

# **Yealink SIP IP Phones Auto Provisioning Guide**

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## Introduction

Yealink IP phones are full-featured telephones that can be plugged directly into an IP network and can be used easily without manual configuration.

This guide provides instructions on how to provision Yealink IP phones with the minimum settings required. Yealink IP phones support FTP, TFTP, HTTP, and HTTPS protocols for auto provisioning and are configured by default to use the TFTP protocol.

## **Supported Phones**

The purpose of this guide is to serve as a basic guidance for provisioning Yealink IP phones. The following table lists product names and available firmware versions for IP phones that use auto provisioning process outlined in this guide.

Product Name	Boot File (Available Firmware Version)	Exclude Mode (Available Firmware Version)
SIP-T58V/A	Yes (80 or later)	Yes (83 or later)
SIP-T56A	Yes (80 or later)	Yes (83 or later)
SIP-T54S	Yes (81 or later)	Yes (83 or later)
SIP-T52S	Yes (81 or later)	Yes (83 or later)
SIP-T48G/S	Yes (81 or later)	Yes (83 or later)
SIP-T46G/S	Yes (81 or later)	Yes (83 or later)
SIP-T42G/S	Yes (81 or later)	Yes (83 or later)
SIP-T41P/S	Yes (81 or later)	Yes (83 or later)
SIP-T40P/G	Yes (81 or later)	Yes (83 or later)
SIP-T29G	Yes (81 or later)	Yes (83 or later)
SIP-T27G	Yes (81 or later)	Yes (83 or later)
SIP-T23P/G	Yes (81 or later)	Yes (83 or later)
SIP-T21(P) E2	Yes (81 or later)	Yes (83 or later)
SIP-T19(P) E2	Yes (81 or later)	Yes (83 or later)
CP860	Yes (81 or later)	No
CP960	Yes (80 or later)	Yes (83 or later)
CP920	Yes (81 or later)	No

Product Name				
W60P	Yes (81 or later)	No		
W53P	Yes (83 or later)	No		
W52P W56P	Yes (81 or later)	No		

We recommend that IP phones running the latest firmware should not be downgraded to an earlier firmware version. The new firmware is compatible with old configuration parameters, but not vice versa.

## **Getting Started**

This section provides instructions on how to get ready for auto provisioning. To begin the auto provisioning, the following steps are required:

- Obtaining Boot, Configuration and Resource Files
- Obtaining Phone Information

### **Obtaining Boot, Configuration and Resource Files**

#### **Boot Files**

The IP phone tries to download the boot file first, and then download the configuration files referenced in the boot file during auto provisioning. You can select whether to use the boot file or not according to your deployment scenario. If required, you need to obtain the template boot file named as "y00000000000000.boot" before auto provisioning.

You can use a boot file to specify which configuration files to be downloaded for specific phone groups by phone model identity, and customize the download sequence of configuration files. It is efficient for you to provision IP phones in different deployment scenarios, including all IP phones, specific phone groups, or a single phone.

The configuration files referenced in the boot file are flexible: you can rearrange the configuration parameters within the Yealink-supplied template configuration files or create your own configuration files from configuration parameters you want. You can create and name as many configuration files as you want and your own configuration files can contain any combination of configuration parameters.

### **Configuration Files**

Before provisioning, you also need to obtain template configuration files. There are two configuration files both of which are CFG-formatted. We call these two files Common CFG file and MAC-Oriented CFG file.

The configuration files contain parameters that affect the features of the phone. You can use the configuration files to deploy and maintain a mass of Yealink IP phones automatically.

You can create and name as many configuration files as you want (e.g., account.cfg, sip.cfg, features.cfg) by using the template configuration files. The custom configuration files can contain the configuration parameters of the same feature modules for all phones.

## **Resource Files**

When configuring some particular features, you may need to upload resource files to IP phones, such as personalized AutoDST file, language package file and local contact file. Resource files are optional, but if the particular feature is being employed, these files are required.

Yealink supplies the following resource file templates:

DSTAutoDST.xmlLanguage PacksFor example, 000.GUI.English.lang 1.English_note.xml 1.English_isReplace Ruledialplan.xmlDial-nowdialnow.xmlCallFailed.xml CallIn.xmlCallIn.xmlConnecting.xml Dialing.xml (not applicable to CP960/W52P/W53P/W56 P/W60P IP phones)Directoryfavorite_setting.xmlDirectoryfavorite_setting.xmlSuper Search in dialing Screen Saver (not applicable to TS8V/T58A/T56A/T48G/T48S IP phones)Remote XML Phone Book PIP phones)Department.xml Menu.xmlScreen Saver (not applicable to T58V/T58A/T56A/T48G/T48S/T46G/T46S/T42G/T42S/T41P/ T58V/T58A/T56A/T48G/T48S/T46G/T46S/T42G/T42S/T41P/ T41S/T40P/T29G/T27G/T23P/T23G/T21(P) E2/T19(P) E2: X81.0XXrom	Feature	Template File Name					
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	Firmware						
I		X.81.0.XX.rom					

Feature	Template File Name
	For example,
	44.81.0.15.rom
	For T58V/T58A/T56A/CP960:
	X.80.0.XX.rom
	For example,
	58.83.0.1.rom

#### **Obtaining Template Files**

You can ask the distributor or Yealink FAE for template files. You can also obtain them online: http://support.yealink.com/documentFront/forwardToDocumentFrontDisplayPage.

#### To download template boot, configuration and resource files:

- 1. Go to Yealink Document Download page and select the desired phone model.
- 2. Download and extract the combined template files to your local system.

For example, the following illustration shows the template files available for SIP-T23G IP phones running firmware version 82.

Other	Tested headset list compatible with Yealink IP Phone V4.0.pdf	
Documents	Yealink_SIP_Phones_AutoProvisioning_Template_V82.20.zip	
	Language_Packs_for_SIP-T19_SIP_T21_SIP-T23_SIP-T40G.zip	
	Yealink_SIP_Phones_AutoProvisioning_Template_V81.110.zip	
	Yealink Products Regulatory Notices.pdf	
	Yealink End User License Agreement.pdf	
	Yealink_SIP_Phones_AutoProvisioning_Template_V81_70.zip	
	Yealink Configuration Encryption Tool.zip	
	Yealink Configuration Generator Tool_V81.zip	
	CE-T23G.pdf	

3. Open the folder you extracted and identify the files you want to edit.

## **Obtaining Phone Information**

Before provisioning, you also need the IP phone information. For example, MAC address and the SIP account information of the IP phone.

**MAC Address**: The unique 12-digit serial number of the IP phone. You can obtain it from the bar code on the back of the IP phone.

SIP Account Information: This may include SIP credentials such as user name, password and IP

address of the SIP server. Ask your system administrator for SIP account information.

## **Provisioning Yealink IP Phones**

This section provides instructions on how IP phones interoperate with provisioning server for auto provisioning, and shows you the auto provisioning process and the four major tasks to provision the phones. It will help users who are not familiar with auto provisioning to understand this process more easily and quickly.

## **Interoperating with Provisioning Server**

When IP phones are triggered to perform auto provisioning, they will request to download the boot files and configuration files from the provisioning server. During the auto provisioning, the IP phone will download and update configuration files to the phone flash.

The following figure shows how the IP phone interoperates with the provisioning server:



IP Phone

Request to Download Boot Files and Configuration Files



Download Boot Files, Configuration Files and Update Configuration Files

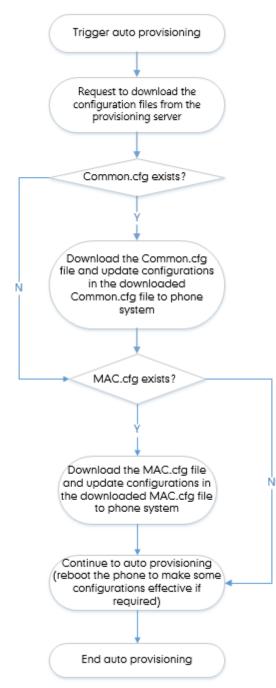


**Provisioning Server** 

## **Auto Provisioning Process**

### **Old Mechanism – Without Boot Files**

The following flowchart shows how Yealink IP phones perform auto provisioning when using configuration files only:

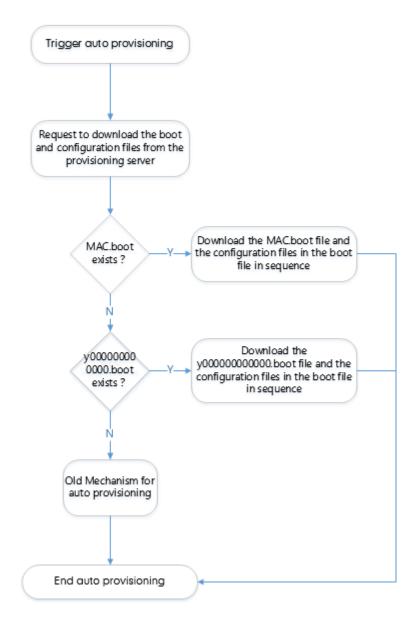


8

### **New Mechanism – With Boot Files**

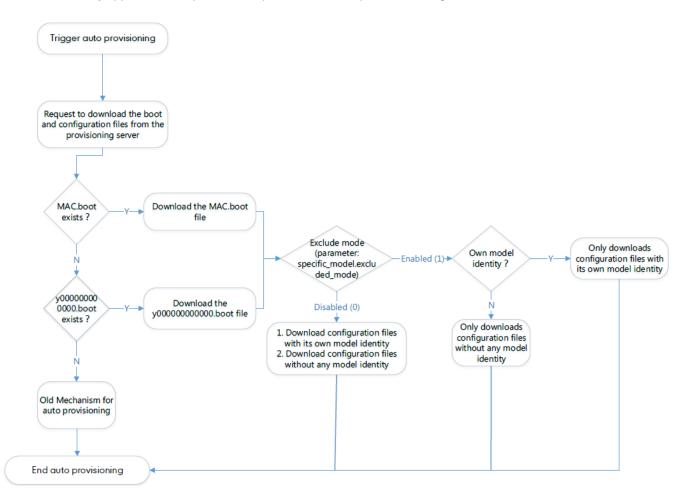
The following figure shows auto provisioning flowcharts for Yealink IP phones when using boot files:

Scenario A – Do Not Support Exclude Mode



#### Scenario B – Support Exclude Mode

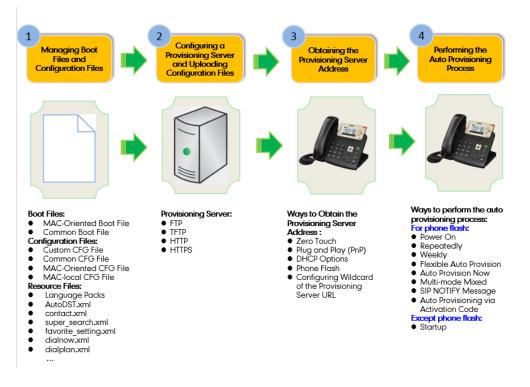
This scenario is only applicable to IP phones (except W53P/W56P IP phones) running firmware version 83 or later.



## **Major Tasks for Auto Provisioning**

You need to complete four major tasks to provision Yealink IP phones.

The following figure shows an overview of four major provisioning tasks:



For more information on how to manage boot files, refer to Managing Boot Files.

For more information on how to manage configuration files, refer to Managing Configuration Files.

For more information on how to manage resource files, refer to Managing Resource Files.

For more information on how to configure a provisioning server, refer to Configuring a Provisioning Server.

For more information on how to obtain the provisioning server address, refer to Obtaining the Provisioning Server Address.

For more information on how to perform auto provisioning, refer to Triggering the IP Phone to Perform Auto Provisioning.

If you are not familiar with auto provisioning on Yealink IP phones, you can refer to An Instance of Auto Provision Configuration.

## **An Instance of Auto Provision Configuration**

This section shows an instance of auto provision configuration.

1. Manage boot files.

Specify the desired URL (e.g., tftp://10.2.5.193/network.cfg) of the configuration files in the boot file (e.g., y00000000000.boot). For more information, refer to Managing Boot Files.

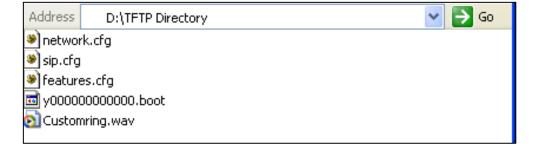
```
#!version:1.0.0.1
## The header above must appear as-is in the first line
##[$MODEL]include:config <xxx.cfg>
##[$MODEL,$MODEL]include:config "xxx.cfg"
[T46S]include:config <tftp://10.2.5.193/network.cfg>
[T48S,T46G]include:config <../sip.cfg>
include:config "features.cfg"
overwrite_mode = 1
specific_model.excluded_mode=0
```

2. Manage configuration files.

Add/Edit the desired configuration parameters in the CFG file (e.g., features.cfg) you want the IP phone to download. For more information on how to manage configuration files, refer to Managing Configuration Files.

```
features.cfg ×
```

- 3. Configure the TFTP server.
  - Place boot files, configuration files and resource files to TFTP root directory (e.g., D:\TFTP Directory).



