

How to Install and Configure the DHCP Service in Windows Server 2008 R2

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Introduction

Dynamic Host Configuration Protocol (DHCP) allows administrators to assign IP addresses to network clients automatically, as opposed to assigning them statically (by hand). This eases administrative effort and improves the performance and reliability of the network by reducing human error. DHCP also creates a single point of administration for assigning IP addresses to multiple clients in a local area network.

For detailed information on how a DHCP server receives requests for and assigns addresses, see the Microsoft Technet article, "How Does DHCP Work" located at:

<http://technet.microsoft.com/en-us/library/cc750190.aspx#XSLTsection126121120120>

When installing and administering the DHCP server role, several key factors need to be addressed. Your IP network needs to be properly addressed, and those addresses need to be properly implemented in the DHCP server. This group of addresses, which will be dynamically assigned and maintained by the DHCP server, are referred to as a scope. Your network clients will receive IP addresses from this scope when they are configured to receive a DHCP address. Assigning an IP address to a client through the DHCP process is referred to as a lease. When a client is taken off the network (shutdown, moved to a different network, etc), the IP address assigned to it is returned to the DHCP scope and can be issued to another client at a later date.

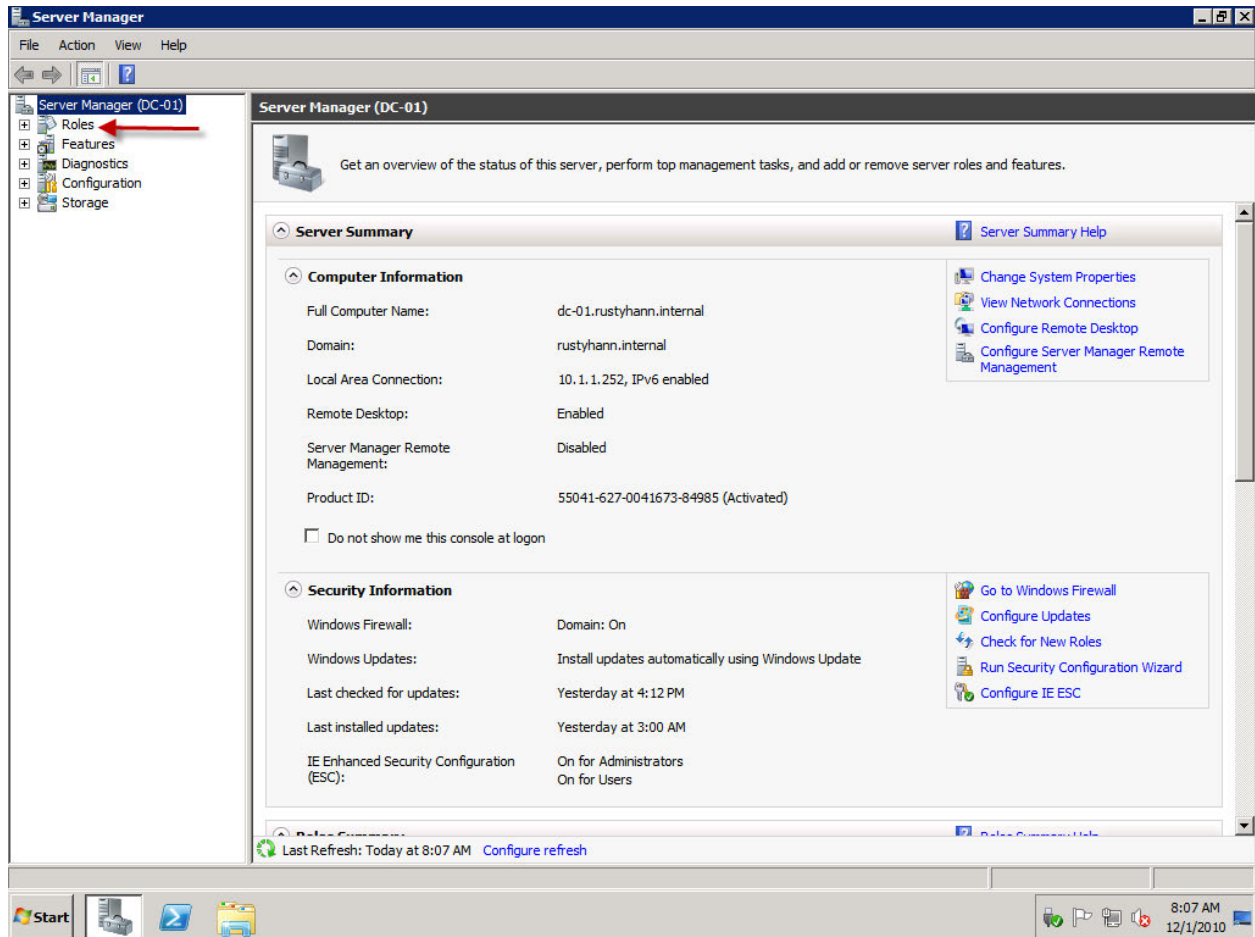
Along with the pool of IP addresses assigned to it, a DHCP scope can have other settings which will be passed to the client as part of a DHCP lease. These settings include primary and secondary DNS servers, a default gateway, and a subnet mask. A subnet mask must be assigned for a client to have local area network connectivity. In order for a client to receive a dynamically assigned address and have connectivity to the Internet, a DNS server(s) and a default gateway must be assigned at a minimum.

The following tutorial will show you how to add the DHCP server role and configure a basic DHCP scope. For further information on managing and maintaining a DHCP server and the scopes implemented on it, see the tutorial, ***"Managing and Maintaining a DHCP server in Windows Server 2008 R2"***.

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STEPS

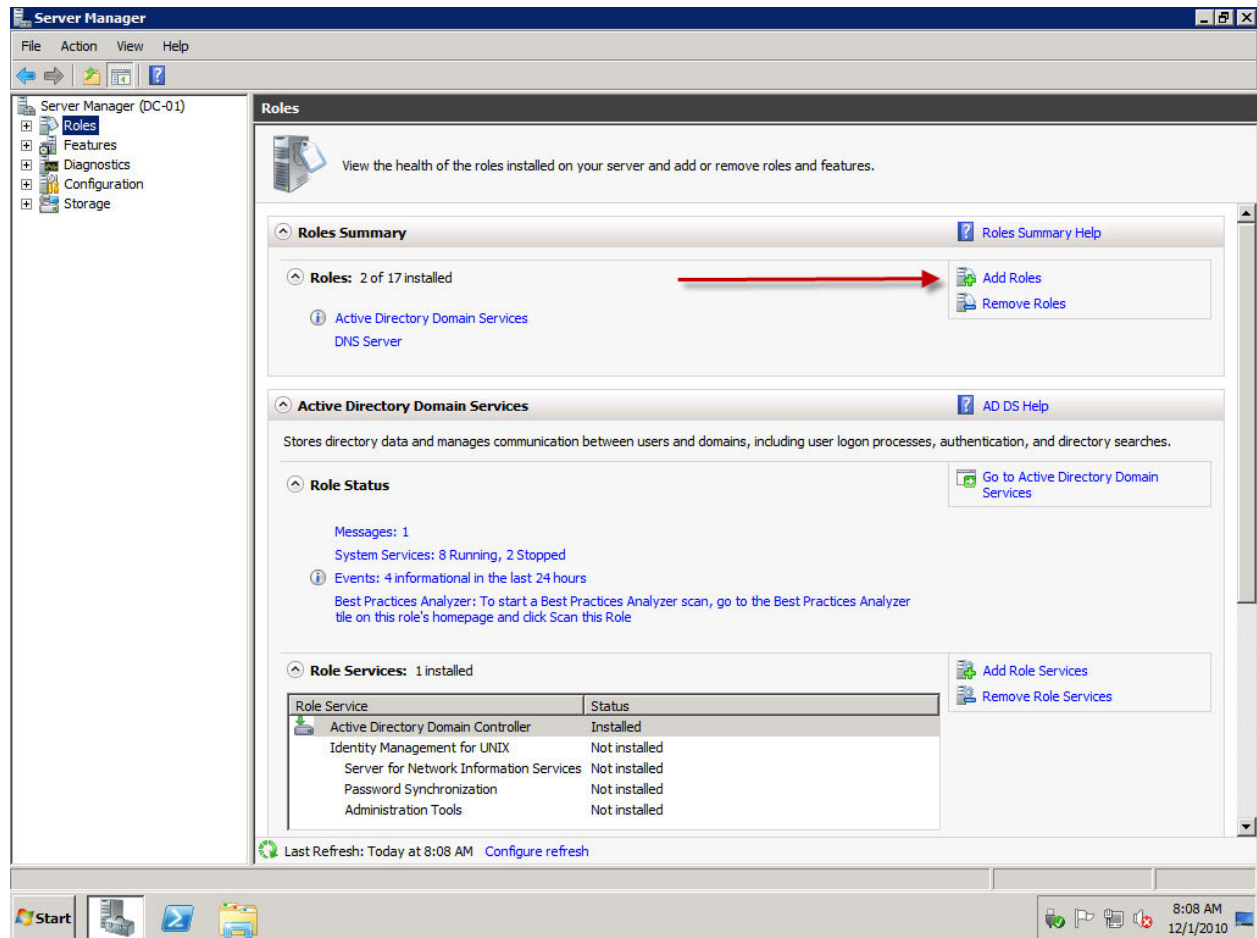
1. Start by opening the Server Manager MMC. This should have opened upon login. Click the Roles node in the left window pane.



