Elastix Unified Communications Server Cookbook

Elastix brings together the most useful tools and features from the Unified Communications and Open Source worlds: IP-PBX, Chat, Call Center, Multisite, Video, and so on, in a modular way. Beginning with installation and gaining an in-depth understanding of the internal workings of Elastix, you will soon dive into the core features of Elastix and VoIP and Unified Communications to enable a full cost-effective Unified Communications server solution. You will explore the configuration of IP-PBX features, control call routes and destinations, and troubleshoot the unified communications software. Finish by going that extra mile and securing your server and implement advanced dialplan functions.

What this book will do for you...

- Understand basic PBX configuration
- Explore the internal PBX options, configuration, and call control
- Set up e-mail and fax services
- Discover how to use the call center module
- Troubleshoot your Elastix Unified Communications Server
- Configure networking and multisites with Elastix Unified Communications Server
- Secure your Elastix Unified Communications Server
- Implement advanced dialplan functions

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Inside the Cookbook...

- A straightforward and easy-to-follow format
- A selection of the most important tasks and problems
- Carefully organized instructions for solving the problem efficiently
- Clear explanations of what you did
- Apply the solution to other situations

Quick answers to common problems

Elastix Unified Communications Server Cookbook

More than 140 real-life, hands-on recipes and tips to install, deploy, administer, and maintain any VoIP/Unified Communications solution based on Elastix

In this package, you will find:

- The author biography
- A preview chapter from the book, Chapter 1 'Installing Elastix'
- A synopsis of the book’s content
- More information on *Elastix Unified Communications Server Cookbook*

**About the Author**

**Gerardo Barajas Puente** is an electrical and electronics engineer with more than 10 years of experience in the VoIP/ToIP field. He is currently employed as a CTO for Neocenter S.A. de C.V., a well-known value-added VoIP distributor in Mexico, Central and South America, and the United States. He has a strong background in signal processing, information security, and VoIP telephony. He has progressed in his career by supporting, testing, designing, and managing VoIP applications and platforms for a wide range of scenarios, such as call centers, corporate offices, multiple-site systems, and so on. He has also done some development (programming) of VoIP solutions with Asterisk, Elastix, and FreePBX with the help of the PHP, Perl, and XML languages. He is one of the first Elastix certified engineers and has spoken twice at Elastix World.
Elastix Unified Communications
Server Cookbook

The main objective of this book is to give you all the necessary tools to configure and support an Elastix Unified Communications Server. We will look at these tools through Cookbook recipes, just follow the steps to get an Elastix System up and running.

Although a good Linux and Asterisk background is required, this book is structured to help you grow from a beginner to an advanced user.

We would like to consider this book as introductory documentation for the journey to becoming a guru in the field of unified communications.

Introduction to the Elastix Unified Communications Server

There is a revolution going on in the field of telecommunication these days. The world is getting smaller, the bandwidth is growing, and the protocols are becoming increasingly standardized, open, and stable.

In 1999, Mark Spencer began a very important project, Asterisk PBX. The advantages of open source licensing allowed this project to grow and develop features that were unachievable with traditional telephony devices at very competitive prices.

Nowadays, enterprises are not just looking for telephone solutions (PBX) anymore. They are looking for integral, complete, and "out-of-the box" solutions that allow them to be as productive as possible. They want to keep their coworkers connected, reachable, and available at all times. If a CTO calls any coworker and the call cannot be answered because the person is at the lobby receiving a customer, it will be routed to that coworker's cell phone, which happens to have a SIP client registered to the PBX using the wireless LAN of the building.

The cost of such a call is almost 0 USD, and even if that coworker does not answer their cell phone, the call can be sent to a voicemail. The voicemail system can send the voice message as an e-mail, and when this person arrives in the office, the message waiting indicator LED on their phone tells them that they have a voice message.
What This Book Covers

Chapter 1, *Installing Elastix*, covers basic recipes for installing Elastix.

Chapter 2, *Basic PBX Configuration*, demonstrates the processes for creating extensions, configuring telephony cards, setting an IVR, and controlling incoming and outgoing calls in a simple way.

Chapter 3, *Understanding Inbound Call Control*, explains how to get deeper into the IP-PBX features to give the installed solution.