3CDaemon					
e ⊻iew <u>H</u> elp			-		
TFTP Server	Start Time	Peer	Bytes	Status	
Configure TFTP Server	Jul 12, 2016 09:30:13	local	0	Listening for TFTP requests on IP address: 10.2.5.193 Port 69	
TFTP Server is started				server URL where the IP phone vnloads boot files and configuration	
Click here to stop it.				s from is tftp://10.2.5.193/	
Logging to Tftpd log. Click to stop.					
×					
Not debugging. Click to start.					
Clear list.					
<b>60</b>					
View Log/Debug files.					

2) Start the TFTP sever. The IP address of the TFTP server is shown as below:

3) Select **Configure TFTP Server**. Click the ... button to locate the TFTP root directory in your local system.

3CDaemon				
<u>File View H</u> elp				
TFTP Server	Start Time	Peer	Bytes	Status
	Jul 12, 2016 09:30:13	local	0	Listening for TFTP requests on IP address: 10.2.5.193, Port 69
Configure IFTP Server	3CDaemon Configurat	tion		
<b>STIP</b>	FTP Profi General Con		ion	Syslog Configuration TFTF Configuration
TFTP Server is started. Click here to stop it.	Create directory n	ames ir	. incomi	ng file re🗸
	Allow overwrite of	existi	ng file	s? 🗆
Logging to Tftpd.log. Click to stop.	Upload/Download	I	):\TFTP	Directory\
X.	Per-packet timeout	in sec	onds	5
Not debugging. Click to start.	Maximum retries			10
Clear list.	Interframe transmi	ssion		0
View Log/Debug files.				

For more information on how to configure a provisioning server, refer to Configuring a Provisioning Server.

4. Configure the provisioning server address on the IP phone.

ealink   1236	-		VC	$\sim$			C		
	Status	Account	Network	DSSKey	Features	Settings	Director	ry Security	
Preference	,	Auto Provision					NOTE	1	
	ţ	PNP Active		🖲 On 🔘 Off					
Time & Date	(	OHCP Active		🖲 On 🗇 Off				hone can interoperate	
Call Display	(	Custom Option(128-	~254)					visioning server using	
Upgrade	(	OHCP Option Value					the IP ph		
Auto Provision	s	Server URL		tftp://10.2.5.193/			When the IP phone triggers to perform auto provisioning, it will		
	l	Jser Name		1				to download the to files from the	
Configuration	ţ	Password		•••••	Ente	r the access	LIBL of	o server. During the oning process, the	
Dial Plan	1	Attempt Expired Tin	ne(s)	5		rovisioning s		ill download and figuration files to th	
Voice	(	Common AES Key				Server URL		nguration mes to th	
Ring	1	MAC-Oriented AES K	Cey	•••••			You c	an click here to get	
Kung	2	Zero Active		Disabled 👻			more guides.		
Tones	1	Wait Time(1~100s)		5					
Softkey Layout		Power On		🖲 On 🔘 Off					

For more information on how to obtain the provisioning server address, refer to Obtaining the Provisioning Server Address.

Yealink							<b>Bro</b>	Log Out Jish(English) +
Te dillink 1123	Status	Account	Network	DSSKey	Features	Settings	Directory	Security
Preference Time & Date Call Display Upgrade Auto Provision Configuration Dial Plan Voice Ring Tones		Auto Provision PNP Active DHCP Active Custom Option(128- DHCP Option Value Server URL User Name Password Attempt Expired Ter Common AES Key MAC-Oriented AES K Zero Active Wait Trme(1~100s)	-254) 10(s)	On Off     Off     On Off     Off		Settings	NOTE Auto Provision with provision acto provision the IP phones When the IP ip provisioning as auto provision request to do configuration 1 provisioning as auto provision IP phone with phone flash.	on can interoperate ng for deploying to bohne triggers to provisioning, it will winkad the files from the river. During the ng process, the
Softkey Layout TR069 Voice Monitoring SIP		Power On Repeatedly Interval(Minutes) Weekly Weekly Upgrade Intr Inactivity Time Expire Time	Contraction of the	On Off	: 00			
		Day of Week Resible Auto Provisio Resible Interval Days Resible Time		Ø Sunday       Ø Sunday       Ø Honday       Ø Tuesday       Ø Wednesday       Ø Hunday       Ø Iniday       Ø Saturday       Ø On ● Off       30       02 ± 00 -       Autoprovision	Click th perfor pr	m the au	ovision No to provisio mediately.	ning

**5.** Trigger the IP phone to perform auto provisioning.

For more information on how to trigger the phone to perform auto provisioning, refer to Triggering the IP Phone to Perform Auto Provisioning.

## **Managing Boot Files**

Yealink IP phones can download CFG files referenced in the boot files. Before provisioning, you may need to edit and customize your boot files.

Yealink supports the following two types of boot files:

- MAC-Oriented boot file (e.g., 00156574b150.boot)
- Common boot file (y00000000000.boot)

You can edit the template boot file directly or create a new boot file as required. Open each boot file with a text editor such as Notepad++.

## **Editing Common Boot File**

The common boot file is effective for all phones. It uses a fixed name "y000000000000.boot" as the file name.

The following figure shows the contents of the common boot file:

```
#!version:1.0.0.1
## The header above must appear as-is in the first line
include:config <xxx.cfg>
include:config "xxx.cfg"
overwrite_mode = 1
```

The following table lists guidelines you need to know when editing the boot file:

Item	Guidelines
#!version:1.0.0.1	It must be placed in the first line. Do not edit and delete.
## The header above must appear as-is in the first line	The line beginning with "#" is considered to be a comment. You can use "#" to make any comment in the boot file.
include:config <xxx.cfg> include:config "xxx.cfg"</xxx.cfg>	<ol> <li>Each "include" statement can specify a URL where a configuration file is stored. The configuration file format must be *.cfg.</li> <li>The URL in &lt;&gt; or "" supports the following two forms:         <ul> <li>Relative URL (relative to the boot file): For example, sip.cfg, HTTP Directory/sip.cfg</li> <li>Absolute URL: For example, http://10.2.5.258/HTTP Directory/sip.cfg</li> </ul> </li> </ol>

Item	Guidelines						
	<ul> <li>The URL must point to a specific CFG file. The CFG files are downloaded in the order listed (top to bottom). The parameters in the new downloaded configuration files will override the duplicate parameters in files downloaded earlier.</li> <li>3) The "include" statement can be repeated as many times as needed.</li> </ul>						
	4) The [\$MODEL] can be added to specify settings for specific phone models. \$MODEL represents the phone model name. The valid phone model names are: T58, T56A, CP960, T54S, T52S, T48S, T48G, T46S, T46G, T42S, T42G, T41P, T41S, T40P, T40G, T29G, T27G, T23P, T23G, T21P E2, T21 E2, T19P E2 and T19 E2. Multiple phone models are separated by commas. For example, [T46S, T23G]. It is only applicable to IP phones (except W53P/W56P) running firmware version 83 or later.						
overwrite_mode	Enable or disable the overwrite mode. The overwrite mode is applied to the configuration files specified to download. Note that it only affects the parameters pre-provisioned via central provisioning. <b>1</b> -(Enabled) - If the value of a parameter in configuration files is left blank, or if a non-static parameter in configuration files is deleted or commented out, the factory default value takes effect. <b>0</b> -(Disabled) - If the value of a parameter in configuration files is left blank, deleted or commented out, the pre-configured value is kept. <b>Note</b> : This parameter can only be used in boot files. If a boot file is used but the value of the parameter "overwrite_mode" is not configured, the overwrite mode is enabled by default.						
specific_model.excluded_ mode	<ul> <li>Enable or disable the exclude mode. The exclude mode applies to the configuration files specified in the boot file.</li> <li><b>0</b>-Disabled (Append Mode), the phone downloads its own model-specific configuration files, and downloads other model-unspecified configuration files.</li> <li><b>1</b>-Enabled (Exclude Mode), the phone attempts to download its own model-specific configuration files; if there is no own model-specific configuration files.</li> <li><b>1</b>-Enabled (Exclude Mode), the phone attempts to download its own model-specific configuration files; if there is no own model-specific configuration files.</li> <li><b>Note</b>: Exclude mode can only be used in boot files. If a boot file is used but the value of the parameter "specific_model.excluded_mode" is not configured, the exclude mode is disabled by default. Exclude mode feature is only applicable to IP phones (except W53P/W56P) running firmware version 83 or later.</li> </ul>						

## **Creating MAC-Oriented Boot File**

The MAC-Oriented boot file is only effective for the specific phone. It uses the 12-digit MAC address of the IP phone as the file name. For example, if the MAC address of the IP phone is 00156574B150, the MAC-Oriented boot file has to be named as 00156574b150.boot (case-sensitive) respectively.

If you want to create a MAC-Oriented boot file for your phone, follow these steps:

#### To create a MAC-Oriented boot file:

- **1.** Create a boot file for your phone. Ensure the file complies with the guidelines that are listed in Editing Common Boot File.
- **2.** Copy the contents from the common boot file and specify the configuration files to be downloaded.

One or more configuration files can be referenced in the boot file. The following takes two configuration files for example:

3. Save the changes and close the MAC-Oriented boot file.

You can also make a copy of the common boot file, rename it and then edit it.

## **Managing Configuration Files**

Auto provisioning enables Yealink IP phones to update themselves automatically via downloading Common CFG, MAC-Oriented CFG, custom CFG and MAC-local CFG files. Before provisioning, you may need to edit and customize your configuration files.

You can edit the template configuration files directly or create a new CFG file as required. Open each configuration file with a text editor such as Notepad++.

For more information on description of all configuration parameters in configuration files, refer to the latest Administrator Guide for your phone on Yealink Technical Support.

### **Editing Common CFG File**

The Common CFG file is effective for all phones of the same model. It uses a fixed name "y000000000XX.cfg" as the file name, where "XX" equals to the first two digits of the hardware version of the IP phone model.

Product Name	Common CFG File				
CP960	y0000000073.cfg				
SIP-T58V/A	y0000000058.cfg				
SIP-T56A	y0000000056.cfg				
SIP-T54S	y00000000070.cfg				
SIP-T52S	y0000000074.cfg				
SIP-T48S	y0000000065.cfg				
SIP-T46S	y0000000066.cfg				
SIP-T42S	y0000000067.cfg				
SIP-T41S	y0000000068.cfg				
SIP-T48G	y0000000035.cfg				
SIP-T46G	y0000000028.cfg				
SIP-T42G	y00000000029.cfg				
SIP-T41P	y0000000036.cfg				
SIP-T40P	y00000000054.cfg				
SIP-T40G	y00000000076.cfg				
SIP-T29G	y00000000046.cfg				

The names of the common CFG file requirements for the phone are:

Product Name	Common CFG File				
SIP-T27G	y0000000069.cfg				
SIP-T23P/G	y00000000044.cfg				
SIP-T21(P) E2	y0000000052.cfg				
SIP-T19(P) E2	y0000000053.cfg				
CP860	y0000000037.cfg				
CP920	y0000000078.cfg				
W53P/W60P	y0000000077.cfg				
W52P/W56P	y0000000025.cfg				

Common CFG file contains configuration parameters which apply to phones with the same model, such as language and volume.

The following figure shows a portion of the common CFG file:

#/version:1.0.0.1
#:version:1.0.0.1
<pre>##File header "#!version:1.0.0.1" can not be edited or deleted, and must be placed in the first line.##</pre>
f##This template file is applicable to IP phones running firmware version 81 or later.##
##For more information on configuration parameters, refer to Description of Configuration Parameters in CFG Files.xlsx.##
***************************************
## Hostname ##
***************************************
static.network.dhcp host name =
*****
## Network Advanced ##
*****
##It enables or disables the PC port.0-Disabled,1-Auto Negotiation.
##The default value is 1. It takes effect after a reboot.
static.network.pc port.enable =
##It configures the transmission mode and speed of the Internet (WAN) port.
##0-Auto Negotiate
##1-Full Duplex 10Mbps
##2-Full Duplex 100Mbps
##3-Half Duplex 10Mbps
##4-Half Duplex 100Mbps
##5-Full Duplex 1000Mbps (only applicable to SIP-T48G/T46G/T46S/T42G/T23G/CP860 IP phones)
##O-full default volue is 0.1t takes effect after a rebot.
static.network.internet port.speed duplex =
stationerwork.incernes_poid.speed_auprex -
##It configures the transmission mode and speed of the PC (LAN) port.
##10-Auto Negotiate
##U-ALCO NEGOCIACE ##1-Full Duplex 10Mbps
##1-rull Duplex lowDps ##2-Full Duplex lowDps
##2-ruii Dupiex Ioompps

The following table lists guidelines you need to know when editing the common CFG file:

Item	Guidelines						
#	The line beginning with "#" is considered to be a comment.						
#!version:1.0.0.1	It must be placed in the first line. Do not edit and delete.						
Filename	The filename complies with the requirements that are listed in the above table.						
Line formats and Rules	Each line must use the following format and adhere to the following rules: <i>Configuration Parameter= Valid Value</i>						
	• Separate each configuration parameter and value with an equal						

Item	Guidelines					
	sign.					
	Set only one configuration parameter per line.					
	• Put the configuration parameter and value on the same line, and do not break the line.					
	<ul> <li>The [\$MODEL] can be added to the front of configuration parameter to specify the value for specific phone groups.</li> <li>\$MODEL represents the phone model. The valid phone models are: T58, T56A, CP960, T54S, T52S, T48G, T48S, T46G, T46S, T42G, T42S, T41P, T41S, T40P, T40G, T29G, T27G, T23P, T23G, T21P E2, T21 E2, T19P E2 and T19 E2. Multiple phone models are separated by commas. For example, [T46S, T23G]. It is only applicable to IP phones (except W53P/W56P) running firmware version 83 or later.</li> </ul>					
	<b>Note</b> : The phone updates model-specific configurations and those model-unspecified configurations.					

