(D) Reptium(D) D CDI	2 40 CHz		* Edit Host Setting	s
	- rocessors	1 CDU	0.400nz		* Edit Virtual Mach	ine Startup/Shutdown Settings
		1 010	MU		Refresh Network	List
	Usage	1525.00	mn2		VMware Tips	•
	Memory	1.98 GB				(Const.)
	Usage	798 MB				Ween information (
						and a state of the
	Datastores					and the second se
	Name A	Capacity	Free Space Location			
	<	137.3 60	110.12 GD C. (VIII.0811	identified (Upprade to VMware	Infrastructure at a price you can
	Notworks				afford!	
	Name		VMnet	Type	Improve server utili	zation and get higher performance.
	Bridged		vmnet0	bridged		
	HostOnly		vmnet1	hostonly		
	NAT		vmnet8	nat		
	<			>		
1						
<i>c</i>						
			1947			
Task	Target	Status	Triggered A	t v Trig	gered by C	Completed At
				D. T.		
Done					9 0	ocal intranet 🔍 100% 🔹

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irtual networks+option from the Start menu. Go straight ab and add a new virtual adapter for VMnet2 and click

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Network Adapter		Virtual Network	Status
SYMware Network Adapter VMnet1		VMnet1	Enabled
	Frabla	Dicable	Remove 1

Now go to the DHCP tab and remove any DHCP assignments (click each item and remove) the click % pply+.

Virtual Network	Editor			
ummary Automatic	Bridging Host Virtua	Network Mapping	Host Virtual Adapters	DHCP NAT
Use this page	to configure the Dyn	amic Host Configurat	ion Protocol settings f	or individual virtua
🗐 networks as	well as control the DH	CP service.		
DHCP				
Virtual Network	Subnet	Netmask	Description	
VMnet1	192.168. 1. 0	255.255.255.0	vmnet1	
VMnet2	10, 10, 10, 0	255.255.255.0	vmnet2	
VMnet8	192.168.140. 0	255.255.255.0	vmnet8	
DHCP service	Started	A <u>d</u> d	Remove	Properties Start
	plancea			
Service request:	1			Stop
				Restart
	[OK C	ancel Anniv	l Help



c mapping+option and change the subnets to be used cking the arrow (indicated) and selecting Subnet+from

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nary Aut	omatic Bridging Host Virtual Network Mapping Host Virtual Adap	oters DHCP NAT
Use th	is page to associate individual virtual networks to specific physical ers as well as change their settings	and virtual network
ddapt		
Inet <u>0</u> :	Bridged to an automatically chosen adapter	• >
4net <u>1</u> :	B VMware Network Adapter VMnet1	
1net <u>2</u> :	Wware Network Adapter VMnet2	
1net <u>3</u> :	Not bridged	• >
1net <u>4</u> :	Not bridged	• >
1net <u>5</u> :	Not bridged	• >
Inet <u>6</u> :	Not bridged	• >
Inet <u>7</u> :	Not bridged	• >
1net <u>8</u> :	B VMware Network Adapter VMnet8	• >
1net <u>9</u> :	Not bridged	• >

For VMnet1 set the IP address to 192.168.1.0

Subnet	
IP <u>A</u> ddress:	192 . 168 . 1 . 0
<u>S</u> ubnet Mask:	255 . 255 . 255 . 0
	OK Cancel

For VMnet2 set the IP address to 10.10.10.0

Subnet	
IP <u>A</u> ddress:	10 . 10 . 10 . 0
<u>S</u> ubnet Mask:	255 . 255 . 255 . 0
	OK Cancel



twork editor.It a good idea to open your host machine me the virtual LAN adapters to something a little more

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S Network Connections				
<u>File E</u> dit <u>V</u> iew <u>T</u> ools Adva <u>n</u> ce	d <u>H</u> elp			<u></u>
🕝 Back - 🕥 - 🏂 🔎	Search 📂 Folders 🕼	3 × 4	-	
Address SNetwork Connections				💌 ラ Go
Name	Туре	Status	Device Name	Phone # or Host
LAN or High-Speed Internet				
🕹 VMware Network Adapter VMnet2	LAN or High-Speed Internet	Connected	VMware Virtual Ethernet Adapter for VMnet2	
😃 VMware Network Adapter VMnet8	LAN or High-Speed Internet	Connected	VMware Virtual Ethernet Adapter for VMnet8	
🕹 Local Area Connection	LAN or High-Speed Internet	Connected	Broadcom NetXtreme 57xx Gigabit Controller	
🕹 VMware Network Adapter VMnet1	LAN or High-Speed Internet	Connected	VMware Virtual Ethernet Adapter for VMnet1	
Wizard				
New Connection Wizard	Wizard			
٢.				>
5 objects				

Renamed to

S Network Connections				
<u>File E</u> dit <u>V</u> iew <u>T</u> ools Adva <u>n</u> ce	d <u>H</u> elp			1
🜀 Back - 🌍 - 🏂 🔎	Search 🌔 Folders 🕼	3 × 9		
Address 🔕 Network Connections				🖌 🄁 Co
Name	Туре	Status	Device Name	Phone # or Host #
LAN or High-Speed Internet				
🕹 VM Heartbeat Network	LAN or High-Speed Internet	Connected	VMware Virtual Ethernet Adapter for VMnet2	
🕹 VMware Network Adapter VMnet8	LAN or High-Speed Internet	Connected	VMware Virtual Ethernet Adapter for VMnet8	
🕹 Local Area Connection	LAN or High-Speed Internet	Connected	Broadcom NetXtreme 57xx Gigabit Controller	
😃 VM to Host Private Network	LAN or High-Speed Internet	Connected	VMware Virtual Ethernet Adapter for VMnet1	
Wizard				
New Connection Wizard	Wizard			
<]				>
VMware Virtual Ethernet Adapter for VMr	net1			

Click the % efresh networks list option+within the VMW are Server console to refresh the virtual networks.