Chapter 4, *Knowing Internal PBX Options and Configurations*, contains recipes used to configure the language of the recordings (or phrases) the Elastix Unified Communications Server displays, create conference bridges, restrict calls, add miscellaneous destinations and applications, and so on.

Chapter 5, *Setting up the E-mail Service*, assists you to set up the Elastix Unified Communications Server as an e-mail server.

Chapter 6, *Elastix Fax System*, explains that although the use of faxes is decreasing, there are situations (especially in communication with banks or government offices) in which it is necessary to send and receive faxes. This chapter is dedicated to this feature.

Chapter 7, *Using the Call Center Module*, shows one of Palo Santo's best contributions to the world of open source telephony, which is an open source call center module. In this chapter, you will be guided through the process of installing and configuring this feature.

Chapter 8, *Going Deeper into Unified Communications*, tells you how you can learn more about Unified Communications. This chapter includes recipes for configuring instant messaging, integration with a CRM and Outlook, video calls, and so on.

Chapter 9, *Networking with Elastix*, proves that one of Elastix's strengths is connecting remote sites and extensions by integrating the dialplan.

Chapter 10, *Knowing the State of Your Elastix System and Troubleshooting*, tells us when debugging and troubleshooting any situation in our system is necessary. The topics of billing and reporting are also discussed.

Chapter 11, *Securing Your Elastix System*, shows us that any IP device the Elastix Unified Communications Server can be targeted to be attacked in many ways, from denial-of-service attacks to telephone frauds, and when creating a backup of our solution, this chapter is helpful.

Chapter 12, *Implementing Advanced Dialplan Functions*, shows advanced features that are not included by default in our Elastix system and are very attractive to some enterprise levels, such as an IVR that retrieves information from a database.
Finally, we will discuss some important topics in the appendices, as follows:

*Appendix A, Description and Use of the Most Well-known Free-PBX Modules*, tells us about the contributions of third-party modules to the FreePBX community.

*Appendix B, Addon Market Module*, covers more of the programs certified by Palo Santo Solutions.

*Appendix C, Asterisk Essential Commands*, shows the most used commands available in Asterisk’s command-line interface.

*Appendix D, Asterisk Gateway Interface Programming*, gives more in-depth information on the commands and information passed between Asterisk and any AGI.

*Appendix E, Helpful Linux Commands*, lists the most used Linux Commands for managing an Elastix Unified Communications system.
The topics covered in this chapter are:

- Installing Elastix Unified Communications Server software
- Inserting the CD-ROM in the desired server or host
- Choosing the system language
- Choosing the keyboard type
- Partitioning the hard disk
- Configuring the network interfaces
- Selecting a proper time zone
- Entering the password for the user root
- Logging into the system for the first time

**Introduction to Elastix Unified Communications System**

There is a revolution going on in the telecommunications field these days. The world is getting smaller, bandwidth is growing, and protocols are getting increasingly standardised, open, and stable.

It was in 1999 when Mark Spencer began a very important project: Asterisk PBX. The advantages of open source licensing allowed this project to develop features unachievable using traditional telephony devices, at very competitive prices.
Installing Elastix

Nowadays, enterprises are not merely looking for telephonic solutions (PBX) anymore; they are looking for integrated, complete, and out-of-the-box solutions that allow them to be as productive as possible. They want to keep their co-workers connected, reachable, and available at all times. If a CTO calls any coworker and the call is not answered, because the person was at the lobby receiving a customer, it will be routed to this coworker's cellular phone, which happens to have a Session Initiation Protocol (SIP) client registered to the PBX using the wireless LAN of the building.

The cost of this call is almost $0. However, if this coworker does not answer his cell phone, this call can be forwarded to a voicemail. The Voicemail System can send the voice message to an e-mail and when this person arrives at the office, he will have the "message waiting" indicator LED on his phone notifying him that he has a voice message.

Elastix’s brief history

We all know that Asterisk runs on Linux and has gained so much attention that it has made system administrators, integrators, developers, and tech-savvy individuals see a big opportunity in business, but sometimes their knowledge of Linux is limited. This has led to projects such as FreePBX, Trixbox, AsteriskNOW, Elastix, and PBX in a Flash that fulfill the need to configure and administer Asterisk PBX without being a Linux expert.