NOTES:

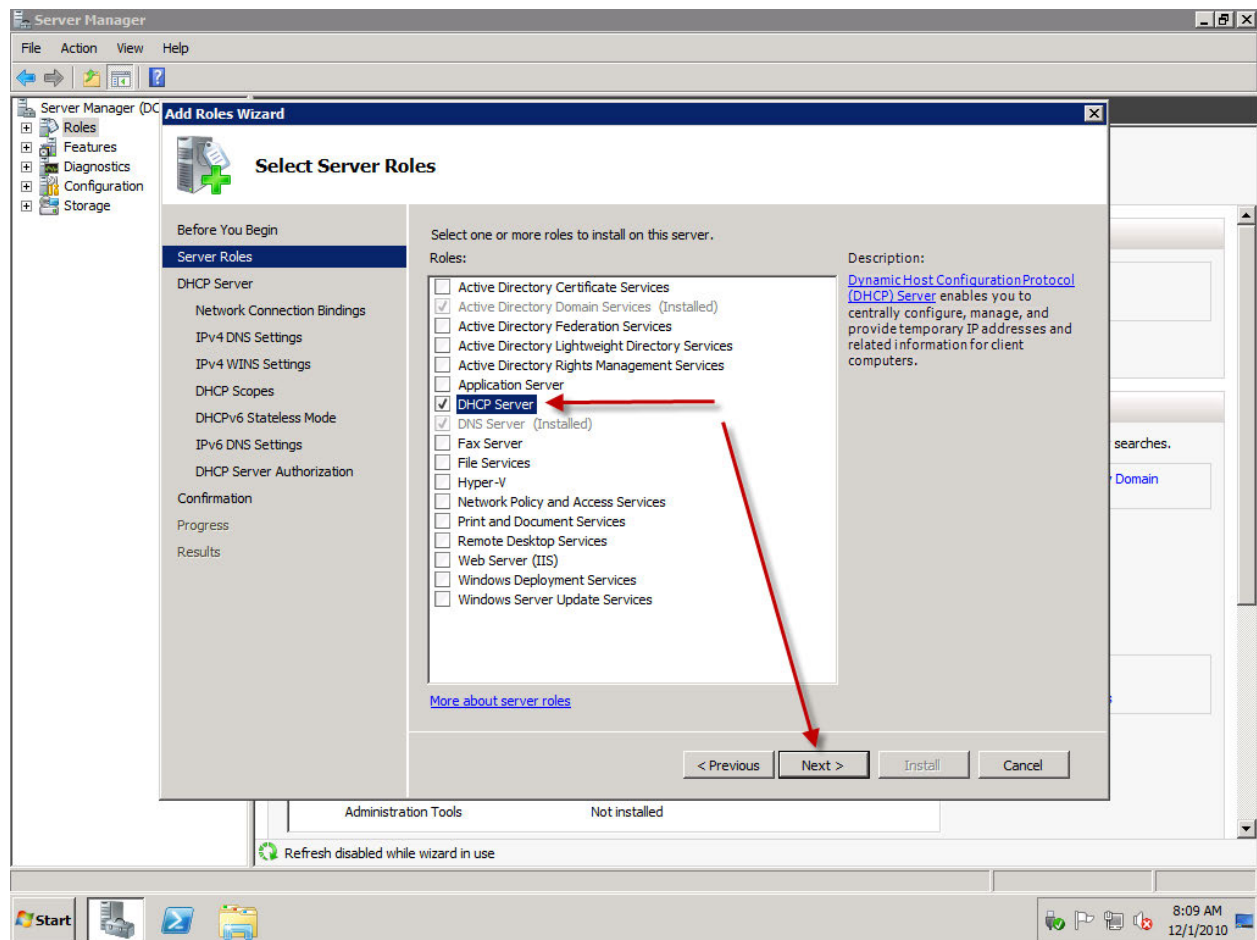
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2. Click Add Roles in the right window pane.



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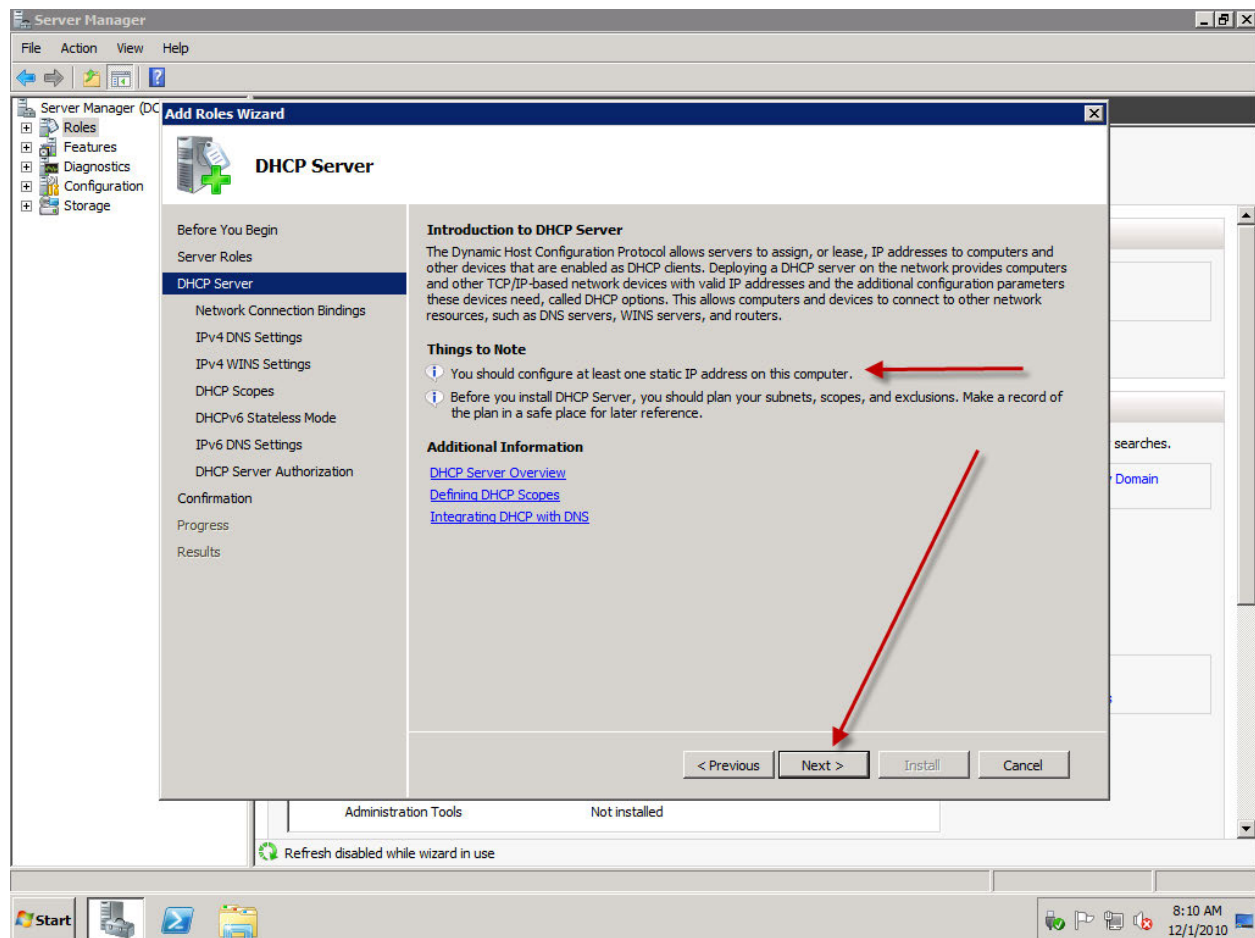
3. Place a checkmark next to, "DHCP Server", and click the Next button.



