



OPEN
TELEPHONY
TRAINING SEMINAR

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The Wave of Future Business Phone Systems

March 3-6, 2009
Digium® Headquarters, Huntsville, AL

Open Telephony Training Seminar

Course Description

This training seminar will teach advanced topics to market, sell, deploy, troubleshoot, customize and administer Asterisk®/FreePBX solutions. The seminar starts by providing an advanced foundation in FreePBX and Asterisk, presented by Philippe Lindheimer, the FreePBX project lead and primary developer. With that solid foundation in place, we move into the Linux command line and how it relates directly to PBX administration, and troubleshooting. We cover system and telephony hardware and IP phones and what to consider when choosing these components. The last day is spent leveraging the previous course content learning how to effectively market and sell to succeed in the lucrative PBX market.

Dates: March 3-6, 2009

Where: Digium® Headquarters, Huntsville, AL

Price: \$2,495

Agenda

Daily Agenda

- 8:00AM - 12:00PM: Lecture and sometimes labs (with 1-2 breaks)
- 12:00PM - 1:00PM: Catered Lunch
- 1:00PM - 5:00PM: Lecture and sometimes labs (with 1-2 breaks)

(*) The Final Day typically ends at 3:00PM to allow people to make reasonable return travel plans.

Who Should Attend?

With three days and a large range of topics from technical to marketing and sales, this seminar appeals to a wide variety of professionals:

- Persons/organizations selling, provisioning, and deploying open source PBXs
- IT professionals deploying PBXs in their own organization
- Telephony professionals and carriers exploring the world of open-source Asterisk-based PBXs.

The course is designed for professionals with some prior exposure to Asterisk and FreePBX who wish to expand their knowledge in this aggressive training seminar. For those with no prior experience, we can provide supplemental material to complete prior to the course in order to get maximum benefit from the training.



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Course Objectives

- Obtain required knowledge to comfortably work with the Linux command line to address remote PBX administration needs
- Securely tunnel using SSH to do remote GUI administration and phone configuration
- Understand components of Asterisk and FreePBX and how they fit together
- Understand the architecture and key components of FreePBX and where to look if/when things go wrong
- Understand basic Asterisk concepts and terms and what they mean
- Understand where and how to customize your installations with your own applications and dialplans with proper integration into FreePBX, and some basics of Asterisk dialplans
- Be efficient at FreePBX deployment planning and all the required basics, MAC (Moves, Adds, Changes), Effective IVR planning and construction, inbound and outbound routing, DID assignments, ACD (Automatic Call Distribution – Queues) and Ring Group usage, Fax integration and considerations and more.
- Configure remote users and understand NAT issues and how to address them
- Understand 911/E911 considerations and where FreePBX may be able to help
- Understand TDM (Zaptel) and VoIP (SIP, IAX) trunking and configuration, and branch office integration
- Address system and TDM hardware considerations, including motherboard selection and impacts of hardware selection on PBX performance and audio quality
- Deal with echo, troubleshoot and fix interrupt (IRQ) issues
- Understand basic telephony and work with the telco providers to effectively troubleshoot
- Be able to configure and work with popular IP based phones and utilize advanced configuration and integration techniques when making deployment choices with various models
- Understand and address Security concerns of the PBX installation
- Understand Marketing, positioning, competition, selling, sales cycle and techniques to differentiate your offerings in the small to medium business PBX space
- Learn how to use a demo kit and wow your perspective clients in their own offices – changing the game against the traditional providers



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About the Organizers

Philippe Lindheimer is the Project Lead and primary Developer of FreePBX, one of the most widely deployed Asterisk based PBX applications with an estimated installed base of over 200,000 systems. Philippe's interest in telecom began in the early 1990s when he worked at Hewlett Packard's European Headquarters helping leading telephone companies re-architect their Business Support Systems. For more than two decades he has worked in the Engineering industry in a range of technical consulting roles with Fortune 500 Companies. He has been involved in creating and presenting numerous technical training events on a worldwide basis. Philippe recently spoke at Astricon where he presented a tutorial on FreePBX.