However, Edgar and José Landívar of Palosanto Solutions went far beyond this. In March 2006, they released the first version of Elastix. This first version was only a visual reporting tool, and by December 2006, Elastix was officially released as a Unified Communications suite using Linux CentOS as the operating system.

The project began to gain attention because all the communications software was completely integrated and available with the PBX engine. There was no need to recompile the fax system, for example. You just had to configure it. There was no need to recompile the drivers for a public switched telephone network (PSTN) card. You only had to install it physically on your server (or PC), Web-GUI would detect the card, and you would be able to configure it as well.

In many Latin American countries, digital E1 telephony lines use a very old and limited protocol called Multi-Frequency Compelled R2 (MFC/R2 or just R2). In order to make this kind of telephony lines and cards support MFC/R2 for Asterisk, there is a module from an abstraction layer called Unicall (by Steve Underwood) that must be downloaded and compiled; after this patch, Asterisk has to be recompiled. This situation was very stressful for many aficionados. However, thanks to Palosanto Solution’s view, since the first release of Elastix, this library has been compiled and installed. Users just needed to configure all the parameters to have their R2 E1 lines work with Asterisk.
Later, with the help of Moisés Silva (the creator of the Openr2:MFC/R2 signaling library), the support for MFC/R2 protocol was much easier. Providing support for the Spanish language gave Elastix a big advantage over other open source telephony distributions. This innovative "vision" has made this project very important these days in the open source telephony solutions community. Today, Palosanto Solutions have achieved a long list of awards and more than one million downloads.

**What is Elastix?**

Elastix is an **open source unified communications platform** that uses Community Enterprise Operating System Linux(CentOS) as the operating system. The best way to describe Elastix is with the following diagram:

As you can see, the elements involved in Elastix's architecture allow any user or enterprise to use the PBX as a gateway to the PSTN, and incorporate many other tools, programs, and elements to communicate in a more efficient way.

For example, users can receive a fax in their e-mail account, or they can have remote extensions in order to integrate all office branches and use them as a single entity to reduce call costs.

Users can also start video calls and video conferences by using their own devices such as cell phones and tablets.
Installing Elastix

Features list

Elastix’s main features can be grouped in general as IP-PBX, fax, e-mail, collaboration, and messaging features. The following sections list these features, among others.

General features

The following table lists Elastix’s general features:

<table>
<thead>
<tr>
<th>General Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Online embedded help</td>
</tr>
<tr>
<td>Voicemail</td>
</tr>
<tr>
<td>System resources monitor</td>
</tr>
<tr>
<td>Network configuration tool</td>
</tr>
<tr>
<td>Server shutdown from the web GUI</td>
</tr>
<tr>
<td>Access control to the interface based on Access control lists (ACL)</td>
</tr>
<tr>
<td>Backs up on an FTP server</td>
</tr>
<tr>
<td>Heartbeat module</td>
</tr>
<tr>
<td>Elastix modules and RPMs</td>
</tr>
<tr>
<td>DHCP client list module</td>
</tr>
<tr>
<td>Automatic backup restore</td>
</tr>
<tr>
<td>Backup restore validation</td>
</tr>
<tr>
<td>DHCP assigned by MAC</td>
</tr>
</tbody>
</table>

IP-PBX main features

The following table lists Elastix’s telephony features:

<table>
<thead>
<tr>
<th>Telephony Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Call recording</td>
</tr>
<tr>
<td>Voicemail</td>
</tr>
</tbody>
</table>
## Telephony Features

