



Grandstream Networks, Inc.

GRP26XX Carrier-Grade IP Phones

DHCP Options Guide - Windows Server 2012



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SUPPORTED DEVICES

The following list shows DHCP Options supported by the GRP26XX series:

- Option 1 : Subnet Mask
- Option 2 : Time Offset
- Option 3 : Router
- Option 6 : Domain Server
- Option 12 : Hostname
- Option 15 : Domain Name
- Option 28 : Broadcast Address
- Option 43 : Vendor Specific
- Option 53 : DHCP Msg Type
- Option 55 : Parameter List
- Option 57 : DHCP Max Msg Size
- Option 60 : Class Id
- Option 61 : Client Id
- Option 66 : Server-Name
- Option 120: SIP Servers DHCP Option
- Option 125: V-I Vendor-Specific Information
- Option 132: IEEE 802.1Q VLAN ID
- Option 133: IEEE 802.1D/p Layer 2 Priority
- Option 150: TFTP server address
- Option 160: DHCP Captive-Portal
- Option 255: End



INTRODUCTION

Dynamic Host Configuration Protocol (DHCP) is a standardized network protocol used on Internet Protocol (IP) networks for dynamically distributing network configuration parameters, such as IP addresses for interfaces and services. With DHCP, network devices request IP addresses and networking parameters automatically from a DHCP server, reducing the need for a network administrator or a user to configure these settings manually.

DHCP servers can be configured to provide optional data that fully configures TCP/IP on a client. Some of the most common DHCP option types configured and distributed by the DHCP server during leases include default gateway, router, DNS, and WINS parameters.

This guide describes advanced DHCP options supported on Grandstream Carrier-Grade IP Phones. Administrators can use these DHCP options for easy setup, to provide specific configuration per device model, synchronize time with NTP servers, configure ACS server URL on devices and more...

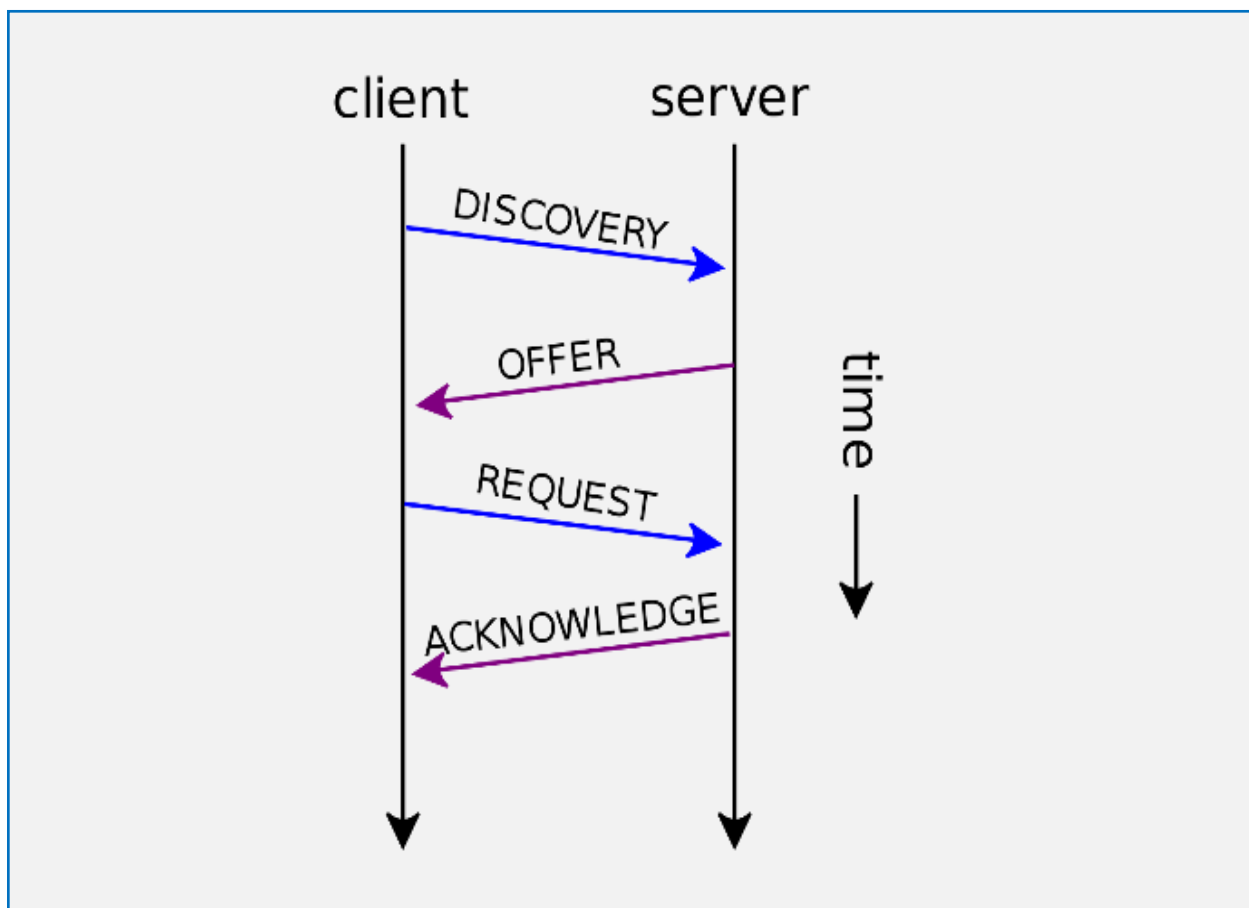


Figure 1: DHCP flow

ENVIRONMENT SETUP

This chapter provides instructions to setup a minimal test environment to run DHCP options described in this guide using DHCP-server via server manager in Windows server 2012.

Administrators can use other Windows or Linux based DHCP servers at their convenience.

Note: This chapter can be skipped if a DHCP server supporting customizing options is already setup.

Step 1: Install DHCP via Server Manager

Before starting the role installation, make sure the computer has a static IP address. In this guide, we will use Windows Server 2012 with static IP address: 192.168.1.100

1. Launch the “Add Roles and features Wizard” from the Dashboard on Server Manager, and select “Role based or feature based installation”.
2. After choosing the server from the “server pool”, select **DHCP server** from the roles list and go through the installation steps.
3. The installation will be completed, and the last page of the wizard is will show the following:

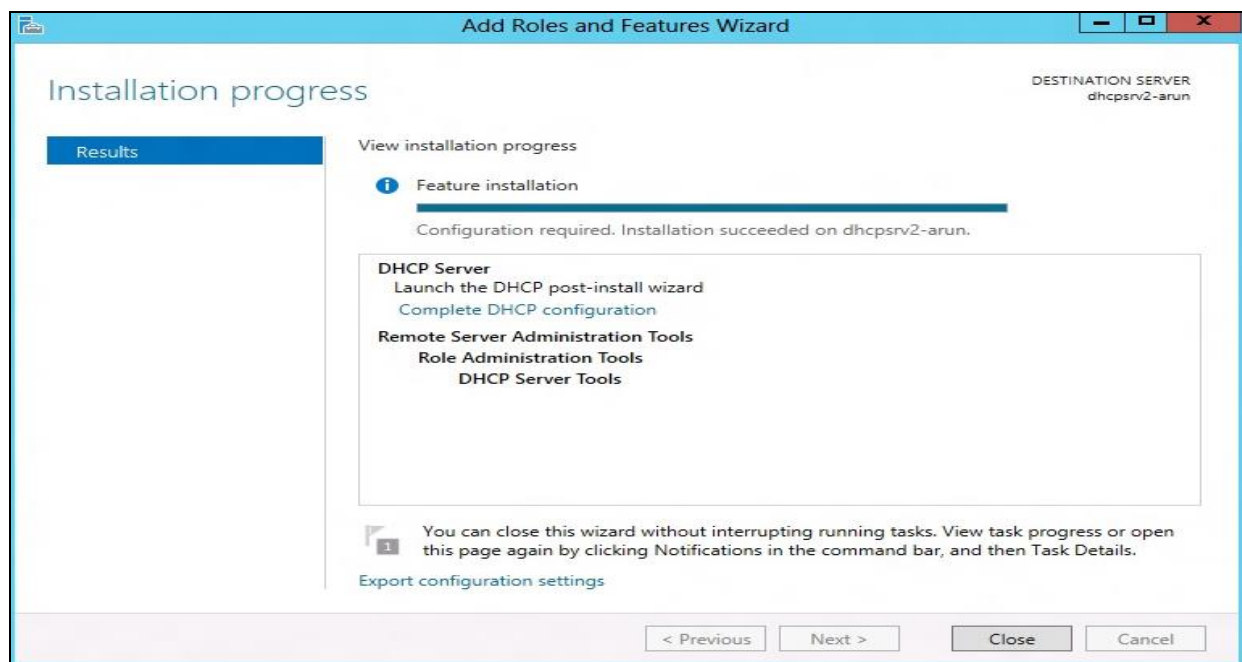


Figure 2: DHCP Role Installation

4. Complete the steps required for the post-install configuration by clicking on “complete DHCP configuration”.



Step 2: DHCP Server Basic Configuration

The first step in the installed DHCP server configuration is to create the scopes (Ranges of IP addresses) that the administrator wants to lease out to the DHCP clients.

