



Solution Recipe: Voice over IP for Business Communications Built on an Intel® Server Platform





Preface

Intel has developed unique Solution Recipes that will enable its channel members to provide complete solutions to their customers, backed by top-quality technology and support. A solution recipe is a comprehensive document that describes how to combine Intel®-based ingredients to create new technology solutions for common business challenges. This recipe describes how businesses can benefit from the new opportunities afforded by a Voice over Internet Protocol (VoIP) solution that runs on Dual-Core Intel® Xeon® processor-based servers and Dual-Core Intel® Pentium® D processor-based desktop PCs. When you are ready to deploy this recipe, please refer to the related Solution Deployment Guide, which includes step-by-step instructions. You can find the guide by visiting: <http://www.intel.com/go/5000sequence>

Common Notation and Terms

IP: Internet Protocol

PBX: Private Branch eXchange. A private telephone exchange inside a business.

SLIC: Subscriber Line Interface Circuit.

Soft PBX/iPBX/IP-PBX: PBX implemented in software using the Internet Protocol (IP) and standard PCs and servers

VoIP: Voice over IP is the routing of voice conversations over the Internet or through any other IP-based network.

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Addressing New Market Opportunities

Companies of all sizes today are eager to lower phone costs and simplify their communications and computing infrastructures. Larger companies are looking for alternatives to expensive, inflexible private branch eXchange (PBX) systems, and smaller companies are looking for PBX-like phone capabilities without the high costs.

This Solution Recipe helps you make the most of these emerging opportunities. In addition to selling hardware platforms, you will be able to offer a complete solution that provides state-of-the-art PC-based telephony functionality.

Reseller Challenges

With competition growing, it's critical that you find new products, new revenue sources, and new opportunities to continue to grow your business. At the same time, business technology solutions are increasingly complex and typically require components from many different vendors. Your customers need guidance when it comes time to sort through the options and put together solutions tailored to their business. They want complete solutions that meet real business problems, not just general-purpose computers.

Customer Challenges

With communication and collaboration options multiplying, technologies from different vendors are becoming increasingly difficult to connect, synchronize, and support. Workers today are dependent on a cumbersome mix of e-mail, cell phones, PDAs, and other devices for business communications.

As workers have shifted to computer-based and mobile communication devices, businesses have become eager to either better integrate their local area network (LAN)-based phone systems or get rid of them. Current business telephony systems, particularly Private Branch eXchanges (PBXs) used by larger companies, are expensive to acquire and maintain, difficult to use, and offer limited functionality.

Intel is helping you meet these customer needs while also helping to create new revenue opportunities with a VoIP solution that runs on Dual-Core Intel® Xeon® processor-based servers and Dual-Core Intel® Pentium® D processor-based desktop PCs. This solution turns your customers' computers into their primary communications and collaboration interface. You can also offer VoIP services to your customers using equipment located off site (at your or a central provider's site), with services delivered over the Internet (known as a 'hosted PBX').

Solution Overview

With the advent of the Internet Protocol (IP), companies began sending voice data over their computer networks (VoIP). Today, innovative companies are using VoIP to implement PBX systems in software, called soft PBX, IP-PBX, or IPBX. Using such systems, businesses can replace their traditional PBX with telephony applications running on servers and replace desktop phones with less expensive handsets that communicate with VoIP software running on desktop PCs. VoIP systems can be managed remotely, through a Web console running on standard hardware and open source or commercial software. VoIP systems deliver the long anticipated integration of voice and data. Voice traffic becomes just another data type that can be integrated into your customer's network, making it possible, for example, to consolidate voice and e-mail messages in the same inbox.

VoIP represents a huge growth market for Intel resellers. The Radicati Group, a telecommunications market research firm, predicts that 74 percent of all corporate telephony lines will be IP-based by 2009¹. International market research firm Infonetics Research projects that worldwide revenue from IP-capable PBX equipment will reach \$10.2B in 2008, up from \$3.6B in 2003².

The end-to-end VoIP solution offered by Intel consists of one or more Dual-Core Intel Xeon processor-based servers running the Linux* operating system and Asterisk* open source PBX software. On the client end, Dual-Core Intel Pentium D processor-based desktop PCs run the Microsoft* Windows* XP operating system and CounterPath eyebeam* telephony software.