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flexible and configurable <strong>Interactive voice response</strong> (IVR)</td>
<td>Support for analog interfaces as <strong>Foreign eXchange Subscriber (FXS)</strong> / <strong>Foreign eXchange Office (FXO)</strong>, (PSTN/POTS)</td>
</tr>
<tr>
<td>Voice synthesis support</td>
<td>Support for digital interfaces (E1/T1/J1) through PRI/BRI/R2 protocols</td>
</tr>
<tr>
<td>IP terminal batch configuration tool</td>
<td>Caller ID</td>
</tr>
<tr>
<td>Integrated echo canceler by software</td>
<td>Multiple trunk support</td>
</tr>
<tr>
<td>Endpoint configurator</td>
<td>Incoming and outgoing routes with support for dial pattern matching</td>
</tr>
<tr>
<td>Support for videophones</td>
<td>Support for follow-me</td>
</tr>
<tr>
<td>Hardware detection interface</td>
<td>Support for ring groups</td>
</tr>
<tr>
<td>DHCP server for dynamic IP</td>
<td>Support for paging and intercom</td>
</tr>
<tr>
<td>Web-based operator panel</td>
<td>Support for time conditions</td>
</tr>
<tr>
<td>Call parking</td>
<td>Support for PIN sets</td>
</tr>
<tr>
<td><strong>Call detail record</strong> <em>(CDR)</em> report</td>
<td>Direct Inward System Access <em>(DISA)</em></td>
</tr>
<tr>
<td>Billing and consumption report</td>
<td>Callback support</td>
</tr>
<tr>
<td>Channel usage reports</td>
<td>Support for Bluetooth interfaces through cellphones <em>(chan_mobile)</em></td>
</tr>
<tr>
<td>Support for call queues</td>
<td><strong>Elastix Operator Panel</strong> <em>(EOP)</em></td>
</tr>
<tr>
<td>Distributed dialplan with Dundi</td>
<td>VoIP provider configuration</td>
</tr>
<tr>
<td>Support for softphones</td>
<td>Virtual conference rooms</td>
</tr>
<tr>
<td>PBX interconnection</td>
<td>Least cost routing</td>
</tr>
</tbody>
</table>

### Fax features

The following table lists all the features related to fax:

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fax server based on HylaFAX</td>
<td>Fax-to-e-mail customization</td>
</tr>
<tr>
<td>Fax visor with downloaded PDFs</td>
<td>Access control for fax clients</td>
</tr>
<tr>
<td>Fax-to-e-mail application</td>
<td>Can be integrated with Winprint HylaFAX</td>
</tr>
<tr>
<td>SendFax module - fax sent through web interface</td>
<td></td>
</tr>
</tbody>
</table>
Installing Elastix

**Collaboration features**
The following table lists the collaboration-related features:

<table>
<thead>
<tr>
<th>Feature</th>
<th>Feature</th>
</tr>
</thead>
<tbody>
<tr>
<td>PBX-integrated calendar with support for voice notifications</td>
<td>Web conference</td>
</tr>
<tr>
<td>Phonebook with click-to-dial capabilities</td>
<td>Calendar module</td>
</tr>
<tr>
<td>Integrated Customer relationship management (CRM) to VTiger CRM</td>
<td>Billing support with A2Billing</td>
</tr>
<tr>
<td>Extension roaming</td>
<td></td>
</tr>
</tbody>
</table>

**Instant messaging**
The following table lists all the features related to instant messaging:

<table>
<thead>
<tr>
<th>Feature</th>
<th>Feature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Openfire instant messaging server</td>
<td>User session reports</td>
</tr>
<tr>
<td>IM client-initiated calls</td>
<td>Jabber support</td>
</tr>
<tr>
<td>Web-based management for IM server</td>
<td>Plugin support</td>
</tr>
<tr>
<td>IM group support</td>
<td>Lightweight Directory Access Protocol (LDAP) support</td>
</tr>
<tr>
<td>Support for other IM gateways like MSN, Yahoo Messenger, GTalk, and ICQ</td>
<td>Server-to-server support</td>
</tr>
</tbody>
</table>

**E-mail**
The following points list all the e-mail related features:

- Mail server with multi-domain support
- Web-based management
- Support for mail relay
- Web-based email client
- Support for quotas
- Anti-spam support
- Based in Postfix for high email volume
Installing Elastix Unified Communications Server software

Elastix Unified Communications Server's operating system is CentOS Linux. To install it, we need a PC or server and a bootable CD-ROM with Elastix Unified Communications System. The most common installation process is via CD-ROM. However, it is possible to install Elastix by using a USB device or virtualization software. For the purposes of this book, we will be working with Elastix Stable Release 2.5.0, which can be downloaded from www.elastix.org.

Depending on the hardware specifications, we have to choose between a 32-bit and a 64-bit distribution. Considering that 32-bit operating systems cannot work with more than 4 GB RAM computers, it is always desirable to work with 64-bit operating systems in order to have a more stable and reliable system.