1. Type: **dhcpgmt.msc** Under “Windows Run” to open DHCP Management.

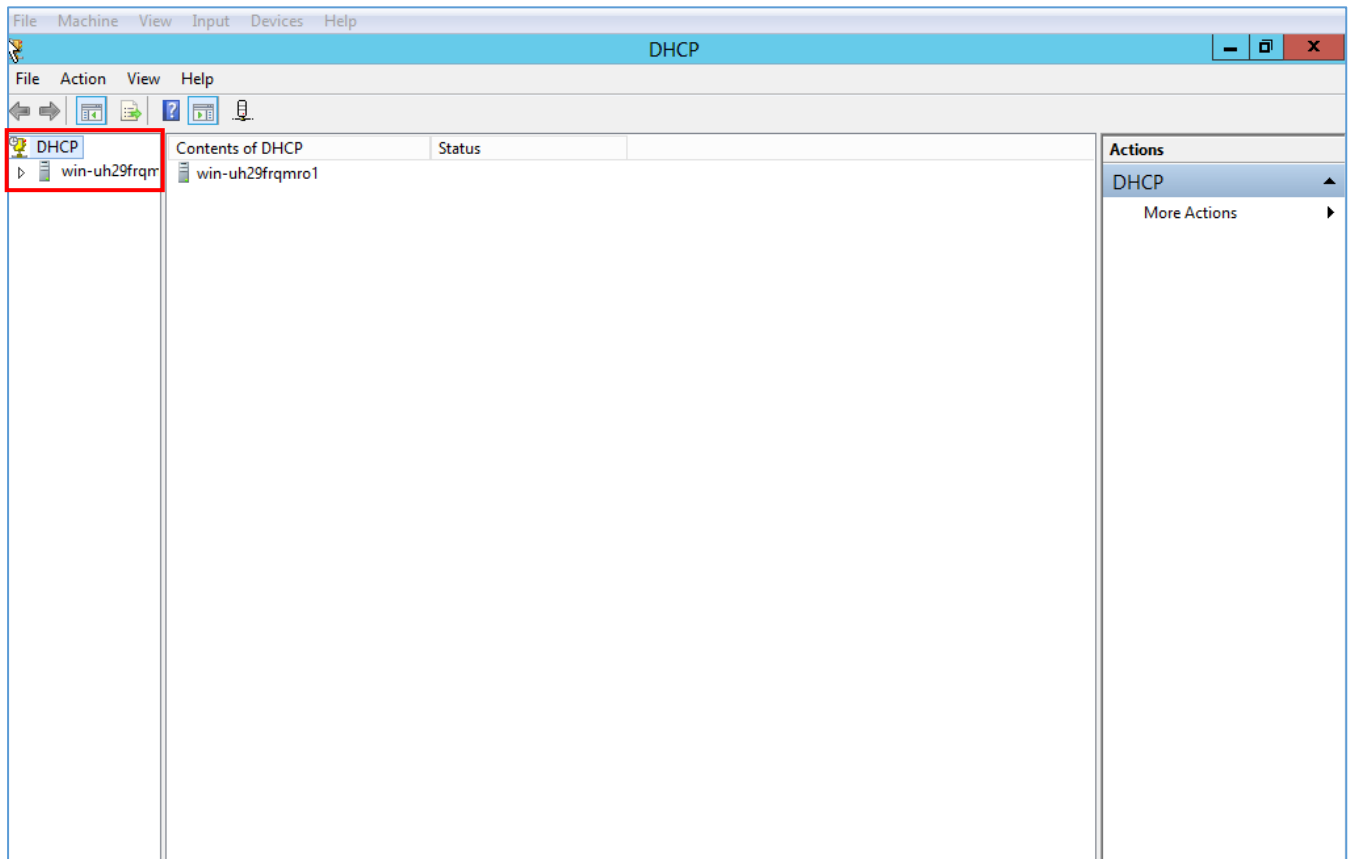
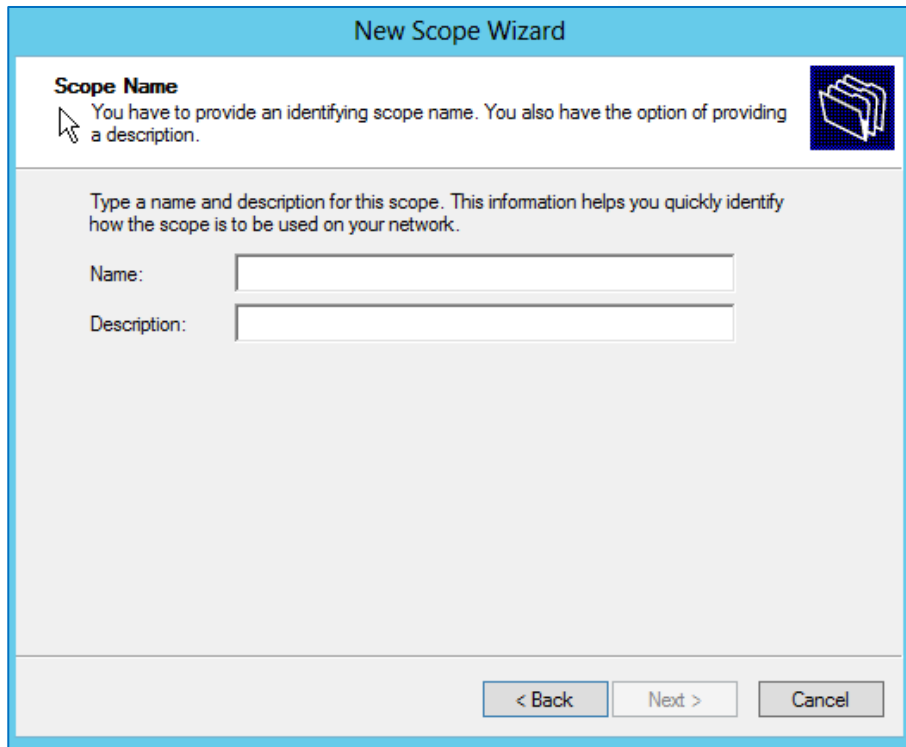


Figure 3: DHCP Management

2. Under the domain name, right click the “IPv4”, and then click on “**New Scope**” to open the New Scope wizard:



New Scope Wizard

Scope Name
 You have to provide an identifying scope name. You also have the option of providing a description.

Type a name and description for this scope. This information helps you quickly identify how the scope is to be used on your network.

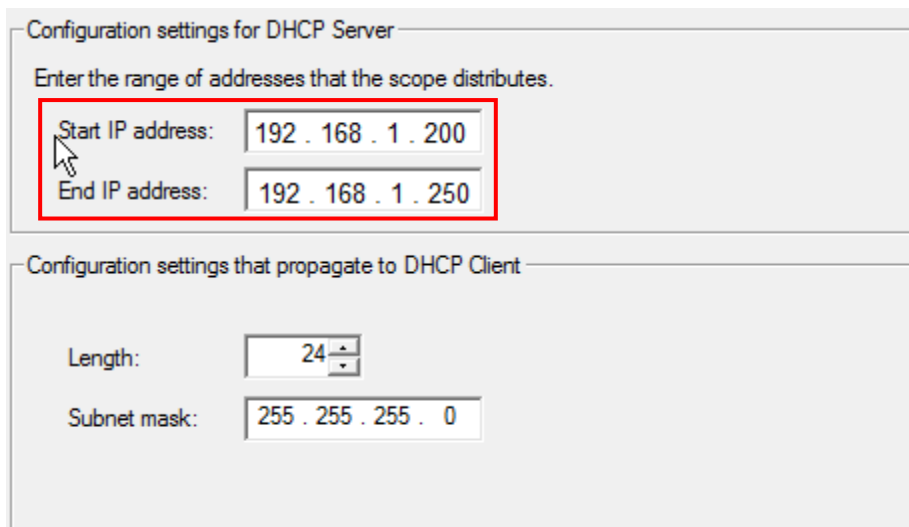
Name:

Description:

< Back Next > Cancel

Figure 4: New Scope Wizard

3. Enter the Name of the new scope and its description, and set the range of IP addresses to lease to DHCP clients. Leave the Length 24 by default and click Next.



Configuration settings for DHCP Server

Enter the range of addresses that the scope distributes.

Start IP address:

End IP address:

Configuration settings that propagate to DHCP Client

Length:

Subnet mask:

Figure 5: IP Address Range

4. The administrator can configure a restricted range of IP addresses by entering the range in “Add exclusions” and setting the lease duration.
5. If you have a Router (Default gateway), set the router IP address and click Next.



6. Set the domain Name of the DNS server and its IP address, and click Next.
7. Activate the scope by clicking “Yes, I want to activate this scope now”, and click Next.
8. Click on Finish to close the wizard.