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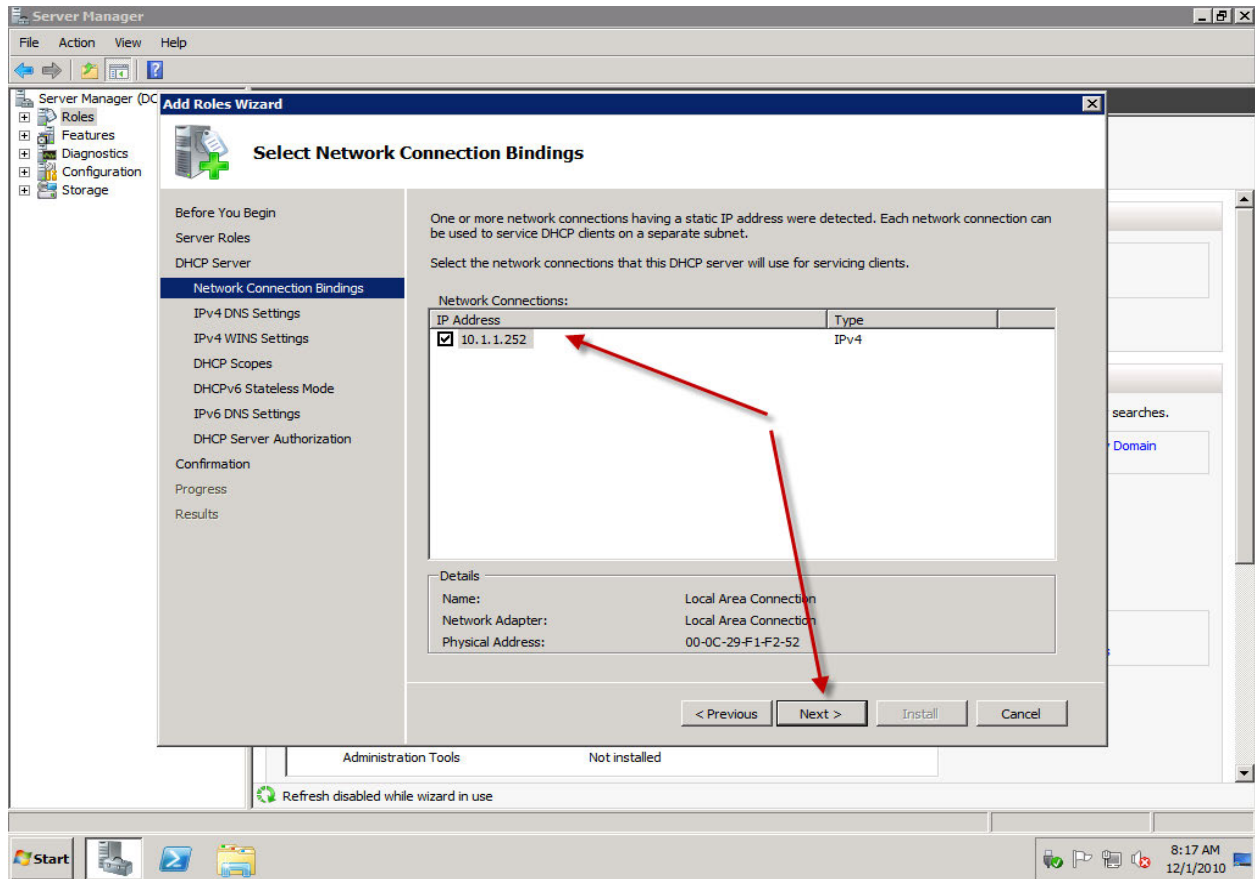
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4. The DHCP Server Introduction screen will appear. Click the Next button.



NOTES: "You should configure at least one static IP address on this computer." This is a direct quote from this screen. **YOU MUST HAVE A STATIC IP ADDRESS FOR YOUR SERVER IN ORDER TO PROPERLY RUN DHCP. DO NOT RUN YOUR DHCP SERVER WITH A DYNAMIC ADDRESS.** If you run your server with a dynamic address, each time you reboot the server you will have a different, dynamically assigned IP address. This will cause client computers to lose connectivity to the server because they will be referencing the old IP address. **SERVERS HAVE STATIC IP ADDRESSES, ALWAYS.**

5. You will now select your network connection bindings. If you only have one network card in your server, you will HAVE to select it. If you have multiple network cards you can select as many or as few as you like as long as one is selected. The default selection is usually sufficient for a basic DHCP scope. **Click the Next button once your network connection bindings have been selected.**



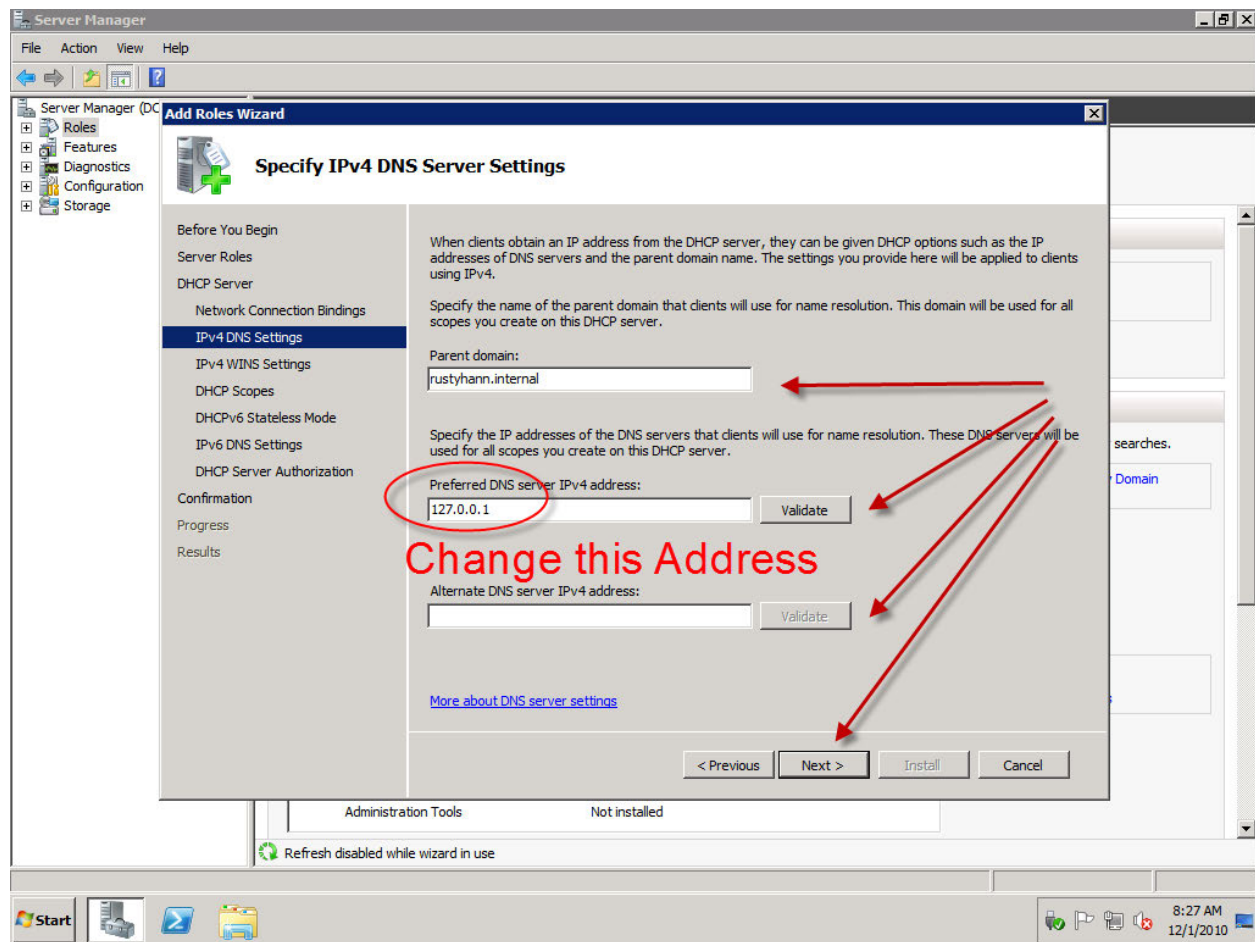
NOTES: The network connection binding is the network address which the DHCP service listens on. When a DHCP request is sent by a client PC, the DHCP server will pick that message up on the network connection you bind the DHCP server to. If the binding is not present, or incorrect, the broadcast message for a DHCP request will be discarded by the server.

