



## IP Office Technical Tip

**Technical Tip No:** 026 Configuring IP Office and IP Endpoints  
across The Public Internet via Manager in a  
SoHO environment  
**Date:** 3<sup>rd</sup> February 2004

<b>Product:</b> IP Office	<b>Version:</b> 2.0(x)
<b>Revision:</b> 1.0	<b>Date:</b> 22 <sup>nd</sup> January 2004

Issue
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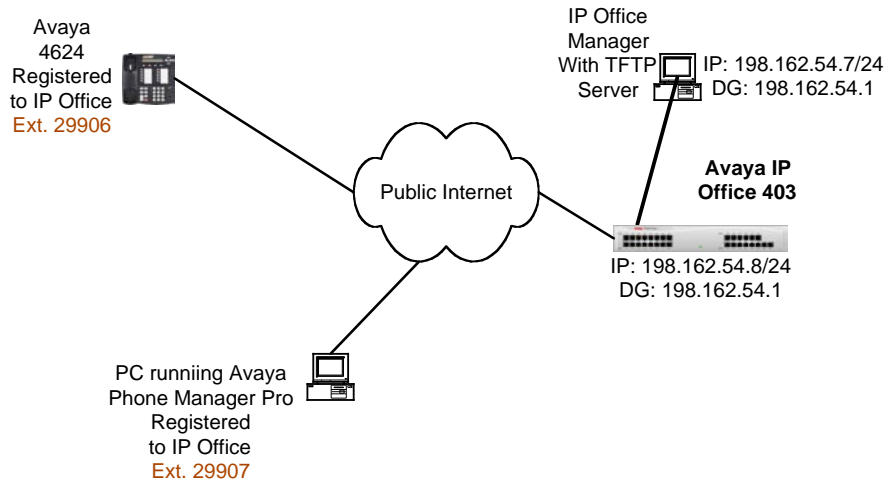
Avaya SMBS Technical Support has been receiving requests from the field on using Manger to configure an Avaya™ IP Office and Avaya™ Telephone Endpoints over The Public Internet.

This Technical Tip describes how to configure an Avaya™ IP Telephone endpoint to register to an Avaya™ IP Office over the public Internet in a static, small office/home office environment, where the emphasis is on ease of setup. Additionally, appropriate conditions are described where Internet Access would work.

### 1. Introduction

This Technical Tip describes how to configure an Avaya™ IP Telephone endpoint to register to an Avaya™ IP Office over the public Internet in a static, small office/home office environment, where the emphasis is on ease of setup. Additionally, appropriate conditions are described where Internet Access would work.

In **Figure 1**, an Avaya IP Office and an Avaya™ Telephone Endpoint connect to each other via the Public Internet.



**Figure 1: The Public Internet**

## 2. Scope

In order for a successful deployment of IP Telephony over the public Internet to occur, certain factors are assumed. These factors are:

- This Technical Tip assumes that the technician has some basic IP Office experience and knows how to operate Manager, connect to the IP Office via Manager, and set up a basic IP telephone extension and user profile. The technician should also understand which IP Office licenses are required for IP Office IP Endpoints and Phone Manager Pro Users. These notes primary focus is to deal with issues regarding connecting users over the public Internet.
- The configuration provided is the most simple configuration possible. If scalability is at issue, an alternate configuration may be necessary, as this configuration makes no attempt to conserve Public IP addresses, nor does it prepare the customer network for future concerns, like the embedded firewall access features and network encryption features.
- The Internet Service provider (ISP) has handed off to the customer an Internet connection at both the office that contains the IP Office (head office) and the office that contains the remote Avaya IP Telephone (remote office). All contracts for the ISP are the responsibility of the customer.
- For both the head office and the remote office, the connection is via a DSL service or Cable modem service. Generally, from the point of view of the IP

Office, these two services are handled in much the same manner, where they both have a physical Ethernet connection. For the Ethernet connection to the ISP, there are two types of Ethernet protocols involved. One type of service is known as a standard Ethernet service. This service is usually more costly, but allows many types of devices that support Ethernet to connect to the Internet. The other service is known as PPP over Ethernet (or simply PPPoE). This is a service that is less costly and is limited in its capabilities. PPPoE is designed to restrict the number of users that can connect to the ISP. PPPoE is used by many broadband service providers to allow authentication and maintain the familiar "dial-up experience" when connecting to the Internet via a PC through a broadband modem. Note, however, that not all broadband service providers use PPPoE.

- For PPPoE, please note the following:
  - IP Office does not support PPPoE.
  - Avaya IP Telephony Endpoints do not support PPPoE.
  - Avaya IP Telephony Softphone Endpoints, such as Avaya™ PhoneManager Pro, may support PPPoE endpoints. The support is dependent on whether the PPPoE drivers are configured in the Customer's PC and that the customer's PC has authenticated to the ISP.
  - A detailed description of PPPoE is out of the scope of this document. If necessary, the customer should contact the ISP to learn how to configure PPPoE on his PC.
- Dynamic Host Configuration Protocol (DHCP) is a service that is provided by a computer over the network. It is not uncommon for the ISP to perform this service. DHCP will provide a client PC or Internet device with an IP address, subnet mask, and a default gateway. The subnet mask and default gateway is always the same, however the IP address may be different from time to time.
- Network Address Translation (NAT) is a method to conserve the global IP addressing pool for the purpose of browsing the Internet. A group of common, non-routable IP addresses are assigned to the customer. These addresses are one-way addresses. This means that the customer can access the Internet, but connections from the Internet cannot directly contact customer.
- For the IP Office in the head office, the IP information from the ISP must consist of a unique, public, static IP address, subnet mask, and a default gateway address. A NATed address is not supported and an address supplied via a DHCP server is not recommended as the IP address can change from time to time. It is the customer's responsibility to contact the ISP and ask for this environment.