ole installed and configured and the virtual networks w time to create a datastore to hold all the ISO images

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Select the nost node in server console as shown below and under Commands+click Madd datastore+;

C VMware Infrastructure Web Access	4	Windows Internet Explorer				
🚱 🕤 👻 🖉 https://d-95918:8333/ul/#{e:"H	HostSystem ha-host",w:{t:true,	:0}}		👻 😵 Certifica	te Error 😽 🗙 Google UK	P -
Elle Edit View Favorites Icols Help						
😭 🍻 🌈 WMware Infrastructure Web Access					🙆 • 📾 • 🖶 • 🕞 e	2age 🔹 🌍 T <u>o</u> ols 🔹 🂙
VMware Infrastructure Web Access	Construction of the local division of the lo					
Application Virtual Machine Adminis	tration 🔳 💷 🕨 🦉	1			Help Virtual Appliance Mark	etplace Log Out
Inventory	D-95918.					
D-95918.	Summary Virtual Mach	ines Tasks Events Permissions				
	General				Commande	-
	II Hostname	D-95918			Constant (the l Machine	
	Manufacturar	5 353101			Add Virtual Machine to Inventory	
	Handal				* Add Datastore	
	Piodel				Configure Options	
	Processors	Intel(R) Pentium(R) D CPU 3.40GHz			* Edit Host Settings	
		1 CRU			* Edit Virtual Machine Startup/Shutd	own Settings
					* Refresh Network List	
	Usage	678.00 MHz			VMware Tips	-
	Memory	1.98 GB				-
	lisage	717 MB			Maser Multiplicater 1	
	Usage	717 MD			The states	
	Datastores					
	Name 🔺	Capacity Free Spa	ce Location		and a second second	
	standard	137.3 GB 105.12 G	B C:\Virtual Mach	ines/		
	<			>	Upgrade to VMware Infrastructure at a	a price you can
	Networks			-	Improve server utilization and get hid	her performance
	Name 🔺		VMnet	Туре	improve server deneater and get ing	ner performancer
	Bridged		vmnet0	bridged		
	HostOnly		vmnet1	hostonly		
	NAT		vmnet8	nat		
1	<			>		
<>			57p			
Task	Target	Status	Triggered At 🔻	Trig	gered by Completed At	
Done					Second Second Second	100% •

At the dialog supply a datastore name (ISOs) and a local path (C:\ISOs) then click % K+;

Name:		
 Local Dat 		
Local Date		
	tastore	
Map a director datastore.	ry on the host system as a	
Directory Pa	th:	
O CIFS Use a shared f	older over a network a VMware datastore.	
Properties:		
Server:		
	Examples: SERVER, nas.example.com, 192.168.0.1	
Folder:		
	Examples: \common\ISO- images, d\$	
Authorizatio	n:	
Username:		
	Examples: MYDOMAIN\user, SERVER\user	
Password:		



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ating the VMos. Under the Commands+section, select r a Virtual machine name and select a datastore (this your local drive) then click Next+;

Pages	11 12	Name and	l Location		
Name and Location Guest Operating System Memory and Processors	^	Enter a de datastore	scriptive name for y where its configurat	our new virtual machine ion files will be saved.	and specify th
lard Dick		Name:	ClusterDC		
Properties		Datastore	1 A	Capacity	Available
	_	ISOs		137.3 GB	80.6 GB
Network Adapter Properties		standard		137.3 GB	105.12 GB
CD/DVD Drive Properties					
Floppy Drive Properties					
ISB Controller					

Select the Operating System type (Enterprise Edition for clustering. We will be using 32bit OS) and click %Next+;

Guest Operating System	
Select the operating system you plan to instal in your virtual machine Your selection will be used to recommend settings and optimize performance. Once the virtual machine has been created, you will need to install this operating system from your own installation disc. Operating System: Windows operating system Novell Netware Solaris operating system Linux operating system Other operating systems Version: Microsoft Windows Server 2003, Enterprise Ed ▼	



C and 400MB for each cluster node) and CPU (1 each)

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Select to create a new virtual disk;

Create Virtual Machine	X
Pages	Hard Disk
Name and Location Guest Operating System Memory and Processors	A virtual disk is a special type of file, which will start small and then grow larger as you add applications and data to your virtual machine.
Hard Disk	Create a New Virtual Disk Choose this option to add a blank disk to your virtual machine.
Properties	• Use an Existing Virtual Disk
Network Adapter	Choose this option to reuse or share a hard disk from another virtual machine.
Properties	Don't Add a Hard Disk
CD/DVD Drive	
Properties	
Floppy Drive	
Properties	
USB Controller	
	<u>~</u>
Help	Back Next Cancel



Next+;

sk and select SCSI bus (SCSI ID 0 for the VM boot

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		Properties			
ame and Location uest Operating System emory and Processors	^	How much Capacity:	software and da	ta should this hard disk be	able to store?
ard Disk		Location:	[standard] Clu	usterDC/ClusterDC.vmdk	Browse.
roperties			105.12 GB ava	ailable	
etwork Adapter		► File Opt	tions		
roperties		⊩ Disk Mo	ode		
D/DVD Drive		v Virtual	Device Node		
roperties		Adapter	IDE 0 🔻	Device: 0 -	
oppy Drive		► Policies			
roperties					
SB Controller					
	~				

Select % dd a network adapter+and the network selection browse opens

Pages	Network Adapter	
Name and Location Guest Operating System Memory and Processors	Network adapters give your virtual machine access to port gr have been configured for virtual machine use on the host. If port groups have been configured, you will not be able to con provide the provided of the port groups have been configured.	oups that no such nect to
Hard Disk Properties	→ Add a Network Adapter	
Network Adapter	 Don't Add a Network Adapter 	
Properties		
CD/DVD Drive		
Properties		
Floppy Drive		
Properties		
USB Controller		
	✓	



