# Installing and Configuring WDS for PXE Boot on Windows Server 2016 2019 2022

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#### IMPORTANT ASSUMPTIONS AND NOTES

- 1. You are using this WDS server in a closed testing / deployment environment. Please do NOT do this in a live production environment without the necessary clearance / permission / authority / licensing to do so.
- 2. You are a network administrator and have domain administrator access or permission to use a Windows Server / Server license for this project.
- You are a network administrator and have the appropriate authority / permission to complete this project.
   You understand how to, are licensed to, and have created the Technician's USB stick from your Deployment Kit for use further on in this
- document. 5. You have the proper Microsoft licensing to use the Deployment Kit for the purpose of this project.
- Four have the proper Microsoft licensing to use the Deployment Kit for the purpose of the
   This server will be both a WDS and DHCP server for this closed environment.
- Macrium Software, its parent company Paramount Software UK Ltd, its affiliates and/or employees are not liable under any circumstances for issues arising directly or indirectly from the use of this document.

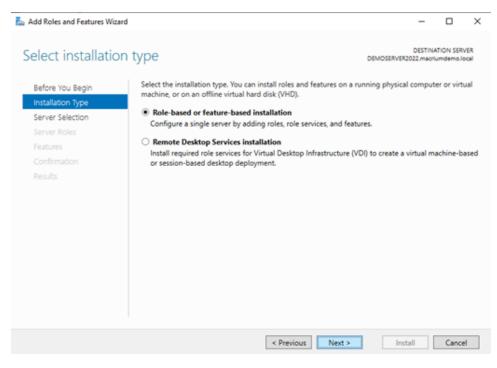
If the above assumptions and notes above do not pertain to your environment, license compliance, and/or permission, and/or if you do not agree with the assumptions and notes above, then please DO NOT proceed. Your use of this document is subject to and constitutes your acceptance of the above and is done so completely at your own risk.

# Install and configure the WDS Role on Windows Server 2016/2019/2022.

- 1. Open Server Manager and select the Local Server
- 2. Click on Manage, then select "Add Roles and Features"

Dashboard	For DEMOSERVER2022				Remove Roles and Feature Add Servers	
Local Server	Computer name	DEMOSERVER2022	Last installed updates	Yesterday at 12	Create Server Group	
All Servers	Domain	macriumdemo.local	Windows Update	Download upda	Server Manager Properties	
AD DS			Last checked for updates	Today at 9:59 AM		
A DNS						
File and Storage Services	Microsoft Defender Firewall	Private: On	Microsoft Defender Antivirus	Real-Time Protectio	an: On	
BH WDS	Remote management	Enabled	Feedback & Diagnostics	Settings		
	Remote Desktop	Disabled	IE Enhanced Security Configuration			
	NIC Tearning Ethernet 2	Disabled 192.168.70.11	Time zone Product ID		l Time (US & Canada) 7-AA268 (activated)	
	Concerner 6	Concernant of	Productor		- more deconsider)	
	Operating system version	Microsoft Windows Server 2022 Standard	Processors	11th Gen Intel(R) C	ore(TM) i9-11950H @ 2.60GHz	
	Hardware information	Microsoft Corporation Virtual Machine	Installed memory (RAM)	2.5 G8		
			Total disk space	579.36 G8		

3. Select "Role-based or feature-based installation". Click "Next" when done.

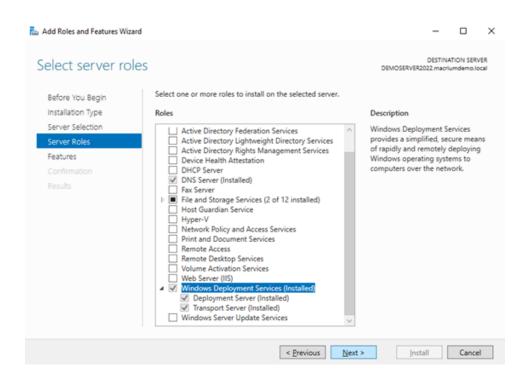


4. Select the destination server. Click "Next" when done.

Before You Begin	Select a server or a vir	tual hard disk on which	to install roles and features.
Installation Type	Select a server from	m the server pool	
Server Selection	<ul> <li>Select a virtual har</li> </ul>	rd disk	
Server Roles	Server Pool		
Features Confirmation	Filter:		
	Name	IP Address	Operating System
	DEMOSERVER2022.m	nacr 192.168.70.11	Microsoft Windows Server 2022 Standard
	1 Computer(s) found		
			dows Server 2012 or a newer release of Windows Serv