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- Additionally, a separate unique static IP address must be supplied to the PC that is running the IP Office Manager application that resides at the head office. IP Office Manager contains a TFTP server, whose job is to keep the IP telephones updated with the most recent software images. IP Office manager is expected to be on the same subnet as the IP Office.
- The IP Office has the ability to connect to the Public Internet via a T1, E1, or frame relay connection, but describing the configuration of these interfaces is out of the scope of this document.
- For the remote office, the IP information from the ISP must consist of a unique, public IP address, subnet mask, and a default gateway address. A NATed address is not supported. However an address assigned by a DHCP server can be supported. It is the customer's responsibility to contact the ISP and ask for this environment.
- An analog modem connection, for the purpose and examples within this document, although may work in some circumstances, is not supported by Avaya SMBS Technical Support and is not described here.
- In all situations, Quality of Service (QoS) is a feature that helps to ensure the quality of a voice conversation. Some ISPs may support QoS in some limited fashion, although, many do not. The customer should ask the ISP for a Service Level Agreement (SLA) that will prioritize the customer's traffic. Without QoS, the customer can experience voice quality problems during peak usage of the provider's network infrastructure. These voice quality problems include a perceived echo, delay, or "clipping" where speech intermittently drops. Also, Avaya Telephone Endpoints may reset under heavy network congestion situations.
- Generally, when communicating via the Voice over Internet Protocol (VoIP), the information is encoded to from analog signals to digital signals via a chip known as a codec. The term, *codec* stands for Coder/Decoder. The two most popular types of codecs are G.711 and G.729A. The G.711 codec uses more bandwidth over Ethernet (It uses about 90 Kbps verses 40 Kbps for the G.729A, assuming a 20ms sample rate), however, from a user point of view, calls sound only slightly clearer than the G.729A codec. In reality, few people could tell the difference. If end-to-end bandwidth is not guaranteed (as it usually isn't for the Internet), then Avaya recommends trying the G.729A codec first, as it represents the best compromise between voice quality and bandwidth utilization.
- If it is determined that a customer has a NATed environment at one end, the customer, can still use the connection, however, additional equipment will be

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required, such as the Avaya™ Security Gateway 200 and Avaya™ VPNremote. Descriptions on how to circumvent NATed environments are outside the scope of this document.

- Using IP Telephony over the public Internet without appropriate security and encryption has become an issue, however, describing how to secure phone conversations requires additional equipment and is not addressed in this document. It is the customer's responsibility for network security and Avaya shall in no way be held responsible for customer security issues. See Legal Disclaimer.
- Examples in this document are for the IP Office 403 Server, however, these Notes are relevant throughout the IP Office product line.
- The IP Telephone Endpoint used here is an Avaya™ 4624 IP Telephone, however, these Notes are relevant throughout the Avaya IP Telephone Endpoint product line supported on IP Office.
- The IP Softphone Endpoint used here is an Avaya™ Phone Manager Pro. Avaya™ Softphone, a product that emulates IP telephones for the Avaya™ Multivantage product line is not supported.

### 3. Equipment and Software Validated

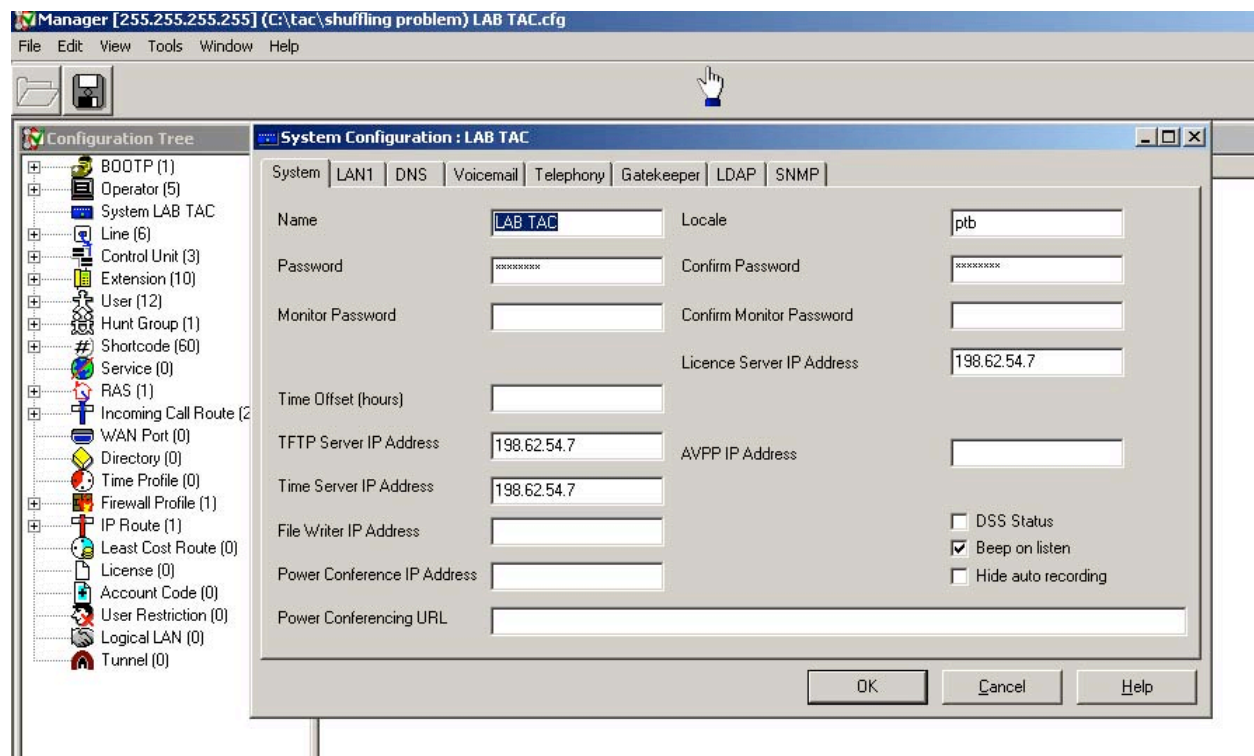
The following equipment and software were used for the sample configuration provided:

Equipment	Software
Avaya™ IP Office 403 Server	2.0
Avaya™ IP 4624 Telephone	1.81
Avaya™ Phone Manager Pro	2.0.7

Table A: Version Table

### 4. Configure IP Office

**Step 1:** Configure System Parameters In Manager, click on the **System** option and choose the **System** tab. For the fields, **TFTP Server IP Address**, **Time Server IP Address**, and **License Server IP Address**, enter the IP address of the PC that is running the IP Office Manager application.

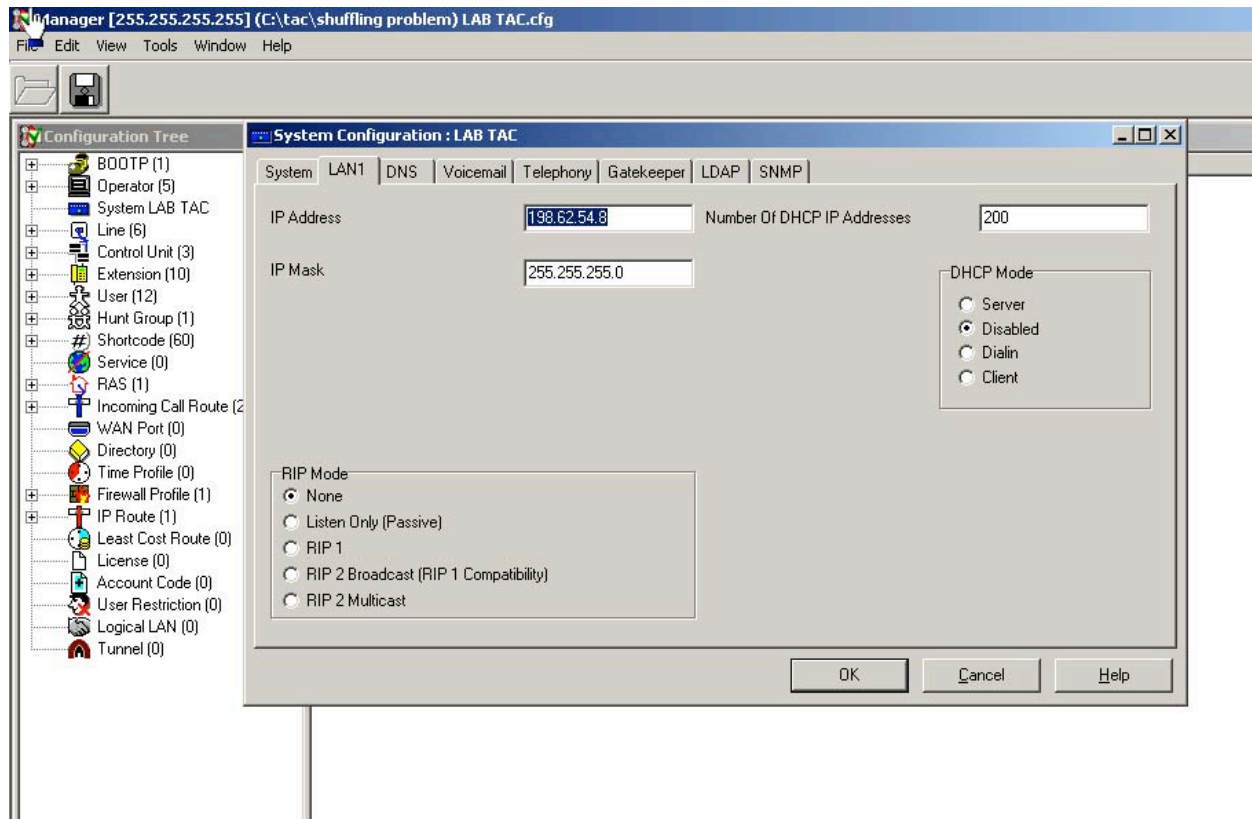


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**Step 2:** Verify Avaya IP Office IP Address as Public. In Manager, click on the **System** option and the **LAN1** tab. Look at the IP Address. If it falls in this range:

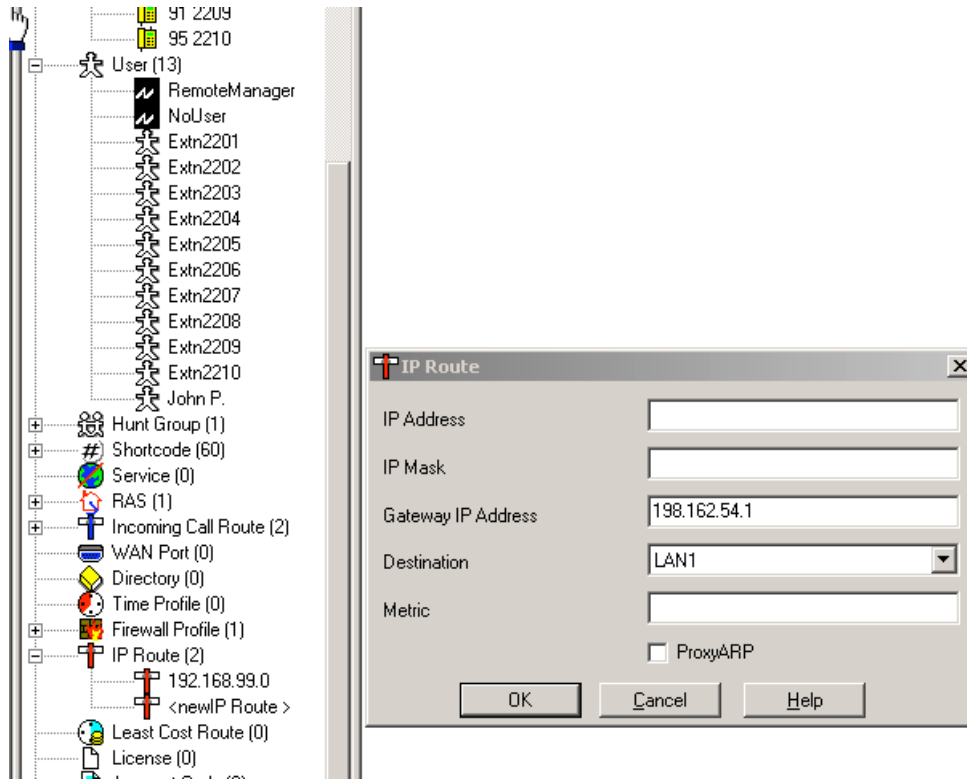
- 10.0.0.0 - 10.255.255.255 (10/8 prefix)
- 172.16.0.0 - 172.31.255.255 (172.16/12 prefix)
- 192.168.0.0 - 192.168.255.255 (192.168/16 prefix)

Then it is not a public address. Contact the ISP and ask for a permanent public address



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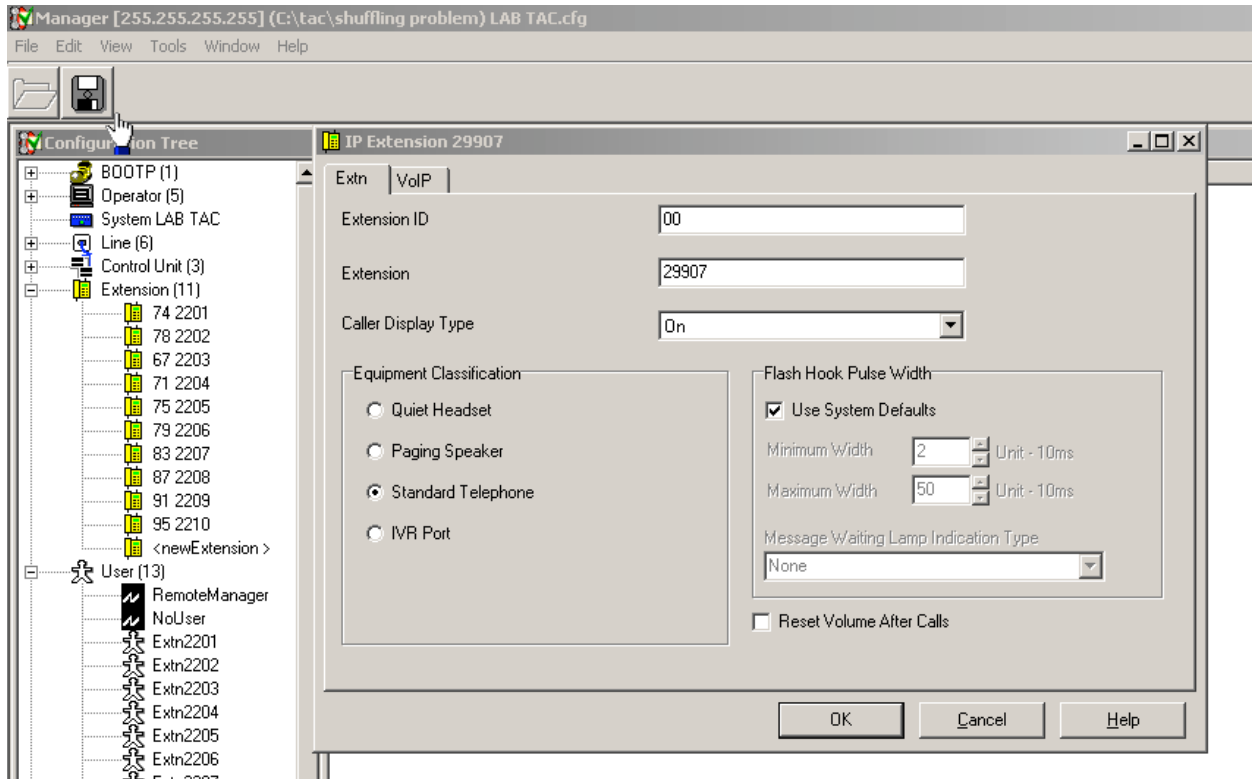
**Step 3:** Configure a Static Route Into the Internet. The ISP should have supplied the customer with a default gateway address. With this information, go to Manager and click on IP route. Add a new route. On the form leave the IP address and IP Mask fields blank, enter the IP address of the default gateway, and choose LAN1 in the Destination field. Click OK.



