

Making IP Telephony knowledge accessible

A pre-study of innovative approaches

* Software distributions
Virtualization and
dedicated appliances

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1 Introduction

One year ago (December 2006), we released the first edition of the VoIP4D Guide “Building Voice Infrastructure in Developing Regions”. It is interesting to see how many things have already changed in one single year in the VoIP arena and we are not far from plug-and-play open telephony systems. VoIP is advancing quickly and setting up a PBX is getting easier and easier for the end user thanks to new user interfaces and dedicated software distributions. There is lots of interest in this area, proof of that is that the guide has been downloaded 150.000 times and included as reference material in several VoIP courses.

While the first edition of the guide focused on understanding the principles of VoIP and illustrating a few scenarios that you can use as a reference to configure Asterisk by editing their configuration files, in this document we will cover some of the projects that want to make the installation and management of Asterisk even more user-friendly.

The goal of this pre-study is to identify which technologies are there that can reduce the gap from newcomers to get started with VoIP and expand the existing community.

In this document we highlight three areas that you have looked into:

- Specialized Asterisk software distributions including graphical configuration tools

(The Asterisk GUI-friendly projects)

- Installing Asterisk using virtualization (Asterisk & VMware)
- Specialized PBX hardware - Asterisk Appliances

As any other booming technology you will find difficult to catch up with what is going on and what projects are around. Many of the tools have changed name during the last years and many projects build their solutions based on existing work. During the preparation of this document we have identify a few aspects that limit the dissemination of open telephony (Section: Limiting factor for IP telephony disemmination). One of those limiting factors is to cope with all the technical jargon and have a clear picture of the existing initiatives and the interaction between them. We have included a sort description of some of those projects (Section: The jargon and the projects) so you can start with a better understanding of what is going on.

2 Limiting factors for IP telephony disemmination

There are dozens of efforts built around Asterisk. From management tools to configure asterisk installed in small devices to business oriented solutions aim to run in large computer farms. Most of the solutions offer a free (but functional) version and a commercial release that targets very specific market niches.

During the preparation of this document, we have reviewed several of those initiatives front the point of view of an end-user approaching IP telephony. During the review we tried to identify what are the limiting factors for the disemmination of the “open“ IP Telephony knowledge in developed and developing countries. Here there is a few of the ideas that came up after the review.

- Most of the efforts do not provide a simple way for the users to get started, documentation (if any) is the result of a compilation of menu's descriptions and options rather than focusing on certain scenarios and how to get them implemented.
- Very few projects are designed with multi-lingual support in mind and very little localization has been done when it comes to documentation.
- Manuals and documents very seldom include illustrative graphics as layouts of IP and telephony networks, scenarios, hardware, etc.
- There is a high level of information overload and low signal-to-noise ratio that make it difficult to identify what information is relevant.
- Many of the projects and tools have changed name during the last years and it is difficult to understand what exactly each of the tools is providing, how and to whom.
- There is not a holistic view of how to deploy IP Telephony (specially in developing regions) including the network provisioning, energy requirements, training and business models.

3 The jargon

Let us start by describing a few terms that are commonly used in Asterisk-based software distributions.

3.1 LiveCD

It is the generic term to refer to an application that can be executed without installation on a hard drive (HD). A LiveCD is an application that boots from your CD and you can play around with. It serves as a controlled "demo" environment.

3.2 GUI

It is a graphical (user) interface that allows a more friendly interaction with a computer or an application. Using a GUI, you will not have to edit configuration files directly.

3.3 Virtual machine

A virtual machine is a software implementation of a computer that is capable of executing programs like a real machine. One of the most popular uses of virtualization is the possibility of running a "guest operative system" inside of an already installed operative system. Virtualization is a broad term that refers to many other areas but from the point of view of this document, you can think as the possibility to run some flavor of Linux with Asterisk inside of your Windows machine.

3.4 ISO

It is a single file that contains all the information stored in a bootable CD-ROM. The ISO file can be burned into a physical CD or loaded (booted) in a virtual machine.

4 The GUI-friendly projects

There are two major group of solutions available¹, those which aim to provide a simple front-end to Asterisk configuration files including the basic services and those that aim to develop an integrated framework to build and manage more complex added value solutions.

To make things easier we have classified some of those projects in three major groups based on the GUI they include: The first group includes all the projects that are based on FreePBX, the second group includes all the projects that rely on the AsteriskGUI and the third group consists on a cluster of initiatives that have implemented their own GUI.

4.1 FreePBX

It is a PBX framework build at the top of asterisk that includes a GUI to manage a asterisk based telephone system. FreePBX grew up in its youth as AMP (Asterisk Management Portal).

Most of the development of FreePBX is under CentOS, a freely-available Linux distribution that is based on Red Hat's commercial products².

1 List of existing initiatives <http://www.voip-info.org/wiki-Asterisk+GUI>

2 FreePBX review <http://www.freepbx.org/news/2007-09-05/freepbx-devices-and-users-under-the-hood>

The FreePBX project has made available a ISO Image that includes a standard implementation of asterisk in Linux with FreePBX.

Projects that use FreePBX include Trixbox and Elastik.

4.1.1 Trixbox

Trixbox³, formerly known as Asterisk @ Home (asterisk at home) or AAH is an asterisk based solution that includes among other things the FreePBX GUI. Trixbox has been recently acquired by Fonality, a company that developed PBXtra, a commercial modification of Asterisk.