Figure 6: Completing the New Scope Wizard

DHCP OPTIONS

To configure the DHCP options, the method includes the following steps:

1. In the DHCP MMC, right-click on IPv4 and select “Set Predefined Options”.

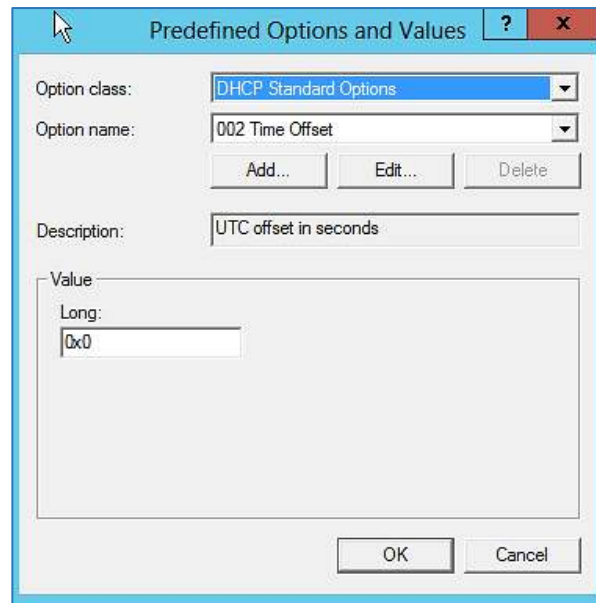


Figure 7: Predefined Options

- **Option Class:** Set the Vendor Class serving to enhance DHCP functionalities (The admin can create a vendor class: *DHCP MMC /IPv4 /Define Vendor Classes*).
 - **Option Name:** Set the option needed.
 - **Add:** Increase the number of options by adding a new one.
 - **Edit:** Modify a specific option.
 - **Value:** Set the value of the chosen option.
2. Just after predefining the options and their values, click on “Server Options” to choose the options.

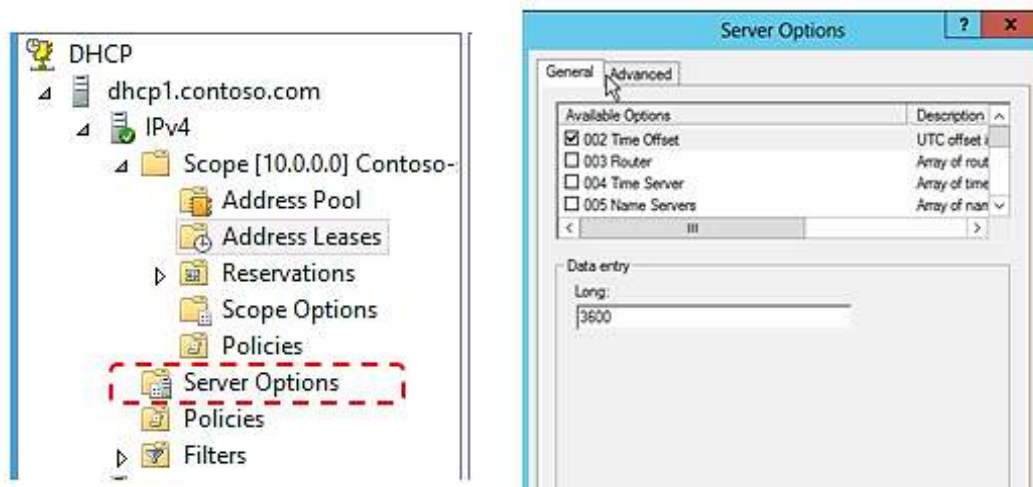


Figure 8 : Server Options



DHCP Option 2 : Time Offset

Description

DHCP option 2 informs the client about the time zone offset (in seconds).

A positive offset indicates a location east of the zero meridian and a negative offset indicates a location west of the zero meridian.

Please refer to RFC2132 for more details.

Example

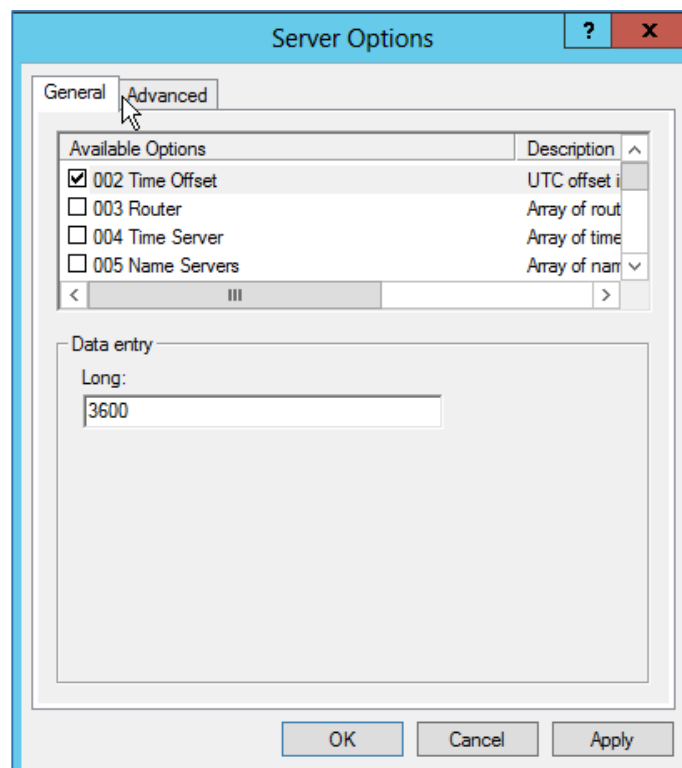


Figure 9: DHCP option 2 (Time offset)

In above example, GMT+1 was set as an offset value
 (one hour * 60 minutes/hour * 60 seconds/minute) = 3600.

Screenshots

Below screenshots of DHCP Discover/Offer for Option 2:

Protocol	Length	Info
DHCP	385	DHCP Discover - Transaction ID 0x409cfa4c
DHCP	369	DHCP Offer - Transaction ID 0x409cfa4c
DHCP	385	DHCP Discover - Transaction ID 0x409cfa4c
DHCP	397	DHCP Request - Transaction ID 0x409cfa4c
DHCP	369	DHCP Offer - Transaction ID 0x409cfa4c
DHCP	369	DHCP ACK - Transaction ID 0x409cfa4c
DHCP	397	DHCP Request - Transaction ID 0x409cfa4c
DHCP	369	DHCP ACK - Transaction ID 0x409cfa4c

<

Next server IP address: 0.0.0.0
 Relay agent IP address: 0.0.0.0
 Client MAC address: Grandstr_fb:4e:3a (00:0b:82:fb:4e:3a)
 Client hardware address padding: 00000000000000000000
 Server host name not given
 Boot file name not given
 Magic cookie: DHCP
 > Option: (53) DHCP Message Type (Discover)
 > Option: (61) Client identifier
 > Option: (57) Maximum DHCP Message Size
 ▾ Option: (55) Parameter Request List
 Length: 12
 Parameter Request List Item: (1) Subnet Mask
 Parameter Request List Item: (2) Time Offset
 Parameter Request List Item: (3) Router

Figure 10: DHCP Discover Request for Option 2

Protocol	Length	Info
DHCP	385	DHCP Discover - Transaction ID 0x409cfa4c
DHCP	369	DHCP Offer - Transaction ID 0x409cfa4c
DHCP	385	DHCP Discover - Transaction ID 0x409cfa4c

<

Message type: Boot Reply (2)
 Hardware type: Ethernet (0x01)
 Hardware address length: 6
 Hops: 0
 Transaction ID: 0x409cfa4c
 Seconds elapsed: 0
 > Bootp flags: 0x0000 (Unicast)
 Client IP address: 0.0.0.0
 Your (client) IP address: 192.168.1.200
 Next server IP address: 192.168.1.100
 Relay agent IP address: 0.0.0.0
 Client MAC address: Grandstr_fb:4e:3a (00:0b:82:fb:4e:3a)
 Client hardware address padding: 00000000000000000000
 Server host name not given
 Boot file name not given
 Magic cookie: DHCP
 ▾ Option: (2) Time Offset
 Length: 4
 Time Offset: (3600s), 1 hour

Figure 11: DHCP Offer Reply for the Option 2

Note: To set Pacific Standard Time (GMT-8) for example. This field would be filled with “-28800”. (Eight hours * 60 minutes/hour * 60 seconds/minute).



DHCP Option 42 : NTP Server

Description

DHCP option 42 specifies a list of NTP servers available to the client by IP address, so that the phone may obtain the date and time from the server.

Please refer to RFC2132 for more details.

Example

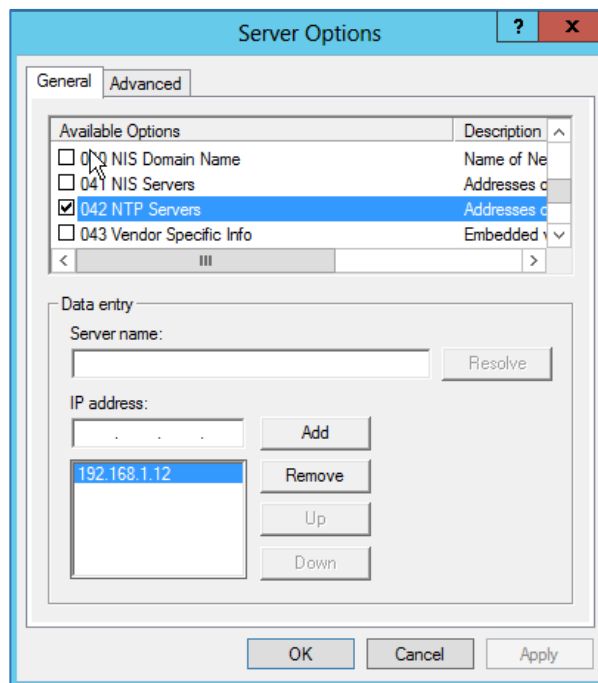


Figure 12: DHCP Option 42

Screenshots

Below screenshots of DHCP Discover/Offer for Option 42.