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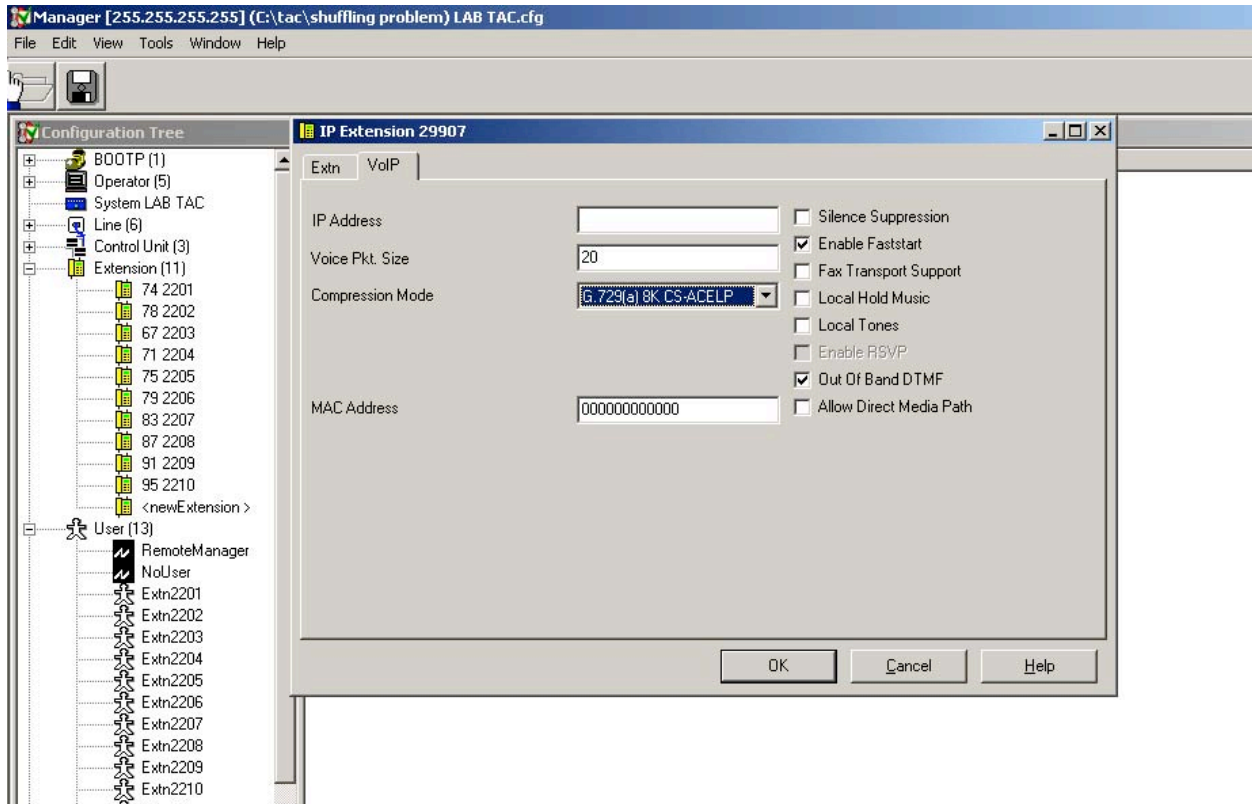