5. Select "Windows Deployment Services" from the Roles list. Click "Next" when done.

×



- 6. To confirm the features that are required, click "Add Features".
  - 🚵 Add Roles and Features Wizard

Add features that are required for Windows Deployment Services?

The following tools are required to manage this feature, but do not have to be installed on the same server.

	Remote Server Administration Tools  Role Administration Tools  Tools] Windows Deployment Services Tools
~	Include management tools (if applicable)
	Add Features Cancel

7. Click "Next" on the Features list.

Add Roles and Features Wizard		DESTINATION SERVER DEMOSERVER2019.macriumdemo.local
Before You Begin Installation Type Server Selection Server Roles Features WDS Role Services Confirmation Results	Select one or more features to install on the selected server  Features  VM Shielding Tools for Fabric Management WebDAV Redirector Windows Biometric Framework Windows Defender Antivirus (Installed) Windows Identity Foundation 35. Windows Identity Foundation 35. Windows Identity Foundation 35. Windows Porcess Activation Service Windows Porcess Activation Service Windows Server Backup Windows Server Backup Windows Sterver Migration Tools Windows Sterver Migration Tools Windows Subsystem for Linux	<ul> <li>Description</li> <li>NET Framework 3.5 combines the power of the .NET framework 2.0 APIs with new technologies for building applications that offer appealing user interfaces, protect your customers' personal identity information, enable seamless and secure communication, and provide the ability to model a range of business processes.</li> </ul>
	< Previous	lext > Install Cancel

8. Read through the notes for WDS installation and click "Next"

📥 Add Roles and Features Wizard		-		×
WDS Before You Begin Installation Type Server Selection Server Roles Features WDS Role Services	DEMOSERVER2 You can use Windows Deployment Services to install and configure Microsoft Wind system remotely on computers that are PXE-enabled. Windows Deployment Servic Installation Services (RIS) and assists with the rapid adoption and deployment of W Windows Deployment Services MMC snap-in allows you to manage all aspects of V Services. Windows Deployment Services also provides end-users with an experience with Windows Setup. Things to note: • Deployment Server requires that DHCP and DNS services are available on your n Server does not require any additional roles or services. Both of these services re participies for the file totae	019.macriu Jows ope es replace findows. 1 Windows e that is o retwork. T	rating es Remote The Deployme consistent fransport	R al e
Confirmation Results	<ul> <li>Before you begin, you need to configure Windows Deployment Services by runn Windows Deployment Services Configuration Wizard or WDSUtil.exe. You will als least one boot image and one install image to the image store.</li> <li>To install Windows operating systems from a Windows Deployment Services sen computers must be PXE-enabled, or you must use the Windows Server 2008 R2 more installation Environment (Windows PE).</li> </ul>	ing eithe io need to ver, either	r the o add at r the clien	
	< Previous Next > Inst		Cancel	

9. Confirm the Role Services and click "Next".

Before You Begin Select the role services to install for Windows Deploymen Installation Type Role services	t Services
Server Selection	
Server Roles Features WDS Role Services Confirmation Results	Description Deployment Server provides the full functionality of Windows Deployment Services, which you can use to configure and remotely install Windows operating systems. With Windows Deployment Services, you can create and customize images and then use them to reimage computers. Deployment Server is dependent on the core parts of Transport Server.