Protocol	Length	Info
DHCP	385	DHCP Discover - Transaction ID 0x409cfa4c
DHCP	369	DHCP Offer - Transaction ID 0x409cfa4c
DHCP	385	DHCP Discover - Transaction ID 0x409cfa4c
DHCP	397	DHCP Request - Transaction ID 0x409cfa4c
DHCP	369	DHCP Offer - Transaction ID 0x409cfa4c
<		
> Internet Protocol Version 4, Src: 192.168.1.100, Dst: 255.255.255.255		
> User Datagram Protocol, Src Port: 67, Dst Port: 68		
▼ Dynamic Host Configuration Protocol (Offer)		
Message type: Boot Reply (2)		
Hardware type: Ethernet (0x01)		
Hardware address length: 6		
Hops: 0		
Transaction ID: 0x409cfa4c		
Seconds elapsed: 0		
> Bootp flags: 0x0000 (Unicast)		
Client IP address: 0.0.0.0		
Your (client) IP address: 192.168.1.200		
Next server IP address: 192.168.1.100		
Relay agent IP address: 0.0.0.0		
Client MAC address: Grandstr_fb:4e:3a (00:0b:82:fb:4e:3a)		
Client hardware address padding: 00000000000000000000		
Server host name not given		
Boot file name not given		
Magic cookie: DHCP		
> Option: (42) Network Time Protocol Servers		
> Option: (120) SIP Servers		

Figure 13: DHCP Discover Request for Option 42

Protocol	Length	Info
DHCP	397	DHCP Request - Transaction ID 0x409cfa4c
DHCP	369	DHCP Offer - Transaction ID 0x409cfa4c
DHCP	369	DHCP ACK - Transaction ID 0x409cfa4c
DHCP	397	DHCP Request - Transaction ID 0x409cfa4c
DHCP	369	DHCP ACK - Transaction ID 0x409cfa4c
<		
Hardware type: Ethernet (0x01)		
Hardware address length: 6		
Hops: 0		
Transaction ID: 0x409cfa4c		
Seconds elapsed: 3		
> Bootp flags: 0x0000 (Unicast)		
Client IP address: 0.0.0.0		
Your (client) IP address: 192.168.1.200		
Next server IP address: 192.168.1.100		
Relay agent IP address: 0.0.0.0		
Client MAC address: Grandstr_fb:4e:3a (00:0b:82:fb:4e:3a)		
Client hardware address padding: 00000000000000000000		
Server host name not given		
Boot file name not given		
Magic cookie: DHCP		
▼ Option: (42) Network Time Protocol Servers		
Length: 4		
Network Time Protocol Server: 192.168.1.12 (192.168.1.12)		
> Option: (120) SIP Servers		

Figure 14: DHCP Offer Reply for the Option 42



DHCP Option 66 : TFTP Server Name

Description

DHCP option 66 provides the IP address or the hostname of a single provisioning server where devices will be redirected to get their configuration files. Without this DHCP option, a manual configuration is requested on each phone the first time it boots.

Please refer to RFC2132/RFC5859 for more details.

Please refer to below link to learn how to provision Grandstream devices:

http://www.grandstream.com/sites/default/files/Resources/grp_provisioning_guide.pdf

Example

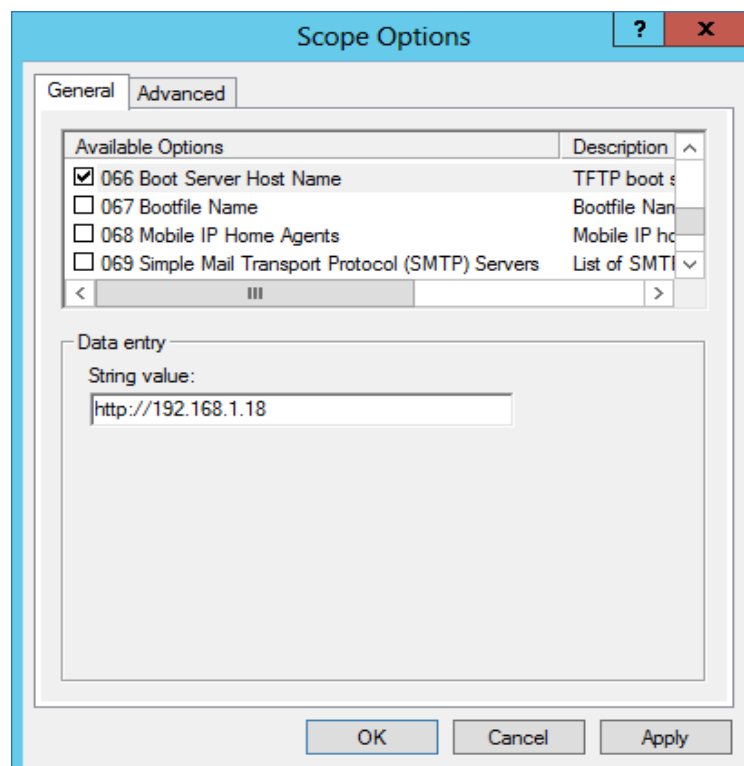


Figure 15: DHCP Option 66

If **http://** is not specified, default TFTP protocol is used for configured server.

Screenshots

Protocol	Length	Info
DHCP	385	DHCP Discover - Transaction ID 0x409cfa4c
DHCP	369	DHCP Offer - Transaction ID 0x409cfa4c
DHCP	385	DHCP Discover - Transaction ID 0x409cfa4c
DHCP	397	DHCP Request - Transaction ID 0x409cfa4c
DHCP	369	DHCP Offer - Transaction ID 0x409cfa4c
< > Bootp flags: 0x0000 (Unicast) Client IP address: 0.0.0.0 Your (client) IP address: 0.0.0.0 Next server IP address: 0.0.0.0 Relay agent IP address: 0.0.0.0 Client MAC address: Grandstr_fb:4e:3a (00:0b:82:fb:4e:3a) Client hardware address padding: 00000000000000000000 Server host name not given Boot file name not given Magic cookie: DHCP > Option: (53) DHCP Message Type (Discover) > Option: (61) Client identifier > Option: (57) Maximum DHCP Message Size ▼ Option: (55) Parameter Request List Length: 12 Parameter Request List Item: (66) TFTP Server Name Parameter Request List Item: (120) SIP Servers Parameter Request List Item: (125) V-I Vendor-specific Information Parameter Request List Item: (160) DHCP Captive-Portal > Option: (60) Vendor class identifier		

Figure 16: DHCP Discover Request for Option 66

Protocol	Length	Info
DHCP	397	DHCP Request - Transaction ID 0x409cfa4c
DHCP	369	DHCP Offer - Transaction ID 0x409cfa4c
DHCP	369	DHCP ACK - Transaction ID 0x409cfa4c
DHCP	397	DHCP Request - Transaction ID 0x409cfa4c
< Transaction ID: 0x409cfa4c Seconds elapsed: 3 > Bootp flags: 0x0000 (Unicast) Client IP address: 0.0.0.0 Your (client) IP address: 192.168.1.200 Next server IP address: 192.168.1.100 Relay agent IP address: 0.0.0.0 Client MAC address: Grandstr_fb:4e:3a (00:0b:82:fb:4e:3a) Client hardware address padding: 00000000000000000000 Server host name not given Boot file name not given Magic cookie: DHCP ▼ Option: (66) TFTP Server Name Length: 12 TFTP Server Name: 192.168.1.18 > Option: (54) DHCP Server Identifier (192.168.1.100)		

Figure 17: DHCP Offer Reply for the Option 66



DHCP Option 43 : Vendor Specific Information

Description

This option is used by clients and servers to exchange vendor-specific information.

DHCP server can send one or more vendor specific parameters to clients, encoded in the form **option_code/value_length/value** in hexadecimal format.

Please refer to RFC2132 for more details.

Example

In following example, DHCP server is configured to send CWMP information (ACS URL <http://192.168.1.18>) encapsulated in option 43.

