

Configuring a Windows DHCP Server with Vendor Classes for UEFI Boot

ThinManager can be configured to allow generic thin clients to boot from ThinManager using the PXE Boot extension, or the Pre-Boot Execution Environment, of the BIOS. ThinManager 11 and later also allow thin clients with the Unified Extensible Firmware Interface (UEFI) to boot as ThinManager Compatible thin clients. This article will discuss the means to achieve this.

PXE Boot Clients, called ThinManager Compatible, need an IP address from a DHCP server and a bootfile from a PXE server. ThinManager provides the PXE server and can provide the IP address by acting as the DHCP server for PXE requests, or letting an existing DHCP server provide the IP address.

🕿 PXE Server Wizard
Network Interface Configuration Select the settings for each network interface
Select Interface to Configure
Realtek PCIe GBE Family Controller
Interface Primary IP Address
PXE Server Mode C Using standard DHCP server Using standard DHCP server on this machine
 Using standard DHCP server with Boot Options (PXE Disabled)
C Not using standard DHCP server
IP Address Conflict Detection
ARP
C None
R Allow New PXE clients
< Back Next > Finish Cancel Help

The ThinManager PXE Server has four modes:

- #1 Using standard DHCP server
- #2 Using standard DHCP server on this machine
- #3 Using standard DHCP server with Boot Options
- #4 Not using standard DHCP server

Using modes #1, #2, and #4 require no additional configuration to boot UEFI thin clients. The PXE Server in ThinManager can distinguish between Legacy PXE and the new UEFI and will send the right firmware to the thin client.

Mode #3, **Using standard DHCP server with Boot Options**, requires configuration to boot UEFI thin clients because it relies on the DHCP Server instead of a PXE Server to provide boot information. This Tech Note will cover the steps needed to get a DHCP Server to provide the UEFI boot information.

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Here is an expansion of the roles of the four PXE Boot Server modes:

- Using standard DHCP server: Use this setting when you have an existing DHCP server to provide IP addresses. ThinManager will provide the PXE information.
- Using standard DHCP server on this machine: This mode is required to provide the PXE information when a standard DHCP server is installed on the same computer as the ThinManager Server. Additionally Port UDP-4011 will need to be opened on the computer if you have UEFI booting thin clients.
- Using standard DHCP server with Boot Options: A DHCP server can be configured to use Option 066 (Boot Server Host Name) with the ThinManager Server IP address. You need to also use Option 067 (Bootfile name) to tell the client what file to download for firmware. The PXE server is still needed to be turned on in ThinManager.
- Not using standard DHCP server: Use this setting if you want to configure ThinManager to
 provide IP addresses with associated boot information to the PXE boot thin clients. Use this
 setting if you do not have a DHCP Server on your network. Configure ThinManager to serve out
 IP addresses on the IP Address Range Page. This is not a traditional DHCP Server and will only
 provide IP addresses to devices making a PXE request.

Using standard DHCP server with Boot Options

Note: This only applies to **Mode #3**, **Using standard DHCP server with Boot Options.** Other options are handled by the PXE Server built into ThinManager.

Mixing legacy PXE clients and the new UEFI PXE Boot add complexity because the two methods require two different bootfiles as provided by DHCP Server Option 67. A method to provide the right information to the thin client is to set up Vendor Classes in the DHCP server.





On your Dynamic Host Configuration Protocol Server (DHCP Server) right click on your DHCP type, either IPv4 or IPv6, and select *Define Vendor Classes…* This will open the **DHCP Vendor Class** window.

	DHCP Vendor Classes	? X
Available classes:		
Name	Description	Add
Microsoft Windows 20 Microsoft Windows 98	Microsoft vendor-specific option Microsoft vendor-specific option	Edit
Microsoft Options	Microsoft vendor-specific option	Remove
		Close

There are three classes that need added.

- Legacy PXEClient:Arch:00000
- x86 UEFI PXEClient:Arch:00006
- x64 UEFI PXEClient:Arch:00007

Select the *Add* button to open the **New Class** window.