## **Editing MAC-Oriented CFG File**

The MAC-Oriented CFG file is only effective for the specific phone. It uses the 12-digit MAC address of the IP phone as the file name. For example, if the MAC address of the IP phone is 00156574B150, the MAC-Oriented CFG file has to be named as 00156574b150.cfg (case-sensitive) respectively.

MAC-Oriented CFG file contains configuration parameters which are expected to be updated per phone, such as the registration information.

The following figure shows a portion of the MAC-Oriented CFG file:

```
if!version:1.0.0.1

##File header "#!version:1.0.0.1" can not be edited or deleted, and must be placed in the first line.##
##This template file is applicable to IP phones running finware version 61 or later.##
##This template file is applicable to IP phones running finware version 61 or later.##
##The default value is 0.
account.1.sip_server.1.transport_type =
account.1.sip_server.2.transport_type =
account.1.sip_server.1.transport_type =
account.1.sip_server.1.transport_type =
account.1.sip_server.2.transport_type =
account.1.sip_server.1.transport_type =
account.1.sip_server.2.transport_type =
account.1.sip_server.3.transport_type =
account.1.sip_server.3.transport_type =
account.3.tableset =
a
```

The following table lists guidelines you need to know when editing the MAC-Oriented CFG file:

Item	Guidelines						
#	The line beginning with "#" is considered to be a comment.						
#!version:1.0.0.1	It must be placed in the first line. Do not edit and delete.						
Filename	The filename matches the MAC address of your phone.						
	<ul> <li>Each line must use the following format and adhere to the following rules:</li> <li><i>Configuration Parameter= Valid Value</i></li> <li>Separate each configuration parameter and value with an equal sign.</li> </ul>						
Line formats and Rules	<ul> <li>Set only one configuration parameter per line.</li> <li>Put the configuration parameter and value on the same line, and do not break the line.</li> <li>The [\$MODEL] can be added to the front of configuration parameter to specify the value for specific phone groups.</li> <li>\$MODEL represents the phone model. The valid phone models are: T58, T56A, CP960, T54S, T52S, T48G, T48S, T46G, T46S, T42G, T42S, T41P, T41S, T40P, T40G, T29G, T27G, T23P, T23G, T21P E2, T21 E2, T19P E2 and T19 E2. Multiple phone models are separated by commas. For example, [T46S, T23G]. It is only</li> </ul>						
	applicable to IP phones (except W53P/W56P) running firmware version 83 or later. <b>Note</b> : The phone updates model-specific configurations and those model-unspecified configurations.						

SIP-T58V/T58A/T56A/T54S/T48G/T48S/T46G/T46S/T29G IP phones support 16 accounts, SIP-T52S/T42G/T42S IP phones support 12 accounts, W53P/W60P DECT IP phones support 8 accounts. SIP-T41P/T41S/T27G IP phones support 6 accounts, W52P/W56P IP DECT phones support 5 accounts; SIP-T40P/T40G/T23P/T23G IP phones support 3 accounts, SIP-T21(P) E2 IP phones support 2 accounts, CP960/CP920/CP860/SIP-T19(P) E2 IP phones support only one account.

### **Creating a New CFG File**

If you want to create a new CFG file for your phone, follow these steps:

#### To create a new CFG file:

- **1.** Create a CFG file for your phone. Ensure the file complies with the guidelines that are listed in Editing Common CFG File or Editing MAC-Oriented CFG File.
- **2.** Copy configuration parameters from the template configuration files and set the valid values for them.

```
settings.cfg ×
```

3. (Optional.) Specify different parameter values for specific phone groups.

For example:

[T46S] features.dnd\_mode = 1

[T48G, T23G] features.dnd\_mode = 0

4. Save the changes and close the CFG file.

You can also make a copy of the template configuration file, rename it and then edit it.

### Managing MAC-local CFG File

By default, MAC-local CFG file automatically stores non-static settings modified via web user interface or phone user interface. This file is stored locally on the IP phone, but a copy can also be uploaded to the provisioning server (or a specified URL configured by "static.auto\_provision.custom.sync.path"). This file enables the phone to keep user's personalization settings, even after auto provisioning. As with the MAC-Oriented CFG files, MAC-local CFG files are only effective for the specific phone. They use the 12-digit MAC address of the IP phone as the file name. For example, if the MAC address of the IP phone is 00156574B150, MAC-local CFG file has to be named as 00156574b150-local.cfg (case-sensitive). If your IP phone with the current firmware version cannot generate a <MAC>-local.cfg file, the IP phone will automatically generate a MAC-local CFG file after it is upgraded to the latest For more information on how to keep user's personalization settings, refer to the latest Administrator Guide for your phone on Yealink Technical Support.

We recommend you do not edit the MAC-local CFG file. If you really want to edit MAC-local CFG file, you can export and then edit it. For more information on how to export CFG files, refer to the latest Administrator Guide for

your phone on Yealink Technical Support.

## **Encrypting Configuration Files**

To protect against unauthorized access and tampering of sensitive information (e.g., login password, registration information), you can encrypt configuration files using Yealink Configuration Encryption Tool. AES keys must be 16 characters and the supported characters contain:  $0 \sim 9$ ,  $A \sim Z$ ,  $a \sim z$  and the following special characters are also supported: # \$ % \* + , - .: = ? @ [] ^ {} . For more information on how to encrypt configuration files, refer to *Yealink Configuration Encryption Tool User Guide*.

## **Managing Resource Files**

Before provisioning, you may need to edit and customize your resource files.

You can edit the template resource files directly or create a new resource file as required. Open each resource file with a text editor such as Notepad++.

### **Customizing Resource Files**

The resource files are effective for all phones of the same model or the specific phone. If the resource file is to be used for all IP phones of the same model, the access URL of resource file had better to be specified in the common CFG file. However, if you want to specify the desired phone to use the resource file, the access URL of resource file should be specified in the MAC-Oriented CFG file.

Refer to Resource Files to get support resource files:

For more information on how to customize these template resource files and an explanation of the configuration parameters that related to these features, refer to the latest Administrator Guide for your phone on Yealink Technical Support.

## **Configuring a Provisioning Server**

Yealink IP phones support using FTP, TFTP, HTTP and HTTPS protocols to download boot files and configuration files. You can use one of these protocols for provisioning. The TFTP protocol is used by default. The following section provides instructions on how to configure a TFTP server.

We recommend that you use 3CDaemon or TFTPD32 as a TFTP server. 3CDaemo and TFTPD32 are free applications for Windows. You can download 3CDaemon online:

http://www.oldversion.com/3Com-Daemon.html and TFTPD32 online: http://tftpd32.jounin.net/.

For more information on how to configure FTP and HTTP servers, refer to Configuring an FTP Server and Configuring an HTTP Server.

## **Preparing a Root Directory**

#### To prepare a root directory:

- **1.** Create a TFTP root directory on the local system (e.g., D:\TFTP Directory).
- 2. Place the boot files, configuration files and resource files to this root directory.



3. (Optional.) Set security permissions for the TFTP directory folder.

You need to define a user or a group name, and set the permissions: read, write or modify. Security permissions vary by organizations.

Administrators (VANS	TD80\Admini	strators)	^
CREATOR OWNER			
Hill, James (jahill@my	corvornamo	coml	
SYSTEM	ser verhame.	comj	~
< C			>
		\dd	Remove
Permissions for Everyone		Allow	Deny
Full Control			
Modify			
Read & Execute			
List Folder Contents		~	
Read		~	
Write		~	
Consist Dormissions			
For special permissions or fo	or advanced	settings,	Advanced

An example of configuration on the Windows platform is shown as below:

## **Configuring a TFTP Server**

If you have a 3CDaemon application installed on your local system, use it directly. Otherwise, download and install it.

#### To configure a TFTP server:

1. Double click **3CDaemon.exe** to start the application.

A configuration page is shown as below:

3CDaemon					- • •			
File View Help								
TFTP Server	Start Time	Peer	Bytes	Status				
Configure IFTP Server	Jul 12, 2016 14:11:08	local	0	Listening for TFTP requests on IP address: 10.2.5.193, Port 69				
TFTP Server is started. Click here to stop it.								
Logging to Tftpd.log. Click to stop.								
Not debugging. Click to start.								
Clear list.								
View Log/Debug files.								

2. Select **Configure TFTP Server**. Click the ... button to locate the TFTP root directory from your local system:

Γ									
L	3CDaemon								
L	<u>File V</u> iew <u>H</u> elp								
L	TFTP Server	Start Time Peer Bytes Status							
		Jul 12, 2016 09:30:13	local	0	Listening for TFTP requests on IP add	Iress: 10.2.5.193, Port 69			
I	Configure TFTP Server	3CDaemon Configurat	3CDaemon Configuration						
	<u>ETTP</u>	FTP Profi General Con		ion	Syslog Configuration TFTP Configuration				
	TFIP Server is started. Click here to stop it. Create directory names in incoming file re								
l	Allow overwrite of existing files?								
l	Logging to Tftpd log. Click to stop. Upload/Download D:\TFTP Directory\								
I	X.	Per-packet timeout	in sec	onds	5				
l	Not debugging. Click to start.	Maximum retries			10				
	Clear list.	Interframe transmis	sion		0				
	View Log/Debug files.								

3. Click the **Confirm** button to finish configuring the TFTP server.

The server URL "tftp://IP/" (Here "IP" means the IP address of the provisioning server, for example, "tftp://10.2.5.193/") is where the IP phone downloads configuration files from.

# **Obtaining the Provisioning Server Address**

Yealink IP phones can obtain the provisioning server address in the following ways:

- Zero Touch
- Plug and Play (PnP) Server
- DHCP Options
- Phone Flash
- Configuring Wildcard of the Provisioning Server URL

The priority of obtaining the provisioning server address is as follows: Zero Touch>PnP Server>DHCP Options (for IPv4: IPv4 Custom option>option 66>option 43; for IPv6: IPv6 Custom option>option 59) >Phone Flash. The following sections detail the process of each way (take the SIP-T23G IP phone as an example).

IPv6 custom option is only applicable to SIP-T54S, SIP-T52S, SIP-T48G/S, SIP-T46G/S, SIP-T42G/S, SIP-T41P/S, SIP-T40P/G, SIP-T29G, SIP-T27G, SIP-T23P/G, SIP-T21(P) E2 and SIP-T19(P) E2 IP phones running firmware version 83 or later.

### **Zero Touch**

Zero Touch allows you to configure the network parameters and provisioning server address via phone user interface during startup. This feature is helpful when there is a system failure on the IP phone. To use Zero Touch, make sure this feature is enabled. This feature is not applicable to W52P/W53P/W56P/W60P IP phones.

To configure zero touch via web user interface:

- 1. Click on Settings->Auto Provision.
- 2. Select Enabled from the pull-down list of Zero Active.
- 3. Enter the desired waiting time in the Wait Time(1~100s) field.

ealink T23G							English(English)			
	Status	Account	Network	Dsskey	Features	Settings	Directory Security			
Preference	Auto	Provision					NOTE			
Preference	PN	P Active		🖲 On 💿 Off			Auto Provision			
Time&Date	DH	ICP Active		🖲 On 🔘 Off			The IP phone can interoperate with provisioning server using			
Call Display	IΡν	4 Custom Option		128			auto provisioning for deploying the IP phones. When the IP phone triggers to perform auto provisioning, it will			
Upgrade	IPv	4 DHCP Option Va	ue	yealink						
15	IPv	6 Custom Option								
Auto Provision	Se	rver URL					request to download the configuration files from the			
Configuration	Us	er Name					provisioning server. During the auto provisioning process, the			
Dial Plan	Pa	ssword		•••••			IP phone will download and update configuration files to the			
Voice	Att	tempt Expired Time	e(s)	5			phone flash.			
	Co	mmon AES Key		•••••			No. and all the base to ant			
Ring	ма	C-Oriented AES Ke	у	•••••			You can click here to get more guides.			
Tones	Ze	ro Active		Enabled	-					
Softkey Layout	Wa	ait Time(1~100s)		5						
TR069	Po	wer On		🖲 On 🔘 Off						
11009	Re	peatedly		🔍 On 🔍 Off						

The default value is 5.

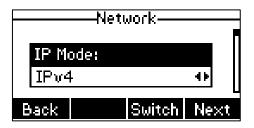
4. Click **Confirm** to accept the change.