Ethan Schroeder is the lead technologist at Schmooze Communications and Teleconnex. He comes from a background of profitably developing commercial solutions with Open Source technologies. In addition to this extensive development experience, he has over 10 years of experience with Linux. Ethan began focusing on telecommunications as a senior manager in finance and project management for a large telecommunications company comprised of cellular, CLEC, ILEC, CATV, and long distance divisions. In addition to modeling traditional telephony, he analyzed the technical and financial feasibility of VoIP and IPTV projects. This breadth and depth of experience in telecommunications, programming, Linux system administration, and marketing, combine perfectly with expertise in the open source Asterisk PBX to bring a full range of business and technical skills to open telephony.

Tony Lewis is in charge of sales, marketing, reseller procurement and reseller relations at Schmooze Communications and Teleconnex. He comes from an entrepreneurial background successfully starting and running various companies and brings a wide background in aggressive sales and marketing. His true passion is competing with FreePBX/Asterisk based PBX's in a Legacy World and he has developed a successful program to give integrators an edge when selling against the Big Brand Competition. Mr. Lewis also has a vast knowledge of FreePBX and Asterisk and what their capabilities for customization bring to the table; and how to use the openness of Asterisk to help close sales.



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Detailed Course Description

The course is spread out over 4 days of lecture and lab opportunities and there is plenty of opportunity for interactive questions as well as after hours deeper discussions in areas that may be of particular interest to you. The major sections of the course are described next.

Advanced PBX Administration in FreePBX

This section will provide detailed information about FreePBX and demonstrate how to effectively utilize this tool to accomplish almost any task in a PBX.

In the first part of the presentation, the components that make up FreePBX and how they integrate into Asterisk will be discussed. In addition, the architectural aspects of FreePBX and Asterisk will be presented. These provide an important basis for subsequent discussion as well as troubleshooting FreePBX related installations that can occur.

A well configured system that is user friendly to your end customers calling you and provides a proper professional image is critical. We show you how to plan your deployments by analyzing the call flows into and out of the system. As we walk through this exercise we highlight many of the features, capabilities, tricks and less known abilities that you can use to optimize your deployment. We will cover topics ranging from Inbound and Outbound routing, to IVRs (auto attendants), Paging and Intercom capabilities, trunk-ing between multiple sites, remote extensions and more.

Faxing remains a critical business function and can sometimes be a challenge in Asterisk installations. We will go over the different faxing solutions available and their relative pros and cons. We will also discuss proper integration with Hylafax/laxmodem and how to configure automatic inbound and outbound fax routing and email gateways using information from FreePBX or external sources such as LDAP with a Windows Server.

We will then cover advanced concepts of integration with FreePBX through hooks and custom dial plans, and some basics you need to know to understand how to take advantage of these. In addition, we will spend an entire section on FreePBX/Asterisk troubleshooting to help tackle some common and not so common issues that you are sure to run into when dealing with many different sites or more complex installations.

The associated lab session will provide an opportunity to configure a system and assure that you have a working system to refer to throughout the presentations so you can follow along and dig deeper into the system as we encounter new areas that may not be familiar to you.

Linux Administration for PBXs

When deploying a FreePBX/Asterisk-based PBXs commercially or for your organization, where your reputation is on the line, you need to be familiar with the Linux command line. Many users come from Windows environments as well as traditional PBX backgrounds and despite their very knowledgeable experience,



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the Linux command line is very new to them. You will learn basic Linux and how it pertains to PBX deployment. Included will be basic Linux commands, the Linux file system, editing files, permissions, scripting, services and package management, network setup and other relevant basics to gain the comfort necessary to fully administer your PBX and obtain the required background to take advantage of the advanced training in the subsequent days.

We will teach advanced integration and troubleshooting in Linux specifically pertaining to day-to-day systems administration.

Critical components of the PBX and how to utilize the command line to administer these components will be highlighted. These discussions will include IRQ analysis for troubleshooting audio and echo issues, tracing Asterisk logs, advanced network setup and administration, DNS, TFTP and auto provisioning, the Asterisk, Apache, PHP and PERL configuration files.

System and TDM Hardware, Gateways and IP Phones

Choosing the right hardware is one of the most critical decisions you can make when deploying a PBX. This section focuses on criteria necessary to choose proper hardware components for your PBX, including TDM cards and gateways to interface with the Public Switched Telephone Network and IP Phones.