# 10. One last chance to make changes. Confirm by clicking "Install".

📥 Add Roles and Features Wizar	d	-		×
Confirm installat	ion selections DEMOSE	DESTINA ERVER2019.macri	ATION SER umdemo.k	
Before You Begin Installation Type Server Selection Server Roles Features WDS Role Services Confirmation Results	To install the following roles, role services, or features on selected server, clici Restart the destination server automatically if required Optional features (such as administration tools) might be displayed on this puble been selected automatically. If you do not want to install these optional features their check boxes. Remote Server Administration Tools Role Administration Tools Windows Deployment Services Tools Windows Deployment Services Deployment Server Transport Server Export configuration settings Specify an alternate source path	age because ti		
	< Previous Next >	Install	Cance	el

11. Wait for the installation to complete and click "Close"

nstallation prog	DESTINATION SER DEMOSERVER2019.macriumdemo.l
	View installation progress
	Feature installation
	Installation succeeded on DEMOSERVER2019.macriumdemo.local.
	Remote Server Administration Tools Role Administration Tools Windows Deployment Services Tools
Confirmation	Windows Deployment Services Deployment Server
Results	Transport Server
	You can close this wizard without interrupting running tasks. View task progress or open this page again by clicking Notifications in the command bar, and then Task Details.

12. In the search pane type "Windows deployment services" and click on the app when it comes up.

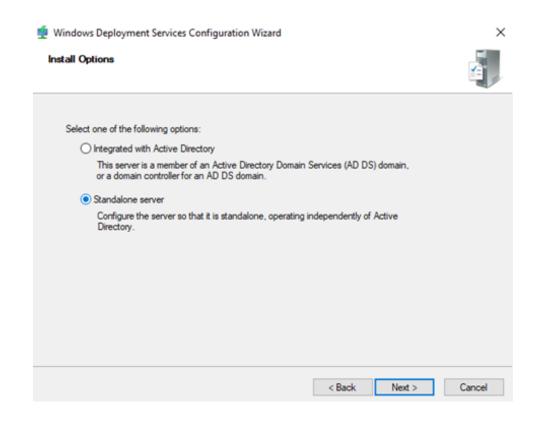
≡	ø	
ŵ	Best n	natch
	1	Windows Deployment Services Desktop app
٢		
	ρv	vindows deployment Services

13. Now we begin the process of configuring WDS. Right click on your server and select "Configure Server".

🝨 Windows Deployme	nt Services —	×
File Action View	Help	
💠 🌩 🙍 💼 🙆		_
Windows Deploymer	tt Services DEMOSERVER2019.macriumdemo.local	
> CEMOSEF	Configure Server Windows Deployment Services is not configured	
	Remove Server erver is not configured. To configure this server, right-click the server, and then click Configure Server.	
	View hust be a local administrator to perform this task.	
	Refresh	
	Help	
Read through the	e information screen and click "Next".	
🝨 Windows [	Deployment Services Configuration Wizard	>
Before You	Begin	
configure	use this wizard to configure Windows Deployment Services. Once the server is d, you will need to add at least one boot image and one install image to the server u will be able to install an operating system.	
Before	you begin, ensure that the following requirements are met:	
a	e server is a member of an Active Directory Domain Services (AD DS) domain, or Iomain controller for an AD DS domain. If the server supports Standalone mode, it n be configured without having a dependency on Active Directory.	
De	ere is an active DHCP server on the network. This is because Windows ployment Services uses Pre-Boot Execution Environment (PXE), which relies on ICP for IP addressing.	
- Th	ere is an active DNS server on your network.	
- Th	is server has an NTFS file system partition on which to store images.	
	ue, click Next,	
To contin	Anna Interna	
To contin		

15. Select "Standalone Server" and click "Next".

Note: While you can select "Integrated with Active Directory", that is beyond the scope of this document.