When Zero Touch is enabled, there will be a configuration wizard during startup:

	—Zero <sup>-</sup>	Touch—	
L	lpdate n	iow? 4s	
Cancel	Status		ОK

Press the **OK** soft key.

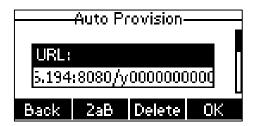
The network parameters are configurable via phone user interface:



Press the Next soft key after finishing network settings.

Configure the provisioning server address, authentication user name (optional) and password (optional) in the **Auto Provision** screen.

An example of screenshot is shown as below:



Press the **OK** soft key.

After the above configuration is completed, the IP phone will connect to the configured provisioning server and perform auto provisioning during startup.

# Plug and Play (PnP) Server

Yealink IP phones support obtaining the provisioning server address from the PnP server. The IP phone broadcasts the PnP SUBSCRIBE message to obtain the provisioning server address during startup. To use Plug and Play, make sure this feature is enabled.

#### To configure PnP via web user interface:

- 1. Click on Settings->Auto Provision.
- 2. Mark the On radio box in the PNP Active field.

Yealink	Status Account Netw	ork Dsskey Feat	ures Settings [	Log Out English(English) - Directory Security
Preference	Auto Provision			NOTE
Time&Date	PNP Active	🖲 On 🔘 Off		Auto Provision
	DHCP Active	◉ On ◎ Off		The IP phone can interoperate with provsioning server using
Call Display	IPv4 Custom Option	128		auto provisioning for deploying the IP phones.
Upgrade	IPv4 DHCP Option Value	yealink		When the IP phone triggers to
Auto Provision	IPv6 Custom Option			perform auto provisioning, it will request to download the
0	Server URL			configuration files from the provisioning server. During the
Configuration	User Name			auto provisioning process, the

#### 3. Click **Confirm** to accept the change.

Any PnP server activated in the network responses with a **SIP NOTIFY** message, and an address of the provisioning server is contained in the message body.

🔀 PMP.pcap - Vireshark					
<u>File Edit View Go Capture Analy</u>	ze Statistics Telephony Ic	ols Help			
N N N N N N N N N N	🛢 📇   🔍 🗢 🌳 🦉 7	2	2 🖂 📓 📓	8 %   🕅	
Filter:		<ul> <li>Eggression Cleag</li> </ul>	Apply		
No Time	Source	Bestination	Protocol		
1 0.000000	10.2.9.106	224.0.1.75	SIP	Request: SUBSCRIBE sip:MAC0015652a3dla@intern.IPPhone.com	
2 0.663070 3 0.666915	10.2.9.46	10.2.9.106	SIP	Status: 202 Accepted subscription Request: NOTICY sig:MAC00156523301a@10.2.9.106:5059	
4 0.671499	10.2.9.106	10.2.9.46	SIP	Status: 200 OK	
5 1.807473	10.2.9.106	10.2.1.199	SIP	Request: REGISTER sip:10.2.1.199	
6 1.810835	10.2.1.199	10.2.9.106	SIP	Status: 200 OK (1 bindings)	
Frame 3 (729 bytes on wire,					
■ Ethernet II, Src: XiamenYe				15:65:2a:3d:1a)	
<ul> <li>Internet Protocol, Src: 10.</li> </ul>			.106)		
User Datagram Protocol, Sr		Port: sds (5059)			
Session Initiation Protoco		100-5050 050 /2 0			
Request-Line: NOTIFY sip: Method: NOTIFY	MAC0015652a3d1a010.2.9	.106:5059 SIP/2.0			
Method: NOTIFY Request-URI: s1p:MACOOL	5653324130010 D 0 10645	050			
[Resent Packet: False]	19032a301a010.2.9.100.3	039			
Message Header					
via: SIP/2.0/UDP 10.2.9	46-5060-branch-20bc4b	×976665779			
■ From: <s1p:mac0015652a3< p=""></s1p:mac0015652a3<>					
Call-ID: 241054610.2.9.		cug-c41034			
E CSeg: 2 NOTIFY					
Sequence Number: 2					
Method: NOTIFY					
	52a3d1a@10.2.9.46:5060>				
Content-Type: applicat	lon/ur1				
Allow: INVITE, INFO, PR	RACK, ACK, BYE, CANCEL,	OPTIONS, NOTIFY, REG	ISTER, SUBSCRI	BE, REFER, PUBLISH, UPDATE, MESSAGE	
Max-Forwards: 70					
User-Agent: Tiptel IP 2	286 /2.43.13.8				
Subscription-State: ter	minated;reason-timeout				
Event: ua-profile					
Allow-Events: talk,hold	d, conference, refer, cheo	k-sync			
Content-Length: 24					
🛛 Message Body					
http://10.2.9.2:99/http	o/				
) Frame (frame), 729 bytes	Packets: 6 Displayed: 1	Markad: 0			Profile: Default
/ rime (trate), 122 bytes	Fackets. 0 pisplayed: 1	am Ard. U			arvand. Delett

After the IP phone obtains the provisioning server address from the PNP server, it will connect to the provisioning server and perform auto provisioning during startup.

### **DHCP Options**

Yealink IP phones can obtain the provisioning server address by detecting DHCP options during startup.

If you are using IPv4 network, the phone will automatically detect the option 66 and option 43 for obtaining the provisioning server address. DHCP option 66 is used to identify the TFTP server. DHCP option 43 is a vendor-specific option, which is used to transfer the vendor-specific information.

If you are using IPv6 network, the phone will automatically detect the option 59 for obtaining the provisioning server address. DHCP option 59 is used to specify a URL for the boot file to be downloaded by the client.

You can configure the phone to obtain the provisioning server address via a custom DHCP option. You can select to use IPv4 or IPv6 custom DHCP option according to your network environment. To obtain the provisioning server address via an IPv4 or IPv6 custom DHCP option, make sure the DHCP option is properly configured on the phone. The IPv4 or IPv6 custom DHCP option must be in accordance with the one defined in the DHCP server.

#### To configure the DHCP option via web user interface:

- 1. Click on Settings->Auto Provision.
- 2. Mark the **On** radio box in the **DHCP Active** field.
- 3. If you are using IPv4 network, enter the desired value in the IPv4 Custom Option field.
- 4. If you are using IPv6 network, enter the desired value in the IPv6 Custom Option field.

Yealink	Status Account Network	Dsskey Features	Log Out English(English) v Settings Directory Security
Preference	Auto Provision		NOTE
Time&Date	PNP Active DHCP Active	● On ○ Off ● On ○ Off	Auto Provision The IP phone can interoperate
Call Display	IPv4 Custom Option	128	with provsioning server using auto provisioning for deploying the IP phones.
Upgrade	IPv4 DHCP Option Value	yealink	When the IP phone triggers to
Auto Provision	IPv6 Custom Option		perform auto provisioning, it will request to download the
	Server URL		configuration files from the
Configuration	User Name		provisioning server. During the auto provisioning process, the
Dial Plan	Password	•••••	IP phone will download and update configuration files to the
Voice	Attempt Expired Time(s)	5	phone flash.
Ring	Common AES Key	•••••	You can click here to get

#### 5. Click **Confirm** to accept the change.

During startup, the phone will broadcast DHCP request with DHCP options for obtaining the provisioning server address. The provisioning server address will be found in the received DHCP response message.

After the IP phone obtains the provisioning server address from the DHCP server, it will connect to the provisioning server and perform auto provisioning during startup.

For more information on the DHCP options, refer to the latest Administrator Guide for your phone on Yealink Technical Support.

The following figure shows the example messages of obtaining the TFTP server address from an IPv4 custom DHCP option:

	.7 (SVN Rev 41973 from /trunk-1.6)]			
	Statistics Telephony Tools Internals			
] 🗑 🌒 🕷 🕷   🖻 🔂 X 😂	'음   익 수 수 수 🖓 若 💷		🕾   👪 🗹 畅 %   🔀	
Filter: sip    bootp	▼ Expres	sion Clear Apply	/	
Io. Time Source	Destination Protocol Length	Info		
14 17.967476 0.0.0.0	255.255.255.255 DHCP 590	DHCP Discover	- Transaction ID 0x88e96872	
15 18.137781 10.2.8.105			- Transaction ID 0x88e96872	
16 18.177701 0.0.0.0			- Transaction ID 0x88e96872	
17 18.178902 10.2.8.105	10.2.8.106 DHCP 342	DHCP ACK	- Transaction ID 0x88e96872	
<ul> <li>User Datagram Protocol, Src</li> <li>Bootstrap Protocol</li> <li>Message type: Boot Reply 6</li> <li>Hardware type: Ethernet</li> <li>Hardware address length: 6</li> <li>Hops: 0</li> <li>Transaction ID: 0x88e9687</li> <li>Seconds elapsed: 100</li> <li>Bootp flags: 0x0000 (unic: Client IP address: 0.0.0.0</li> <li>Your (client) IP address: 10</li> <li>Relay agent IP address: 10</li> <li>Client MAC address: xiamer</li> <li>Client MAC address: widers</li> <li>Server host name: mid071-1</li> <li>Boot file name not given</li> <li>Magic cookie: DHCP</li> <li>Option: (t=1,1=4) ID Addre Magic</li> </ul>	st) (0.0.0.0) 10.2.8.106 (10.2.8.106) .2.8.105 (10.2.8.105) 0.0.0 (0.0.0.0) Ye_38:28:d8 (00:15:65:38:28:d8) dding: 00000000000000000000 for3xon ssage Type = DHCP ACK ask = 255.255.255.0 ess Lease Time = 6 hours ng Time Value = 5 hours, 15 min Time Value = 3 hours	potpc (68)	6 (10.2.8.106)	

Right click the root node of the custom option (e.g., option 128) shown on the above figure, and select **Copy**->**Bytes**->**Printable Text Only**. Paste the copied text in your favorite text editor to check the address, for example, tftp://192.168.1.100/.

## **Phone Flash**

Yealink IP phones can obtain the provisioning server address from the IP phone flash. To obtain the provisioning server address by reading the IP phone flash, make sure the configuration is set properly.

To configure the IP phone flash via web user interface:

1. Click on Settings->Auto Provision.

 Enter the URL, user name and password of the provisioning server in the Server URL, User Name and Password field respectively (the user name and password are optional).

Yealink			Log Out English(English)
	Status Account Network	Dsskey Features S	ettings Directory Security
Preference	Auto Provision		NOTE
	PNP Active	🖲 On 🔘 Off	Auto Provision
Time&Date	DHCP Active	◉ On © Off	The IP phone can interoperate with provisioning server using
Call Display	IPv4 Custom Option	128	auto provisioning for deploying
Upgrade	IPv4 DHCP Option Value	yealink	the IP phones. When the IP phone triggers to
	IPv6 Custom Option		perform auto provisioning, it will
Auto Provision	Server URL	tftp://10.2.5.193/	request to download the configuration files from the
Configuration	User Name		provisioning server. During the auto provisioning process, the
Dial Plan	Password	•••••	IP phone will download and update configuration files to the
Voice	Attempt Expired Time(s)	5	phone flash.
VOICE	Common AES Key	•••••	_
Ring	MAC-Oriented AES Key	•••••	You can click here to get more guides.
Tones	Zero Active	Enabled -	

3. Click **Confirm** to accept the change.

After the above configuration is completed, the IP phone will connect to the configured provisioning server and perform auto provisioning by one of the following methods: Power On, Repeatedly, Weekly, Flexible Auto Provision, Auto Provision Now, SIP NOTIFY Message and Multi-mode Mixed. For more information on these methods, refer to Triggering the IP Phone to Perform Auto Provisioning.

### **Configuring Wildcard of the Provisioning Server URL**

Normally, many phone models may be deployed in your environment. To deploy many phone models using a unified provisioning server, it is convenient for the administrator to configure a unified provisioning server URL for different phone models. On the provisioning server, many directories need to be configured for different phone models, each with a unique directory name. Yealink IP phones support the following wildcards in the provisioning server URL:

- **\$PN**: it is used to identify the directory name of the provisioning server directory where the corresponding boot files and configuration files are located.
- **\$MAC**: it is used to identify the MAC address of the IP phone.

The parameter "static.auto\_provision.url\_wildcard.pn" is used to configure the directory name where the boot files and configuration files located. For more information on the parameter, refer to the latest IP Phones Description of Configuration Parameters in CFG Files or Administrator Guide for your phone on Yealink Technical Support.

When the IP phone obtains a provisioning server URL containing the wildcard \$PN, it automatically replaces the character \$PN with the value of the parameter "static.auto\_provision.url\_wildcard.pn" configured on the IP phone. When the IP phone is triggered to perform auto provisioning, it will request to download the boot files and configuration files from the identified directory on the provisioning server.

The value of the parameter "static.auto\_provision.url\_wildcard.pn" must be configured in accordance with the directory name of the provisioning server directory where the boot files and configuration files of the IP phones are located.

The following example assists in explaining the wildcard feature:

You want to deploy SIP-T42G and SIP-T46G IP phones simultaneously in your environment. IP phones are configured to obtain the provisioning server URL via DHCP option 66. The following details how to deploy the SIP-T42G and SIP-T46G IP phones using wildcard feature.