If you wish to listen for DHCP broadcast messages on multiple network connections, you must have multiple network connection bindings. It is imperative that you bind the correct network connection to the network you intend to issue dynamic addresses to.

For instance, if you have two networks and only wish to run the DHCP service on one of them, you must bind the network connection connected to that specific network. If you were to bind the network connection to the incorrect network, two things would happen. The wrong network would receive dynamic addresses, and the network which DHCP was intended to run would NOT receive dynamic addresses. If you bound both connections, both networks would receive dynamic addresses, which is fine for the network that was intended to have dynamic addresses, but would create IP address conflicts due to the second network receiving improper dynamic addresses.

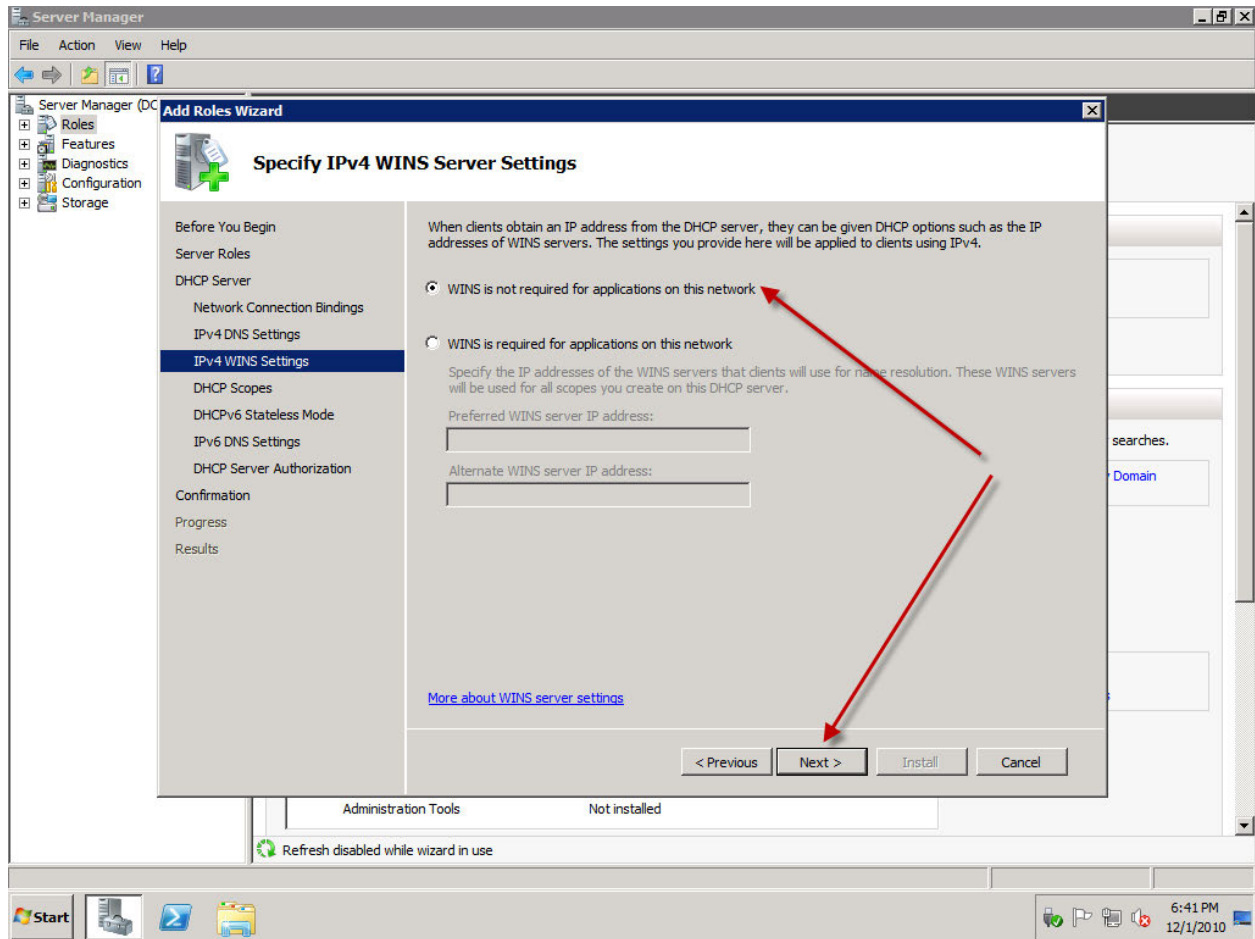
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6. Specify the Parent Domain, Preferred DNS server IPv4 address, and Alternate DNS server IPv4 address. **Make sure to change the Preferred DNS server IPv4 address to the IP address of the server itself, or another DNS server on your network.** Click the Next button when finished.



NOTES: The default Preferred DNS server IPv4 address is 127.0.0.1 because this server is also a domain controller which resolves DNS queries for itself. If you leave this setting at its default, 127.0.0.1, clients that receive a dynamic address from this DHCP server will try to resolve DNS queries using their local (local to the client receiving the address) loopback address. If a DNS entry is not present in the client DNS cache, the DNS query will fail. You must set the Preferred DNS server IPv4 address to the IP address of a DNS server on your network. This will direct client DNS queries to the DNS server specified, which will successfully resolve those DNS queries if set up correctly.

7. Leave the radio button next to, "WINS is not required for applications on this network", selected and click the Next button.