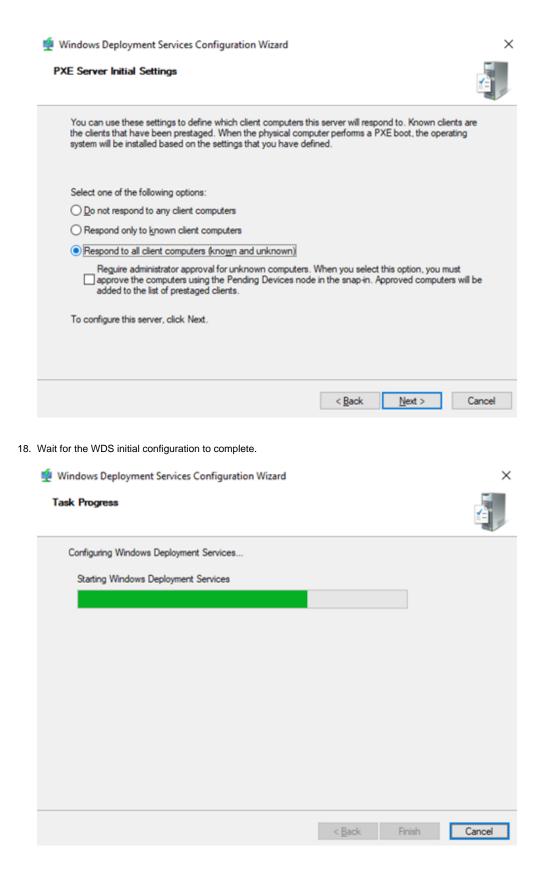


16. Create a remote installation folder or use the default given. In this example, we're using the default "C:\RemoteInstall". Click "Next".

Note: If you select a folder on the same volume as your operating system, you'll have a System Volume Warning pop up. Read it and click "Yes" if you're comfortable with moving forward, or pick another volume to store the Remote Install folder.

-				
Remote In	nstallation Folder Location			
and the large e	mote installation folder will contain boot images, install im e Windows Deployment Services management tools. Ch mough to hold all of the images that you will have. This p partition and should not be the system partition.	oose a partition t	that is	
Entert	he path to the remote installation folder.			
Path:				
C:\Re	moteinstall	Brow	/se	
		< Back	Next >	Cancel
		< Back	Next >	Cancel
		< Back	Next >	Cancel
		< Back	Next >	Cancel
ystem V	olume Warning	< Back	Next >	Cancel
ystem V	olume Warning	< Back	Next >	Cancel
ystem V	olume Warning	< Back	Next >	Cancel
ystem V	-			×
ystem V	The volume selected is also the Wind	lows system	n volume. Fo	×
ystem V	The volume selected is also the Wind best performance and data reliability	lows system	n volume. Fo	×
ystem V	The volume selected is also the Wind	lows system	n volume. Fo	×
ystem V	The volume selected is also the Wind best performance and data reliability folder should be stored on a separat	lows system 1, the remot 2e volume, a	n volume. Fo e installation and, where	×
iystem V	The volume selected is also the Wind best performance and data reliability folder should be stored on a separat possible, on a separate disk from the	lows system 1, the remot 2e volume, a	n volume. Fo e installation and, where	×
iystem V	The volume selected is also the Wind best performance and data reliability folder should be stored on a separat	lows system 1, the remot 2e volume, a	n volume. Fo e installation and, where	×
iystem V	The volume selected is also the Wind best performance and data reliability folder should be stored on a separat possible, on a separate disk from the	lows system 1, the remot 2e volume, a	n volume. Fo e installation and, where	×
iystem V	The volume selected is also the Wind best performance and data reliability folder should be stored on a separat possible, on a separate disk from the	lows system 1, the remot 2e volume, a	n volume. Fo e installation and, where	×
öystem V	The volume selected is also the Wind best performance and data reliability folder should be stored on a separat possible, on a separate disk from the	lows system 1, the remot 2e volume, a	n volume. Fo e installation and, where	×

17. For your PXE Initial Settings, please select "Respond to all client computers (known and unknown)". Click "Next".



19. Click on "Finish" once the initial configuration is completed.

peration Complete	
You have successfully configured Windows Deployment Services. To modify any of the server settings, right-click the server, and click Properties.	
Now that you have configured the server, you will need to add images. These images include a boot image (which is the bootable environment that you initially boot the computer into), and the install images (which are the operating system images that you deploy).	
To add images when this wizard closes, select the following check box. To add images at a later time right-click the Install Images or Boot Images node in the snap-in.	
Add images to the server now	
To close this wizard, click Finish.	