The minimum system requirements for a small office with 12 analog lines (or trunks) and perhaps 12 extensions are as follows:

- CPU Speed: 1 GHz
- RAM: 1 GB RAM
- Hard Disk: At least 80 GB

It is very important to create a very good design for any Unified Communications System from the beginning. It does not matter how many features your system may have (which involves the PBX part) or how amazing it is, if the voice quality is poor, the chances of replacing your system with another solution are very high.

The main elements to cover when designing a VoIP solution are as follows:

- Resources of the hardware on which the Elastix Unified Communications System will be installed
- Quality of service in the LAN/VLAN
- Number of simultaneous (or concurrent) calls expected
- Number and type of external lines and internal endpoints
- Transcoding, recording calls, conferencing, and queues, as they demand more resources than a regular two-way call
- Additional services such as an e-mail service and a DHCP service
Installing Elastix

Before installing Elastix Unified Communications Server, it is necessary to check whether the PC or the server has CD-ROM booting capabilities. If this booting option is not available, please try using a USB device or an external CD-ROM device.

In order to check the booting capabilities of a PC/server, we must access its BIOS (which stands for Basic Input Output System (BIOS) and follow its menu either to check it or enable it. This is usually done by pressing the Delete, F1, F2, or Esc key.

Inserting the CD and booting

After downloading the Elastix Unified Communications Server software, the file will be saved as an ISO image. It is mandatory to "burn" this image to a CD by using burning software and selecting the BURN ISO IMAGE or BURN ISO or BURN IMAGE option.

How to do it...

1. Turn on the destination device (PC or Server).
2. Place the CD into the CD tray immediately after turning on the PC/server. If all goes well, we will see the following screen:

![Elastix Logo](image)

- To install or upgrade in graphical mode, press the Enter key.
- To install or upgrade in text mode, type: linux text Enter.
- Use the function keys listed below for more information.

[F1-Main] [F2-Options] [F3-General] [F4-Kernel] [F5-Rescue]

boot: _

3. Press the Enter key at the boot prompt to start the installation process.
There is more...

We can wait for 15 seconds or simply press the Enter key, and the installation process will start automatically. However, we will describe the options accessible with the F1, F4, F3, F4, and F5 keys. The first option **F1-Main** will allow us to return to the **Main Booting Menu**. The **F2-Options** are the **Installer Boot Options**.

![Installer Boot Options](image)

- To disable hardware probing, type: `linux noprobe <ENTER>`.
- To test the install media you are using, type: `linux mediacheck <ENTER>`.
- To enable rescue mode, type: `linux rescue <ENTER>`. Press `F5` for more information about rescue mode.
- If you have a driver disk, type: `linux dd <ENTER>`.
- To prompt for the use of other install methods such as network install when booting from a CD, type `linux askmethod <ENTER>`.
- If you have an installer update disk, type: `linux updates <ENTER>`.
- To test the memory in your system type: `memtest86 <ENTER>`.

This option is only available when booting from CD.
In this option, it is possible to select booting options such as to disable hardware probing (\texttt{linux noprobe}), enable rescue mode (\texttt{linux rescue}) and so on. To enable any of these booting options, we just type the desired option after the boot prompt and press \texttt{Enter}. Sometimes, when the \textbf{Advanced Programmable Interrupt Controller (APIC)} is present on newer motherboards and causes some problems during installation, it has been known to cause problems on older hardware. In order to avoid such issues, it is better to disable it. This can be done by typing \texttt{linux noapic} or \texttt{linux acpi=off}. This is useful on some older systems and is a requirement for using \textbf{advanced power management (APM)}. This will disable the hyper-threading support of our processor. The \textbf{F3-General} option will display the \textbf{General Boot Help}.

The \textbf{F4-Kernel} provides \textbf{Kernel Parameter Help}. To pass an option to the kernel, we use the format: \texttt{linux <options>}. 
The **F5-Rescue** option is used for rescuing an already-installed system.

**Kernel Parameter Help**

Some kernel parameters can be specified on the command line and will be passed to the kernel.

To pass an option to the kernel, use the following format:

```
linux <options>
```

If a different installation mode is desired, enter it after the option(s).