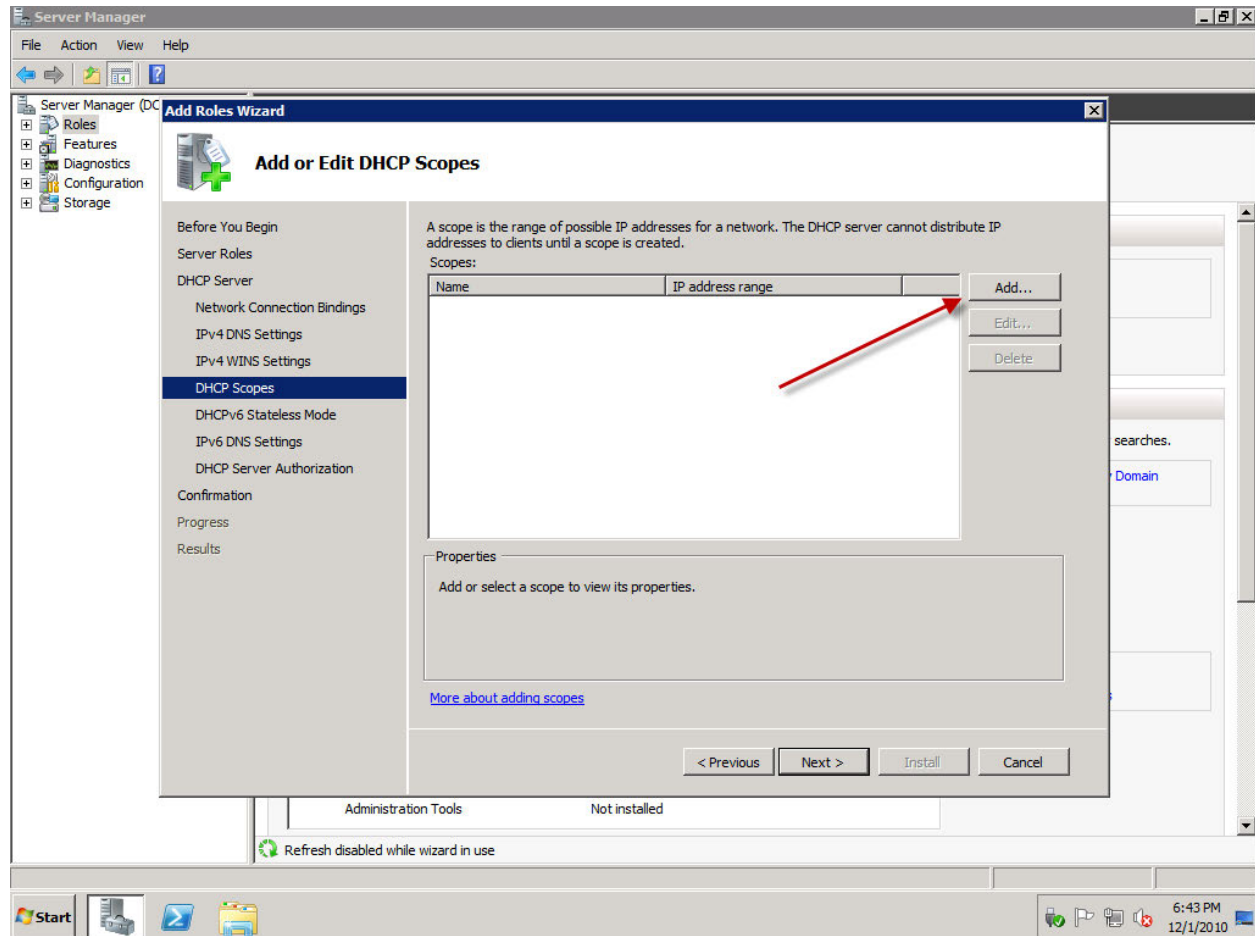


NOTES: This is the default value, even though you can change it if WINS is used in your network.

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8. You can choose to add a DHCP scope at this stage in the DHCP server role installation. **Click the Add button.**

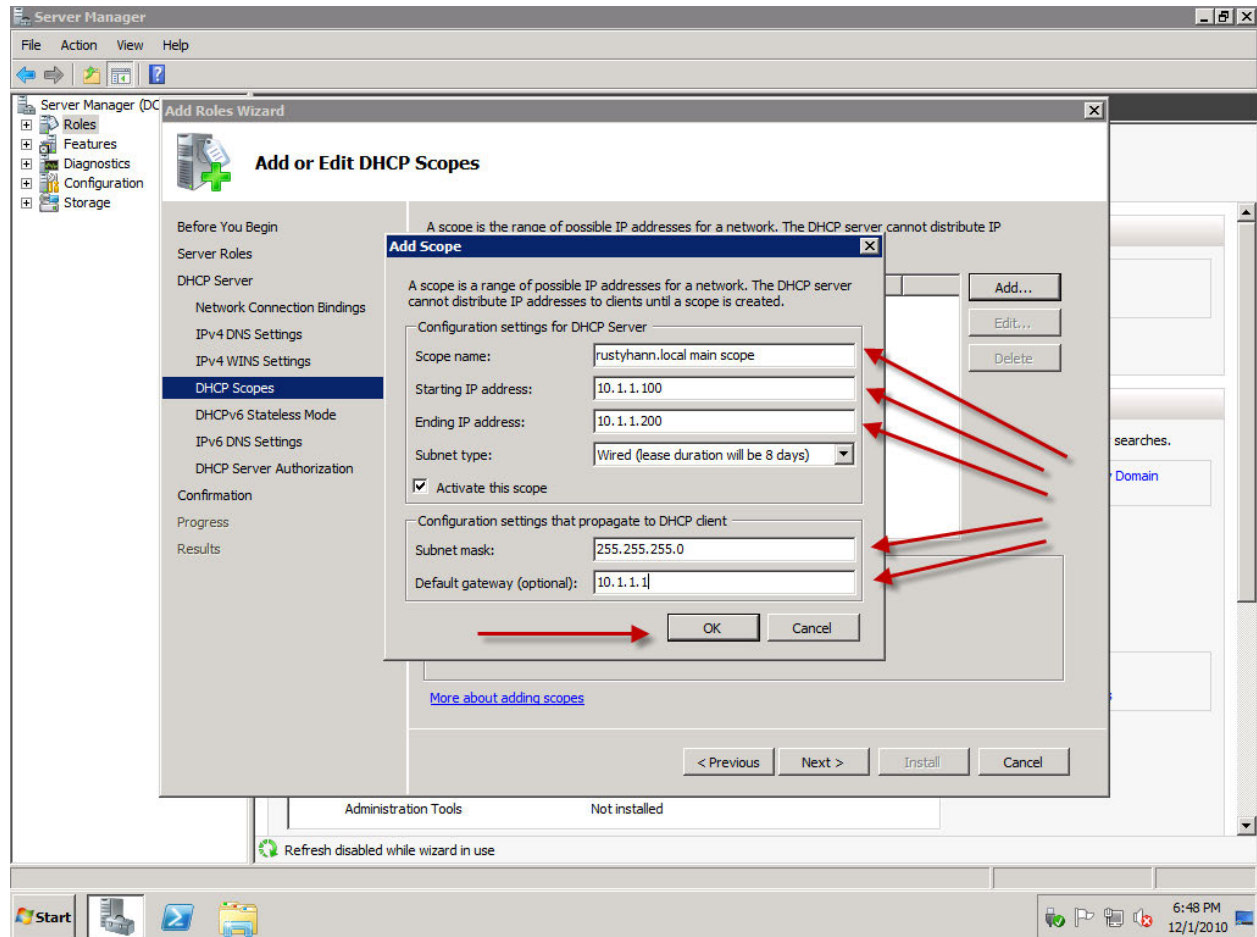
DO NOT CLICK THE NEXT BUTTON.



NOTES: If you do not add a scope now, you can add one later using the DHCP MMC or the Server Manager MMC (which includes the DHCP MMC snap-in).