Select to use an ISO image for the vCD drive and click the browse button,

Create Virtual Machine				
Pages		CD/DVD Drive		
Name and Location Guest Operating System Memory and Processors	^	CD and DVD media can be accessed on the host system or on your local computer.		
Hard Disk Properties		Host Media Use a Physical Drive Choose this option to give the guest operating system access to a choise of DVD drive on the best operating system access to a		
Network Adapter Properties	=	Vise an ISO Image Choose this option to give the guest operating system access to an ISO image residing on the bost file system		
CD/DVD Drive		130 mage reading on the nost me system.		
Properties				
Floppy Drive Properties		• Don't Add a CD/DVD Drive		
USB Controller				
Help		Back Next Cancel		

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drill down and select the Windows 2003 R2 Enterprise eate virtual machine window+click %Next+;



Complete

T

Inventory	Contents	Informatio	on
 D-95918.corp.northampto 	📁 SQL Server x86 Ent	Name:	ISOs
🔻 🚆 ISOs	📁 Windows Server Enterprise 2003 R2 🕯	Type:	Datastore
SQL Server x86 E		Capacity:	137.304 0
standard		Available:	80.604 GE
e Type: ISO Image (*.iso)		<	

At the next screen do not add a floppy drive and click %Next+;

Pages	Floppy Drive
Name and Location Guest Operating System Memory and Processors	Floppy media can be accessed on the host system or on your local computer.
Hard Disk Properties	Use a Physical Drive
Vetwork Adapter Properties	 Choose this option to give the guest operating system access to a physical floppy drive on the host system. Use a Floppy Image Choose this option to give the guest operating system access to a
CD/DVD Drive Properties	floppy image residing on the host file system. Create a New Floppy Image Choose this option to create a new floppy image on the host file system
loppy Drive	System
Properties	
JSB Controller	



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nd click %Next+;

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Pages	USB Controller
Name and Location Guest Operating System Memory and Processors	A USB controller gives your virtual machine access to USB devices plugged into the host.
Hard Disk Properties	 Add a USB Controller Don't Add a USB Controller
Network Adapter Properties	
CD/DVD Drive Properties	
Floppy Drive	
USB Controller	
Ready to Complete	
Help	Back Next Cancel

At the last screen click % inish+to complete the VM

Pages	Ready to Complete		
Name and Location Guest Operating System Memory and Processors	Please verify that your ner Name:	w virtual machine is configured correctly. ClusterDC	
Hard Disk	Location: Guest Operating System:	[standard] Microsoft Windows Server 2003, Enterpri	
Properties	Memory:	256 MB	
Network Adapter	Processors:	1	
Properties	Hard Disk:	8 GB	
	Network Adapter:	Using "HostOnly"	
CD/DVD Drive	CD/DVD Drive:	Using "[ISOs] Windows Server Enterpris	
Properties	USB Controller:	No	
Floppy Drive	▶ More Hardware		
USB Controller			
Ready to Complete			



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Select the first node and under the Command+section click % dd hardware+, the following screen appears. Click % etwork adapter+and the vNIC properties appear;

de 1 and node 2). For each of the cluster nodes add a for the Heartbeat network. This is done as follows;

Add Hardware Wizard		×
Pages	Hardware Type	
Hardware Type	Select a device from the following list:	
Hard Disk	Hard Disk	
Properties	Retwork Adapter	
Ready to Complete	CD/DVD Drive Floppy Drive Serial Port Parallel Port Passthrough SCSI Device Sound Adapter USB Controller	
Help	Back Next	Cancel

Select the %/Mnet2+option from the drop down list and click %/ext+, then click %/inish+ to complete. Do this for the second cluster node too.

🖶 Add Hardware Wizard		×
Pages	Properties	
Hardware Type Network Adapter Properties Ready to Complete	Which network will your virtual machine access? Network Connection: Bridged Connect at Power On: HostOnly VMnet2 NAT	
Help	Back Ne	xt Cancel



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systems on each VM and create a domain controller)C. Configure networking (Public and Heartbeat) ne 2 nodes to the domain. Once this is done you may structions in this document.

proceed with the rest of the instructions in this document.

Once the cluster nodes have been created we need to shut the VMqs down and attach the pre created virtual disks to each cluster node this involves also manually editing the VM configuration file (*.vmx). With the VMqs powered off start as follows. Select node 1 and click %Add hardware+ Click %Hard disk+;

Add Hardware Wizard		×
Add Hardware Wizard Pages Hardware Type Hard Disk Properties Ready to Complete	Hardware Type Select a device from the following list: Hard Disk Network Adapter CD/DVD Drive Floppy Drive Serial Port Parallel Port	
	 Parallel Port Passthrough SCSI Device Sound Adapter USB Controller 	
Help	Back Next Cance	1

Use existing hard disk;

Add Hardware Wizard		×
Pages	Hard Disk	
Hardware Type	A virtual disk is a special type of file, which will start small and then	
Hard Disk	grow larger as you add applications and data to your virtual machine.	
Properties	Create a New Virtual Disk Choose this option to add a blank disk to your virtual machine.	
Ready to Complete	 Use an Existing Virtual Disk Choose this option to reuse or share a hard disk from another virtual machine. 	
Help	Back Next Cancel	

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Pag	jes	Properties	
Hard Prop Real	d Disk berties dy to Complete	How much software and data should this hard disk be able Location: Capacity: Disk Mode Virtual Device Node Policies	to store? Browse
Help	p	Back Next	Cancel

The datastore browser opens. Select the first disk Quorum+and click QK+;

Inventory	Contents	Informatio	on
 D-95918.corp.northampto ISOs Standard ClusterDC INST1 Quorum SQLNode1 SQLNode2 	Quorum.vmdk	Name: Size: Modified: Type: Datastore:	Quorum.vmdk 512 MB Jul 29, 2009, 5:08 VM Disk File (*.vm standard
le Type: VM Disk (*.vmdk)		[



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+settings accept the default assignment for node1 if you chose a SCSI bus boor drive change the adapter ext+;

Pages	Properties	
Hardware Type	How much software and data should this hard d	isk be able to store?
tard Disk	Location: [standard] Quorum/Quorum.vn	ndk Browse
roperties	Capacity: 0.5 GB	
leady to Complete	▶ Disk Mode	
	Virtual Device Node	
	Adapter: SCSI 0 👻 Device: 0 💌	
	IDE 0 ▶ Policies IDE 1	
	SCSI 0 SCSI 1	
	SCSI 2 SCSI 3	
Help	Back	Next Cance

At the next screen select the More hardware+option to add the 2 remaining SCSI disks.