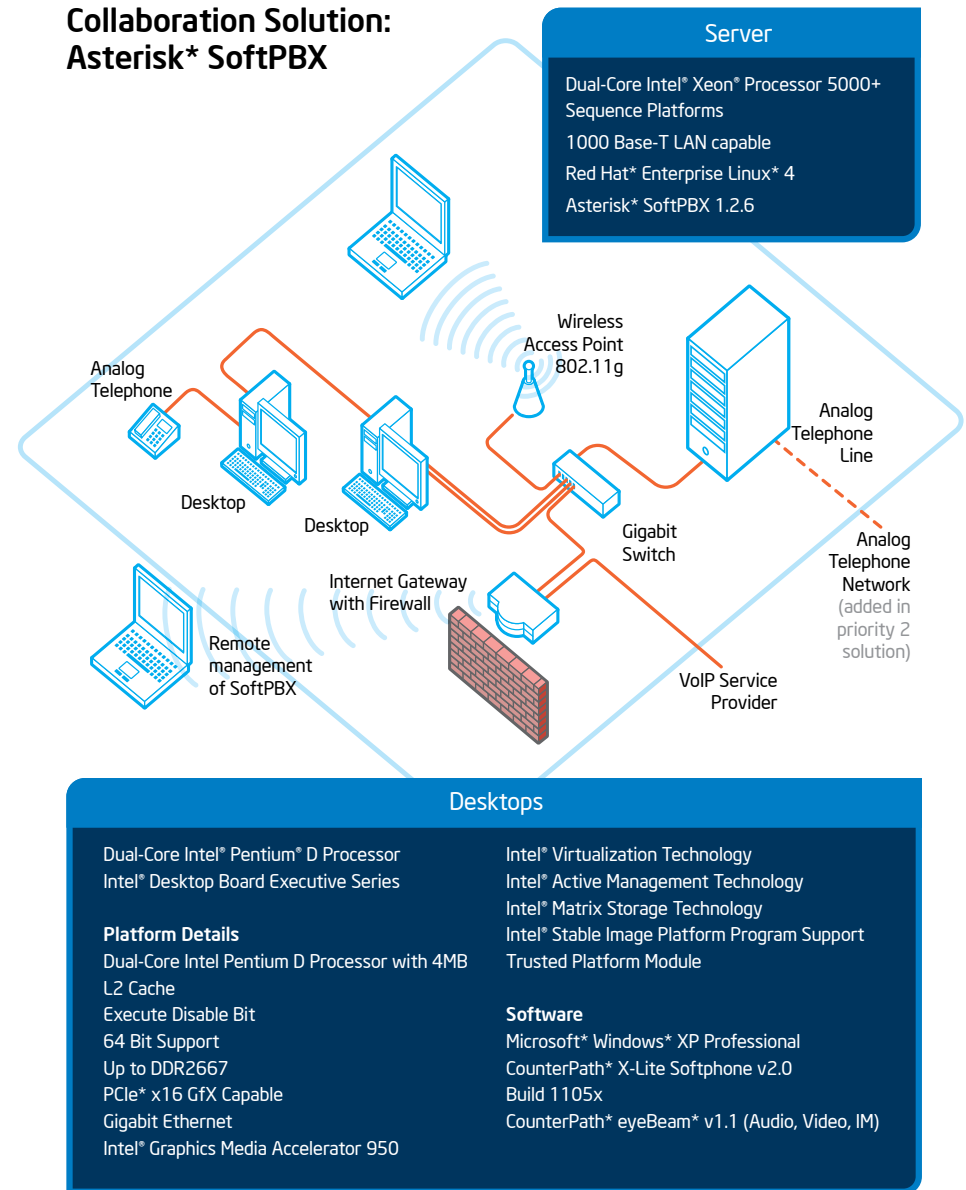
¹ The Radicati Group, "IP Telephony to Make Up 75% of All Corporate Telephony in 2009." (December 21, 2005)

² Infonetics Research, "Enterprise Telephony Market Share 3Q05." (November 28, 2005)

† Intel processor numbers are not a measure of performance. Processor numbers differentiate features within each processor family, not across different processor families.