**Step 4:** Configure VoIP Extensions. Select Extension from IP Office Manager. Enter a new extension. Fill out the form



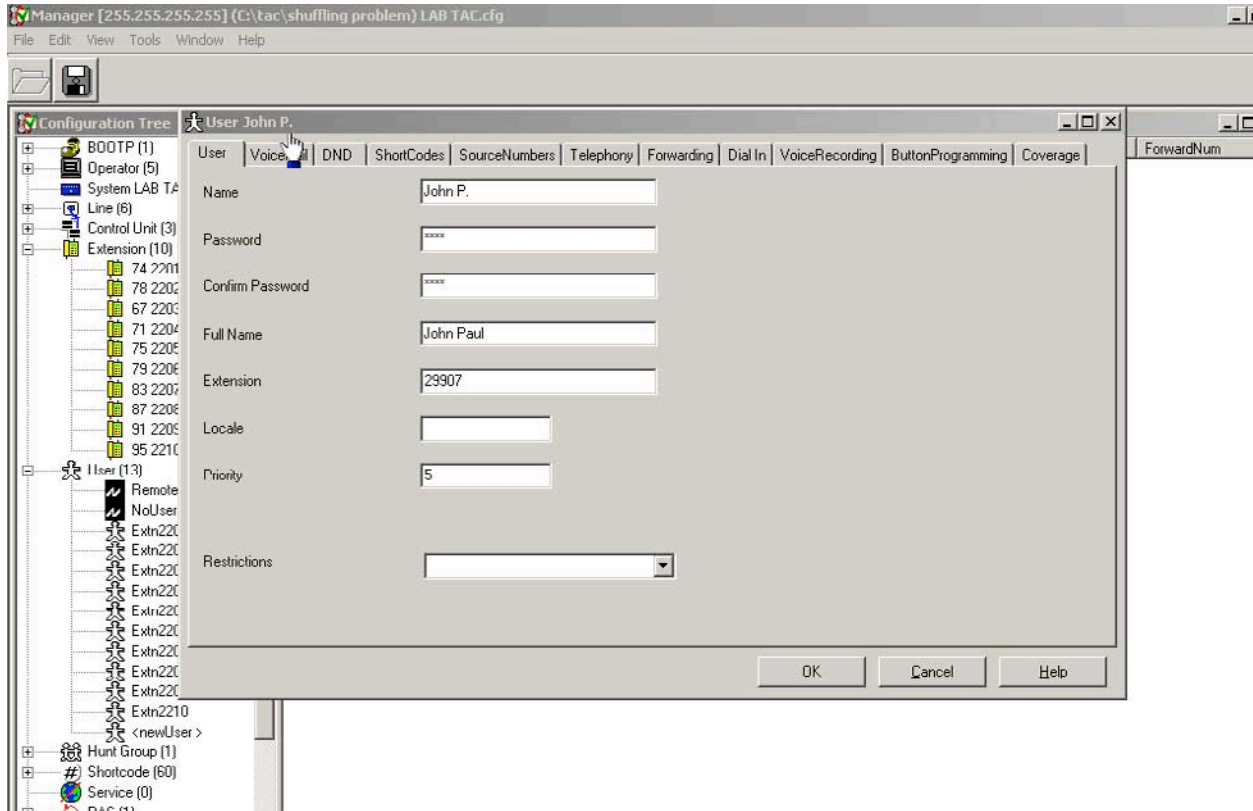
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**Step 5:** Select the **VoIP** tab. Enable **Faststart**, and **Out of band DTMF**. Do not enable **Direct Media Path**. Choose the **G.729A** codec.



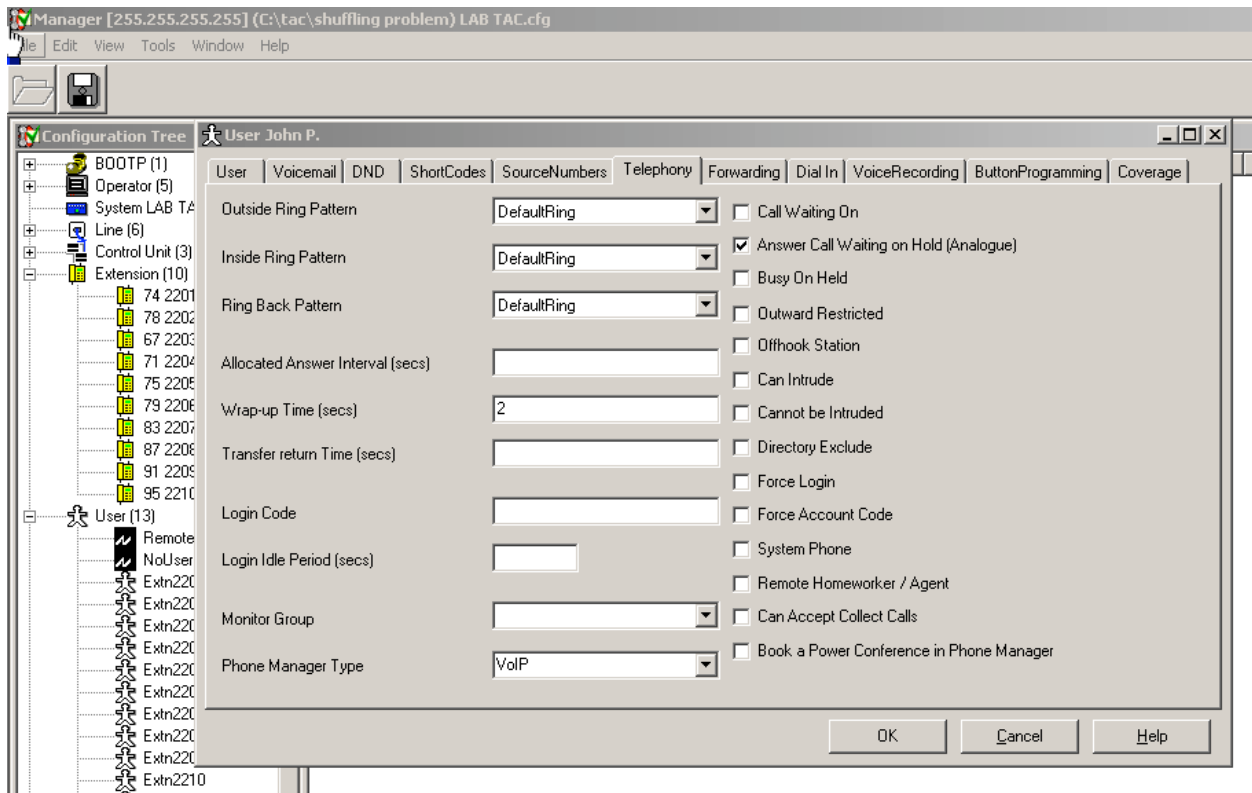
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**Step 6:** Configure VoIP Users. Click on users and add a new user. Fill out the name, full name, password and confirm password fields. Note that the Password and Confirm Password fields are not echoed back. Make note of the name and password, as you will need this information when configuring the IP Telephone Endpoints. Enter the extension that matches the extension in the prior step.