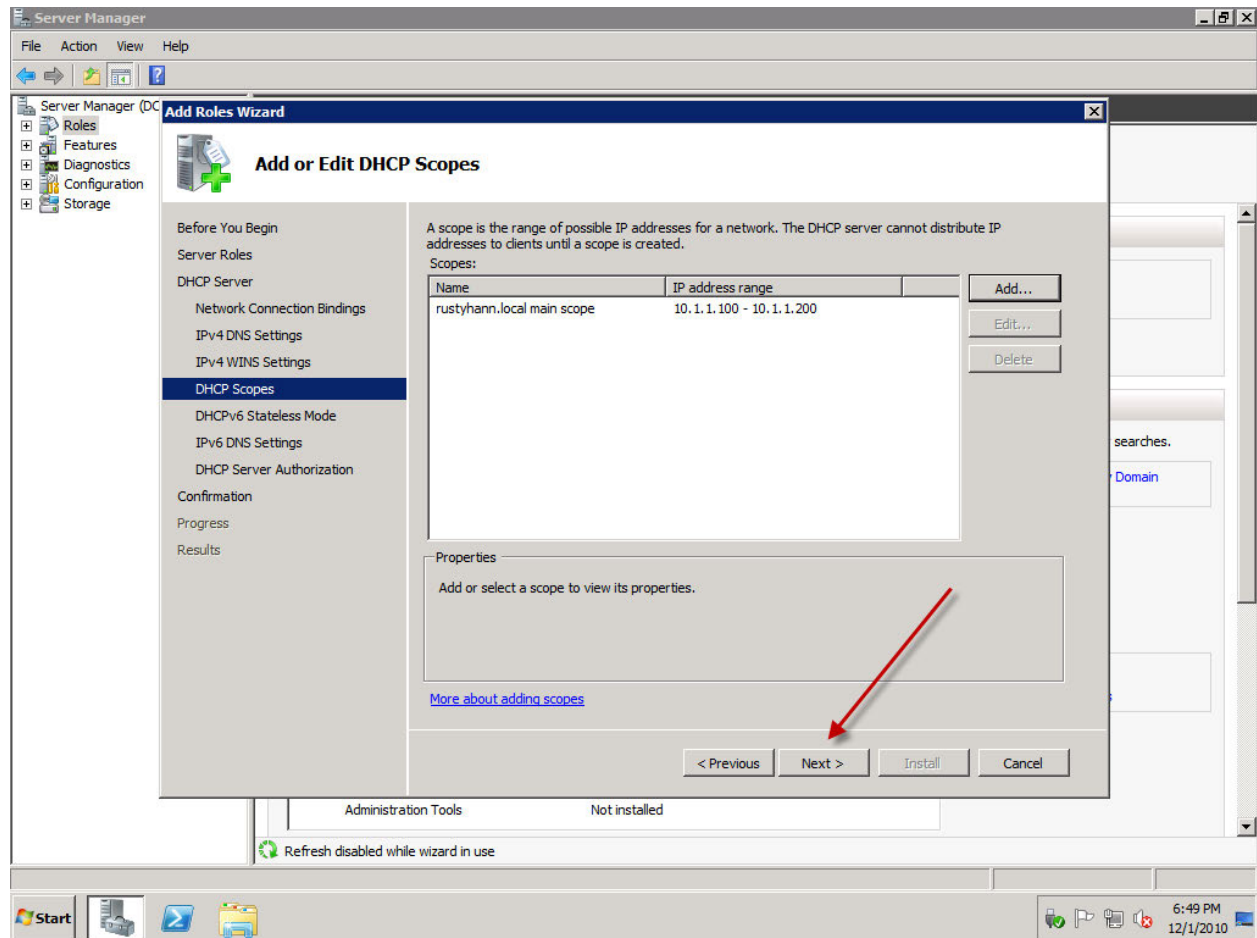
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9. Fill in the corresponding text boxes to create a DHCP scope. You will need to add a Scope name, Starting IP address, Ending IP address, and leave the Subnet type at its default setting (Wired). You will also need to add a Subnet mask and Default Gateway. The exact settings will depend on the IP addressing scheme of your network. **Click the OK button when finished.**



NOTES: A default gateway is optional, but if you want your clients to have connectivity outside the local area network, you will need to add a default gateway. You will also need to route the traffic according to the needs of your clients and network topology.

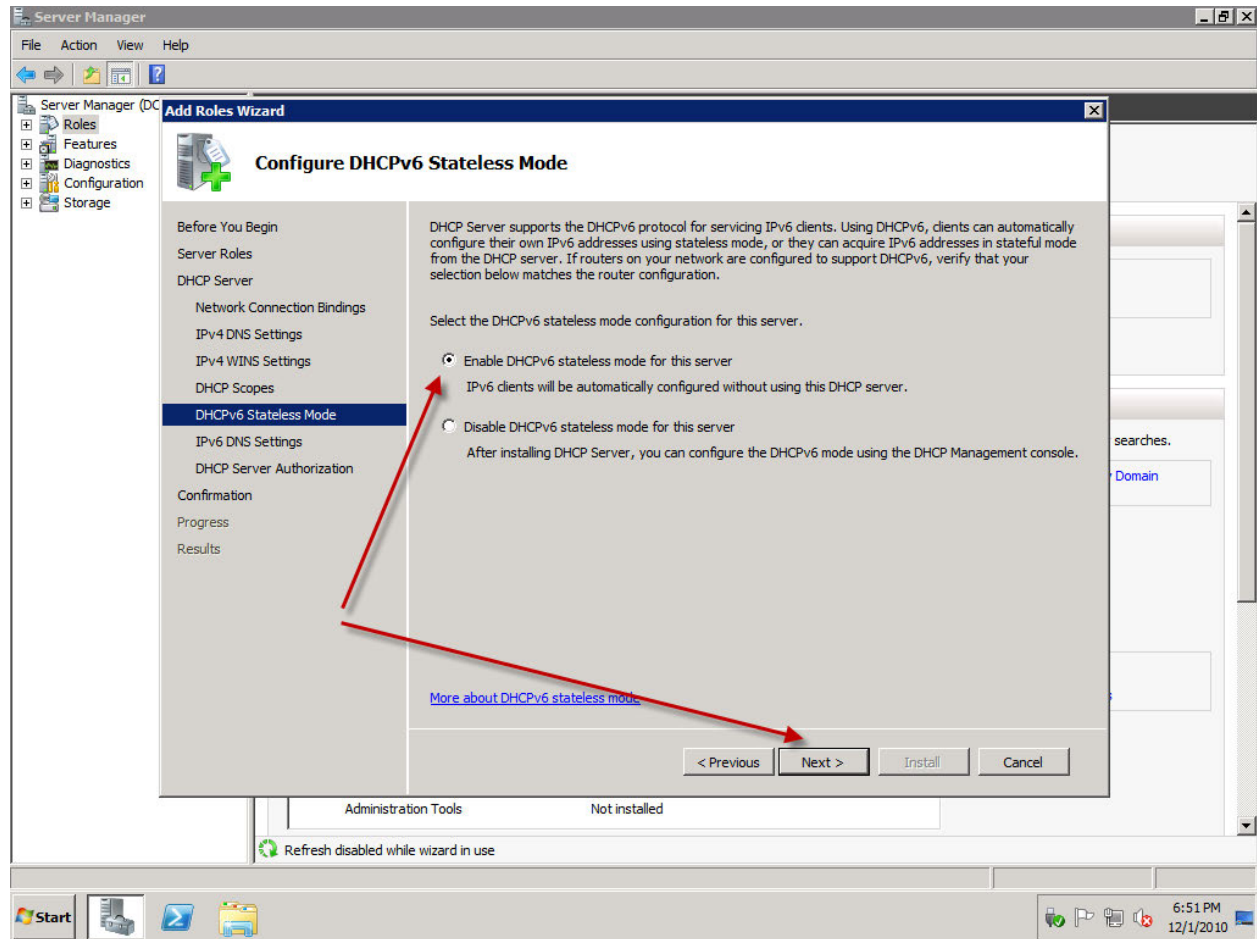
10. Click the Next button.



