

Performing Multicast Deployments

Updated: April 15, 2009

Applies To: Windows Server 2008, Windows Server 2008 R2

In order to deploy an image using multicasting instead of unicasting, you must first create a multicast transmission. Multicast transmissions make the image available for multicasting, which enables you to deploy an image to a large number of client computers without overburdening the network. When you deploy an image using multicasting, the image is sent over the network only once, which can drastically reduce the amount of network bandwidth that is used. Note that data is transferred only if clients request data. If no clients are connected (that is, if the transmission is idle), data will not be sent over the network. Note that this topic pertains only to the default installation of Windows Deployment Services. If you only installed the Transport Server role service, see one of the following for instructions:

- [Using Transport Server](#) if you have Windows Server 2008
- [Configuring Transport Server](#) if you have Windows Server 2008 R2

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When to implement multicasting

Consider implementing multicasting if your organization:	Multicasting might not optimize your installations if your organization:
<ul style="list-style-type: none">• Has network routers that support multicasting.• Is a large company that requires many concurrent client installations.	<ul style="list-style-type: none">• Has network routers that do not support multicasting.• Does not have bandwidth overload problems.

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| <ul style="list-style-type: none">• Wants to use network bandwidth efficiently. This is because with this feature, images are sent over the network only once, and you can specify limitations (for example, to only use 10 percent of your bandwidth).• Has enough disk space on client computers for the image to be downloaded.• Meets the requirements listed in the following section. | <ul style="list-style-type: none">• Deploys images to only a small number of client computers simultaneously.• Has disk space limitations on the client computers. (This is because the image is downloaded to client computers instead of being installed from a server.) |
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Prerequisites for creating a multicast transmission

- Routers that support multicasting. In particular, Internet Group Membership Protocol (IGMP) snooping should be enabled on all devices. This will cause your network hardware to forward multicast packets only to those devices that are requesting data. If IGMP snooping is turned off, multicast packets are treated as broadcast packets, and will be sent to every device in the subnet.
- At least one install image that you want to transmit on the server.
- The Boot.wim file from the product DVD for one of the following operating systems:
 - Client: Windows Vista (with at least Service Pack 1 (SP1)) or Windows 7. Do not use the Boot.wim from the Windows Vista DVD unless your version of Windows Vista has SP1 integrated into the DVD. If you use the Windows Vista Boot.wim, you will be able to create the transmission, but users who boot into it will not be able to join the transmission.
 - Server: Windows Server 2008 or Windows Server 2008 R2.

You can also use a custom boot image. For instructions, see [Creating Images \(http://go.microsoft.com/fwlink/?LinkId=115311\)](http://go.microsoft.com/fwlink/?LinkId=115311).

Known issues in creating a multicast transmission

You may encounter the following issues when implementing multicasting:

- If multiple servers are using multicast functionality on a network (Transport Server, Deployment Server, or another solution), it is important that each server is configured so that the multicast IP addresses do not collide. Otherwise, you may encounter excessive traffic when you enable multicasting. Note that each Windows Deployment Services server will have the same default range. To ensure that each server is using a unique IP address, use Multicast Address Dynamic Client Allocation Protocol (MADCAP) or specify static ranges that do not overlap. To specify a range, right-click the server in the MMC snap-in, click **Properties**, and then click the **Network Settings** tab.
- After you configure Windows Deployment Services server, if you modify the Multicast IP Address, the UDP port range, or the RPC port number, you must restart the service before the changes will take effect. If you do not restart the service, the server will use the old values and may not answer clients. To restart the service, right-click the server in the MMC snap-in, click **All Tasks**, and then click **Restart**.