Pages	Ready to Complete	te	
lardware Type	The following hards	ware will be added to your virtual machine. P is accurate.	Please
lard Disk	von y ande and hee		
roperties	Hard Disk:	0.5 GB	
leady to Complete	► More Hardwar	e	



Now do the same for Node 2.

Once the disks have been added to both VMs it is important that only 1 machine is booted at any one time until the Windows cluster is installed and configured on the first node otherwise disk corruption will occur. The final step remaining is to ensure that the virtual SCSI bus on each VM is set to share and disk locking is disabled. Edit the .VMX file for each node by clicking the virtual machine and then under commands click Configure VM. On the advanced tab click into the Configuration Parameters section and then click Add New Entry using the following;

Name = disk.locking Value = false

Click % pply+and % K+to finish configuring the VM. Do the same for the second node. Next locate the VM configuration (search for *.VMX) file for each node, open in NOTEPAD and find the following section;

scsiX.sharedBus = "none" where X is the SCSI bus number the shared disks are attached too (1 in our case).

Change the text to;

scsiX.sharedBus = "virtual"

Close the file and save it.



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on both nodes, we need to power on the first node and P NTFS partitions on each of the 3 disks. Also configure k only on the heartbeat NIC. Select TCP\IP advanced

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properties and on the DNS tab clear the checkbox Register this connections address in DNS+. In network connections explorer change the adapter order to Public first then Private\Heartbeat.

dvanced Settings		2 🛛
Adapters and Bindings	Provider Order	
Connections are listed network services. Connections:	in the order in which they are ac	cessed by
Local Area Conn Local Area Conn VM to Host Priva VMware Network VM Heartbeat Network	ection te Network Adapter VMnet8 etwork	t t
Bindings for Local Are	a Connection: er Sharing for Microsoft Network	s t
Client for Micr Client for Micr Client for Micr	rotocol (TCP/IP) rosoft Networks rrotocol (TCP/IP)	1
		a s
		Cancel
	01	Cancel

Highlight the connection and click the up or down arrow to move. Ensure the Public connection is topmost

Boot the first node and create 3 NTFS partitions on the 3 new drives, use drive letters Q (Quorum), S (SQL Data) and T (SQL Logs). Although not necessary on your virtual machines the following instructions are used to create aligned partitions for use with SQL Server.

Open a command prompt and type diskpart followed by return as shown below





number (you may get these from disk management),

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Now issue the command to create the partition shown below

📾 C:\WINDOWS\system32\cmd.exe - diskpart	- 🗆	×
C:\>diskpart		-
Microsoft DiskPart version 5.1.3565		
Copyright (C) 1999-2003 Microsoft Corporation. On computer: D-95918		
DISKPART> select disk Ø		
Disk Ø is now the selected disk.		
DISKPART> create partition primary align = 64		
		-

Your complimentary use period has ended. Thank you for using

PDF Complete.

eated assign a drive letter using the following

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Now type exit to quit diskpart and at the command prompt format the partition using



The partition will be created using the label SQLData and NTFS file system with a cluster size of 64kb. (Note that NTFS disk compression will be disabled on this partition).

Create a simple text file on each drive. Shutdown the first node and boot the second node. Open disk management and assign the drive letters to the 3 raw disks. Check the text files exist, if they do then all is well. If you cannot view the files drive corruption has occurred and you should re create the virtual disks (remove them from the VMqs first).



nfigure the first node into the new cluster, shutdown d open cluster administrator and select the option to

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•
-
Browse
Cancel
1000

Click %Next+at the welcome screen;

New Server Cluster Wizard		×
	Welcome to the New Server Cluster Wizard This wizard helps you create a new server cluster. Using this wizard, you specify the computer that will be the first node in the cluster. After you finish the wizard, you can add additional nodes by using Cluster Administrator. This wizard requires that you provide the following information: • The cluster's domain • A cluster name that is unique in the domain • The name of the first computer to be added to the cluster • A static IP address • Logon information for a user account in the domain for the cluster service account To continue, click Next.	
	< <u>B</u> ack <u>N</u> ext> Cancel	



Confirm the node to add to the cluster and click %Next+;

Server Cluster Wizard	
Select Computer The computer must be a member	of the domain you specified.
Enter the name of the computer th	at will be the first node in the new cluster.
Computer name:	
sqlnode1	Browse
	Ad <u>v</u> anced
	< <u>B</u> ack <u>N</u> ext> Cancel

Complete

Click Here to upgra Unlimited Pages ar

T

from the analysis stage and click %Next+to proceed;

	ait while the wizard d	letermines the	cluster configu	uration.	Ø
🖌 Che	king for existing clus	ter			
✓ Esta	olishing node connec	ction(s)			
✓ Che	king node teasibility	e en en e			
Y Find	ng common resource	es on nodes			
0.1 10.112		·			
ks compl	ted.		ViewLog	Dataile	Re-analuae
			VIEW LOG	Details	116-arraiy26
Moutho	sontinuo. Cliak Pook	La abanda tha			
ks compl	ted.		View Log	Details	1 .