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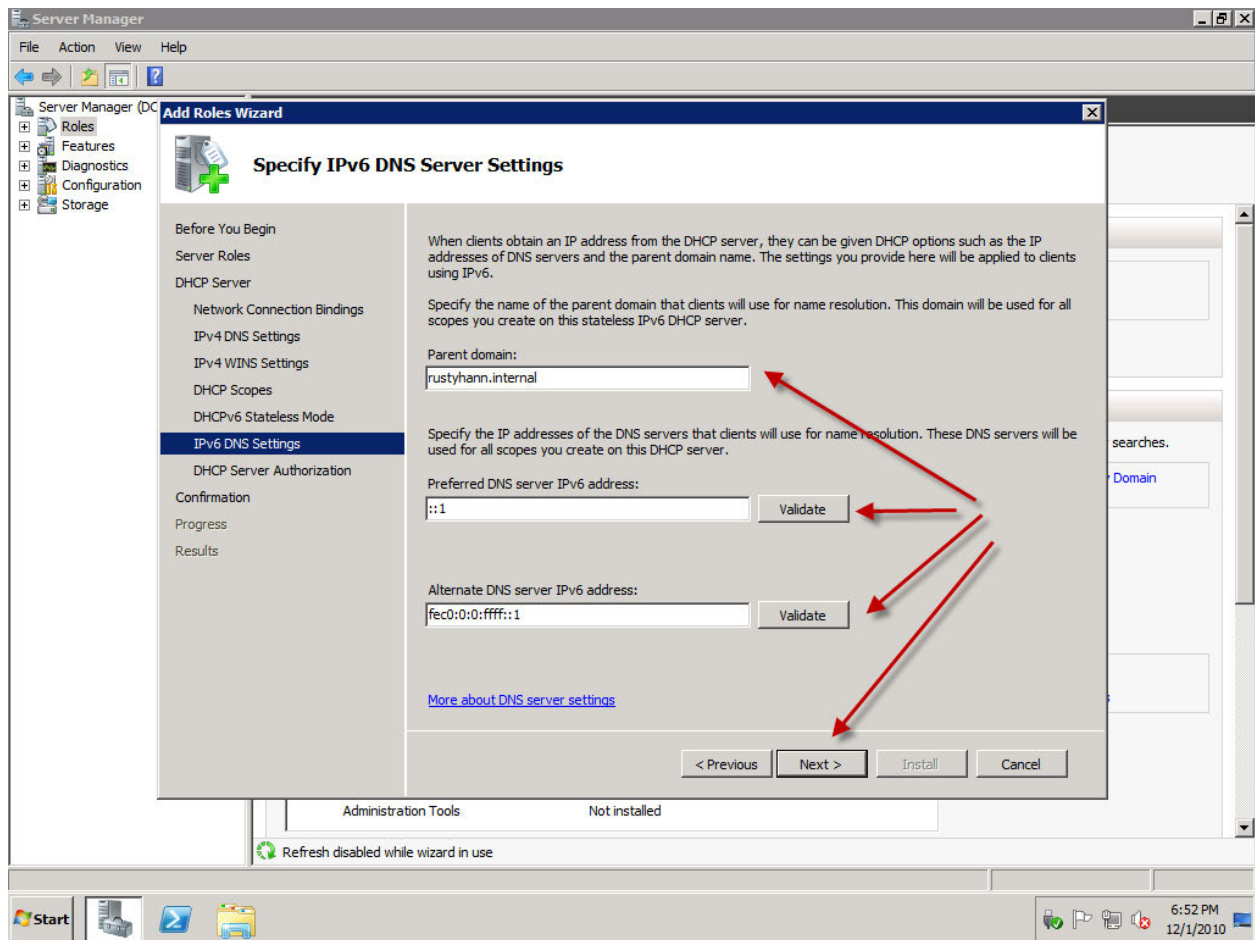
11. You will now need to select between stateless and stateful modes of IPv6 operation. If you do not know the IPv6 requirements for the routers on your network, **leave this option at its default, "Enable DHCPv6 stateless mode for this server", and click the Next button.** If you are not running IPv6 on your network, you can select, "Disable DHCPv6 stateless mode for this server".



NOTES: IPv6 configuration is beyond the scope of this tutorial.

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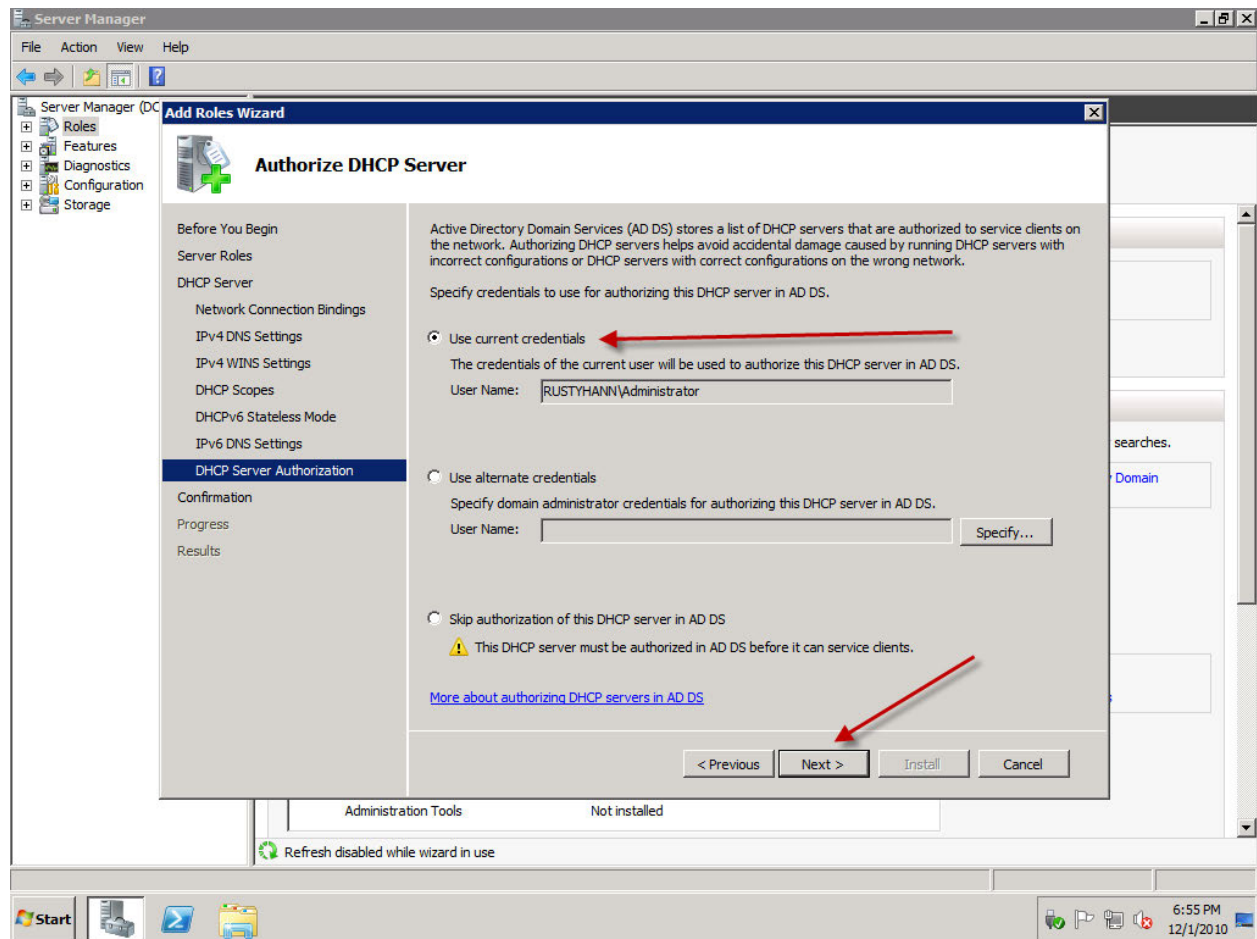
12. You will need to specify your IPv6 settings for this DHCP server. **If you do not understand the settings, leave them at their default values and click the Next button.** If you chose to disable DHCPv6 stateless mode, this screen will not appear.



NOTES: IPv6 configuration is beyond the scope of this tutorial.