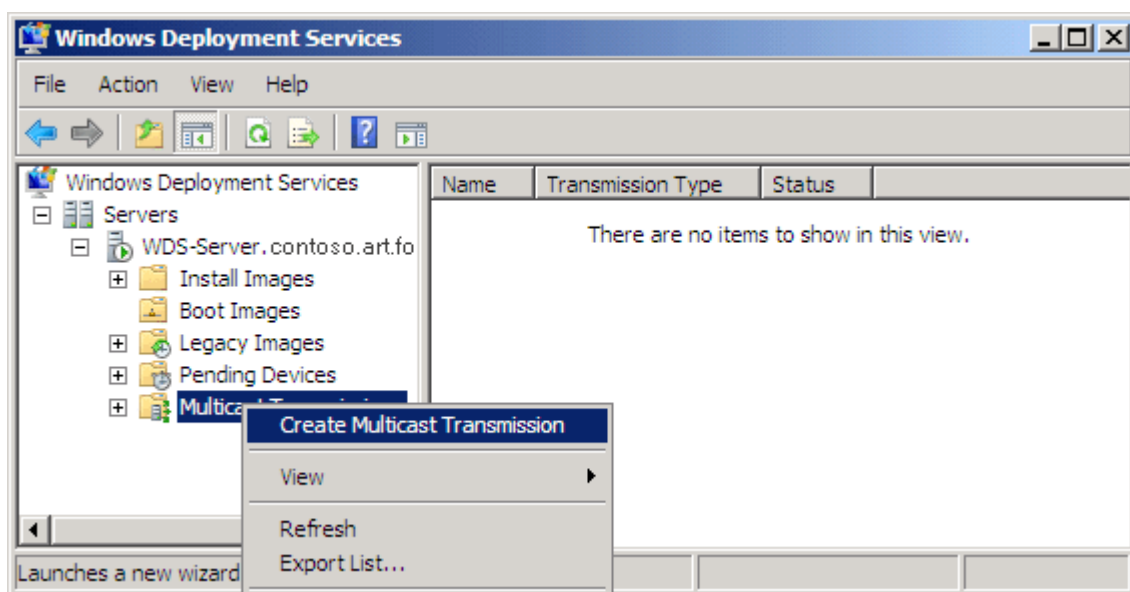
- Each transmission can be run only as fast as the slowest client. That is, the entire transmission will be slow if there is one slow client. If you have Windows Server 2008 R2, you can resolve this issue by setting the transfer policy as specified in step 1 of the following procedure. Otherwise, to resolve this issue, first determine the client that is holding back the transmission (this is called the master client). To do this, open an elevated Command Prompt window and run **WDSUTIL /Get-MulticastTransmission /Show-clients**. Next, disconnect the master client. This will force the master client to run the transmission by using the Server Message Block (SMB) protocol, and the other clients' multicast performance should speed up. If they do not speed up, repeat this step for the new master client.

Steps for creating a multicast transmission

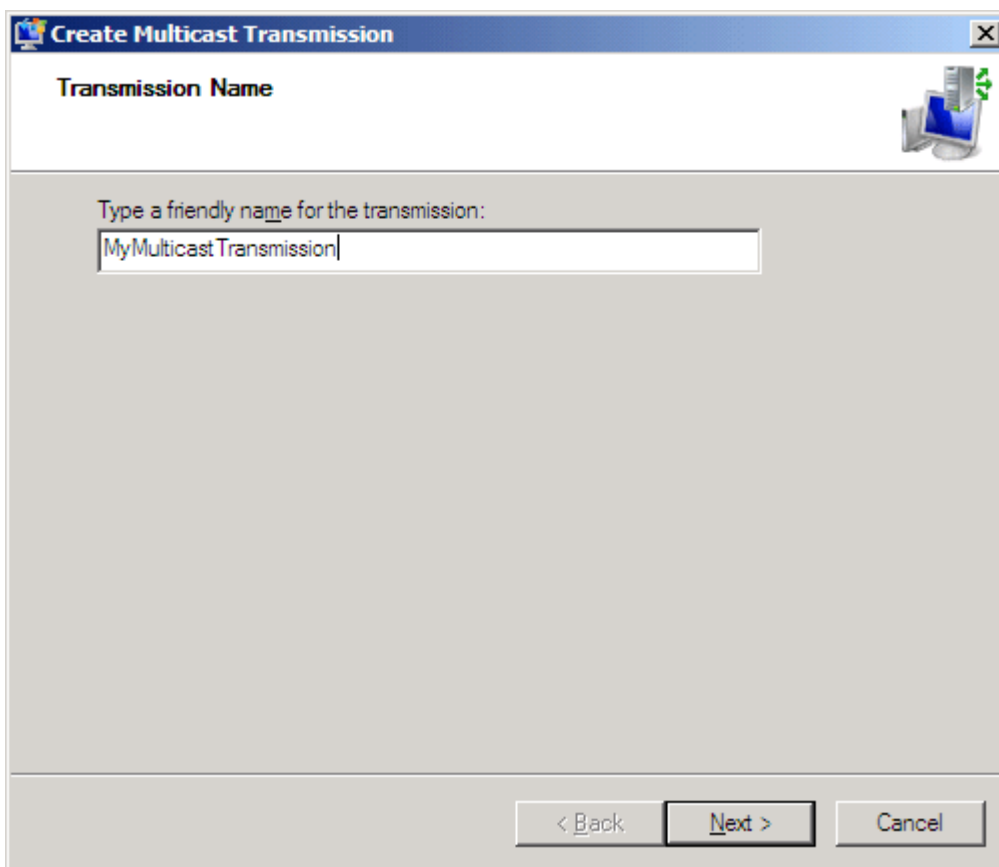
To perform this task, use the following procedure.