Enter a unique IP Address for the cluster and click %Next+;

v Server Cluster Wizard			
IP Address Enter an IP address that cluster management cluster.	tools will use	to connect to the	
IP Address:			
192 168 1 20			
	< <u>B</u> ack	<u>N</u> ext >	Cancel

PDF Complete	Your complimenta use period has ende Thank you for usin PDF Complet	<i>Ty</i> <i>d.</i> <i>D5</i> Cluster Configuration	v 1.0
Here to upgrade ited Pages and	Cluster Service Account Enter login information for be run. User name: User name: Bassword: Domain: This account will be give for proper operation.	In local administrative rights on all nodes of this cluster to	allow
		< <u>B</u> ack <u>N</u> ext>	Cancel

Ŧ

Click Unlim

Review the proposed configuration and click % Next+;

v Server Cluster Wizard			
Proposed Cluster Configuration Verify that you want to create a cluster w	with the followin	g configuration.	
Cluster name: Cluster1.TEST			-
Cluster IP address: 192.168.1.20\255.255.255.0			
Cluster network: Public - Private and Public VMware Accelerated AMD PCNet Adag Primary Address: 192.168.1.11 \ 255.25	pter 55.255.0		
Cluster service account credentials: Name:test Password: *****			•
To create a cluster with this configuration, cli	ick Next.	Quorum	⊻iew Log



figured review any errors or warnings and click % ext+

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Creatir Ple	ng the Cluster ase wait while the cluster is co	onfigured.	Ê
	Reanalyzing cluster Configure cluster services Configure resource types Configure resources		
Tasks c	completed.		
Tasks c	completed.		<u>R</u> etry

Finally click % Finish+to exit;

New Server Cluster Wizard	and the second	×
	Completing the New Server Cluster Wizard You have successfully completed the New Server Cluster Wizard.	
	View Log To close this wizard, click Finish.	
	< <u>B</u> ack Finish Cance	1



Julimited Pages and Expanded Features

ctive and managing the resources you may now boot e cluster administrator on SQLNode1, right click the and the add node wizard will start.

🚰 Cluster Administrator - [CLUSTER1 (C	uster1.TEST)]	
🚮 Eile View Window Help		_ B ×
	ne Active Groups Active Resources Network Interfaces	
Evict Node		
Start Cluster Service S <u>t</u> op Cluster Service		
New Configure Application	<u>G</u> roup Ctrl+G <u>R</u> esource Ctrl+N	
Properties	Node Gluster	
Adds nodes to the cluster		

Click %Next+through the welcome screen and you will be asked to provide the computer name of the node you wish to add. Browse for the computer name and select from the list returned. Click the %Add+button to confirm the node;

Enter the names of the	computers that will be added to	o the cluster.
Computer name:		Browse
Selected computers:	SQLNODE2	
		Remove
		Advanced
4		

minimal configuration by clicking the advanced button.

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F

Advanced Configuration Options	? ×
C Lypical (full) configuration	
This option is appropriate for most installations and will result in a completely configured server cluster.	
Advanced (minimum) configuration	
Only select this option for complex configurations where you do not want the wizard to automatically locate and include all the storage to be managed by the cluster.	ð
You can manually add these storage devices after completing the wizard.	
For more information, click Help.	
OK Cancel Help	

Cluster administrator analyses the configuration, review any errors or warnings.

dd Nodes Wizard			x
Analyzing Configuration Please wait while the wizard detern	mines the cluster configu	uration.	
 ✓ Checking for existing cluster ✓ Establishing node connection(✓ Checking node feasibility ✓ Finding common resources on ★ Checking cluster feasibility 	(s) nodes		
Tasks completed.			
Click Next to continue. Click Back to ch	View Log	Details	<u>R</u> e-analyze
	< <u>B</u> ack	<u>N</u> ext >	Cancel

PDF Complet	Your use per Thai	complimentary riod has ended nk you for using PDF Complete	05 Cluster Configuration	1	v 1.0
ere to upgrad ed Pages and	Cluster Serv Enter log be run.	Features rice Account n information for the test TEST count will be given le r operation.	e domain account under which the o	es of this cluster to allow	

T

Click H Unlimit

Review the proposed configuration and click %Next+;

l Nodes Wizard		
Proposed Cluster Configuration Verify that you want to add nodes to a (cluster with the following con	figuration.
Cluster name: CLUSTER1.TEST		
Cluster IP address: 192.168.1.20\255.255.255.0		
Cluster network: Public - Private and Public		
Primary Address: 192.168.1.11 \ 255.2	255.255.0	
Cluster service account credentials: Name:test Password: *********		
To add nodes to a cluster with this configura	ation, click Next.	⊻iew Log
	< <u>B</u> ack	xt> Cancel

PDF Complet	Your complimentary use period has ended. Thank you for using PDF Complete.	05 Cluster Configuration e cluster, again review any errors or warnings	v 1.0
ere to upgrad ed Pages and	e to Expanded Features	×	
	Adding Nodes to the Cluster Please wait while the cluster is c	configured.	
	 		
	Tasks completed.		
		View Log Details <u>H</u> etry	
		< <u>B</u> ack <u>N</u> ext > Cancel	

T

Click H Unlimi

Finally click % inish+when the wizard has completed;

Add Nodes Wizard		×
	Completing the Add Nodes Wizard You have successfully completed the Add Nodes Wizard.	
	View Log To close this wizard, click Finish.	
	< <u>B</u> ack [Finish] Cance	



rces owned by SQLNode1

s configured you should see the following in cluster

v 1.0

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Name	State	Owner	Group	Resource Type	Description	
Disk Q:	Online	SQLNODE1	Cluster Group	Physical Disk		
up 💭 Disk S:	Online	SQLNODE1	Group 0	Physical Disk		
Cluster IP Address	Online	SQLNODE1	Cluster Group	IP Address		
Cluster Name	Online	SQLNODE1	Cluster Group	Network Name		
ation Disk T:	Online	SQLNODE1	Group 1	Physical Disk		
s						
sources						
terfaces						
ps wroec						
rfares						
itoriacos						