For example, to install on a system with 256MB of RAM using noprobe mode, type the following:

```
linux mem=256M noprobe
```

**Rescue Mode Help**

The installer includes a rescue mode which can be used when a system does not boot properly. The rescue mode includes many useful utilities (editor, hard drive and RAID tools, etc.) which will allow you to restore a system to a working state.

To enter the rescue mode, boot your system from the installation CDROM or floppy and type `linux rescue <ENTER>`.
Choosing the system’s language

The next screen is the Choose a Language screen. On this screen, we choose the language that we will use during the installation process. As shown at the bottom of the screen, the Tab key allows us to jump between options. The Spacebar key will let us select any option with * and may work as the Enter key. The F12 key will select the highlighted option and go to the following screen.

How to do it...

Here are the steps to select the system’s installation language:

1. Select the language you would like to use by using the arrow keys from the keyboard.
2. Press Tab to move to the OK button.
3. Once the OK button is highlighted, press the Spacebar key or Enter.

These steps are shown in the following screen-shot:
Choosing the keyboard type

The next screen is the Keyboard Type screen where we will select the type of keyboard we are using in this process.

How to do it...

Here are the steps to choose the keyboard type:

1. Use the arrow keys and then press Tab highlighting the OK button.
2. Press the Spacebar key or Enter, as shown in the following image:
Partitioning the hard disk

After the previous step, the following screen may or may not appear; it depends on the hard disk status of the PC/server. If the hard disk has not being partitioned or does not have a valid partition table, it will indicate the need to initialize the disk. The **YES** option is already highlighted. Press **Enter** to proceed.

The next screen is the **Partitioning Type** screen. It displays the hard disk or disks detected by the installation script. If the PC/server has a RAID array of disks, the installation program will also display it on this screen as a single hard disk. The installation program was created to automatically partition the selected disk. To deploy an efficient Elastix Unified Communications Server installation, it is highly recommended to dedicate the entire hard disk space.

**How to do it...**

Here are the steps to partition a disk:

1. Use the arrow keys from the keyboard to move the selection up to **Remove all partitions on selected drives and create default layout**, as shown in the next screenshot. If we have multiple drives in our system, we need to make sure that it has chosen the correct drive.
2. Use **Tab** to move to the **OK** button.
3. Press the Spacebar key or Enter.

4. The next image asks you to confirm the hard disk that will be formatted, as all previous data will be erased.
If your server or system has a RAID system, in most cases it is already configured from the factory, so there is no need to make any special configurations when installing Elastix. CentOS Linux sees your RAID system as a single hard disk. We need to make sure the hard disk to be formatted is equal to your RAID free space.

5. Choose No in the Review Partition Layout with the Tab key and then press Enter.

The next screen is the Configure Network Interface screen. It is very important to configure at least one network interface in order to have Elastix working properly.
On this screen, all the Ethernet or network interface cards detected by the installation program will appear. Select with the arrow keys the first one on the top of the list (eth0).

**How to do it...**

1. Select the **Activate on boot** option to activate the card whenever the system is restarted or initialized.
2. Select IPv4 support (**Enable IPv4 support**). We leave IPv6 support not enabled.
3. The next screen is called **IPv4 Configuration for eth0**. In this section, the main characteristics of IP addressing for the Ethernet Interfaces are set and configured. We must decide between provisioning an IP address for the Ethernet card via a DHCP server or configuring it statically (Static). It is highly recommended to assign a static IP address to the system to ensure the correct performance of all services. If the IP address is assigned via DHCP, there is a risk that the system could get a different IP address at the next restart. This can lead to the IP phones never registering, for example.

![IPv4 Configuration for eth0](image)

4. To configure a static IP address, it is imperative to know which IP address, net mask, gateway, and DNS will be used. To add these values, use the arrow keys to move to the desired option and press *Enter* to add/edit them. At the end, we press *Tab* to highlight the *OK* button and press *Enter* to go to the next step.
5. In the **Miscellaneous Network Settings**, we must add the Network Gateway IP address and the primary and secondary DNS addresses in order to route all packets through the LAN. At the end, we press Tab to highlight the OK button and press Enter to set these parameters and proceed to the **Hostname Configuration** screen.
6. On the next screen, we declare the name of the system. It could be `elastix-server` or `elastix-pbx` or whatever name you decide, just to identify the server on the network. If we select the option to name the system automatically via DHCP, the LAN DHCP will assign the name of the server if this option has already been set in the DHCP server.