To enable multicasting of an install image

- If you have Windows Server 2008 R2, you should first set the transfer policy for the server (if you have the initial release of Windows Server 2008, skip this step). To do this, right-click the server, click **Properties**, click the **Multicast** tab, and select an option under **Transfer Settings**. These settings allow you to enable the following:
 - Multiple stream transfer.** The first option under Transfer Settings uses a single stream for all multicast clients, regardless of client speed. The next two options allow you to separate slower clients into their own multicast stream, which enables faster clients to complete their deployment more quickly instead of being held back by slower clients. These settings are only available for clients that boot into a boot image from Windows 7 or Windows Server 2008 R2.
 - Automatic disconnect.** The last option under Transfer Settings allows you to automatically stop clients that fall under a specified speed. The clients that are disconnected will continue to transfer the image using unicasting (Server Message Block).
- To create a multicast transmission for an install image, right-click the **Multicast Transmissions** node (or an install image) and click **Create Multicast Transmission**.



- Type a name for the transmission.



4. Continue to follow the instructions in the wizard. There are two types of multicast transmissions:

- **Auto-Cast.** This option indicates that as soon as an applicable client requests the image, a multicast transmission of the selected image begins. Then, as other clients request the same image, they too receive the image using multicasting.
- **Scheduled-Cast.** This option sets the start criteria for the transmission based on the number of clients that are requesting an image and/or a specific day and time. With ScheduledCast, only clients that join before the transmission is started will receive the image using multicasting. That is, clients that join later will receive the image using unicasting. If you do not select start criteria for the transmission, then you must manually start it (by right-clicking the transmission and clicking **Start**).

Consider using Auto-Cast if:	Consider using Scheduled-Cast if:
<ul style="list-style-type: none"> ○ You work for a large corporation or an organization with high bandwidth that can handle installations at any time. ○ You do not want customers to have to wait for the installation to begin. 	<ul style="list-style-type: none"> ○ You work for a smaller organization or an organization where network traffic is an issue during the day. This way, you can set installations to occur during nonpeak hours or at night. ○ To reduce the total time of the transmission. Because you can set multiple clients to start at the same time, the time will be reduced because Windows Deployment Services will not have to resend a part of the image to clients that started after the first client. ○ You do not want the transmission to start until you manually start it (to do this, clear both check boxes when you create the transmission).

Additional Tasks

The following are additional tasks that you can perform to configure and manage multicast transmissions.

To configure transmissions

After a transmission has been created, you can perform the following actions:

- **Start the transmission.** If the transmission is the Scheduled-Cast type, there is at least one client, and the transmission has not started yet, you can right-click the transmission and then click **Start**. Alternatively, you can run `WDSUTIL /Start-MulticastTransmission /Image:<image name> /ImageType:Install /ImageGroup:<image group name>`.
- **Delete the transmission.** If you right-click the transmission and click **Delete**, the multicast transmission stops and each client installation will start the transmission again using unicasting. That is, the client installations will not be deleted completely, but they will not use the multicast transmission to complete the installation. Alternatively, you can run `WDSUTIL /Remove-MulticastTransmission /Image:<image name> /ImageType:Install /ImageGroup:<image group name> /Force`.
- **Deactivate the transmission.** If you right-click and then click **Deactivate**, each client that is currently installing will continue, but no new clients will be joined to the transmission. After each current client installation is completed, the transmission will be deleted. If there are no clients when you click this option, the transmission will be deleted instantly. Alternatively you can run `WDSUTIL /Remove-MulticastTransmission /Image:<image name> /ImageType:Install /ImageGroup:<image group name>`.
- **View the transmission's properties.** To view the properties, right-click the transmission and then click **Properties**. Note that you cannot edit the properties of a transmission after it is created. To make a change after you have created a transmission, you need to delete it and then recreate it. Alternatively, you can run `WDSUTIL /Get-MulticastTransmission /Image:<image name> /ImageType:Install /ImageGroup:<image group name>`.
- **Refresh the transmissions and data.** To do this, right-click a transmission and then click **Refresh**. You can also refresh the data by pressing F5.