Open the networks information and set the properties for each item;



Second Second Seco	Your complimentary use period has ended. Thank you for using PDF Complete.	05 Cluster Configuration	v 1.0
Click Here to upgrade to Unlimited Pages and Exp	oanded Features		<u>?</u> ×
Lien Na De Str Su	Heartbeat Heartbeat Heartbeat Scription: Enable this network for cluster use This network performs the following Client access only (public netwo Internal cluster communications All communications (mixed netwo ate: Up bnet mask: 255.255.255.0	role in the cluster: rk) only (private network) prk)	
	UN	Abbiy	

The Public should be set to Mixed Communication access;

Public Properties	<u>? ×</u>
General	
Name: Public	
Description:	
 Enable this network for cluster use This network performs the following role in the cluster: Client access only (public network) Internal cluster communications only (private network) All communications (mixed network) 	
State: Up Subnet mask: 255.255.255.0	
OK Cancel Apply]



by moving a cluster group from one node to another. Right group+. The resource will transfer to the partner node;

v 1.0

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_ 8 × 🚮 Eile View Window Help 🚳 👁 🛆 🗙 🖆 🔯 🛍 🖉 🚵 State Resource Type Description Name Owner Disk T: Online SQLNODE1 Physical Disk Resour
 Resour
 Resour
 Resour
 Rei
 Cluster Ctrl+T Take Offline Ctrl+M New Configure Application

Moves an entire group from one node to another

Groups 0 and 1 transferred to SQLNode2;

	=== [===]						
2 🛋 🛆 🕋 🖭 🚉	Name	State	Owner	Group	Resource Type	Description	
Groups	Manie Manieko:		SOLNODE1	Cluster Group	Physical Dick	Description	
🛁 Cluster Group	Di Dick St	Online	SOLNODE2	Group ()	Physical Disk		
- 🚰 Group 0	Cluster IP Address	Online	SOLNODE1	Cluster Group	IP Address		
Group 1	Cluster Name	Online	SOLNODE1	Cluster Group	Network Name		
Resources	Disk T:	Online	SOLNODE2	Group 1	Physical Disk		
Cluster Configuration		0000000000					
Resource Types							
Networks							
Public							
Metwork Interfaces							
SOLNODE1							
Active Groups							
- Active Resources							
Network Interfaces							
SQLNODE2							
- Active Groups							
Active Resources							
Network Interfaces							



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DISTRIBUTED TRANSACTION COORDINATOR

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Next we need to create a cluster resource and group for the Distributed Transaction Coordinator service.

In Cluster Administrator right click £ roupsqand select Newq> £ roupq Give the group a name and click Nextqthen add available nodes and click £ inishq Right click the newly created group and select Newq> £ esourceq Give the resource a name ± NST1DTC IPq from £ esource Typeqdrop down list select ± P Addressqand click Nextq Select available nodes and click Nextq Click Nextqthrough dependencies, enter an IP Address and mask for the public network (192.168.0.30 and 255.255.255.0) and click £ inishq

Right click the group and select Newq> Resourceq Give the resource a name INST1DTC Nameq From the drop down list select Network nameqas the resource type and click Nextq Select available nodes and click Nextq Add IP Address resource as a dependency and click Nextq Enter the unique network name and uncheck the DNS registration must succeedqcheckbox then click Finishq

If the DTC disk drive has already been discovered by Cluster Administrator you may skip this paragraph. Otherwise, right click the group and select Awy> Aesourceq Give the resource a name DTC Dataqand from the drop down list select Physical Diskqas the resource type, then click Awxtq Select available nodes and click Awxtq Click Awxtqthrough the dependencies. From the drop down list on the parameters dialog select the disk drive to use (P:) then click Finishq

Lastly create the DTC resource by right clicking the group and selecting Alewq> ±esourceq Give the resource a name ±NST1DTC SVCqand select £Distributed Transaction Coordinatorqfrom the £Resource Typeqdrop down list, then click ±Nextq Select available nodes and click ±Nextq At the dependency dialog select the resources for Network Name and Physical Disk only (These resources must be online for the service to start) then click ±Inishq Now right click the group and bring it online.



ERVER INSTANCE.

Click Here to upgrade to Unlimited Pages and Expanded Features

ated and configured you may then proceed to install the SQL Server instance. This is done as follows, at the splash screen select to install the SQL Server components;

SQL Server 2005 (Disc 1 of 2)	
	Start
	Prepare
	Revie <u>w</u> hardware and software requirements
	<u>R</u> ead the release notes
	Install SQL Server Upgrade Advisor
	Install Server <u>c</u> omponents, tools, Books Online, and samples
	Run the SQL Native Client Installation Wizard
	Other Information
	Browse this CD
	⊻isit the SQL Server website
SQL Server 2005 Enterprise Edition	R <u>e</u> ad the SQL Server license agreement E <u>x</u> it

Accept the EULA and click %Jext+;

d User	License Agreement
MICF	OSOFT SOFTWARE LICENSE TERMS
MICF	OSOFT SQL SERVER 2005 STANDARD AND ENTERPRISE IONS
Ines Micr live read abov rece Micr	e license terms are an agreement between osoft Corporation (or based on where you , one of its affiliates) and you. Please . them. They apply to the software named e, which includes the media on which you sived it, if any. The terms also apply to any osoft
*	updates,
*	supplements,
*	Internet-based services, and
*	support services
	and the familie terms and any differed



erver support files and .NET Framework

SQL Server required for	Component Update will install the following components SQL Server Setup:
.NET Fra	nework 2.0
Microsoft	SQL Native Client
MILTOSOTU	syr server 2003 serup support Hies
Click Install t	o continue.

Click %Jext+to continue;

Installs software components required prior to installing SQL	1
Server.	
ISQL Server Component Opdate will install the following componi required for SQL Server Setup;	ents
✓.NET Framework 2.0	
✓ Microsoft SQL Native Client	
 Microsoft SQL Server 2005 Setup Support Files 	
The required components were installed successfully.	