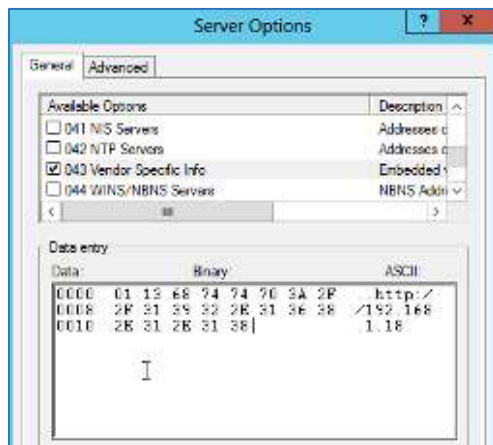


Figure 18: DHCP Option 43

Above DHCP option 43 contains the following:

0x01 (CWMP option for ACS URL)

0x13 (hex of decimal 19 = length of the URL)

19 bytes forming the URL in hexadecimal format
(<http://192.168.1.18>)

Screenshots

Protocol	Length	Info
DHCP	385	DHCP Discover - Transaction ID 0x409cfa4c
DHCP	369	DHCP Offer - Transaction ID 0x409cfa4c
DHCP	385	DHCP Discover - Transaction ID 0x409cfa4c
DHCP	397	DHCP Request - Transaction ID 0x409cfa4c

Seconds elapsed: 3	
> Bootp flags: 0x0000 (Unicast) Client IP address: 0.0.0.0 Your (client) IP address: 0.0.0.0 Next server IP address: 0.0.0.0 Relay agent IP address: 0.0.0.0 Client MAC address: Grandstr_fb:4e:3a (00:0b:82:fb:4e:3a) Client hardware address padding: 00000000000000000000 Server host name not given Boot file name not given Magic cookie: DHCP	
> Option: (55) Parameter Request List Length: 12 Parameter Request List Item: (43) Vendor-Specific Information Parameter Request List Item: (66) TFTP Server Name	

Figure 19: DHCP Discover Request for Option 43



DHCP Option 12 : Host Name

Description

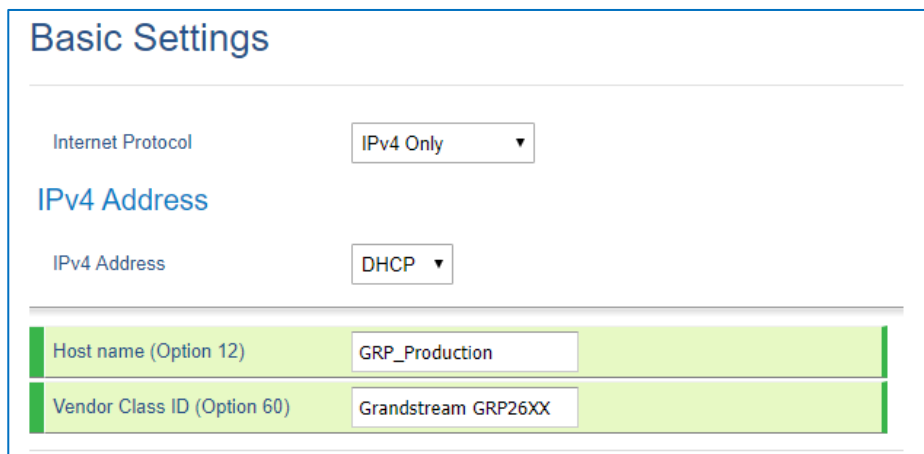
This option specifies the name of the client.

Option 12 is used to identify the client's name against the DHCP server to make special configuration from the server side, this is similar to option 60 and 125.

Please refer to RFC1533/RFC2132 for more details

Screenshots

Below screenshot is taken from GRP26XX, the value of Option 12 can be modified from the Phone Web GUI under **Network → Basic Settings: Host Name**



Basic Settings

Internet Protocol: IPv4 Only

IPv4 Address

IPv4 Address: DHCP

Host name (Option 12): GRP_Production

Vendor Class ID (Option 60): Grandstream GRP26XX

Figure 20: Host Name under web GUI

Protocol	Length	Info
DHCP	385	DHCP Discover - Transaction ID 0x409cfa4c
DHCP	369	DHCP Offer - Transaction ID 0x409cfa4c
DHCP	385	DHCP Discover - Transaction ID 0x409cfa4c
DHCP	397	DHCP Request - Transaction ID 0x409cfa4c

<	
Relay agent IP address: 0.0.0.0	
Client MAC address: Grandstr_fb:4e:3a (00:0b:82:fb:4e:3a)	
Client hardware address padding: 00000000000000000000	
Server host name not given	
Boot file name not given	
Magic cookie: DHCP	
▼ Option: (12) Host Name	
Length: 14	
Host Name: GRP_Production	
▼ Option: (255) End	

Figure 21: DHCP Discover Advertisement for Option 12



DHCP Option 60 : Vendor Class Identifier

Description

Option 60 is used by clients to optionally identify the vendor type and configuration of a DHCP client. When using multiple devices from different vendors, DHCP server can provide specific configuration for each client based on received Option 60.

Please refer to RFC1533/RFC2132 for more details.

Example

In following example, option 60 is configured to identify GRP2613 with its value “Grandstream GRP2613 dslforum.org”.

The first step is to add the option 60 under “**Predefined options and values → Add**”.

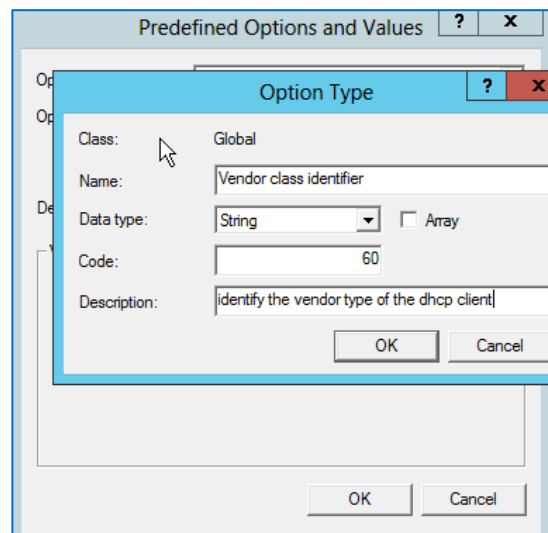


Figure 22: DHCP Option 60 Predefinition

Client packets with configured “option 60” but have no string specified (a string of 0 length) are handled accordingly.

Screenshots

Protocol	Length	Info
DHCP	385	DHCP Discover - Transaction ID 0x409cfa4c
DHCP	369	DHCP Offer - Transaction ID 0x409cfa4c
DHCP	385	DHCP Discover - Transaction ID 0x409cfa4c
DHCP	397	DHCP Request - Transaction ID 0x409cfa4c
<		
▼ Option: (60) Vendor class identifier		
	Length: 32	
	Vendor class identifier: Grandstream GRP2613 dslforum.org	

Figure 23: DHCP Discover Advertisement for Option 60



DHCP Option 120 : SIP Server

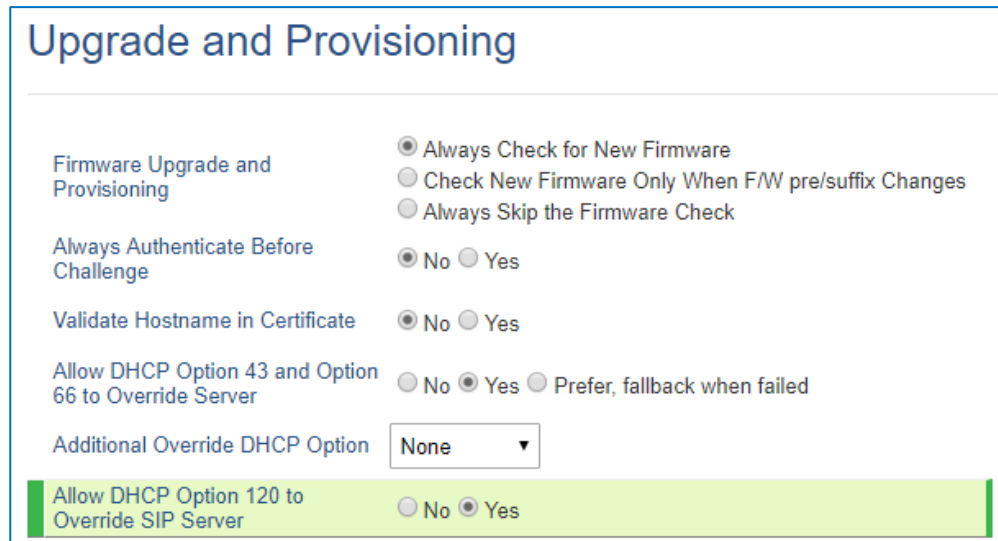
Description

The option is used to provide SIP server IP address or FQDN to SIP clients.

Please refer to RFC3361 for more details.

Example

Enable DHCP Option 120 under **Web GUI → Maintenance → Upgrade and Provisioning**, by setting **“Allow DHCP Option 120 to Override SIP Server”** to **Yes**.