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13. In order for this server to issue dynamic IP addresses, you must authorize the DHCP server in Active Directory. This is due to the fact that this specific server is also a domain controller and a member of the domain "rustyhann.internal". **If you are logged in as an Enterprise or Domain Administrator, who has the credentials to authorize a DHCP server, accept the default selection, "Use current credentials", and click the Next button.**

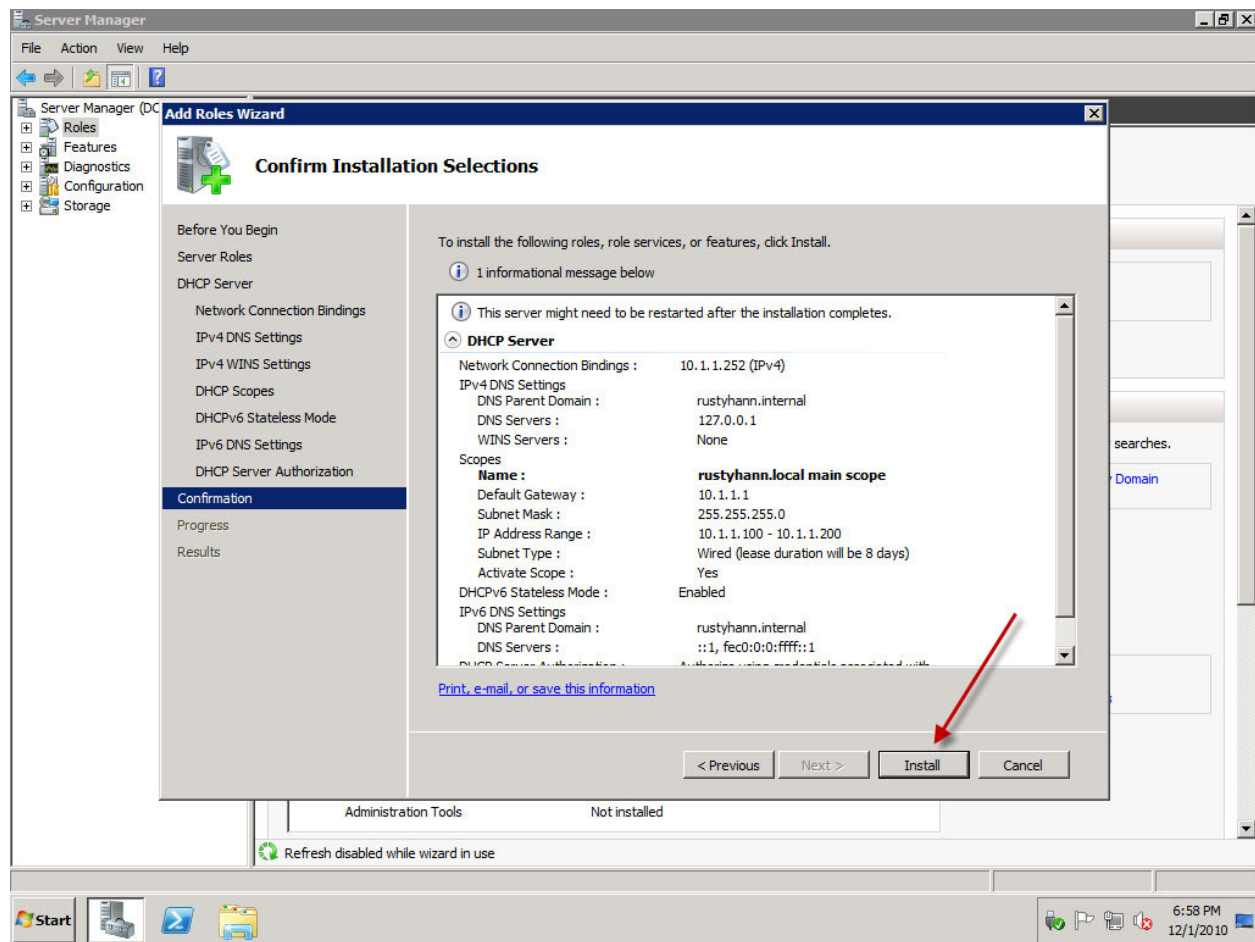


NOTES: If you do not have the credentials to authorize a DHCP server in the Active Directory environment, you can select the option, "Use alternate credentials", and specify them. You also have the option of skipping authorization by choosing, "Skip authorization of this DHCP server in AD DS". **If you do not authorize the server in Active Directory, the server will fail to start and will not issue DHCP addresses.**

If you are not running this DHCP server in an Active Directory environment, you do not need to authorize the server. The aforementioned configuration is beyond the scope of this tutorial.

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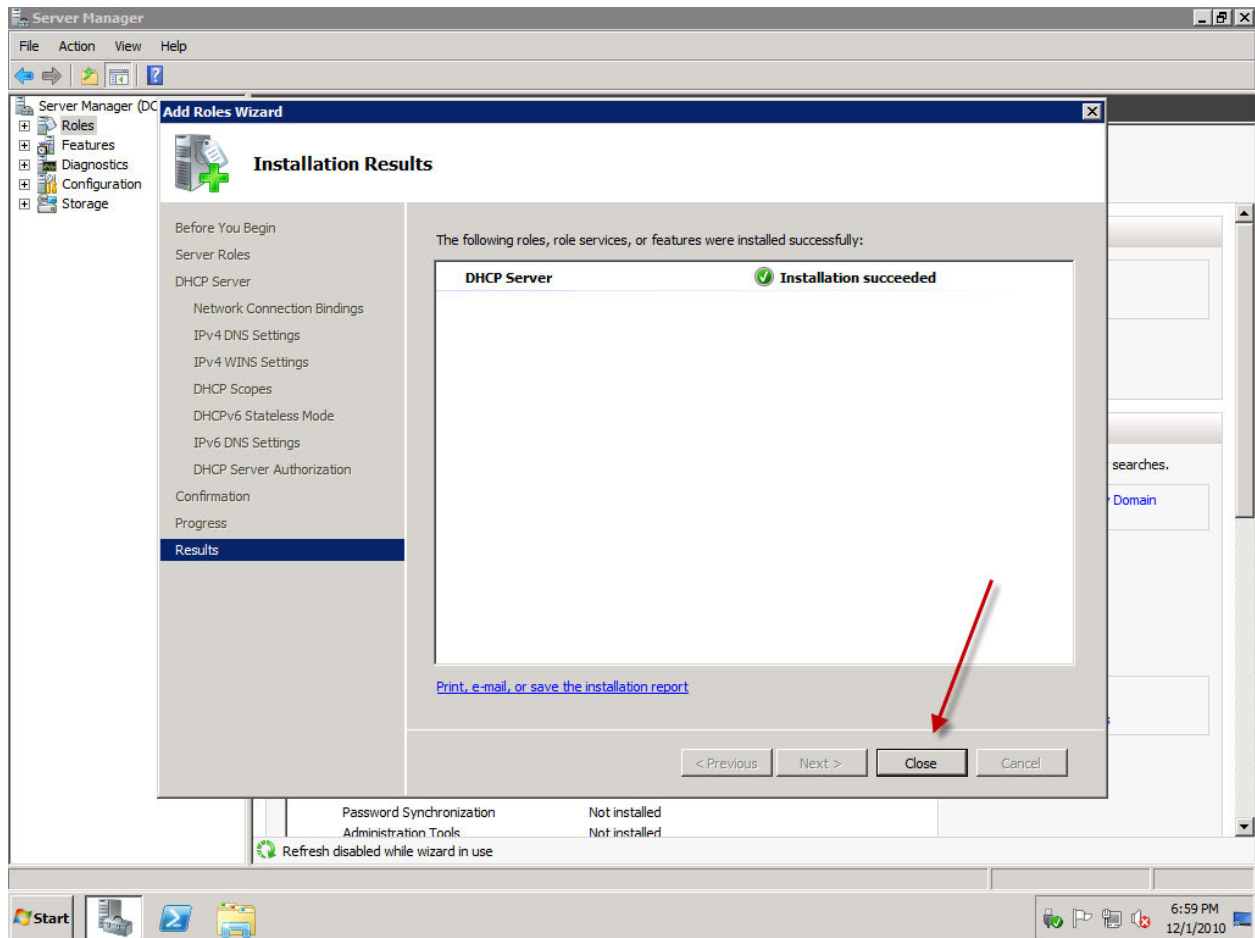
14. Review your installation settings and ensure they are correct. Click Install to complete the installation of the DHCP server role.



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15. When the installation has completed successfully, click the Close button.



NOTES: This is the end of this tutorial.

Troubleshooting

- Ensure ALL of your DHCP scope options are correct.
- Ensure you have bound your DHCP server to the correct network connection(s)
- Ensure your server has a static IP address
- Ensure you have network connectivity. To test this, give a client on the network a static address and see if you can ping the server
- Ensure you have activated your DHCP server in Active Directory if you are working in an Active Directory environment
- Ensure your DHCP server is 'turned on'. A green circle with a checkmark next to it will be present next to IPv4.

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