Click %Next+to the complete the System Configuration Check. Review any errors or warnings (IIS is only required for Reporting Services installations so ignore this)

29 Remaining	29 Total O Success	0 Error 0 Warning	
ails:			
Action	Status	Message	
NODE1 - Internet Explorer Requirement	2		
NODE1 - COM Plus Catalog Requirem			
NODE1 - ASP.Net Version Registratio			
NODE1 - Minimum MDAC Version Req			
NODE2 - WMI Service Requirement			
NODE2 - MSXML Requirement			
NODE2 - Operating System Minimum L			
NODE2 - Operating System Service P			
NODE2 - SQL Server Edition Operation			

Complete

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T

licence details (the product is pre-pidded)

The Name f	ield must be filled	d in prior to pro	oceeding. The	Company field	is optional.
N <u>a</u> me:					
Company:					
Please ente sticker in th	er your 25 charac ie CD liner notes	ter Product Ke or the CD slee	ey. You can fin ve.	d this number (on the yellow

Select the options to install, note the option for a fail over cluster (select this now). Click %Next+to proceed

Components to Install Select the components to install or upgrade.		
☑ SQL Server Database Services		
🔲 Create a SQL Server failover cluster 🕊		
🦳 Analysis Services		
🔽 Create an Analysis Server failover cluster		
<u>Reporting Services</u>		
Notification Services		
🔲 Integration Services		
✓ Workstation components, Books Online and developments	ent tools	

Your complimentary use period has ended. 05 Cluster Configuration Complete Thank you for using PDF Complete. click %Next+ Instance Nan You can insta

instance.

T

	_	
ne		1
II a default instance	e or you can specify a named	1

Provide a name for the instance. For a default installation, click Default instance and click Next. To upgrade an existing default instance, click Default instance. To upgrade an existing named instance select Named instance and specify the instance name.

⊙ <u>D</u> e	ned instanc	e		
In	stance1			

Supply a unique Virtual network name. For more info on network names and named instances see Appendix B.

🛃 Microsoft SQL Server 2005 Setup				×
Virtual Server Name The virtual server name must be uniqu	ue on the ne	etwork.		
Enter the name of the new virtual ser	ver.			
<u>V</u> irtual server name:				
SQLCluster01				
Help	< <u>B</u> ack	<u>N</u> ext :	,	Cancel

X



Click Here to upgra Unlimited Pages a

Your complimentary use period has ended. Thank you for using PDF Complete.

tual network name and click % dd+

Enter an IP address for the virtu Add.	al server. To add IP addreses for additional networks, click
Virtual server name:	SQLCluster01
N <u>e</u> twork to use:	Public
IP address:	192 168 1 33
Network address:	192.168.1.0
Network subnet:	255.255.255.0
	<u>A</u> dd <u>R</u> emove
Selected networks and IP addres	sses:

Then click %Jext+to proceed

inter an IP address for the virtual se add.	rver. To add IP addreses for additional networks, click
irtual server name:	SQLCluster01
l <u>e</u> twork to use:	X
P address:	
letwork address:	
letwork subnet:	
	Add <u>R</u> emove
elected networks and IP addresses; 192–168–1, 33–255, 255, 255, 0, Public	



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Your complimentary use period has ended. Thank you for using PDF Complete.

ontains the resources you wish to use;

Cluster Group Selection		
Select the cluster group when installed.	re the virtual server resources will be	L
Available cluster groups:		
Cluster Group		
MS DTC		
SQL Disks		
Unavailable cluster groups:		
L Unavailable cluster groups:]
Unavailable cluster groups:]
Unavailable cluster groups:		

Select the required nodes to participate in the SQL Server cluster and click %Jext+

Microsoft SQL Server 200	05 Setup	×
Cluster Node Configura	ation	
Select the nodes to include in	the virtual server.	
Available nodes:	Selected nodes:	
	Add ->	
	<- <u>R</u> emove	
Required node:		
NODE1		
Unavailable nodes:		
	1	
Help	< <u>B</u> ack <u>N</u> ext >	Cancel

Circk Here to upgrade	Your complimentary use period has ended. Thank you for using PDF Complete.	05 Cluster Configuration unt for the remote setup;
	Remote Account Information Account for remote setup.	
	Enter a user name and password th the cluster system. This will be used	at is a valid administrator account for all nodes in during setup only.
	TEST\Administrator Password:	
	<u>j</u>	
-	Help	< Back Next > Cancel

Switch to the domain controller and create a user account for the SQL Server service. Supply the service account information and click % Jext+;

Microsoft SQL Server 2005 Setup		×
Service Account Service accounts define which accounts t	to log in.	
Customize for each service account		
C Use the built-in System account	 Local system	¥
Use a domain user account		
<u>U</u> sername: Password:		
_ Domain:		
Start services at the end of setup		
☐ SQL Server Agent ☑ SQL Browser		
Help	< Back	Cancel



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Complete

r and create a set of Global security groups for the SQL ate a group for each resource indicated below, or create rver service domain user account must be a member of p name(s) and click % Next+;

the group(s). Supply the group	name(s) and	click	%Jext
--------------------------------	--------	-------	-------	-------

Hicrosoft SQL Server 200)5 Setup
Domain Groups for Clus	stered Services
The startup account for each to set its access control. Enter clustered service being installe	clustered service will be added to the DomainName\GroupName ' the name of existing DomainName\GroupName for each id. For additional information, click Help.
Service Name	DomainName\GroupName
<u>S</u> QL Server	
SQL Server Agent	
<u>F</u> ull-Text Search	
Help	< <u>B</u> ack <u>N</u> ext > Cancel

Select the SQL Server authentication method and click %Next+;

ion Moue	
o SQL Server.	
uthentication mode to use for this installation.	
: Authentication Mode	
ode (Windows Authentication and SQL Server Authentication)	
sa logon password below:	
ssword:	
<u>p</u> assword:	