We start with a discussion of PBX hardware, including options of buying all-in-one appliances or servers or building custom machines. Motherboards, as one of the biggest factors in the reliability and quality of a PBX deployment will be discussed at length, as well as other components of the PBX server and how to weight cost versus quality.

A detailed presentation on IP phones, including discussions of capabilities, integration with Asterisk, quality, and manufacturers will be delivered. Real world examples and anecdotes will be presented to better enable you to choose the right phones for the application you are deploying.

Finally, TDM cards and gateways will be discussed. Different technologies will be explored in detail, such as T1, PRI, analog, hardware echo cancellation (HWEC). In addition, manufacturer options will be discussed and the nuances of how each phone manufacturer integrates (or doesn't very well) with Asterisk.

Troubleshooting Echo, QoS, IRQ and Telco Issues

Advanced troubleshooting skills will make the difference of you having a satisfied customer or an unhappy customer, and this has far reaching consequences. No matter how you slice it, telephony deployments are always full of issues, from circuit cutover issues, to networking issues, to training issues. Your ability to troubleshoot effectively will enable you to make deployments as smooth as possible, as well as keeping existing customers satisfied when problems occur.

Troubleshooting tools, including Asterisk log files, CLI output, debugging and call tracing will be discussed in detail. Knowing how to use these tools will enable you to get to root cause of problems and correct them.



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Echo is one of the most difficult issues you will face in PBX deployments. If your customers have echo problems, they will be irate, and echo problems are some of the most difficult issues to diagnose and correct. In this part of the presentation, we will discuss types of echo and how to alleviate echo. Detailed information will be presented about echo training and echo cancellation, including free and commercial software and hardware alternatives. As echo problems are often rooted in hardware issues, we will elaborate on previous discussions about hardware choices and IRQ handling as it relates to echo and QoS.

Finally we will discuss troubleshooting carrier-related issues. These issues include PRI troubleshooting, analog call drops and call releasing, and how to communicate with carriers when a problem turns into finger pointing.

Telephony Essentials

A basic understanding of telephony will be presented. This knowledge is critical when selling and deploying an Asterisk PBX. Technology including T1s, PRIs, and analog will be discussed. Included will be discussions about the pros and cons of each technology, how and why you should steer customers to particular technologies, provisioning circuits, and ordering circuits from the telephone company. Finally “pure IP” circuit implementations will be presented, along with their advantages, disadvantages, when to use (and not use) these pure IP circuits and the potential pitfalls.

Marketing and Selling Asterisk PBX Solutions

The marketplace for selling and marketing PBXs has changed surprisingly little since the vast move to IP telephony. In fact, as you sell PBXs you will rarely be competing with each other. Instead, you will be competing with the goliath big name incumbents and be selling an IP-PBX solution in a legacy world. Your ability to differentiate yourself and sell a solution that is on par with the big name vendors will be key to your success.

First we will discuss the PBX market, including the presentation of a competitive analysis, market trends, and market statistics. These form the basis of your market potential now and in the years to come.

The next portion of the Marketing & Sales section will be focused on branding and image. We will discuss how to portray your brand to customers and translate your brand into sales. In addition, we will present how to push your brand and image deep into your product, from the PBX itself to phones, interfaces, and product feature cards.

We will present your competition, who they are, what their capabilities are, their strengths, weaknesses, and how to sell against them. You are not selling consulting. You are selling an enterprise product and you need to understand the mechanics of the vendors that comprise your competition.

We will then get into proven strategies for selling Asterisk-based PBXs, including demonstration kits, what to talk about in your sales pitch (and what NOT to talk about), demonstrating credibility,, feature selling, and the overall sales cycle and what to expect.



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The PBX market is huge and there is substantial money in the market, so knowing your competition and product pricing models is extremely important. We will discuss product pricing and how to make good money without leaving any on the table.

Finally we will discuss sales and marketing channels from direct sales to sales through your own chain of resellers. Included will be discussions on direct internet sales, yellow pages, online referral services and customer referrals. If you choose to sell through a reseller chain, we will tell you how to find resellers, structure a reseller agreement, train, and support your resellers.