- 1. Create two directories on the root directory of provisioning server.
- 2. Configure the directory names of these two directories to be "T42G" and "T46G".
- 3. Place the associated boot files and configuration files to the directory created above.
- 4. Configure the value of DHCP option 66 on the DHCP server as: tftp://192.168.1.100/\$PN.
- 5. Configure the value of the parameter "static.auto\_provision.url\_wildcard.pn".

The default value of the parameter "static.auto\_provision.url\_wildcard.pn" is "T42G" for the SIP-T42G IP phones and "T46G" for the SIP-T46G IP phones. If the default value is different from the directory name, you need to configure the value of this parameter to be the directory name on the IP phones in advance.

During startup, IP phones obtain the provisioning server URL "tftp://192.168.1.100/\$PN" via DHCP option 66, and then replace the character "\$PN" in the URL with "T42G" for the SIP-T42G IP phones and "T46G" for the SIP-T46G IP phones. When performing auto provisioning, the SIP-T42G IP phones and the SIP-T46G IP phones first request to download the MAC-Oriented boot files and configuration files referenced in MAC-Oriented boot files from the provisioning server address "tftp://192.168.1.100/T42G" and "tftp://192.168.1.100/T46G" respectively. If no matched MAC-Oriented boot files are found on the server, the SIP-T42G IP phones and the SIP-T46G IP phones request to download the Configuration files referenced in common boot files and configuration files referenced in the server, the SIP-T42G IP phones and the SIP-T46G IP phones request to download the common boot files and configuration files referenced in common boot files from the provisioning server address "tftp://192.168.1.100/T42G" and "tftp://192.168.1.100/T46G" respectively.

If the URL is configured as "tftp://192.168.1.100/\$PN/\$MAC.boot" on the DHCP server, the SIP-T42G IP phones and the SIP-T46G IP phones will replace the characters "\$PN" with "T42G" and "T46G" respectively, and replace the characters "\$MAC" with their MAC addresses. For example, the MAC address of one SIP-T42G IP phone is 00156543EC97. When performing auto provisioning, the IP phone will only request to download the 00156543ec97.boot file and configuration files referenced in the 00156543ec97.boot file from the provisioning server address "tftp://192.168.1.100/T42G".

For more information on boot files, refer to Managing Boot Files.

# **Triggering the IP Phone to Perform Auto Provisioning**

This chapter introduces the following methods to trigger the IP phone to perform auto provisioning:

- Power On
- Repeatedly
- Weekly
- Flexible Auto Provision
- Auto Provision Now
- Multi-mode Mixed
- SIP NOTIFY Message
- Auto Provisioning via Activation Code

When there is an active call on the IP phone during auto provisioning, the IP phone will detect the call status every 30 seconds. If the call is released within 2 hours, the auto provisioning will be performed as usual. Otherwise, the process will be ended due to timeout.

### **Power On**

The IP phone performs the auto provisioning when the IP phone is powered on.

To activate the power on mode via a web user interface:

1. Click on Settings->Auto Provision.

2. Mark the **On** radio box in the **Power On** field.

ealink   1236					English(English)
	Status Account Ne	twork Dsskey	Features	Settings	Directory Security
Preference	Auto Provision				NOTE
Preference	PNP Active	On Off			Auto Provision
Time&Date	DHCP Active	On Off			The IP phone can interoperat with provsioning server using
Call Display	IPv4 Custom Option	128			auto provisioning for deploying
Upgrade	IPv4 DHCP Option Value	yealink			the IP phones. When the IP phone triggers t
to the December of the second	IPv6 Custom Option				perform auto provisioning, it v
Auto Provision	Server URL				request to download the configuration files from the
Configuration	User Name				provisioning server. During the auto provisioning process, the
Dial Plan	Password	•••••			IP phone will download and update configuration files to t
Voice	Attempt Expired Time(s)	5			phone flash.
	Common AES Key	•••••			D You and allah have to ant
Ring	MAC-Oriented AES Key	•••••			You can click here to get more guides.
Tones	Zero Active	Disabled	-		
Softkey Layout	Wait Time(1~100s)	5			
TR069	Power On	🖲 On 🔘 Off	1		
TRU09	Repeatedly	🗢 On 🔍 Off	-		

**3.** Click **Confirm** to accept the change.

# Repeatedly

The IP phone performs the auto provisioning at regular intervals. You can configure the interval for the repeatedly mode. The default interval is 1440 minutes.

To activate the repeatedly mode via web user interface:

- 1. Click on Settings->Auto Provision.
- 2. Mark the **On** radio box in the **Repeatedly** field.

ealink   1236				Log Ou English(English)						
	Status	Account	Network	Dsskey	Features	Settings	Directory Security			
Preference	Auto P	rovision					NOTE			
Freierence	PNP	Active		🖲 On 💿 Off			Auto Provision			
Time&Date	DHC	P Active		🖲 On 🔘 Off			Auto Provision The IP phone can interoperate with provsioning server using			
Call Display	IPv4	Custom Option		128			auto provisioning for deploying			
Upgrade	IPv4	DHCP Option Val	ue	yealink			the IP phones.			
Auto Provision	IPv6	Custom Option				When the IP phone triggers to perform auto provisioning, it will request to download the configuration files from the				
	Serv	er URL		tftp://10.2.5.193	1					
Configuration	User	Name				provisioning server. During the auto provisioning process, the IP phone will download and update configuration files to the				
Dial Plan	Pass	word		•••••						
Voice	Atte	mpt Expired Time	(s)	5			phone flash.			
	Com	mon AES Key		•••••		<b>B N N N N N N N N N N</b>				
Ring	MAC	-Oriented AES Ke	у	•••••			You can click here to get more guides.			
Tones	Zero	Active		Enabled	-					
Softkey Layout	Wait	: Time(1~100s)		5						
TR069	Pow	er On		🖲 On 🔘 Off						
	Repe	eatedly		🖲 On 🔘 Off						
Voice Monitoring	Inte	rval(Minutes)		1440						
SIP	Wee	kly		◯ On						

3. Enter the desired interval time (in minutes) in the Interval(Minutes) field.

4. Click Confirm to accept the change.

### Weekly

The IP phone performs auto provisioning at a random time every week/month/quarter. You can configure what time of the day and which day of the week to trigger the IP phone to perform auto provisioning. You can also configure a regular week interval to trigger the IP phone to perform auto provisioning. You can specify the delay time to perform auto provisioning when the IP phone is inactive at regular week. For example, you can configure the IP phone to check and update new configuration only when the IP phone has been inactivated for 10 minutes between 2 to 3 o'clock in the morning every Monday at a 4-week interval.

If you configure two or more days in a week, the auto provisioning only occurs at a random day.

#### To activate the weekly mode via web user interface:

- 1. Click on Settings->Auto Provision.
- 2. Mark the On radio box in the Weekly field.
- 3. Enter the desired upgrade interval in the Weekly Upgrade Interval(0~12week) field.
- 4. Enter the desired value in the Inactivity Time Expire(0~120min) field.
- 5. Enter the desired time in the Time field.

6. Check one or more checkboxes in the **Day of Week** field.

ealink T236			English(English)
	Status Account Network	Dsskey Features Set	tings Directory Security
Preference	Auto Provision		NOTE
	PNP Active	◉ On ◎ Off	Auto Provision
Time&Date	DHCP Active	◉ On ◎ Off	The IP phone can interoperate
Call Display	IPv4 Custom Option	128	with provsioning server using auto provisioning for deploying
	IPv4 DHCP Option Value	vealink	the IP phones.
Upgrade	IPv6 Custom Option		When the IP phone triggers to perform auto provisioning, it wi
Auto Provision			request to download the
0	Server URL	tftp://10.2.5.193/	configuration files from the provisioning server. During the
Configuration	User Name		auto provisioning process, the I phone will download and update
Dial Plan	Password	•••••	configuration files to the phone
Voice	Attempt Expired Time(s)	5	flash.
	Common AES Key	•••••	You can click here to q
Ring	MAC-Oriented AES Key	•••••	more guides.
Tones	Zero Active	Enabled -	
Softkey Layout	Wait Time(1~100s)	5	
	Power On	● On ◎ Off	
TR069	Repeatedly	● On ◎ Off	
Voice Monitoring	Interval(Minutes)	1440	
SIP	Weekly	🖲 On 🔘 Off	
Power Saving	Weekly Upgrade Interval(0~12week)	4	
	Inactivity Time Expire(0~120min)	10	
	Time	02 : 00 03 : 00	
		Sunday	
		Monday	
	Day of Week	Tuesday	
	Day of Week	Wednesday Thursday	
		Friday	
		Saturday	

7. Click **Confirm** to accept the change.

### **Flexible Auto Provision**

The IP phone performs auto provisioning at a random time on a random day within a specific period of time. The random day is calculated on the basis of the phone's MAC address. You can specify an interval and configure what time of the day to trigger the IP phone to perform auto provisioning.

For example, you can configure the IP phone to check and update new configuration between 1 and 6 o'clock in the morning at a 30-day interval. The IP phone will perform auto provisioning at a random time (e.g., 03:47) on a random day (e.g., 18) based on the phone's MAC address.

Note that the update time will be recalculated if auto provisioning occurs (e.g., Auto Provision Now) during this specific period of time.

#### To activate the flexible auto provision mode via web user interface:

- 1. Click on Settings->Auto Provision.
- 2. Mark the On radio box in the Flexible Auto Provision field.
- 3. Enter the desired value in the Flexible Interval Days field.

alink 1236							En	glish(English)
	Status	Account	Network	Dsskey	Features	Settings	Directory	Security
Preference	Auto	o Provision					NOTE	
Time&Date	P	NP Active		🖲 On 🔘 Off			Auto Provisi	
ImeaDate	c	HCP Active		🖲 On 💿 Off				can interoperate ing server using
Call Display	1	Pv4 Custom Option		128			auto provision the IP phones	ing for deploying
Upgrade	1	Pv4 DHCP Option Va	alue	yealnk				phone triggers to
Auto Provision	1	Pv6 Custom Option					perform auto	provisioning, it w
AUCO PTOVISION	5	erver URL					request to do configuration	files from the
Configuration	L. L.	Jser Name						erver. During the ing process, the
Dial Plan	p	assword						download and juration files to th
Voice	,	Attempt Expired Tim	ve(s)	5			phone flash.	
	c	Common AES Key						333
Ring		AC-Oriented AES K	ey				W You can o more guides.	click here to get
Tones	z	ero Active		Disabled				
Softkey Layout	v	Valt Time(1~100s)		5				
	P	ower On		🖲 On 💿 Off				
TR069	R	tepeatedly		O on 💌 off				
Voice Monitoring		nterval(Minutes)		1440				
51P		Veekly		O on . Off				
Designed Conclusion		Veekly Upgrade Inte	nval(0~12week)	0				
Power Saving		nactivity Time Expire		0				
		ime	(contraction)	00 : 00 - 00	- 00			
		bay of Week		Sunday     Monday     Tuesday     Wednesday				
		AP OF FREEX		Vednesday				
	F	lexible Auto Provisio	n	🖲 On 🔘 Off				
	F	iexible Interval Days		30				
	F	lexible Time		02 : 00 - 06	: 00			
				Auto Provision	Now			

4. Enter the desired start time and end time in the **Flexible Time** field.

5. Click **Confirm** to accept the change.

## **Auto Provision Now**

You can use auto provision now mode to manually trigger the IP phone to perform auto provisioning immediately.

To use the auto provision now mode via web user interface:

**1.** Click on **Settings->Auto Provision**.

ealink   1236	Status	Account	Network	Dsskey	Features	Settings	Directory	Security
Preference	Auto	o Provision					NOTE	3
	P	NP Active		🖲 On 🔘 Off			Auto Provisi	on
Time&Date	D	HCP Active		🖲 On 🔘 Off				can interoperate
Call Display	3	Pv4 Custom Option		128				ng for deploying
Upgrade	J	Pv4 DHCP Option Val	Je	yealnk				
	1	Pv6 Custom Option					perform auto ;	phone triggers to provisioning, it w
Auto Provision	s	ierver URL					configuration f	
Configuration	0	iser Name						rver. During the ng process, the
Dial Plan	P	assword					IP phone will o	
Voice	A	ttempt Expired Time	(s)	5			phone flash.	
voice	c	Common AES Key						
Ring	N	AC-Oriented AES Ke	e la				You can o more guides.	lick here to get
Tones	z	ero Active		Disabled				
Softkey Layout	v	Vait Time(1~100s)		5				
Contraction and Contraction of Contr	p	ower On		🖲 On 🔿 Off				
TR069	R	epeatedly		O On 🔍 Off				
Voice Monitoring		nterval(Minutes)		1440				
SIP	v	Veekly		🔿 On 💌 Off				
Power Saving	v	Veekly Upgrade Inter	val(0~12week)	0				
	1	nactivity Time Expire(	0~120min)	0				
	ा	îme		00 : 00 - 00	: 00			
	D	ay of Week		Sunday Monday Monday Monday V Tuesday V denesday V Inursday V Friday V Saturday				
	F	lexible Auto Provision		O On @ Off				
	F	lexible Interval Days		30				
	F	lexble Time		02 : 00 -	1			

2. Click Auto Provision Now.

The IP phone will perform auto provisioning immediately.