To configure clients in a transmission

After you have created the transmission, client computers can join it by selecting the image in the Windows Deployment Services client installation screens. Client computers can also join a transmission by using `Wdsmcast.exe`, a command-line tool included in the Windows Automated Installation Kit (Windows AIK). When there are clients in a transmission, you can do any of the following:

- **View clients and see progress.** To view any connected clients, expand the **Multicast Transmissions** node, click the image, and view the right pane. Windows Server 2008 R2 includes additional progress information including the master client and performance counters such as the client's memory, CPU, and network usage. Alternatively, you can run `WDSUTIL /Get-MulticastTransmission /Image:<image name> /ImageType:Install /ImageGroup:<image group name> /show:clients` or to view a client's <id>, run `WDSUTIL /Get-MulticastTransmission /Image:<image name> /ImageType:Install /ImageGroup:<image group name> /show:clients`.
- **Stop a client installation.** To stop the installation completely, right-click a client and then click **Disconnect**. You should use this option with caution because the installation will fail and the computer could be left in an unusable

state. Alternatively you can run `WDSUTIL /Disconnect-Client /ClientID:<id> /Force`.

- **Disconnect a client from a multicast transmission.** To discontinue the transmission for a particular client but continue to transfer the image through unicasting, right-click the client, and then click **Bypass multicast**. `WDSUTIL /Disconnect-Client /ClientID:<id>`.

To configure the UDP port range for multicasting

This setting specifies the range of UDP ports to use for multicasting and other components, such as the Trivial File Transfer Protocol (TFTP) provider. Before you change this range, you need to have at least as many ports as you have sessions and concurrent clients accessing the server. In terms of multicasting, a session is a network interface on your server. To calculate the number of sessions, multiply the number of network adapters on your server by the number of images that could be concurrently transferred using multicasting. For example, if you have two network adapters, and clients are connected on both interfaces, the content will be sent on the network twice (once from each interface). So in this case, you would need at least two ports. Because this range is also used by the TFTP provider, you will need as many available ports as you have concurrent clients accessing the server.

Using the MMC	Using WDSUTIL
<div>1. Right-click the server, and then click Properties.</div> <div>2. On the Network Settings tab, specify the UDP port range.</div> <div>3. You must restart the service before the changes will take effect. To do this, right-click the server in the MMC snap-in, click All Tasks, and then click Restart.</div>	<div>1. Click Start, right-click Command Prompt, and click Run as administrator.</div> <div>2. Run <code>WDSUTIL /Set-Server [/Server:<name>] /Transport /StartPort:x /EndPort:y</code>.</div> <div>3. You must restart the service before the changes will take effect. To do this, run <code>wdsutil /stop-server</code> and then run <code>wdsutil /start-server</code>.</div>

To configure how the server will obtain IP addresses for multicasting

The server allocates a multicast IP address to each multicast session, and all connected clients listen in on that address. It's important that all IP addresses be unique on the network to ensure that each client receives the correct data. If you have a complex network, you should consider using DHCP to select the addresses. In more basic environments, you can configure a range and have the Windows Deployment Services server select the address.

Using the MMC	Using WDSUTIL
<div>1. Right-click the server, and then click Properties.</div>	<div>1. Click Start, right-click Command Prompt, and click Run as administrator.</div>

2. On the **Network Settings** tab (or the **Multicast** tab for Windows Server 2008 R2) under **Multicast IP Address**, select one of the following:

- **Obtain IP address from DHCP**
- **Use IP address from the following range**

3. Right-click the server in the MMC snap-in, click **All Tasks**, and then click **Restart**.

2. Do one of the following:

- To use MADCAP to obtain the IP address for each namespace, run WDSUTIL /Set-Server [/Server:<name>] /Transport /ObtainIPFrom:DHCP.
- To configure a preset range of IP addresses, run WDSUTIL /Set-Server [/Server:<name>] /Transport /ObtainIPv4From:Range /Start:x.x.x.x /End:y.y.y.y.

3. You must restart the service before the changes will take effect. To do this, run WDSUTIL /stop-server and then run WDSUTIL /start-server.

To avoid IP address conflicts

When two servers select the same multicast IP address to send data to, data intended for clients of either server can be routed to all clients. This causes unnecessary network traffic. Note also that this is particularly harmful if the servers are connected by a low-bandwidth connection (such as a wide area network (WAN) link), because both sets of data will be sent over this connection. The following are preventive measures that you should take to avoid this situation. To modify these options, right-click the server in the MMC snap-in, click **Properties**, and then click the **Network Settings** tab (or the **Multicast** tab for Windows Server 2008 R2).

- Use DHCP for IP addresses. This will prevent addresses from being assigned twice.
- Configure a static range for each server, making sure that this range does not overlap with the ranges defined for other servers.
- Lower the multicast Time-To-Live (TTL) setting to prevent the routers from forwarding multicast traffic outside the site network. You can also configure your border router not to forward multicast traffic.

Community Additions