See http://www.intel.com/products/processor_number for details

Collaboration Solution: Asterisk* SoftPBX





Solution Benefits

Benefits for Intel® Channel Partner Program Members

New Revenue Opportunities

The VoIP solution opens up a new revenue stream and allows you to offer more complete solutions that solve real business problems for your customers. In addition to selling hardware, you can sell integrated computing and communications systems that simplify life for the IT staff, enable workers to be more productive, and help lower operating costs.

This VoIP solution provides opportunities for you to offer additional products such as telephone and PBX interface cards, notebook computers, and communication servers; new services such as telecom hosting and Virtual Private Network (VPN) management; and new service contracts. For example, you might add VoIP to a package of premium small business-class service offerings. Such a package would offer pre-loaded software that enables customer employees to access voicemail, e-mail, calendars, contact lists, and other services from their Microsoft Office Outlook* software.

Benefits for Your Customers

Lower Costs

By selling a VoIP solution, you simplify your customer's infrastructure by consolidating two networks (computer and phone) into one. In addition to lower management and support costs, this VoIP solution can deliver lower equipment costs to customers with existing PBX systems, since PCs and servers can be less expensive than these turnkey systems, and soft PBX handsets can be less expensive than proprietary PBX phones. Customers can also reuse their analog telephones by plugging them into their PCs using an adapter card to make them function like IP phones. A major appeal to customers will be lower phone bills, especially for long-distance calls, since calls are placed over the Internet at no charge. Remote workers simply call over the VPN.

More Phone Features

By integrating voice capability with their computers, your customers will be able to manage voicemail, e-mail, and faxes through a single inbox. Workers will also be able to have just one device on their desktop (their PC) for all their communication and collaboration needs and just one phone number that follows them wherever they go. They will enjoy conveniences (such as point-and-click dialing and user-directed call routing) that just aren't available with traditional telephone systems. User-directed call routing allows you to enter the name of an individual you want to call into Outlook. Your PC consults the various numbers for this person in the database and automatically routes the call to the preferred number.



Higher Productivity

Unified messaging and integrated communications leads to improved employee productivity. A recent Intel study showed that performance for routine office phone tasks increased between 134 and 500 percent using VoIP over traditional phone systems. Scheduling a conference call bridge was 27 times faster and receiving a fax was 31 times faster. Repetitive tasks, such as accessing voicemail or looking up a phone number and placing a call, were two and four times faster, respectively³.

High Reliability

The many high availability features built into Dual-Core Intel Xeon processor-based servers provide the reliability levels your customers need to entrust their telephony systems to their computers. Plus, Intel®-based PCs and servers are cost-effective enough for customers to install redundant servers to provide extra layers of protection.

High-quality Voice Service

This VoIP solution provides high voice quality due to the tuned, high performance of the dual-core processors, I/O, and memory and the Intel® High Definition Audio technology which can be built into the Intel Pentium D processor-based PC.

³ "The Business Case for Enterprise VoIP," Intel white paper, February 2006.

Richer Phone Features with VoIP

Traditional Phone Features:

- Hold
- Transfer
- Mute
- Conference
- Redial
- Forward

VoIP-enabled Features:

- Fax
- Follow me
- Unified messaging
- Remote call management
- Inbox voicemail
- Automated attendant
- Presence information
- Directory access
- Click to call
- Click to conference
- Pop-up window



Solution Recipe

Server Components

Dual-Core Intel® Xeon® Processor-based Server(s)

Dual-Core Intel Xeon processor-based servers provide the computing horsepower needed to perform complex digital signal processing in software. Dual-core processors have two complete processing units (cores) in a single chip, virtually doubling processing capability without a comparable increase in power consumption.

Intel® I/O Acceleration Technology (Intel® I/OAT) Improves Network Throughput

VoIP relies on powerful CPUs to handle complex digital signal processing in software that used to require specialized hardware components. Servers based on Dual-Core Intel® Xeon® processors include Intel® I/O Acceleration Technology (Intel® I/OAT) that provides top speeds for telephony processing. Intel® I/OAT works with existing Ethernet network infrastructures and requires no modification to current applications. Intel® I/OAT delivers superior VoIP performance and network responsiveness for customers planning to scale their network traffic workload and number of users accessing the PBX software.

Intel®-based Platform Communications Components

Adding a third-party Subscriber Line Interface Circuit* (SLIC) device connected to the platform's PCI bus enables VoIP functionality in a regular analog telephone. A SLIC connector makes a telephone look like a regular speaker and microphone to the computer sound system. It provides dial tone, ring, and other functions to standard analog telephone handsets connected through RJ-11 connectors.