### **Multi-mode Mixed**

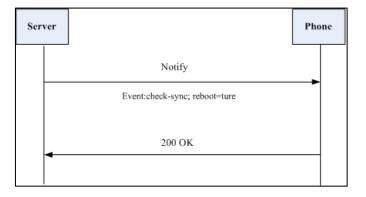
You can activate more than one method for auto provisioning. For example, you can activate the "Power On" and "Repeatedly" modes simultaneously. The IP phone will perform auto provisioning when it is powered on and at a specified interval.

### **SIP NOTIFY Message**

The IP phone will perform auto provisioning when receiving a SIP NOTIFY message which contains the header "Event: check-sync". Whether the IP phone reboots or not depends on the value of the parameter "sip.notify\_reboot\_enable". If the value is set to 1, or the value is set to 0 and the header of the SIP NOTIFY message contains an additional string "reboot=true", the IP phone will reboot immediately. For more information on the parameter "sip.notify\_reboot\_enable", refer to the latest IP Phones Description of Configuration Parameters

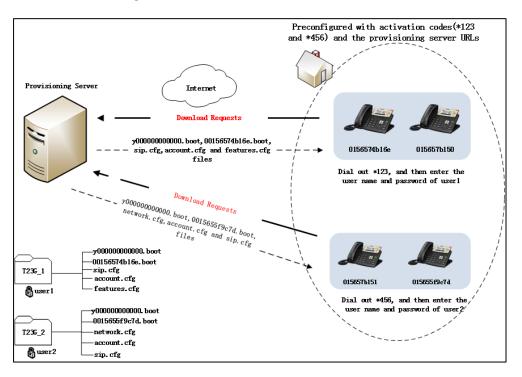
in CFG Files or Administrator Guide for your phone on Yealink Technical Support. This method requires server support.

The following figure shows the message flow:



### **Auto Provisioning via Activation Code**

In addition to the updating modes introduced above, users can trigger IP phones to perform auto provisioning by dialing an activation code. To use this method, the activation code and the provisioning server URL need to be pre-configured on the IP phones. This method works only if there is no registered account on the IP phone. It is usually used for IP phones distributed by retail sales. It has the advantage that the IP phones do not need to be handled (e.g., registering account) before sending them to end-users.



The following lists the processes for triggering auto provisioning via activation code:

- 1. Create multiple directories (e.g., T23G\_1 and T23G\_2) on the provisioning server.
- 2. Store boot files and configuration files to each directory on the provisioning server.
- 3. Configure a user name and password for each directory on the provisioning server.

The user name and password provides a means of conveniently partitioning the boot files and configuration files for different IP phones. To access the specified directory, you need to provide the correct user name and password configured for the directory.

**4.** Configure unique activation codes and the provisioning server URLs on IP phones.

The activation code can be numeric characters, special characters "#", "\*" or a combination of them within 32 characters.

The following are example configurations in the configuration file for IP phones:

static.autoprovision.1.code = \*123

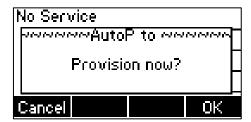
static.autoprovision.1.url = http://192.168.1.30/T23G\_1/

static.autoprovision.2.code = \*456

static.autoprovision.2.url = http://192.168.1.30/T23G\_2/

- 5. Send the specified activation code, associated user name and password to each end-user.
- **6.** The user can set up the IP phone, and then input the activation code (e.g., \*123) after the phone startup.

The LCD screen will prompt the following dialog box:



7. Press the OK soft key to trigger the IP phone to perform auto provisioning.

The LCD screen will prompt the following input box:

	AutoP A	Authority-	
User	Name:		
Cancel	2aB	Delete	OK

8. Enter the user name and password in the User Name and Password field respectively.

The entered user name and password must correspond to the directory where the boot files and configuration files of the IP phone are located. If you enter invalid user name or password, the LCD screen will prompt the message "Wrong user name or password!". The prompt message will disappear in two seconds, and the LCD screen will return to the idle screen. You need to input the activation code again to trigger auto provisioning.

The IP phone downloads the specified configuration files in sequence in boot files from the provisioning server to complete phone configurations. For more information on boot files and configuration files, refer to Managing Boot Files and Managing Configuration Files.

The entered user name and password will be saved to the IP phone for next auto provisioning.

The LCD screen will not prompt for user name and password if the provisioning server does not require authentication, or the user name and password are already saved on the IP phone.

The following parameters are used to configure the auto provisioning via activation code method (X ranges from 1 to 50):

#(Optional.) Configure the code name for triggering auto provisioning.

static.autoprovision.X.name

#Configure the activation code.

static.autoprovision.X.code

#Configure the URL of the provisioning server.

static.autoprovision.X.url

#Configure the username and password for downloading boot files and configuration files. If

configured, the LCD screen will not prompt for user name and password.

static.autoprovision.X.user

static.autoprovision.X.password

# **Downloading and Verifying Configurations**

### **Downloading Boot, Configuration and Resource Files**

After obtaining the provisioning server address in one of the ways introduced above, the phone will request to download the boot files and configuration files from the provisioning server when it is triggered to perform auto provisioning.

The IP phone will try to download the MAC-Oriented boot file firstly and then download the configuration files referenced in the MAC-Oriented boot file from the provisioning server during the auto provisioning. If no MAC-Oriented boot file is found, the IP phone will try to download the common boot file and then download the configuration files referenced in the common boot file. If no common boot file is found, the IP phone will try to download the Common CFG file firstly, and then try to download the MAC-Oriented CFG file from the provisioning server – that is, the old mechanism for auto provisioning.

For more information about auto provisioning, refer to Auto Provisioning Process.

If the access URLs of the resource files have been specified in the configuration files, the phone will try to download the resource files.

### **Resolving and Updating Configurations**

After downloading, the phone resolves the configuration files and resource files (if specified in the configuration files), and then updates the configurations and resource files to the phone flash. Generally, updated configurations will automatically take effect after auto provisioning is completed. For update of some specific configurations which require a reboot before taking effect, for example, network configurations, the IP phone will reboot to make the configurations effective after auto provisioning is completed.

The IP phone calculates the MD5 values of the downloaded files before updating them. If the MD5 values of the Common and MAC-Oriented configuration files are the same as those of the last downloaded configuration files, this means these two configuration files on the provisioning server are not changed. The IP phone will complete the auto provisioning without repeated update. This is used to avoid unnecessary restart and the impact of phone use. On the contrary, the IP phone will update configurations.

The latest values to be applied to the IP phone are the values that take effect.

The phone only reboots when there is at least a specific configuration requiring a reboot after auto provisioning. If you want to force the IP phone to perform a reboot after auto provisioning, you can configure "static.auto\_provision.reboot\_force.enable = 1" in the configuration file. For more information on the specific configurations which require a reboot during auto provisioning and the parameter "static.auto\_provision.reboot\_force.enable", refer to the latest IP Phones Description of Configuration Parameters in CFG Files for your phone on Yealink Technical Support.

If configuration files have been AES encrypted, the IP phone will use the Common AES key to decrypt the Common CFG file and the MAC-Oriented AES key to decrypt the <MAC>.cfg file after downloading the configuration files. For more information on how the IP phone decrypts configuration files, refer to *Yealink Configuration Encryption Tool User Guide*.

### **Using MAC-local CFG File**

#### Uploading and downloading the <MAC>-local.cfg file

You can configure whether the IP phone uploads the <MAC>-local.cfg file to the provisioning server (or a specified URL configured by "static.auto\_provision.custom.sync.path") once the file changes for backing up this file, and downloads the <MAC>-local.cfg file from the provisioning server (or a specified URL configured by "static.auto\_provision.custom.sync.path") during auto provisioning to override the one stored on the phone. This process is controlled by the value of the parameter "static.auto\_provision.custom.sync".

#### Updating configurations in the <MAC>-local.cfg file

You can configure whether the IP phone updates configurations in the <MAC>-local.cfg file during auto provisioning. This process is controlled by the value of the parameter "static.auto\_provision.custom.protect". If the IP phone is configured to keep user's personalized settings (by setting the value of the parameter "static.auto\_provision.custom.protect" to 1), it will update configurations in the <MAC>-local.cfg file. If the value of the parameter "overwrite\_mode" is set to 1 in the boot file, the value of the parameter "static.auto\_provision.custom.protect" will be forced to set to 1.

The IP phone updates configuration files during auto provisioning in sequence: CFG files referenced in the boot file>MAC-local CFG file (if no boot file is found, Common CFG file>MAC-Oriented CFG file>MAC-local CFG file). The configurations in the <MAC>-local.cfg file take precedence over the ones in other downloaded configuration files. As a result, the personalized settings of the phone configured via the phone or web user interface can be kept after auto provisioning.

Note that if the personalized settings are static settings, they cannot be kept after auto provisioning because the static settings will never be saved in the <MAC>-local.cfg file.

For more information, refer to the latest Administrator Guide for your phone on Yealink Technical Support.

### **Verifying Configurations**

After auto provisioning, you can then verify the update via phone user interface or web user interface of the phone. For more information, refer to *Yealink phone-specific user guide*.

During auto provisioning, you can monitor the downloading requests and response messages by a WinPcap tool. The following shows some examples. **Example1:** Yealink SIP-T23G IP phone downloads the boot file and configuration files from the TFTP server.

<u>Eile Edit V</u>	/iew <u>G</u> o <u>C</u> aptur	e <u>A</u> nalyze <u>S</u> tatistics	Telephony Tools Internal	s <u>H</u> elp	
004	# #   P	) X 2   Q +	🍬 🥥 📅 生 🗐 🖬		T 🙀 🗹 🍕 🔆 🙀
Filter: tftp			- Expr	ession Clear	Apply Save
No. Tim		Source	Destination	Protocol	Length Info
	, 389499000	10.2.20.73	10.2.5.193	TETP	81 Read Request, File: 00156574b16e,boot, Transfer type: octet, blksize\000=1432\000
	. 389595000	10.2.20.73	10.2.5.193	TETP	81 Read Request, File: 001507/4010e.boot, Transfer type: octet, biksize(000=1432/000 81 Read Request, File: 001567/4010e.boot, Transfer type: octet, biksize(000=1432/000
	.416697000	10.2.5.193	10.2.3.193	TETP	81 Read Request, File: 00150740160.0004, Transfer type: 0ctet, 0185120(000-1432/000 88 Error Code, Code, Access violation, Message: Could not open requested file for reading
	.417077000	10.2.5.193	10.2.20.73	TETP	88 Error Code, Code: Access violation, Message: Could not open requested file for reading
	.440553000	10.2.20.73	10.2.5.193	TETP	82 Read Request, File: y00000000000.boot, Transfer type: octet, blksize\000=1432\000
	.440666000	10.2.20.73	10.2.5.193	TETP	82 Read Request, File: y000000000000.boot, Transfer type: octet, b1Ks1ze\000=1432\000
	.462578000	10.2.5.193	10.2.20.73	TETP	57 Option Acknowledgement, blksize\000=1432\000
	.462889000	10.2.5.193	10.2.20.73	TETP	60 Option Acknowledgement, blksize\000=1432\000
	.464898000	10.2.20.73	10.2.5.193	TETP	60 Acknowledgement, Block: 0
	.464989000	10.2.20.73	10.2.5.193	TETP	60 Acknowledgement, Block: 0
	.465642000	10.2.5.193	10.2.20.73	TETP	428 Data Packet, Block: 1 (last)
	.466974000	10.2.5.193	10.2.20.73	TETP	428 Data Packet, Block: 1 (last)
	.469270000	10.2.20.73	10.2.5.193	TETP	60 Acknowledgement, Block: 1
	.469359000	10.2.20.73	10.2.5.193	TETP	60 Acknowledgement, Block: 1
	.483306000	10.2.20.73	10.2.5.193	TETP	71 Read Request, File: sip.cfg, Transfer type: octet, blksize\000=1432\000
	.483401000	10.2.20.73	10.2.5.193	TETP	71 Read Request, File: sip.cfg, Transfer type: octet, blksize\000=1432\000
3779 17.	. 506728000	10.2.5.193	10.2.20.73	TETP	57 option Acknowledgement, blksize\000=1432\000
3781 17.	. 506988000	10.2.5.193	10.2.20.73	TETP	60 Option Acknowledgement, blksize\000=1432\000
3786 17.	. 511914000	10.2.20.73	10.2.5.193	TETP	60 Acknowledgement, Block: 0
3787 17.	. 512005000	10.2.20.73	10.2.5.193	TETP	60 Acknowledgement, Block: 0
3788 17.	. 512439000	10.2.5.193	10.2.20.73	TETP	625 Data Packet, Block: 1
3790 17.	. 513683000	10.2.5.193	10.2.20.73	TETP	625 Data Packet, Block: 1
3794 17.	. 515113000	10.2.20.73	10.2.5.193	TETP	60 Acknowledgement, Block: 1
3795 17.	. 515201000	10.2.20.73	10.2.5.193	TETP	60 Acknowledgement, Block: 1
3804 17.	.538122000	10.2.20.73	10.2.5.193	TETP	76 Read Request, File: features.cfg, Transfer type: octet, blksize\000=1432\000
3805 17.	. 538224000	10.2.20.73	10.2.5.193	TETP	76 Read Request, File: features.cfg, Transfer type: octet, blksize\000=1432\000
	. 569170000	10.2.5.193	10.2.20.73	TETP	88 Error Code, Code: Access violation, Message: Could not open requested file for reading
3811 17.	. 569472000	10.2.5.193	10.2.20.73	TETP	88 Error Code, Code: Access violation, Message: Could not open requested file for reading