Upgrade and Provisioning

Firmware Upgrade and Provisioning
☒ Always Check for New Firmware
☐ Check New Firmware Only When F/W pre/suffix Changes
☐ Always Skip the Firmware Check

Always Authenticate Before Challenge
☒ No ☐ Yes

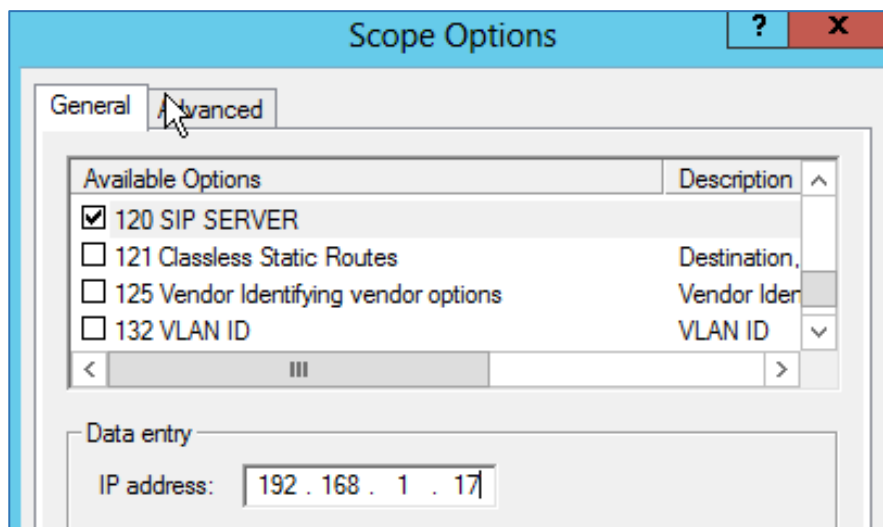
Validate Hostname in Certificate
☒ No ☐ Yes

Allow DHCP Option 43 and Option 66 to Override Server
☐ No ☒ Yes ☐ Prefer, fallback when failed

Additional Override DHCP Option: None

Allow DHCP Option 120 to Override SIP Server
☐ No ☒ Yes

In the following example, the DHCP option 120 is configured by adding and defining a new option under “Predefined Options and Values”.



Scope Options

General **Advanced**

Available Options	Description
☒ 120 SIP SERVER	
☐ 121 Classless Static Routes	Destination,
☐ 125 Vendor Identifying vendor options	Vendor Identifier
☐ 132 VLAN ID	VLAN ID

Data entry

IP address: 192.168.1.17

Figure 24: DHCP Option 120

Screenshots

Protocol	Length	Info
DHCP	385	DHCP Discover - Transaction ID 0x409cfa4c
DHCP	369	DHCP Offer - Transaction ID 0x409cfa4c
DHCP	385	DHCP Discover - Transaction ID 0x409cfa4c
DHCP	397	DHCP Request - Transaction ID 0x409cfa4c

> Bootp flags: 0x0000 (Unicast)
 Client IP address: 0.0.0.0
 Your (client) IP address: 0.0.0.0
 Next server IP address: 0.0.0.0
 Relay agent IP address: 0.0.0.0
 Client MAC address: Grandstr_fb:4e:3a (00:0b:82:fb:4e:3a)
 Client hardware address padding: 00000000000000000000
 Server host name not given
 Boot file name not given
 Magic cookie: DHCP
 ▾ Option: (55) Parameter Request List
 Length: 12
 Parameter Request List Item: (120) SIP Servers
 Parameter Request List Item: (125) V-I Vendor-specific Information

Figure 25: DHCP Discover Request for Option 120

Protocol	Length	Info
DHCP	385	DHCP Discover - Transaction ID 0x409cfa4c
DHCP	369	DHCP Offer - Transaction ID 0x409cfa4c
DHCP	385	DHCP Discover - Transaction ID 0x409cfa4c
DHCP	397	DHCP Request - Transaction ID 0x409cfa4c

Relay agent IP address: 0.0.0.0
 Client MAC address: Grandstr_fb:4e:3a (00:0b:82:fb:4e:3a)
 Client hardware address padding: 00000000000000000000
 Server host name not given
 Boot file name not given
 Magic cookie: DHCP
 ▾ Option: (120) SIP Servers
 Length: 5
 SIP Server Encoding: IPv4 Address (1)
 SIP Server Address: 192.168.1.17

Figure 26: DHCP Offer Reply for Option 120



DHCP Option 125 : Vendor-Identifying Vendor Options

Description

DHCP clients may use this option to identify the vendor that manufactured the hardware on which the client is running the software in use in a unique way.

Option 125 is similar to option 12 & 60 but advertising more parameters of a device:

- **DeviceManufacturerOUI**
- **DeviceSerialNumber** (Grandstream products set DeviceSerialNumber with MAC address)
- **DeviceProductClass**

Please refer to RFC3925 for more details.

Example

Add the option under “Predefined options and values” with data type: Encapsulated.

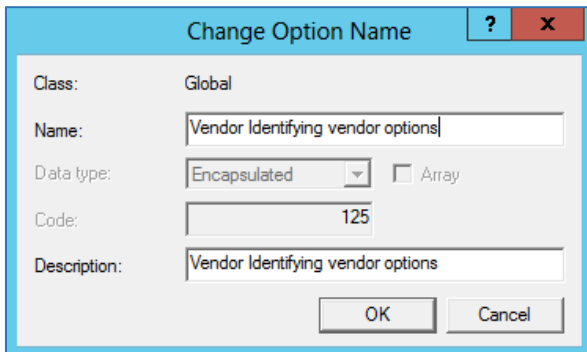


Figure 27: DHCP Option 125

Advertised information in above option 125 are:

- DeviceManufacturerOUI = **000b82**
- DeviceSerialNumber = **000b82XXXXXX**
- DeviceProductClass = **GRP26XX**

Screenshots

During DHCP initiation, **DHCP Discover/DHCP Request** including option 125 are sent from client, the server checks **V-I Vendor-specific information**, if matching configured values, specific configuration will be provided to client, otherwise, common configuration is provided to client.

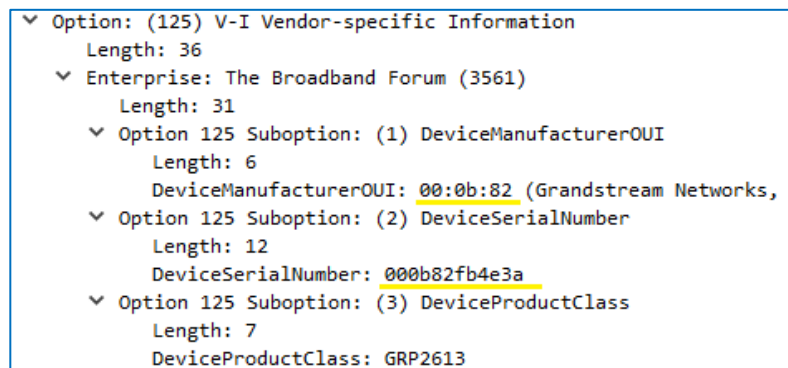


Figure 28: DHCP Discover Advertisement for Option 125



DHCP Option 132 : Vlan ID

Description

This option allows to assign a VLAN ID tag to devices during booting stage/DHCP renewal.

Please refer to RFC4578 / IEEE_802.1Q for more details

Example

- Enable the DHCP VLAN Override by setting it to: **“Enable DHCP Option VLAN”** to **Enabled**.
Under **Web GUI → Network → Advanced Settings**

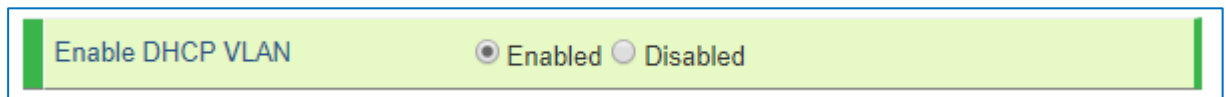


Figure 29: Enable DHCP Option 132

- Disable LLDP to avoid conflict. The phone cannot support LLDP and option 132 at the same time.

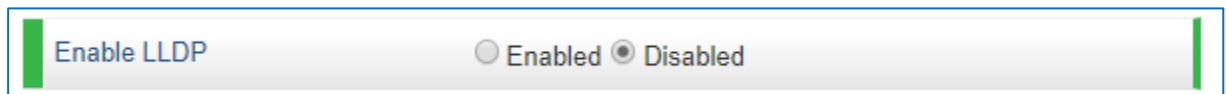


Figure 30: Disable LLDP

- Add the Option 132 under “Predefined options and values” with data type: “String” and select “Array”.

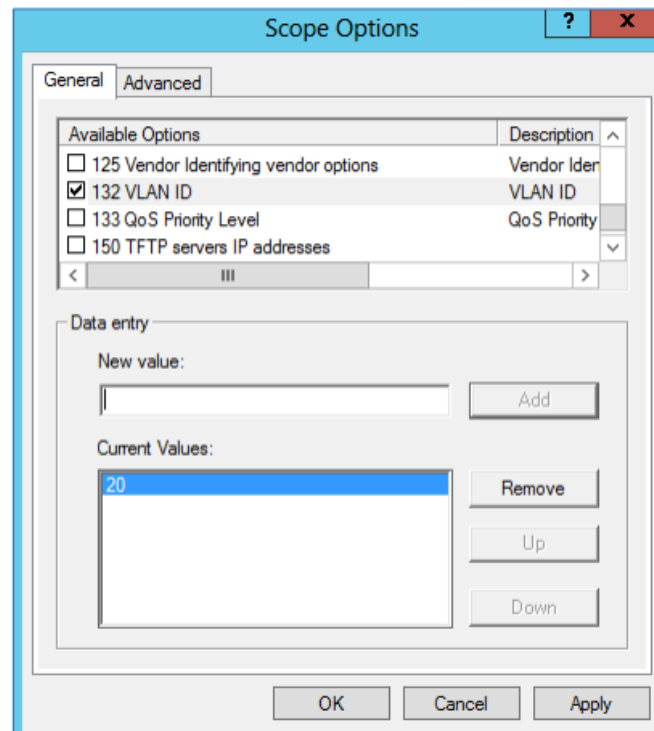


Figure 31: DHCP Option 132



Screenshots

Protocol	Length	Info
DHCP	387	DHCP Discover - Transaction ID 0x879b240a
DHCP	387	DHCP Discover - Transaction ID 0x879b240a
DHCP	326	DHCP Offer - Transaction ID 0x879b240a
DHCP	399	DHCP Request - Transaction ID 0x879b240a
DHCP	326	DHCP Offer - Transaction ID 0x879b240a