	New Class	? X
Display name:		
ļ.		
Description:		
1		
ID:	Binary:	ASCII:
	ОК	Cancel

Enter a name for the new class in the *Display name* field to the New Class window.



Display na Legacy F	ame: PXE		1	Vew	Cla	ISS			?	2
PXEClier	nt:Arch:00	000	1							
D: 0000 0008 0010	50 58 74 3A 30 30	45 41 30	Binar, 43 72 30	y: 6C 63	69 68	65 3A	6E 30	PXE0 t:A1 0000	ASC Clie: rch:)	ll: n O
					[ОК		Can	cel

The syntax for the **Description** is very specific. It needs to be entered in the **ASCII** field also.

- Legacy PXE = PXEClient:Arch:00000
- PXE Client (UEFI x86) = PXEClient:Arch:00006
- PXE Client (UEFI x64) = PXEClient:Arch:00007

Create the first, select **OK** to finish, and define the next class.

New Class ? X	
Display name: PXE Client (UEFI x86)	ŗ
Description: PXEClient:Arch:00006	[
D: Binary: ASCII: 0000 50 58 45 43 6C 69 65 6E PXEClien 0008 74 3A 41 72 63 68 3A 30 0010 30 30 30 36 t:Arch:0 0006	r
OK Cancel]

PXE Client (UEFI x86) = PXEClient:Arch:00006



PXE Clie Descriptio	ent (UEF on: nt:Arch:	FI x64	4))7	_					
ID: 0000 0008 0010	50 ! 74 : 30 :	58 4 3A 4 30 3	145 41 30	Binan 43 72 37	/: 6C 63	69 68	65 3A	6E 30	ASCII: PXEClien t:Arch:0 0007

PXE Client (UEFI x64) = PXEClient:Arch:00007

	DHCP Vendor Classes	? X
Available classes: Name Microsoft Windows 20 Microsoft Windows 98 Microsoft Options Legacy PXE PXE Client (UEFlx86) PXE Client (UEFlx64)	Description Microsoft vendor-specific option Microsoft vendor-specific option Microsoft vendor-specific option PXEClient:Arch:00000 PXEClient:Arch:00006 PXEClient:Arch:00007	Add Edit Remove
		Close

When defined the new classes will be displayed in the DHCP Vendor Classes window.

Select Close

Right click on *Policies* in the Scope





Select New Policy to launch the DHCP Policy Configuration window.

Three policies need created, one for each Vendor Class, so this wizard needs run three times.

	DHCP Policy Configuration Wizard
Policy based IP	Address and Option Assignment
This feature allo clients based on	ws you to distribute configurable settings (IP address, DHCP options) to certain conditions (e.g. vendor class, user class, MAC address, etc.).
This wizard will Configuration Po policy.	guide you setting up a new policy. Provide a name (e.g. VolP Phone slicy) and description (e.g. NTP Server option for VolP Phones) for your
Policy Name:	Legacy PXE
Description:	
	< Back Next > Cancel

Enter a Policy name and select Next.



Specify a and values	condition for the policy being for the condition.	configured. Select a c	niteria, operator
Criteria:	Vendor Class	•	
Operator:	Equals	•	
– Value(s)			
Value:	Legacy PXF	•	Add
	Prefix wildcard(*)		766
	Append wildcard(*)		
	Legacy PXE*		Remove
	,		

Select the user defined Vendor Class from the Value drop-down.

Select *Add* to move it to the text field.

Select **OK**

Select Next to continue.

DHCP	Policy Configura	tion Wizard
Configure Conditions for the	e policy	
A policy consists of one or mor Address) that are distributed to settings to clients that match th A policy with conditions bas	e conditions and a set the client. The DHCP nese conditions. and on fully qualified do	of configuration settings (options, IP server delivers these specific main name can have
configuration settings for DI	NS but not for options of	or IP address ranges.
Conditions	Operator	Value
Vendor Class	Equals	PXE Client (UEFIx86)*
CAND © OR	Add	Gack Next > Cancel

Select Next to continue.