20. There are still a few things to set up. Right click on your server again and this time select "Properties".



21. Go to the PX Response tab. If you need to make any changes for your environment, change it here. Otherwise, leave the earlier selection of "Respond to all client computers (known and unknown)" as your choice.

	t	Advanc	ed	Network			TFTP
General	PXE Re:	sponse	AD DS	Boot	Clie	ent	DHCP
DVE Doop	onse Policy						
			التسعيمين	respond to. K			
				staged device			
				-			
	t record to		computers				
-							
0			nt computers				
Response	ond to all cli	ent comput	ters (known a	nd unknown)			
				nown compu			
				ve the compu o-in. Approve			
			f prestaged o				
PXE Resp	onse Delay						
			sponds to clie	ents.			
Adjust hov		is server re		ents.			
Adjust hov	v quickly thi	is server re		nts.			
Adjust hov	v quickly thi	is server re		ents.			
Adjust hov	v quickly thi	is server re		ents.			
Adjust hov	v quickly thi	is server re		ents.			
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Adjust hov	v quickly thi	is server re		ents.			
Adjust hov	v quickly thi	is server re		ents.			

22. Select the "Boot" tab and change the PXE Boot Policy. For known clients (computers that have already been identified on the network), select "Require the user to press the F12 key to continue the PXE boot". This will allow known clients to boot into their installed OS if you don't interact with the keyboard within the time limit.

For unknown clients, select "Always continue the PXE boot". This will ensure that new machines use PXE boot to get their base Macrium Deployment Kit image.

Multica	st	Advanc	ced	Network		TFTP
General	PXE	Response	AD DS	Boot	Client	DHCF
PXE Boot	Policy -					
After a ne	twork boo	t is initiated, o	define when a	PXE boot wi	ll continue.	
Known cl	ients:					
Requi	re the use	r to press the	F12 key to c	ontinue the P	XE boot	
() Alway	s continu	e the PXE boo	ot			
◯ Contin	ue the P	KE boot unles	s the user pre	esses the ESC	key	
○ Never	continue	the PXE boo	t			
Unknown	n clients:					
Requi	re the use	er to press the	F12 key to c	ontinue the P	XE boot	
Alway	s continu	e the PXE boo	ot			
◯ Contin	ue the P	KE boot unles	s the user pre	esses the ESC	key	
○ Never	continue	the PXE boo	t			
Default b	oot image	(optional)				
x86 archit	-	(0)				Select
Xoo archii	ecture.					Select
x64 archit	ecture:					Select
arm archit	ecture:					Select
annaronn	ootaro.					Jeleot
arm64 arc	chitecture	: L				Select
x86 (UEF	l) archited	ture:				Select
		. [				<b></b>
x64 (UEF	I) archited	ture:				Select

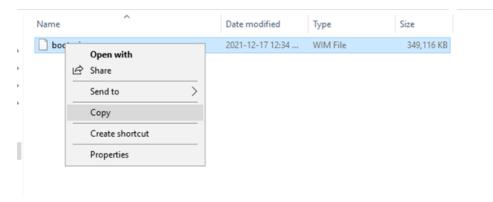
23. Because this is both the WDS and DHCP server, select the DHCP tab and ensure that both checkboxes are selected. This will automatically configure option 60 in DHCP.

DEMOSERVE	R2022 P	roperties				×
Multica	st	Advanc	ced	Network		TFTP
General	PXE	Response	AD DS	Boot	Client	DHCP
If Dynamic Host Configuration Protocol (DHCP) is running on this server, check both of the following check boxes and use DHCP tools to add appropriate PXE options to all DHCP and DHCPv6 scopes.						
	nually co	HCP server is onfigure DHCF				
🗹 Do not li	isten on	DHCP ports				
Configur	e DHCP	options to ind	licate that this	is also a PXE	server	
			ОК	Ca	incel	Apply

24. Now we need to add a boot image to the WDS server. Insert your Macrium Deployment Kit Technician's USB stick (or mount the ISO) to your server, and navigate to the sources folder. In this example, the USB stick is mounted as drive "D", so the path is "D:/Sources". You'll find the "boot. wim" boot image file there.

← → × ↑ 📙 D:\sources				~ © S
	Name	Date modified	Туре	Size
Y 📌 Quick access	boot.wim	2021-12-17 12:34	MINA CIL	349,116 KB
Desktop	* Doot.wim	2021-12-17 12:39	wini Pile	349,110 ND
🕹 Downloads	*			
🖹 Documents	*			
Fictures	*			
> 💻 This PC				
> 🚊 DVD Drive (D:) Macrium Technician's Media				
<b>.</b>				

25. Right click on the "boot.wim" file and select "Copy".



26. Go to your desktop, right click and select "Paste". You should see a copy of the "boot.wim" file on your desktop now.