>	Ethernet II, Src: Grandstr_fb:4e:3a (00:0b:82:fb:4e:3a), Dst: Broadcast (ff:ff:ff:ff:ff:ff)
>	Internet Protocol Version 4, Src: 0.0.0.0, Dst: 255.255.255.255
>	User Datagram Protocol, Src Port: 68, Dst Port: 67
▼	Dynamic Host Configuration Protocol (Discover)
	Message type: Boot Request (1)
	Hardware type: Ethernet (0x01)
	Hardware address length: 6
	Hops: 0
	Transaction ID: 0x879b240a
	Seconds elapsed: 99
>	Bootp flags: 0x0000 (Unicast)
	Client IP address: 0.0.0.0
	Your (client) IP address: 0.0.0.0
	Next server IP address: 0.0.0.0
	Relay agent IP address: 0.0.0.0
	Client MAC address: Grandstr_fb:4e:3a (00:0b:82:fb:4e:3a)
	Client hardware address padding: 00000000000000000000
	Server host name not given
	Boot file name not given
	Magic cookie: DHCP
▼	Option: (55) Parameter Request List
	Length: 14
	Parameter Request List Item: (132) PXE - undefined (vendor specific)
	Parameter Request List Item: (133) PXE - undefined (vendor specific)
	Parameter Request List Item: (160) DHCP Captive-Portal

Figure 32: DHCP Discover Request for Option 132

Protocol	Length	Info
DHCP	387	DHCP Discover - Transaction ID 0x879b240a
DHCP	387	DHCP Discover - Transaction ID 0x879b240a
DHCP	326	DHCP Offer - Transaction ID 0x879b240a
DHCP	399	DHCP Request - Transaction ID 0x879b240a
DHCP	326	DHCP Offer - Transaction ID 0x879b240a

▼	Option: (132) PXE - undefined (vendor specific)
	Length: 2
	Value: 3230

Figure 33: DHCP Offer Reply for Option 132

In above screenshot, value 3230 is 20 (vlan-id) converted from text to hexadecimal.

Note: After getting VLAN ID from DHCP server and finishing DHCP process, the device will send a second DHCP discover its new assigned VLAN tag to get an IP address on the VLAN range.



DHCP Option 133 : QoS Priority Level

Description

This option assigns the priority within an Ethernet frame header when using VLAN tag, it specifies a priority value between 0 and 7 to differentiate the traffic priority.

Please refer to RFC4578 / IEEE_P802.1p for more details

Example

- Enable the DHCP VLAN Override and Disable LLDP to avoid conflict.
Under **Web GUI → Network → Advanced Settings**
- Add the Option 133 under “Predefined options and values” with data type: “String” and select “Array”.

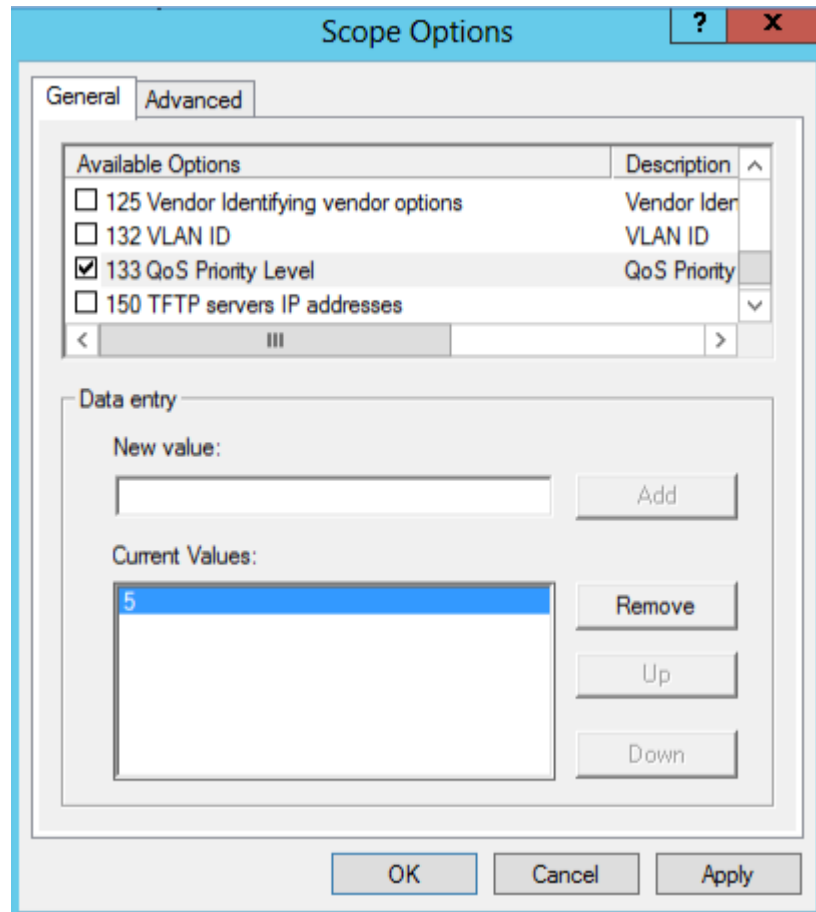


Figure 34: DHCP Option 133

Screenshots



Protocol	Length	Info
DHCP	387	DHCP Discover - Transaction ID 0x879b240a
DHCP	387	DHCP Discover - Transaction ID 0x879b240a
DHCP	326	DHCP Offer - Transaction ID 0x879b240a
DHCP	399	DHCP Request - Transaction ID 0x879b240a
DHCP	326	DHCP Offer - Transaction ID 0x879b240a

<		
> Ethernet II, Src: Grandstr_fb:4e:3a (00:0b:82:fb:4e:3a), Dst: Broadcast (ff:ff:ff:ff:ff:ff)		
> Internet Protocol Version 4, Src: 0.0.0.0, Dst: 255.255.255.255		
> User Datagram Protocol, Src Port: 68, Dst Port: 67		
✓ Dynamic Host Configuration Protocol (Discover) - Message type: Boot Request (1) - Hardware type: Ethernet (0x01) - Hardware address length: 6 - Hops: 0 - Transaction ID: 0x879b240a - Seconds elapsed: 99 > Bootp flags: 0x0000 (Unicast) - Client IP address: 0.0.0.0 - Your (client) IP address: 0.0.0.0 - Next server IP address: 0.0.0.0 - Relay agent IP address: 0.0.0.0 - Client MAC address: Grandstr_fb:4e:3a (00:0b:82:fb:4e:3a) - Client hardware address padding: 00000000000000000000 - Server host name not given - Boot file name not given - Magic cookie: DHCP ✓ Option: (55) Parameter Request List - Length: 14 - Parameter Request List Item: (133) PXE - undefined (vendor specific) - Parameter Request List Item: (160) DHCP Captive-Portal		

Figure 35: DHCP Discover Request for Option 133

Protocol	Length	Info
DHCP	387	DHCP Discover - Transaction ID 0x879b240a
DHCP	387	DHCP Discover - Transaction ID 0x879b240a
DHCP	326	DHCP Offer - Transaction ID 0x879b240a
DHCP	399	DHCP Request - Transaction ID 0x879b240a
DHCP	326	DHCP Offer - Transaction ID 0x879b240a

<		
> Option: (59) Rebinding Time Value		
✓ Option: (133) PXE - undefined (vendor specific) - Length: 1 - Value: 35		

Figure 36: DHCP Offer Reply for Option 133

In above screenshot, value 35 is 5 (priority level) converted from text to hexadecimal.



DHCP Option 150 : TFTP Servers List

Description

DHCP option 150 provides one or more IP addresses of TFTP server(s) where devices will be redirected to download their configuration files. Without this DHCP option, a manual configuration is requested on each phone the first time it boots.

Please refer to RFC5859 for more details.

Please refer to below link to learn how to provision Grandstream devices:

http://www.grandstream.com/sites/default/files/Resources/gs_provisioning_guide.pdf

Example

Enable DHCP Option 150 under **Web GUI → Maintenance → Upgrade and Provisioning**, by setting “**Additional Override DHCP Option**” to **Option 150**.

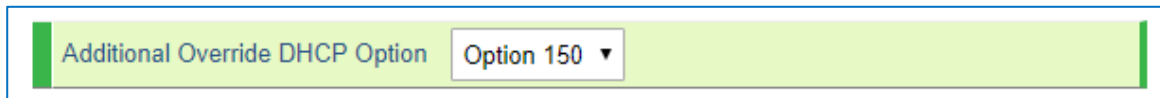


Figure 37: DHCP Option 150 under the IP Phone web interface

Predefine the option 150 by adding it and setting the IP addresses of the TFTP servers needed by the devices to be configured.