**Example 2:** Yealink SIP-T23G IP phone downloads the boot file and configuration files from the FTP server.

Filter:	ftp		▼ Exp	ression Clear	Apply Save
No.	Time	Source	Destination	Protocol	Length Info
317	73 28,950484000	10.2.5.193	10.2.20.73	FTP	75 [TCP Retransmission] Response: 213 382
317	75 28,952342000	10.2.20.73	10.2.5.193	FTP	91 Request: RETR y0000000000.boot
317	6 28.952453000	10.2.20.73	10.2.5.193	FTP	91 [TCP Retransmission] Request: RETR y00000000000.boot
	9 28.958927000	10.2.5.193	10.2.20.73	FTP	102 Response: 125 Using existing data connection
	30 28.959253000	10.2.5.193	10.2.20.73	FTP	102 [TCP Retransmission] Response: 125 Using existing data connection
	0 28.963510000	10.2.5.193	10.2.20.73	FTP	122 Response: 226 Closing data connection; File transfer successful.
	93 28.963862000	10.2.5.193	10.2.20.73	FTP	122 [TCP Retransmission] Response: 226 Closing data connection; File transfer successful.
	2 28.991053000	10.2.5.193	10.2.20.73	FTP	108 Response: 220 3Com 3CDaemon FTP Server Version 2.0
	25 28.992201000	10.2.20.73	10.2.5.193	FTP	76 Request: USER 123
	26 28.992302000	10.2.20.73	10.2.5.193	FTP	76 [TCP Retransmission] Request: USER 123
	29 28,993908000	10.2.5.193	10.2.20.73	FTP	99 Response: 331 User name ok, need password
	30 28.994220000	10.2.5.193	10.2.20.73	FTP	99 [TCP Retransmission] Response: 331 User name ok, need password
	31 28.994857000	10.2.20.73	10.2.5.193	FTP	78 Request: PASS admin
	32 28,994966000	10.2.20.73	10.2.5.193	FTP	78 [TCP Retransmission] Request: PASS admin
	85 28.995764000	10.2.5.193	10.2.20.73	FTP	91 Response: 530 Login access denied
	36 28,996077000	10.2.5.193	10.2.20.73	FTP	91 [TCP Retransmission] Response: 530 Login access denied
	37 28.996878000	10.2.20.73	10.2.5.193	FTP	82 Request: USER anonymous
	38 28.996979000	10.2.20.73	10.2.5.193	FTP	82 [TCP Retransmission] Request: USER anonymous
	1 28.997855000	10.2.5.193	10.2.20.73	FTP	99 Response: 331 User name ok, need password
	2 28.998113000	10.2.5.193	10.2.20.73	FTP	99 [TCP Retransmission] Response: 331 User name ok, need password
	14 28.998745000 18 29.000393000	10.2.20.73	10.2.5.193 10.2.20.73	FTP	73 Request: PASS 101 Response: 230-The response '' is not valid.
	18 29.000393000		10.2.20.73	FTP	
	19 29.000/15000 53 29.035465000	10.2.5.193	10.2.20.73	ETP	101 [TCP Retransmission] Response: 230-The response '' is not valid. 145 Response: 230-Next time, please use your email address as password.
	5 29.035867000	10.2.5.193	10.2.20.73	FTP	145 Response: 230-Next time, please use your email address as password. 145 [TCP Retransmission] Response: 230-Next time, please use your email address as password.
	58 29.035867000 58 29.037118000	10.2.20.73	10.2.5.193	ETP	145 LICP Retransmission; Response: 230-Next time, please use your email address as password. 74 Request: TYPE I
	58 29.037118000 59 29.037213000	10.2.20.73	10.2.5.193	FTP	74 Request: TYPE 1 74 [TCP Retransmission] Request: TYPE I
	59 29.037213000	10.2.5.193	10, 2, 20, 73	ETP	86 Response: 200 Type set to I.
	52 29.038460000 53 29.038702000	10.2.5.193	10.2.20.73	FTP	86 Response: 200 Type set to I. 86 [TCP Retransmission] Response: 200 Type set to I.
	54 29.039357000	10.2.20.73	10.2.5.193	ETP	72 Request: PASV
	58 29.040715000	10.2.5.193	10.2.20.73	FTP	114 Response: 227 Entering passive mode (10,2,5,193,211,172)
	59 29.041000000	10.2.5.193	10.2.20.73	ETP	114 Kesponse: 127 Entering passive mode (1012,3114) [117]
	9 29.054116000	10.2.20.73	10.2.5.193	ETP	80 Request Size sin cfa
	s 29.054212000		10.2.5.193	FTP	80 LTCP RETAINSING Request: SIZE SID.CTQ

**Example 3:** Yealink SIP-T23G IP phone downloads boot file and configuration files from the HTTP server.

Ele Edit	t <u>V</u> iew <u>G</u> o <u>C</u> apture	e Analyze Statistics	Telephony Tools Internals	Help	
00		X 2 0 4	* 🗠 🌫 🔸 🗐 🖬		D. 🕐 🖬 🗹 🛼 % 🙀
				-, -, -,	
Filter: h	ittp		<ul> <li>Express</li> </ul>	ssion Clear	ar Apply Save
No.	Time	Source	Destination	Protocol	Length Info
	1,962425000	10.2.5.193	10, 2, 20, 73	HTTP	1882 POST /servlet?p=settings-autop&g=write&now=true HTTP/1.1 (application/x-www-form-urlencoded
141	2,267524000	10.2.20.73	10.2.5.193	HTTP	234 GET /HTTP%20Directory/00156574b16e.boot HTTP/1.1
142	2.26//50000	10.2.20.73	10.2.5.193	нттр	234 [ICP KETRANSMISSION] GET /HITP%2001rectory/001505/4016e.boot HTTP/1.1
	2.270563000	10.2.5.193	10.2.20.73	HTTP	66 HTTP/1.1 404 Not Found (text/html)
	2.305531000	10.2.20.73	10.2.5.193	HTTP	235 GET /HTTP%20Directory/y0000000000.boot HTTP/1.1
	2.305723000	10.2.20.73	10.2.5.193	HTTP	235 [TCP Retransmission] GET /HTTP%20D1rectory/y00000000000.boot HTTP/1.1
	2.321164000	10.2.5.193	10.2.20.73	HTTP	448 HTTP/1.1 200 OK (application/octet-stream)
	2.359293000	10.2.5.193	10.2.20.73	HTTP	574 GET /js/define.js?44.81.254.71 HTTP/1.1
	2.373167000	10.2.20.73	10.2.5.193	HTTP	1514 [TCP Previous segment not captured] Continuation or non-HTTP traffic
	2.374421000	10.2.20.73	10.2.5.193	HTTP	1514 Continuation or non-HTTP traffic
	2.376198000	10.2.20.73	10.2.5.193	HTTP	1133 Continuation or non-HTTP traffic
	2.377011000	10.2.5.193	10.2.20.73	HTTP	570 GET /js/aes.js?44.81.254.71 HTTP/1.1
	2.380821000	10.2.5.193	10.2.20.73	HTTP	581 GET /js/zeropadding-min.js?44.81.254.71 HTTP/1.1
	2.380973000			HTTP	571 GET /js/jsbn.js?44.81.254.71 HTTP/1.1
	2.381075000	10.2.5.193	10.2.20.73	HTTP	573 GET /js/prng4.js?44.81.254.71 HTTP/1.1
	2.381175000	10.2.5.193	10.2.20.73	HTTP	569 GET /js/rng.js?44.81.254.71 HTTP/1.1 569 GET /js/rsa.js?44.81.254.71 HTTP/1.1
	2,408422000	10.2.20.73	10.2.5.193	нттр	269 GET /15/F54, 15/44, 61, 254, /1 HTIP/1, 1 224 GET /HTTP%20Directory/sip.cfg HTTP/1, 1
	2.408639000	10.2.20.73	10.2.5.193	HTTP	224 JCP Retransmission GeT /HTP/2001rectory/sip.cfd HTP/1.1
	2,412543000	10.2.5.193	10.2.20.73	HTTP	66 HTTP/1.1 404 NOT FOUND (TEX/html)
	2,442529000	10.2.20.73	10.2.5.193	HTTP	229 GET /HTTP%20Directory/features.cfg HTTP/1.1
	2.442/25000	10.2.20.73	10.2.5.193	нттр	229 [TCP Retraismission] GET /HTTP%20Directory/teatures.ctg HTTP/1.1
	2,455300000	10.2.5.193	10.2.20.73	HTTP	645 HTTP/1.1 200 OK (application/octet-stream)
	2,458812000	10.2.5.193	106,120,188,46	HTTP	1046 POST /g?h=A366528EB8E894F17A1F12E8A58FE660&r=0000&v=5,2,5,17503 HTTP/1,1 (app]ication/x-www
	2,508429000	10.2.5.193	10, 2, 20, 73	HTTP	492 GET /note/1.English_note.xml HTTP/1.1
	2.509486000	10.2.5.193	10.2.20.73	HTTP	492 [TCP Retransmission] GET /note/1.English_note.xml HTTP/1.1
507	2.558874000	106.120.188.46	10.2.5.193	HTTP	296 HTTP/1.1 200 OK (text/plain)
509	2.643723000	10.2.5.193	36.110.147.36	HTTP	1433 GET /websearch/features/yun6.jsp?pid=sogou-brse-d2a452edff079ca6&w=1440&v=7400&st=1468309421
509	2.643723000	10.2.5.193	36.110.147.36	нттр	1433 GET /websearch/features/yun6.jsp?pid=sogou-brse-d2a452edff079ca6&w=1440&v=7400&st=1468

# **Troubleshooting**

This chapter provides general troubleshooting information to help you solve problems you might encounter when deploying phones.

If you require additional information or assistance with the deployment, contact your system administrator.

#### Why does the IP phone fail to download configuration files?

- Ensure that auto provisioning feature is configured properly.
- Ensure that the provisioning server and network are reachable.
- Ensure that authentication credentials configured on the IP phone are correct.
- Ensure that configuration files exist on the provisioning server.
- Ensure that MAC-Oriented boot file and common boot file don't exist simultaneously on the provisioning server. If both exist, the IP phone only downloads MAC-Oriented boot file and the configuration files referenced in the MAC-Oriented boot file.

# Why does the IP phone fail to authenticate the provisioning server during auto provisioning?

- Ensure that the certificate for the provisioning server has been uploaded to the phone's trusted certificates list. If not, do one of the following:
  - Import the certificate for the provisioning server to the phone's trusted certificates list (at phone's web path Security->Trusted Certificates->Import Trusted Certificates).
  - Disable the IP phone to only trust the server certificates in the trusted certificates list (at phone's web path Security->Trusted Certificates->Only Accept Trusted Certificates).

#### Why does the provisioning server return HTTP 404?

- Ensure that the provisioning server is properly set up.
- Ensure that the access URL is correct.
- Ensure that the requested files exist on the provisioning server.

#### Why does the IP phone display "Network unavailable"?

- Ensure that the Ethernet cable is plugged into the Internet port on the IP phone and the Ethernet cable is not loose.
- Ensure that the switch or hub in your network is operational.
- Ensure that the configurations of network are properly set in the configuration files.

#### Why is the permission denied when uploading files to the root directory of the FTP server?

- Ensure that the complete path to the root directory of the FTP server is authorized.
- Check security permissions on the root directory of the FTP server, if necessary, change the permissions.

#### Why doesn't the IP phone obtain the IP address from the DHCP server?

- Ensure that settings are correct on the DHCP server.
- Ensure that the IP phone is configured to obtain the IP address from the DHCP server.

#### Why doesn't the IP phone download the ring tone?

- Ensure that the file format of the ring tone is \*.wav.
- Ensure that the size of the ring tone file is not larger than that the IP phone supports.
- Ensure that the properties of the ring tone for the IP phone are correct.
- Ensure that the network is available and the root directory is right for downloading.
- Ensure that the ring tone file exists on the provisioning server.

#### Why doesn't the IP phone update configurations?

- Ensure that the configuration files are different from the last ones.
- Ensure that the IP phone has downloaded the configuration files.
- Ensure that the parameters are correctly set in the configuration files.
- Ensure that the value of the parameter "static.auto\_provision.custom.protect" is set to 0. If it
  is set to 1, the provisioning priority is shown as follows: phone/web user interface >central
  provisioning >factory defaults. A setting you make using a lower-priority method does not
  apply to or override a duplicate setting made using a higher-priority method.

For more information, refer to the latest Administrator Guide for your phone on Yealink Technical Support.

# Glossary

**MAC Address:** A Media Access Control address (MAC address) is a unique identifier assigned to network interfaces for communications on the physical network segment.