4.1.2 Elastik

Elastix⁴ is an appliance software that includes FreePBX that integrates the best tools available for Asterisk-based PBXs into a single, easy-to-use interface. The software runs on CentOS and there are ISO images available.

4.2 AsteriskGUI

It is the graphical interface built-in the Asterisk 1.4 software series.

Projects that use the AsteriskGUI include:

4.2.1 AsteriskNOW

It is a Linux distribution based on rPath⁵. AsteriskNOW⁶ includes a GUI designed by Digium known as Asterisk GUI. AsteriskNow, was formerly known as PoundKey.

4.2.2 CosmoPBX

CosmoPBX⁷ is built from Knoppix which has solid Debian Linux foundation. CosmoPBX is bundled with Asterisk 1.4.0 and Asterisk-GUI Beta.

4.3 Other GUIs

4.3.1 Switchbox

A company recently acquired by Digium (the company behind Asterisk) that has released the Switchvox Free Edition⁸, a software package that runs on Linux Fedora Cora 6.

3 Trixbox download <http://www.trixbox.org>

4 Elastik download <http://www.elastix.org/>

5 rPath <http://distrowatch.com/table.php?distribution=rpath> <http://www.rpath.com>

6 AsteriskNOW download <http://www.asterisknow.org>

7 CosmoPBX <http://cosmopbx.sourceforge.net/>

8 Switchbox Free Edition http://www.switchvox.com/sv?page=free_edition

4.3.2 AstBill

AstBill⁹ is a web based billing, routing and management software for Asterisk. AstBill LiveCD is based on Knoppix Linux distribution and Drupal.

4.3.3 AskoziaPBX

This effort started at the University of Applied Sciences of Wolfenbüttel that has developed a small size firmware (12 MB) image of asterisk with a user friendly interface to run in small embedded devices. It is based on asterisk 1.4 and FreeBSD 6.2¹⁰.

5 Asterisk and virtual machines

If you do not have a PC available that you can dedicate to install Asterisk you can install Asterisk in a Windows machine as a guest operative system. By virtualizing the Asterisk distribution in your Windows machine, you can test the software and even run a small production environment. It is important to mention that dedicated hardware as the one that will allow you to bridge the VoIP network to the PSTN (the traditional phone network) will not work in a virtualized environment.

The advantage of a virtual environment is that you will be able to test many complex scenarios without buying any specific hardware. For example, you can install two Asterisk PBXs in the same Windows machine to test VoIP routing between them or configure a softphone so you can leave messages in a voicemail.

The majority of the existing efforts will offer you an installable ISO image (something you can burn, boot and install) or a vmware ISO image (something you can load in a VMware player).

The *Vmware Player* is available for download here:

<http://www.vmware.com/download/player/>

ISO Images for AsteriskNOW distribution (native and vmware) are available for download here:

<http://www.asterisknow.org/downloads>

6 Asterisk dedicated appliances

There are several efforts that provide Asterisk-based dedicated appliances. Close hardware solutions include: Asterisk Appliance, Trixbox Appliance, D-Link Horst Box professional. Open hardware designs are derived from the work of David Rowe and the Astfin Team.

⁹ AstBill <http://sourceforge.net/projects/astbill/>

¹⁰ Askozia PBX <http://askozia.com/>

The following table summarizes our findings and positions the IP04 from the Free Telephony Project as the most mature low cost solution for embedded telephony today.

Product	Arch	HW	SW	Interfaces	Power	Features	Status (Nov 2007)	Price (USD)
IP04	Blackfin	Open	Open	1 Ethernet 4 FXS/FXO	very low	MMC card	Production	450
IP08	Blackfin	Open	Open	2 Ethernet 8 FXS/FXO	very low	MMC card USB	Prototype	450
Asterisk Appliance	Blackfin	Closed	Open	5 Ethernet (4 LAN, 1 WAN) 8 FXS/FXO	low	HW echo, CF card	Production	1259.50 (VoIP only) 1859 (4 FXO)
Vdex-40	Mindspeed	Closed	Open	1 Ethernet 4 FXO	low	HW echo	Evaluation	695
Trixbox	x86	Closed	Open	Any with expansions	high	4 line LCD	Production	1499 (4 FXOs)
Magiclink	Blackfin	Closed	??	2 Ethernet 4/8 FXO	very low	based on IP04	Evaluation	899 (1+)
Astfin	Blackfin	Open	Open	1 Ethernet 1 PRI 1 BR4	low	MMC card, HW echo option	Prototype	N/A
PIKA	AMCC Power PC	Closed	Closed	1 Ethernet 1 USB 4 FXS/FXO	low		Evaluation	1200

Table 1: Comparative chart of Asterisk-based appliances

7 Conclusions

During the preparation of this document we have identified some of the factors that limit the dissemination of open IP Telephony. Some of the reasons can be found in the lack of user friendly tools and documentation in local languages. In the last year(s) we have seen three major trends that look to facilitate the deployment of the technology.

The first trend is the growth of Voice over IP specific software distributions and graphical user interfaces. The second is the possibility to virtualize such dedicated softwares avoiding the need of having extra PC to test them. The third, and probably most interesting innovation in this area is the availability of the first Asterisk-based appliances.

A big step towards the dissemination of IP Telephony can be found in the Free Telephony Project, a community project that has developed an open hardware appliance (IP04) that runs Asterisk in a very low power processor.