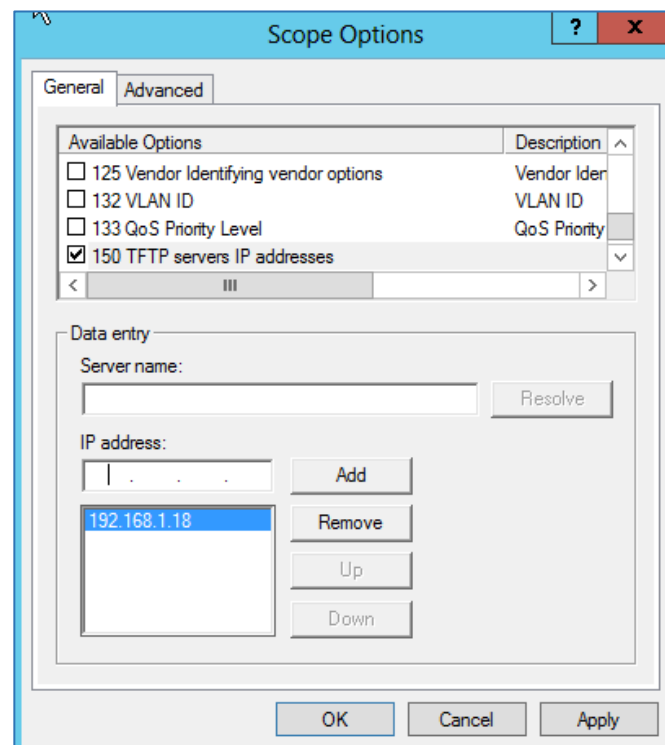


Figure 38: DHCP Option 150

Screenshots

Protocol	Length	Info
DHCP	385	DHCP Discover - Transaction ID 0x409cfa4c
DHCP	369	DHCP Offer - Transaction ID 0x409cfa4c
DHCP	385	DHCP Discover - Transaction ID 0x409cfa4c
DHCP	397	DHCP Request - Transaction ID 0x409cfa4c

Seconds elapsed: 3

- > Bootp flags: 0x0000 (Unicast)
- Client IP address: 0.0.0.0
- Your (client) IP address: 0.0.0.0
- Next server IP address: 0.0.0.0
- Relay agent IP address: 0.0.0.0
- Client MAC address: Grandstr_fb:4e:3a (00:0b:82:fb:4e:3a)
- Client hardware address padding: 00000000000000000000
- Server host name not given
- Boot file name not given
- Magic cookie: DHCP
- ▼ Option: (55) Parameter Request List
 - Length: 12
 - Parameter Request List Item: (150) TFTP Server Address
 - Parameter Request List Item: (2) Time Offset

Figure 39: DHCP Discover Request for Option 150

Protocol	Length	Info
DHCP	397	DHCP Request - Transaction ID 0x409cfa4c
DHCP	369	DHCP Offer - Transaction ID 0x409cfa4c
DHCP	369	DHCP ACK - Transaction ID 0x409cfa4c
DHCP	397	DHCP Request - Transaction ID 0x409cfa4c

Transaction ID: 0x409cfa4c

Seconds elapsed: 3

- > Bootp flags: 0x0000 (Unicast)
- Client IP address: 0.0.0.0
- Your (client) IP address: 192.168.1.200
- Next server IP address: 192.168.1.100
- Relay agent IP address: 0.0.0.0
- Client MAC address: Grandstr_fb:4e:3a (00:0b:82:fb:4e:3a)
- Client hardware address padding: 00000000000000000000
- Server host name not given
- Boot file name not given
- Magic cookie: DHCP
- ▼ Option: (150) TFTP Server Address
 - Length: 4
 - TFTP Server Name: 192.168.1.18
- > Option: (54) DHCP Server Identifier (192.168.1.100)
- > Option: (1) Subnet Mask (255.255.255.0)

Figure 40: DHCP Offer Reply for Option 150



DHCP Option 160 : Configuration Server Address

Description

Similar to option 66, DHCP option 160 can provide one or more configuration server(s) to clients to get automatically provisioned. Without this DHCP option, a manual configuration is requested on each phone the first time it boots.

Example

Go to the Web GUI under “**Maintenance → Upgrade and Provisioning**”, set the “Additional Override DHCP Option” to Option 160.

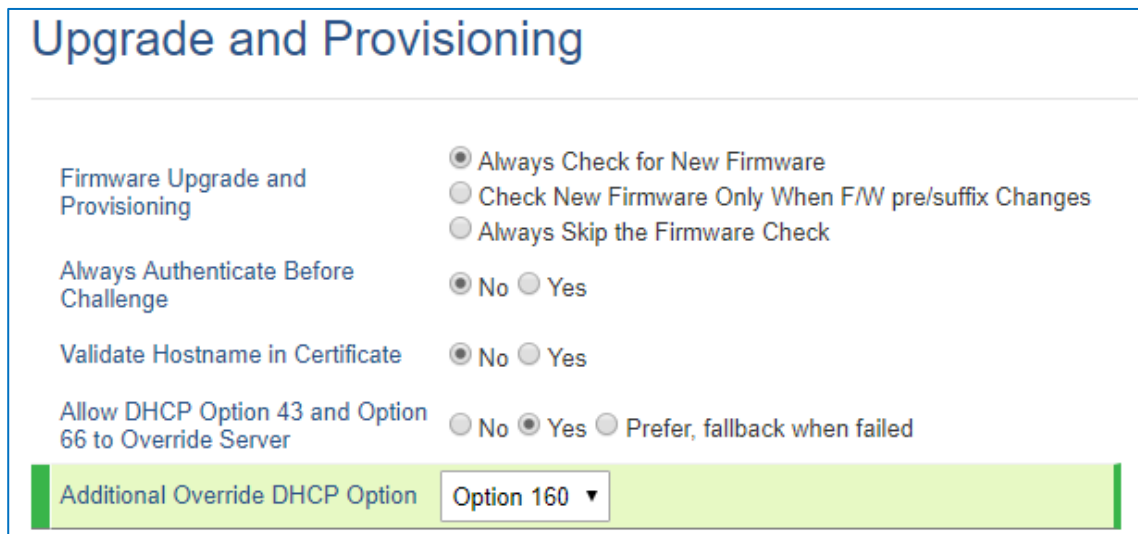


Figure 41: DHCP Option 160 under the IP Phone web interface

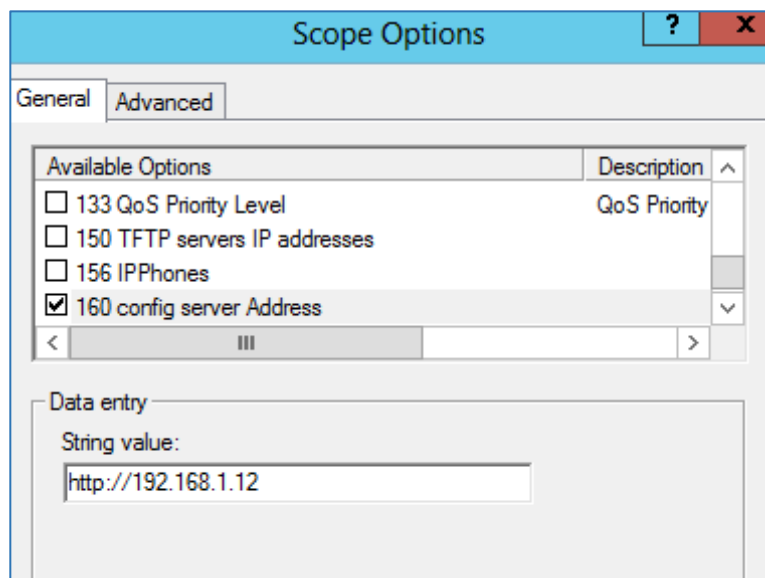


Figure 42: DHCP Option 160

Screenshots

Protocol	Length	Info
DHCP	385	DHCP Discover - Transaction ID 0x409cfa4c
DHCP	369	DHCP Offer - Transaction ID 0x409cfa4c
DHCP	385	DHCP Discover - Transaction ID 0x409cfa4c
DHCP	397	DHCP Request - Transaction ID 0x409cfa4c
<		
Seconds elapsed: 3 > Bootp flags: 0x0000 (Unicast) Client IP address: 0.0.0.0 Your (client) IP address: 0.0.0.0 Next server IP address: 0.0.0.0 Relay agent IP address: 0.0.0.0 Client MAC address: Grandstr_fb:4e:3a (00:0b:82:fb:4e:3a) Client hardware address padding: 00000000000000000000 Server host name not given Boot file name not given Magic cookie: DHCP v Option: (55) Parameter Request List Length: 12 Parameter Request List Item: (160) DHCP Captive-Portal		

Figure 43: DHCP Discover Request for Option 160

Protocol	Length	Info
DHCP	387	DHCP Discover - Transaction ID 0x879b240a
DHCP	387	DHCP Discover - Transaction ID 0x879b240a
DHCP	326	DHCP Offer - Transaction ID 0x879b240a
DHCP	399	DHCP Request - Transaction ID 0x879b240a
DHCP	326	DHCP Offer - Transaction ID 0x879b240a
<		
v Option: (160) DHCP Captive-Portal Length: 19 Captive Portal: http://192.168.1.12 > Option: (255) End		

Figure 44: DHCP Offer Reply for Option 160