**MD5:** The MD5 Message-Digest Algorithm is a widely used as cryptographic hash function that produces a 128-bit (16-byte) hash value.

**DHCP:** Dynamic Host Configuration Protocol (DHCP) is a network configuration protocol for hosts on Internet Protocol (IP) networks. Computers that are connected to IP networks must be configured before they can communicate with other hosts.

**FTP:** File Transfer Protocol (FTP) is a standard network protocol used to transfer files from one host to another host over a TCP-based network, such as the Internet. It is often used to upload web pages and other documents from a private development machine to a public web-hosting server.

**HTTP:** The Hypertext Transfer Protocol (HTTP) is an application protocol for distributed, collaborative, hypermedia information systems. HTTP is the foundation of data communication for the World Wide Web.

**HTTPS:** Hypertext Transfer Protocol Secure (HTTPS) is a combination of Hypertext Transfer Protocol (HTTP) with SSL/TLS protocol. It provides encrypted communication and secure identification of a network web server.

**TFTP:** Trivial File Transfer Protocol (TFTP) is a simple protocol to transfer files. It has been implemented on top of the User Datagram Protocol (UDP) using port number 69.

AES: Advanced Encryption Standard (AES) is a specification for the encryption of electronic data.

**URL:** A uniform resource locator or universal resource locator (URL) is a specific character string that constitutes a reference to an Internet resource.

**XML:** Extensible Markup Language (XML) is a markup language that defines a set of rules for encoding documents in a format that is both human-readable and machine-readable.

# **Appendix**

### **Configuring an FTP Server**

Wftpd and FileZilla are free FTP application software for Windows. This section mainly provides instructions on how to configure an FTP server using wftpd for Windows. You can download wftpd online: http://www.wftpd.com/products/products.html or FileZilla online: https://filezilla-project.org.

We recommend that you use vsftpd as an FTP server for Linux platform if required.

### **Preparing a Root Directory**

#### To prepare a root directory:

- 1. Create an FTP root directory on the local system (e.g., D:\FTP Directory).
- 2. Place the boot files and configuration files to this root directory.
- 3. Set the security permissions for the FTP directory folder.

You need to define a user or group name, and set the permissions: read, write, and modify. Security permissions vary by organizations.

An example of configuration on the Windows platform is shown as below:

Administrators (VANS	TD80\Admini	strators)		^
2 Everyone				
🕵 Hill, James (jahill@my	servername	.com]		-
SYSTEM				~
<			>	
	-	\ <u>d</u> d	<u>R</u> emove	•
Permissions for Everyone		Allow	Deny	
Full Control				^
Modify				
Read & Execute		~		
List Folder Contents		~		
Read		<b>~</b>		
Write		<b>V</b>		
Consist Dermissions				~
For special permissions or f click Advanced.	or advanced	settings,	Advance	d

### **Configuring an FTP Server**

### To configure a wftpd server:

- **1.** Download the compressed file of the wftpd application to your local directory and extract it.
- 2. Double click the Wftpd.exe.

The dialogue box of how to register is shown as below:

How to Register	<b>—X</b> —
In an effort to reduce the number of emails I get that ask me "How do I register?", I'd just like to note that you can find this information by opening the "Help" menu, and selecting the option "Registering".	ОК
So that you don't think this is a nag, I've given you the option to disable this dialog below, but please only do that if you feel you can remember how to register.	
Okay, I understand that - don't show me this dialog again.	

3. Check the check box and click **OK** in the pop-up box.

The log file of the wftpd application is shown as below:

E:\desktop\1.FTP - WFTPD		
File Edit View Logging Messages Security	y Help	
# -001] 2015/3/20 17:39:16 Welcome to WFT # -001] 2015/3/20 17:39:16 The first address # -001] 2015/3/20 17:39:16 But you might be # -001] 2015/3/20 17:39:16 WFTPD is listeni # -001] 2015/3/20 17:39:16 WFTPD is listeni # -001] 2015/3/20 17:39:16 WFTPD is listeni # -001] 2015/3/20 17:39:16 WFTPD is listeni	assigned to your system is 127.0.0.1 reached at a number of other addresses. network administrators for the address that is ng on port 21, standard ftp diled by WM_ENDSESSION message	
# -001] 2015/3/20 17:39:16 Unregistered ver # -001] 2015/3/20 17:39:16 select the "Regis		,

### 4. Click Security->Users/rights.

E:\desktop\1.FTP - WFTPD			
File Edit View Logging Messa [# -001] 2015/3/20 17:39:16 Welc [# -001] 2015/3/20 17:39:16 The f	ome General	ig to all unused IP add ystem is 127.0.0.1	resses.
[# -001] 2015/3/20 17:39:16 But y [# -001] 2015/3/20 17:39:16 Chec	k witi Host/net	ér of other addresses. ors for the address that	t is reachable from the Intern
[# -001] 2015/3/20 17:39:16 WFTI [# -001] 2015/3/20 17:39:16 Progr	ram will be killed by WM_E		
I# -0011 201E/2/20 17:20:16 Upro.	aiotorod version - for instru	otione on registering	
[# -001] 2015/3/20 17:39:16 Unre [# -001] 2015/3/20 17:39:16 selec			
	ά the "Registering" option τ		0 users NUM //

5. Click New User.

User / Rights Se	curity Dialog	×
User Name: User default	default Done	]
New User	Delete         Change Pass           Restrict to home directory and below	
Home [	Browse	]
Help	Rig	hts >>

6. Enter a user name (e.g., test1) in the User Name field and then click OK.

User / Rigi	nts Securit	y Dialog					8
User Name User defau		default r	•	-	Done		
New Us	User Name	: test1		0 Car He	ncel	1	
He	elp				F	Rights :	>>>

 Enter the password of the user (e.g., test1) created above in the New Password and Verify Password field respectively, and then click OK.

User / Rigl	nts Security Dialog	83
User Name ⊤User test1	Change Password	
New Us	New Password:	]
Home	Verify Password:   ****** Help	
He	elp	Rights >>

8. Click Browse to locate the FTP root directory in your local system.

User / Rights S	ecurity Dialog		×
User Name: User test1	test1	•	Done
New User	Delete Delete	Change Pass directory and below	
Home	E:\DESKTOP\CON	FIGURATION FILE	Browse
Help			Rights>>

9. Click **Rights**>> and assign the desired permission for the user (e.g., test1) created above.

**10.** Check the check boxes of **Read**, **Create Files/Dirs**, **List Directories** and **Overwrite/Delete** to make sure the FTP user has the read and write permission.

User / Rights Se	curity Dialog		×
User Name: User test1	test1	•	Done
New User	Delete Restrict to ho	Change Pass me directory and below	
Home	E:\DESKTOP\C	ONFIGURATION FILE	Browse
Help Rights for user tes	t1		Rights<<
Directory: ×		Browse	e Remove
🔽 Read	directory * I Virectories	<ul> <li>✓ Create Files/Dirs</li> <li>✓ Overwrite/Delete</li> </ul>	

11. Click Done to save the settings and finish the configurations.

The server URL "ftp://username:password@IP/" (Here "IP" means the IP address of the provisioning server, "username" and "password" are the authentication for FTP download. For example, "ftp://test1:123456@10.3.6.234/") is where the IP phone downloads boot files and configuration files from.

Before configuring a wftpd server, ensure that no other FTP servers exist in your local system.

### **Configuring an HTTP Server**

This section provides instructions on how to configure an HTTP server using HFS tool. You can download the HFS software online: http://www.snapfiles.com/get/hfs.html.

### **Preparing a Root Directory**

#### To prepare a root directory:

- 1. Create an HTTP root directory on the local system (e.g., D:\HTTP Directory).
- 2. Place the boot files and configuration files to this root directory.
- 3. Set the security permissions for the HTTP directory folder.

You need to define a user or group name and set the permissions: read, write, and modify. Security permissions vary by organizations.

An example of configuration on the Windows platform is shown as below:

Administrators (VANSTD80\Administrators)     CREATOR OWNER				^
Everyone				
🕵 Hill, James (jahill@my	servername	.com]		-
SYSTEM				Y
<			>	
	_	\ <u>d</u> d	Bemove	9
Permissions for Everyone		Allow	Deny	
Full Control				^
Modify				
Read & Execute		~		
List Folder Contents		~		
Read				
Write		~		
Consist Dormissions				~
For special permissions or f click Advanced.	or advanced	settings,	Advance	d

# **Configuring an HTTP Server**

HFS tool is an executable application, so you don't need to install it.

### To configure an HTTP server:

**1.** Download the application file to your local directory, double click the **hfs.exe**.

The main configuration page is shown as below:

HFS ~ HTTP File Server 2.2f	Build 155	
🛃 Menu   📅 Port: 8080   🎎 You are in Expert mode	N2.	
Open in browser http://10.2.11.101:8080/		
	Top s	peed: 0.0 KB/s
Virtual File System	Log	
	17:23:24 Check update: no new versio	n
🗊 IP 📃 Filename	Status Speed Time left	%
Connections: 0 Out: 0.0 KB/s In: 0.0 KB/s Total Out: 0 B Tot	al In: 0 B VFS: 0 items	

2. Click Menu in the main page and select the IP address of the PC from IP address.

HFS ~ HTTP File Server 2.2f	Build 155
📕 Menu   📍 Port: 8080   🕵 You	are in Expert mode
+ Self Test Edit HTML template Other options	8080/ Top speed: 0.0 KB/s
Upload Start/Exit Virtual File System Limits Flash taskbutton Fingerprints Tray icons Virtual Start	stem Log 17:23:24 Check update: no new version
IP address       Accept connections on       Dynamic DNS updater       URL encoding       Updates       W Donatel	This IP address is used only for URL building         192.168.147.1         192.168.172.1         ✓ 102.11.101         ✓         Custom
Load file system Ctrl+O     Save file system Ctrl+S     Clear file system     Save options	Don't include port in URL Find external address Constantly search for better address
Help  Web links Uninstall HFS Webout	Filename 🔱 Status Speed Time left %
Switch OFF F4 Exit	
Connections: 0 Out: 0.0 KB/s In	: 0.0 KB/s Total Out: 0 B Total In: 0 B VFS: 0 items

The default HTTP port is 8080. You can also reset the HTTP port (make sure there is no port conflict).

🙀 HFS ~ HTTP File Server 2.2f	Build 155 🗆 🗉 🕱
🛓 Menu   🖑 Port: 8080   🎎 You are in Expert mode	
Open in browser http://10.2.11.101:8080/	
	Top speed: 0.0 KB/s
Virtual File System	Log
A / Port	17:23:24 Check update: no new version
Specify a port to accept connection, or leave empty to decide automatically.	
8088	
OK Cancel	
<u></u>	
	5
👔 IP 📃 Filename	i) Status Speed Time left %
Connections: 0 Out: 0.0 KB/s In: 0.0 KB/s Total Out: 0 B To	tal In: 0 B VFS: 0 items

**3.** Right click the  $\oint$  icon on the left of the main page, select **Add folder from disk** to add the HTTP Server root directory.

📾 HFS ~ HTTP File Server 2.2f	Build 155	- • •
🛃 Menu 🛛 🖑 Port: 8088 🛛 🅵 You are in Expert mode		
© Open in browser http://10.2.11.101:8088/		
	Te	op speed: 0.0 KB/s
Virtual File System Log		
Add files		
E 💋 Add folder from disk		
New empty folder Ins		
S New link		
Advanced +		
Copy URL address Ctrl+C		
🔗 Browse it F9		
Comment		
Bind root to real-folder		
👌 Set user/pass		
Sestrict access		
Customized realm		
<ul> <li>✓ Browsable</li> <li>✓ Archivable</li> </ul>		
the second disabled? ■		
Hide tree		
Auto-hide empty folders		
Hide file extention in listing	Speed Time left	%
Connections: 0 Out: 0.0 KB/s In: 0.0 KB/s Total Out: 0 B Total In: 0 B VFS: 55	51 items - not savec	H.

**4.** Locate the root directory from your local system.

📾 HFS ~ HTTP File Server 2.3 beta		Build 275		0	
🛃 Menu   🖑 Port: 80 🌱 👥 You are	in Easy mode				
Open in browser http://10.2.11.101:8088/ProvisioningDir/				Already i	n clipboard
Virtual File System		Log			
✓ / └──♡ ProvisioningDir					
🗊 IP address	🗖 File	Status	Speed	Time	Progress
Out: 0.0 KB/s In: 0.0 KB/s					

- Check the server URL (e.g., http://10.2.11.101:8088/ProvisioningDir) by clicking "Open in browser".
- 6. (Optional.) Right click the root directory name (e.g., ProvisioningDir), and then select **Set** user/pass....
- **7.** (Optional.) Enter the desired user name and password for the root directory in the corresponding fields and then click **OK**.

Insert the reques	ted user/pass	<b>-X</b> -
Username	123	
Password	*****	
Re-type password	*****	
		eset

Yealink IP phones also support the Hypertext Transfer Protocol with SSL/TLS (HTTPS) protocol for auto provisioning. HTTPS protocol provides the encrypted communication and secure identification. For more information on installing and configuring an Apache HTTPS Server, refer to the network resource.