27. Go back to the WDS Console, expand your server, and right click on "Boot Images". Select "Add Boot Image".

🙅 Windows Deployment Services				
✓ Servers				
✓ ➡ DEMOSERVER20	19.macriumdemo.local			
🔉 🚞 Install Image	5			
> 🛋 Boot Images				
> 📑 Pendir	Add Boot Image			
> <u>द</u> ि Presta	View >			
> 📑 Multic	view >			
> 📑 Driver:	Export List			
> 🔂 demoserv				
> 🛍 Active Directo	Help			

28. Click "Browse" and go to your desktop. Double-click on the "boot.wim" file we copied over above.

<b>4</b>	
👳 Add Image Wizard	×
Image File	
Enter the location of the Windows in	nage file that contains the images to add.
File location:	
	Browse
Note: The default boot and install in installation DVD in the \Sources for	rages (Boot.wim and Install.wim) are located on the der.
More information about images and	inage lypes
CONTRACTOR OF CONTRACTOR OF CONTRACTOR	ALIMPEC ADDRESS
	< Back Next > Cancel
🝨 Select Windows Image File	×
← → · · ↑ ■ > This PC > Desktop	v č Search Desktop ,0
Organize • New folder	· · · · · · · · · · · · · · · · · · ·
Name	C Date modified Type
A Quick access	2021-12-17 12:34 WIM File
Desktop #	AND THE OF THE PARTY OF
Documents #	
Pictures x*	
This PC	
2 DVD Drive (Dt) Macris	
Network	
¢	>
File game: boot.wim	✓ Windows image files (*.wim)
	Qpen Cancel

29. Confirm the path and click "Next".

🝨 Add Image Wizard	×
Image File	<b>I</b>
Enter the location of the Windows image file that contains the images t	o add.
File location:	
C:\Users\MacriumAdmin\Desktop\boot.wim	Browse
Note: The default boot and install images (Boot.wim and Install.wim) an installation DVD in the \Sources folder.	e located on the
More information about images and image types	
< Back Next >	Cancel

30. Give the image a name and description. For this example, we used "Macrium Deployment Kit Recovery Environment" as the Image Name, and "Microsoft Windows PE (amd64)" as the description. Click "Next" when done.

Add Image Wizard Image Metadata			×
Enter a name and description for the follow	ving image:		
'Microsoft Windows PE (amd64)'			
Image name:			
Macrium Deployment Kit Recovery Enviro	nment	7	
Image description:		_	
Microsoft Windows PE (amd64)		7	
Image architecture: x64			
	< Back	Next >	Cancel

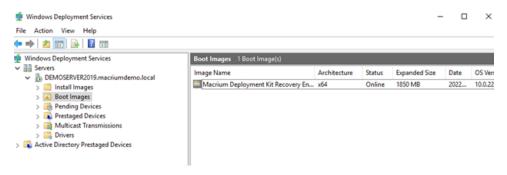
31. Review the final summary, and click "Next".

🝨 Add Image Wizard	×
Summary	
You have selected	the following images
Image group:	Boot Images
Image file:	C:\Users\MacriumAdmin\Desktop\boot.wim
Selected images:	
Name	
Macrium Deployn	ient Kit Recovery Environment
To change your se Next.	lection, click Back. To add the selected images to the server, click
	< Back Next > Cancel

32. Wait for the operation to complete and click "Finish".

🝨 Add Image Wizard	×
Task Progress	
The operation is complete	
The selected images were successfully added to the s	erver.
< Bac	k Finish Cancel

33. Confirm the boot image by going back into the WDS Console, click on "Boot Images" and see your new boot image in the right-hand pane.



WDS is setup and ready, however you still need to ensure that DHCP is installed on this server and that option 60 is enabled to have PXE compatible systems boot into this Macrium Deployment Kit Recovery Environment.

See Installing and Configuring DHCP for PXE Boot on Windows Server 2016 2019 2022