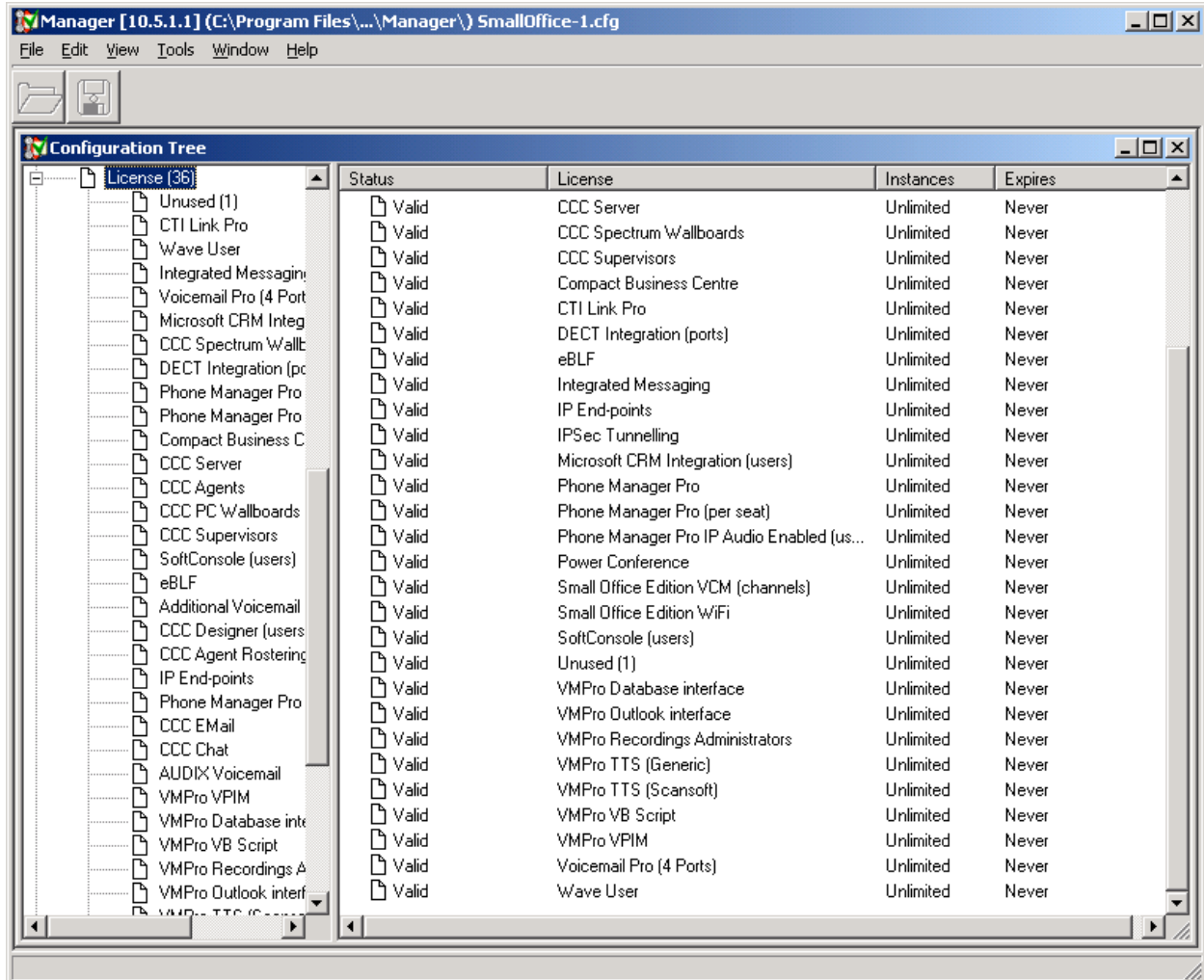
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**Step 7:** Click on the **Telephony** tab. If the extension is to be used by an IP telephone such as a 4624, then choose “Lite” for the Phone manager type. If the extension is to be an Avaya Phone Manager Pro type Softphone extension then choose “VoIP”. In this example, this extension will be used for Avaya Phone Manager Pro.



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**Step 8:** Configure Licenses. Click on the License button and add licenses for IP Endpoints and Phone Manager Pro.



**Step 9:** Save and Reboot. Click on the save button and reboot the Avaya IP Office in order to take advantage of the new settings.

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## 5. Configuring Avaya IP Telephone Endpoint

### 5.1. Configuring Avaya IP 4624 Telephone

Prior to configuring the IP telephone, the technician should have set up a VoIP extension and user profile for this telephone and has verified that the IP Office has all required licenses

The ISP should provide the customer with a public IP Address Subnet Mask and Default Gateway address. If the ISP claims that this is automatic (via DHCP) then only the IP address of the IP Office and the IP address of the TFTP server is required.