Configure settings for the policy If the conditions specified in the policy match a client request applied.	, the settings will	be 🤇
A scope can be subdivided into multiple IP address ranges. Clie	ents that match t	ne condition
Configure the start and end IP address for the range. The start range must be within the start and end IP addresses of the sco	and end IP addrope.	esses for the
The current scope IP address range is 10.7.10.201 - 10.7.10.2	210	
If an IP address range is not configured for the policy, policy cli address from the scope range.	ents will be issue	d an IP
Do you want to configure an IP address range for the policy:	C Yes	
Start IP address:		
End IP address:		
Percentage of IP address range: No valid range specified		

Select a segment of the IP range or use the entire range.

Select Next to continue.

DHCP Policy Confi	guration Wizard
Configure settings for the policy If the conditions specified in the policy match applied.	a client request, the settings will be
Vendor class: DHCP Standard Option	ons 💌
Available Options	Description ^
☑ 066 Boot Server Host Name	TFTP boot server host name
✓ 067 Bootfile Name	Bootfile Name
O68 Mobile IP Home Agents	Mobile IP home agents in priori
String value: acpboot.bin	
	< Back Next > Cancel

Enter the ThinManager IP Address in the Option 66 String value field.

Note: Only one ThinManager Server can be specified in Option 66 when using PXE boot.

Enter the Option 67 value that matches the mode of thin client boot.

- Legacy PXE Boot uses acpboot.bin.
- x86 UEFI Boot uses tmboot32.bin.
- x64 UEFI Boot uses tmboot64.bin



Drier	Policy Config	uration Wizard
Summary		
A new policy will be created with view properties of the policy and Name: Legacy PXE Description:	h the following pro d click the DNS tal	perties. To configure DNS settings, b.
Conditions: OR of		
Conditions	Operator	Value
Settings:		
Settings: Option Name	Vendor Class	Value
Settings: Option Name Boot Server Host Name Bootfile Name	Vendor Class	Value 10.7.10.10 acpboot.bin

The wizard will show a summary of the Vendor Class Policy.

Repeat the wizard to create the other user created Vendor Classes.

D	HCP Policy Config	uration Wizard		DH	CP Policy Config	guration Wizard	
Summary			S	Summary			()
A new policy will be creative properties of the policy with policy with the policy of	ted with the following pro licy and click the DNS ta (UEFI x86)	perties. To configure DNS settings, b.		A new policy will be create view properties of the polic Name: PXE Client (U Description: Conditions: OR of	d with the following pro y and click the DNS ta IEFI x64)	operties. To configure DNS settings, ab.	
Conditions	Operator	Value		Conditions	Operator	Value	
Vendor Class	Equals	PXE Client (UEFbx86)*		Vendor Class	Equals	PXE Client (UEFI x64)	
Settings:				Settings:			
Option Name	Vendor Class	Value		Option Name	Vendor Class	Value	
Boot Server Host Name Bootfile Name	3	10.7.10.10 tmboot32.bin		Boot Server Host Name Bootfile Name		10.7.10.10 tmboot64.bin	
		< Back Finish Ca	ancel		[< Back Finish C	ancel

Each policy will show a summary.



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File Action View Help							
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DHCP ☐ pburns11.lab.thinmanager.com ↓	Policy Name Legacy PXE PXE Client (UEELx86)	Description	Processin 1 2	Level	Actions		
				Scope	Policies		
 ▲ Scope [10.7.10.0] Pburns Address Pool Address Leases Reservations Scope Options Policies Server Options Policies ▶ ♥ Filters ▲ ♥ Filters ▲ ♥ Server Options 	PXE Client (UEFI x64)		3	Scope	More Actions		
	<			2			

When done the policies will be shown in the **DHCP** dashboard.