7. If not, our server will have the name `localhost`. We select the manually option with the Spacebar, then go to the editing section with the Tab key and type the desired name for our system. Finally, we press Tab to highlight the OK button and press Enter.

**Selecting a proper time zone**

On the next screen, we can set the time zone of our server. It is highly recommended to use the System clock uses UTC option.
How to do it...

Use the Tab key and Spacebar to navigate between options. It's important to have this feature set, because it has a huge impact on the Call Detailed Report (CDR), for example.

Entering the password for the user root

After setting the server's time zone, the most critical screen will be displayed, called Root Password. Here, the password is set for the super-administrator user of the system (root). If this section is skipped or the password is forgotten, the system's security and operations are compromised. Although there are some tricks to changing the root password even if the system is in production, it is better to set this password at this time. We will use a complex but easy-to-remember password. This password is case sensitive, so we check whether the Caps Lock key is enabled or disabled.
How to do it...

Type the password twice in the relevant boxes. When finished, use the Tab key to move to the OK button and press Enter.

There is more...

After this step, a variety of screens will appear. These screens will inform you that the Elastix System is being installed and its status (Dependency Check, Formatting, and Package Installation).
When the **Package Installation** screen appears, it means that all packages needed for the system are being installed. The following screens show, the number of packages already installed and to be installed, the amount of time elapsed, and the remaining time to end the installation.
Installing Elastix

Welcome to Elastix

Package Installation

Name: elastix-vtigercrm-5.2.1-5-noarch
Size: 64106k
Summary: Package that install VTigerCRM.

<table>
<thead>
<tr>
<th>%</th>
<th>Packages</th>
<th>Bytes</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>69%</td>
<td>447</td>
<td>1301M</td>
<td>8:05:35</td>
</tr>
<tr>
<td></td>
<td>412</td>
<td>1866M</td>
<td>8:04:34</td>
</tr>
<tr>
<td>81%</td>
<td>35</td>
<td>235M</td>
<td>8:01:00</td>
</tr>
</tbody>
</table>

(Tab)/(Alt-Tab) between elements  | (Space) selects  | (F12) next screen

Welcome to Elastix

Bootloader

Installing bootloader...
Finally, the installation program will ask us to remove the CD-ROM, as it will reboot the server.

Logging into the system for the first time

When the system is rebooted for the first time, you will notice the status of services that are starting (OK or FAIL). Sometimes, the FAIL status is displayed because your system is searching for telephony cards that are not physically installed, but their drivers are being loaded.
How to do it...

1. As soon as the reboot process is finished, a script will be executed. This script will guide us through the process of setting the MySQL database administrator password and Elastix Web Login, FreePBX, VTiger, FOP, and A2 Billing administrator user (admin) password.

   This is done this way because in earlier versions of Elastix, these passwords were well known and if the system was exposed to the Internet improperly, its security was compromised. Therefore, the possibility of telephone fraud was very high.

2. The screen that asks for this setting is as follows. Remember that we need to introduce these passwords twice and that these passwords should be different from the root's password. The following screen is for introducing the MySQL database root password for the admin user:
3. Validate the MySQL root password for the admin user:

5. Validate the admin password:

![Elastix password configuration](image)

6. Finally, when all these steps are done, we will see the login prompt as follows:

```
CentOS release 5.7 (Final)
Kernel 2.6.18-238.12.1.el5 on an i686
elastix-pbx login: _
```
7. We will log in at the login prompt with the following credentials and actions:
   **User**: root
   **Password**: (The one we entered in the Root Password screen)

8. After doing this, we will see the following screen that confirms that our installation was successful. Notice that it shows the IP address of our Elastix server:

   As you can see, installing Elastix Unified Communications Server is a simple process. It demands the knowledge of a few parameters to install it and there is no need to recompile or compile elements or modules. Nevertheless configuring it makes the difference between an excellent communications platform or a bad one.
Where to buy this book

You can buy Elastix Unified Communications Server Cookbook from the Packt Publishing website.

Alternatively, you can buy the book from Amazon, BN.com, Computer Manuals and most internet book retailers.

Click here for ordering and shipping details.