Perform the following:

**Step 1:** Plug the Phone in. After loading software, the phone will display a DHCP request message with a timer indicator. If this timer indicator counts past 40 seconds, usually this means that no IP DCHP information has been received. This could mean that there is no DHCP server. Press the \* key to manually program the information. If this is the case, then go to **Step 3**.

**Step 2:** If there were a DHCP Server, the IP telephone would have received its IP address, subnet mask, and default gateway from the ISP. However, it still needs the IP address of the TFTP server and IP address of the IP Office. The IP telephone will show it's displeasure by displaying the following message:

No FileSv Address  
\* to Program

**Step 3:** Press the \* key now. The phone will display:  
Phone=198.168.47.5  
New=

**Step 4:** This is the IP address that it has received from the DHCP Server. If it is 0.0.0.0, then there is no DHCP service, and the ISP must supply the IP address. If the IP address falls in the following ranges:

10.0.0.0 - 10.255.255.255 (10/8 prefix)  
172.16.0.0 - 172.31.255.255 (172.16/12 prefix)  
192.168.0.0 - 192.168.255.255 (192.168/16 prefix)

Then it is not a public address. Contact the ISP and ask for a public address

**Step 5:** Press the # key to accept this address.

**Step 6:** The phone will now display:  
CallSv=0.0.0.0  
New=

**Step 7:** Change this to the address of the IP Office. This is the address that was entered into the **LAN1** field of the IP Office Manager screen. To enter the decimal, press the \* key. Press the # key when finished.

**Step 8:** The phone will now display:  
CallSvPort=1719  
New=

**Step 9:** Leave this setting as is. Press # to continue.

**Step 10:** The phone will now display:  
Router=198.168.47.1  
New=

**Step 11:** This information has been provided by the ISP's DHCP server. Leave as is and press # to continue. If it is 0.0.0.0, then it must be manually entered. To enter the decimal, press \* key. Press # to continue.

**Step 12:** The phone will now display:  
Mask=255.255.255.252  
New=

**Step 13:** This information has been provided by the ISP's DHCP server. Leave as is and press # to continue. If it is 0.0.0.0, then it must be manually entered. To enter the decimal, press \* key. Press # to continue.

**Step 14:** The phone will now display:  
FileSv=0.0.0.0  
New=

**Step 15:** Enter the IP address of the IP Office Manager PC. To enter the decimal, press \* key. Press # when finished.

**Step 16:** The phone will now display:  
802.1Q = Auto  
\* = Change # = OK

**Step 17:** Press \* until the display reads 802.1Q = Off. Then press # to continue.

**Step 18:** The phone will now display:

Vlan ID=0  
New=

**Step 19:** Leave this setting as is. Press # to continue.

**Step 20:** The phone will now display:  
Save New Values?  
\* = No           # = Yes

**Step 21:** Press # when finished. The phone will now cycle through and request a DHCP address over again. When finished, this time the phone will ask for an extension (EXT). Enter the extension of the phone and press the # when finished. This information should have been configured in IP Office Manager prior to configuration.

**Step 22:** After the extension is entered, the phone will now ask for a password. Enter the password and press # when finished. Note that the password is not echoed on the screen. Instead, asterisks (\*) are shown for each digit entered. This information should have been configured in IP Office Manager prior to configuration.

**Step 23:** The phone is now configured on the Internet and registered to the IP Office. The customer is now ready to use the phone.

## 5.2. Configuring Avaya Phone Manager Pro Softphone

Prior to configuring the Avaya Phone Manager Pro Softphone, the technician should have set up a VoIP extension and user profile for this telephone and has verified that the IP Office has all relevant licenses

The customer should have a PC with a sound card with headset and microphone already connected to the Internet. The technician should verify that the PC is working correctly. An example would be if the customer could browse the Internet. In addition the customer should be able to demonstrate that the PC sound card is working correctly by playing a sound file (.wav) through the headset. Furthermore, the customer should be able to demonstrate that the microphone is working correctly by launching the sound recorder application (under programs→accessories→entertainment), where he can record his voice and play it back through the headset.

Finally, the technician should confirm that the IP address of the PC is a public address and not a NATed address. The customer should launch a command window and type "ipconfig". The IP address of the PC will be displayed. If address falls in the following range:

10.0.0.0 - 10.255.255.255 (10/8 prefix)  
172.16.0.0 - 172.31.255.255 (172.16/12 prefix)

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192.168.0.0 - 192.168.255.255 (192.168/16 prefix)

Then it is not a public address. Contact the ISP and ask for a public address

If the above steps check out, then follow the directions for installing Avaya Phone Manager Pro.

After installation is complete, launch Avaya Phone Manager Pro. Click on **Configure** and select **PBX**.

Enter the address of the **LAN1** IP address of the IP Office in the **PBX Address** box. Avaya Phone Manager Pro will immediately populate the **Username** drop down box with a list of users. Choose the appropriate user and enter its associated password that was previously configured on the IP Office User screen. Click on the Login button when ready.

## 6. Conclusion

After completing the configurations as described above, the IP telephones should correctly register to the Avaya IP Office over the public Internet and phone calls can be executed.

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