Software Components

Asterisk* Open Source PBX Application Software

Asterisk is a complete PBX implemented in software. It runs on the Linux operating system and provides a full suite of PBX features, including voicemail, conference calling, interactive voice response, call queuing, and call forwarding. Because it is available as an open source program (or a business edition, which requires a license), Asterisk acquisition costs are far lower than commercial alternatives. Support for Asterisk is available from Digium, Inc.* (See support section of this document for more information). Intel has worked with Digium (the commercial company that sponsors Asterisk) to obtain discounted pricing for the Asterisk* Business Edition SoftPBX for the Intel channel. Ask your channel sales team for details.

Linux* Operating System

Since Intel is the platform of choice, this solution can also be developed on leading Linux operating systems. Several vendors offer well-supported, stable versions of Linux used by companies of all sizes to run mission-critical applications. Intel has verified this VoIP solution only on Red Hat Linux. However, Asterisk is known to work with many other Linux distributions and more information can be found at www.asterisk.org.



Desktop Components

Dual-Core Intel® Pentium® D Processor

The client machine recommended for the VoIP solution is the Dual-Core Intel Pentium D processor. The Dual-Core Intel Pentium D processor is Intel's fastest desktop processor that features built-in security, power efficiency, and management technologies. The benefits of Dual-Core Intel Pentium D processor for your customers include:

- Responsive multitasking for running multiple demanding applications simultaneously.
- Support for advanced applications such as high-definition entertainment, videos, and games.
- Support for multiple users on one computer—one user can quickly sync with a handheld or mobile music device while another user plays an online game or talks to a friend using VoIP.

Intel® High Definition Audio

Intel® High Definition Audio provides the high-quality audio needed for telephony applications.

Subscriber Line Interface Circuit (SLIC) Card

(If soft PBX system will connect to analog phone system).

CounterPath* eyeBeam* Telephony Software

CounterPath* Solutions, Inc., is a leading provider of voice and video over IP solutions for PCs and softphones. CounterPath* eyeBeam* is a PC-based telephony application that provides an intuitive, easy-to-use interface and a broad menu of phone features such as conference calling, mute, auto-answer, speed dial, transfer, hold, caller ID, call forwarding, and more.

Microsoft* Windows* XP Operating System

Intel chose the Microsoft Windows XP operating system for the desktop portion of the VoIP solution to meet the needs of the majority of business owners who already use Microsoft Windows.



Offer On-Premise or Hosted PBX

The server portion of the VoIP solution can sit either on your customer's premise or on your premise, with you providing VoIP as a service.

Customer-premise Soft PBX

Some customers will want to install VoIP on their own servers and manage it themselves. The advantages of this approach include:

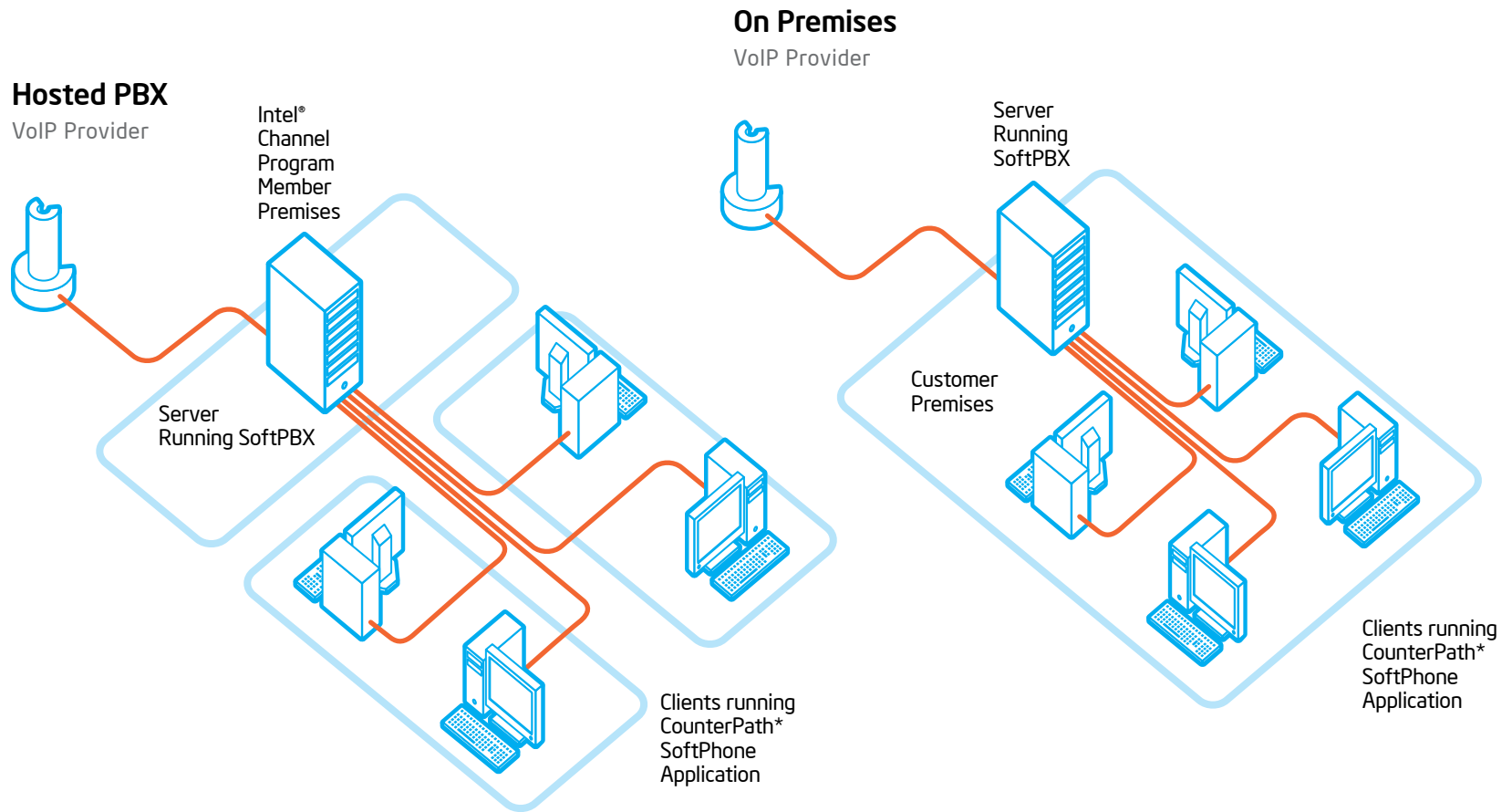
- More flexibility in integrating VoIP into other line-of-business systems, such as customer relationship management or call center applications
- Greater security for confidential voice traffic by keeping calls within the company firewall
- Lower scaling costs
- Savings from keeping in-company calls off expensive broadband connections

Reseller-hosted Soft PBX

Many of your customers will view the move to VoIP as challenging for a variety of reasons. They may not want to invest time and money in specialized resources to support this new technology. They know that keeping up with changes in technology can be difficult and potentially expensive if they don't make the right choices. Or, they may prefer to take advantage of the scalability and reliability of a carrier's infrastructure to help ensure high quality of service (QoS). The advantages to your customers of choosing reseller-hosted VoIP services include:

- VoIP available as a service, with you hosting the soft PBX server software on your servers and customers paying you a per-user monthly fee
- No need to buy server hardware and software licenses
- No need to manage VoIP
- Predictable, budgetable telephony costs

To you, the advantage of this approach is increased service revenues and customer retention. Of course, hosting your customers' VoIP solutions will require an infrastructure investment on your part, ensuring adequate hardware and staff resources. In this scenario, you will also need to connect your soft PBX servers to an external VoIP service provider such as Vonage* in the U.S.





Solution Support

Intel has thoroughly tested and verified the components in this VoIP solution recipe. Please continue to use your existing Intel® Support Services (<http://www.intel.com/go/Channel/Support>) for information on Intel®-based hardware, including Intel® Processors, Intel® Desktop and Server Boards, and associated drivers.

For your convenience, Intel has worked with several independent software vendors, open source vendors, and application vendors to streamline technical support for this solution. For more information on the third-party hardware and software products, please download the Solution Deployment Guide (<http://www.intel.com/go/5000sequence>) to obtain the specific list of vendors and contacts.

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