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n (if you set your Windows regional settings correctly Click %Jext+;

Expanded Features d, the Regional Settings on the server are incorrect, stop the

installation and check and correct the regional settings.

icrosoft SQL Server 2005 Setup	
llation Settings Collation settings define the sorting b	ehavior for your server.
ation settings for service: SQL Server	
Collation designator and sort order:	
	E Binary - code point
Case - sensitive	
	Width - sensitive
⁵ <u>SQL collations (used for compatibility</u> Binary order based on code point con Strict compatibility with version 1.x co Dictionary order, case-insensitive, for Dictionary order, case-insensitive, for	y with previous versions of SQL Server) nparison, for use with the 850 (Multilingual) ase-insensitive databases, for use with the use with 1252 Character Set. r use with 1252 Character Set. previous preference, for use with 1252 Ch
Help	

Click %Jext+;

Microsoft SQL Server 2005 Setup	×
Error and Usage Report Settings	
Help Microsoft improve some of the SQL Server 2005 components and services.	
error reporting server. Error reports include information regarding the	e condition of SQL
Server 2005 when an error occurred, your hardware configuration ar reports may unintentionally include personal information, which will no Microsoft.	nd other data. Error ot be used by
Automatically send Eeature Usage data for SQL Server 2005 to Micro includes anonymous information about your hardware configuration a software and services.	osoft. Usage data and how you use our
For more information on the error reporting feature and the tupe of infor	mation controlick
Help.	madon sent, click
Help ZBack Nevt >	Cancel
	Cancor



05 Cluster Configuration

d Expanded Features	×
Ready to Install	
Setup is ready to begin installation.	
Setup has enough information to start copying the program files. T change any of your installation settings, click Back. To exit setup, o	o proceed, click Install. To click Cancel.
The following components will be installed:	
SQL Server Database Services (Database Services, Renlication, Full-Text Search)	
Client Components	
(Connectivity Components, Management Tools, Busine Development Studio, SQL Server Books Online)	ss Intelligence
Help Sack Install	Cancel

Setup displays the progress on each node via the drop down list indicated;

INODE2	•
NODE1	
MSXML6	
SQL Setup Support Files Setup finished	
SQL VSS Writer Configuring components	
SQL Native Client Setup finished	
OWC11 Setup finished	
SQL Server Backward-Compatibility Files	
SQL Server Database Services	
Visual Studio Integrated Development	-



bleted click %Jext+;

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roduct	Status
MSXML6	Setup finished
SQL Server Books Online	Setup finished
SQL Setup Support Files	Setup finished
SQLXML4	Setup finished
SQL Native Client	Setup finished
<u>0WC11</u>	Setup finished
SQL Server Backward-Compatibility Files	Setup finished
Workstation Components, Books Onlin	Setup finished
Workstation Components, Books Onlin	Setup finished

Click %Finish+

Microsoft Syl, Server 2005 Setup	
Completing Microsoft SQL Server 2005 Setup	
Setup has finished configuration of Microsoft SQL Server 2005	
Refer to the setup error logs for information describing any failure(s) that occurre- setup. Click Finish to exit the installation wizard.	d during
Summary Log	
fo minimize the server surface area of SQL Server 2005, some features and servic	tes are
disabled by default for new installations. To configure the surface area of SQL Ser Surface Area Configuration tool.	ver, use the
disabled by default for new installations. To configure the surface area of SQL Ser Surface Area Configuration tool. Analysis Services	ver, use the
 disabled by default for new installations. To configure the surface area of SQL Ser Surface Area Configuration tool. Analysis Services If Analysis Services was upgraded from SQL Server 2000, all cubes, dimensions, and mining models must be reprocessed using SQL S Management Studio. 	erver
 disabled by default for new installations. To configure the surface area of SQL Ser Surface Area Configuration tool. Analysis Services If Analysis Services was upgraded from SQL Server 2000, all cubes, dimensions, and mining models must be reprocessed using SQL S Management Studio. Reporting Services 	erver
 disabled by default for new installations. To configure the surface area of SQL Ser Surface Area Configuration tool. Analysis Services If Analysis Services was upgraded from SQL Server 2000, all cubes, dimensions, and mining models must be reprocessed using SQL S Management Studio. Reporting Services The Reporting Services installation options you specified in Setup determine whether further configuration is required before you can access the report server. If you installed the default configuration, the 	erver



ISTANCES & NETWORK NAMES

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setup requires you to supply an instance name for the

SQL Server instance you are installing. On a non clustered system, the machine name is the instance name prefix. A virtual network name is essentially the same as a machine name in that it must be unique on the network.

Installations of SQL Server allow only one default instance, after that the rest must be named.

Take the following scenarios

5.1 NON CLUSTERED

A non clustered server named <u>\\MYSERVER</u> has 2 SQL Server instances installed to it. When the administrator installed SQL server they created a named instance using the name <code>%</code> astance1+and a default instance.

To log on to each instance you would use,

Default

MYSERVER

Named

MYSERVER\Instance1

5.2 CLUSTERED

A 2 node clustered system exists using the following details,

Node1

Node 2

Name = SQLCLNODE01	
IP = 10.10.10.17	

Name = SQLCLNODE02 IP = 10.10.10.18

Windows Cluster

Name = WINCL01 IP = 10.10.10.12

Default SQL Instance	Named SQL Instance
Network Name = SQLCL01	Network Name = SQLCL02
Instance Name =	Instance Name = INST01



Ided to the system as there are now more names and ne computers. In the clustered environment it is agard the node names and IP addresses when

connecting to SQL Server. Everything is referenced by the Network name. In the clustered environment the Network Name and not the machine name forms the instances prefix.

To logon to the default instance you use

SQLCL01

To logon to the named instance you use

SQLCL01\INST01

Practice these by using names of your own to substitute the items above and ensure you understand default and named instances in both clustered and non clustered environments.