



InternetPBX:

A Powerful New Phone and Messaging System

By David Perez

InternetPBX delivers a new generation of phone and messaging services for business. Companies receive a complete communications solution, built on open architectures. Functionality includes improved call control, personal assistants with automatic speech recognition, low-cost Internet Protocol (IP) long distance, unified messaging, and access from anywhere. A server-based system built on new Open Telephony Standards, InternetPBX is designed to use standard hardware and software platforms, and its services are available over existing local and wide area, Internet, phone, and wireless networks.

Software-based InternetPBX replaces traditional business phone systems with a product that consolidates analog and digital features—traditional telephone service, e-mail, voice-mail, and faxing integrated with low-cost Internet Protocol (IP) telephony. Users gain advanced phone services that help them deal with the challenges of business communications today.

Benefits of InternetPBX include:

- Faster and better communication with customers and suppliers
- Increases in organizational productivity with improved services
- Low-cost long distance with IP telephony
- A system that is easy to install, manage, and expand

Problems with Business Communications Today

Business communications today face three problems. The first is sheer volume. Communication seems to grow constantly in most companies. Knowledge workers are overwhelmed. It is more difficult to keep up with phone calls and e-mail. Critical customer communications are often buried or lost in an avalanche of information.

The second problem is that messaging now comes in many different forms via many separate systems. Workers use landlines and wireless phones to receive phone calls and check voicemail. They must go to a fax machine for faxes (too often on a different floor or even in a different building). They receive e-mail on their computers, and often must go online to check for mail.

Messages in different formats are often redundant. Business users must access several systems to find customers' messages, and they often must respond multiple times to a single concern. For example, when a customer could not reach a support engineer on the phone, the alternative was to page that person. When no one answered the page, the customer sent an e-mail or a fax. So the engineer received the same message through several different systems.

The third problem is change. Communications technologies and systems for business are continuously changing. Even the businesses are constantly changing—upsizing, downsizing, and reconfiguring. The cost of changing a traditional phone system multiple times can be larger than its initial price. Older analog systems or those built with proprietary technology generally

have closed architectures that cannot be upgraded or cannot have new kinds of services added efficiently.

COM2001.com designed InternetPBX specifically to address the need for improved communications productivity. To increase efficiency, it focused on creating systems that work the way users work. To deliver more affordable solutions, it focused on rapidly converging computer telephony (CT) and IP telephony technologies.

What Is InternetPBX?

InternetPBX defines a new kind of business phone solution. It replaces traditional business phone systems with more versatile PC-based technology that unifies phone, messaging, and productivity services in one solution, based on the convergence of voice and data within digital networks.

It is built on open standards, using robust and ubiquitous PC technology platforms (Microsoft and Intel) and off-the-shelf components. Its IP telephony provides lower costs for business users. InternetPBX provides virtually every phone and messaging service small businesses need, as illustrated in Figure 1.

Features of InternetPBX

The COM2001.com InternetPBX simplifies the business communications environment while adding features and services beyond those provided by traditional systems. Major InternetPBX features and services include the following:

- **Integrated Voice over an IP Gateway** allows users to mix standard and IP phone service, depending on call destination and desired quality. IP telephony is especially suited for low-cost calls to other offices, fellow employees, and preferred vendors.
- **Unified Messaging** gives users one easy-to-access location for all messages. InternetPBX places voicemail, e-mail, and fax messages in a Microsoft Exchange database. Users can easily view, save, delete, forward, and store these messages on their computer desktop. Unified Messaging reduces the time and effort for checking messages and the risk that an important message from a customer will be lost.
- **High-Quality Digital Conference Bridge** enables users to set up conference calls for up to 64 participants with a few clicks of the mouse. Participants enjoy excellent sound quality, and the InternetPBX Toolbar lists the

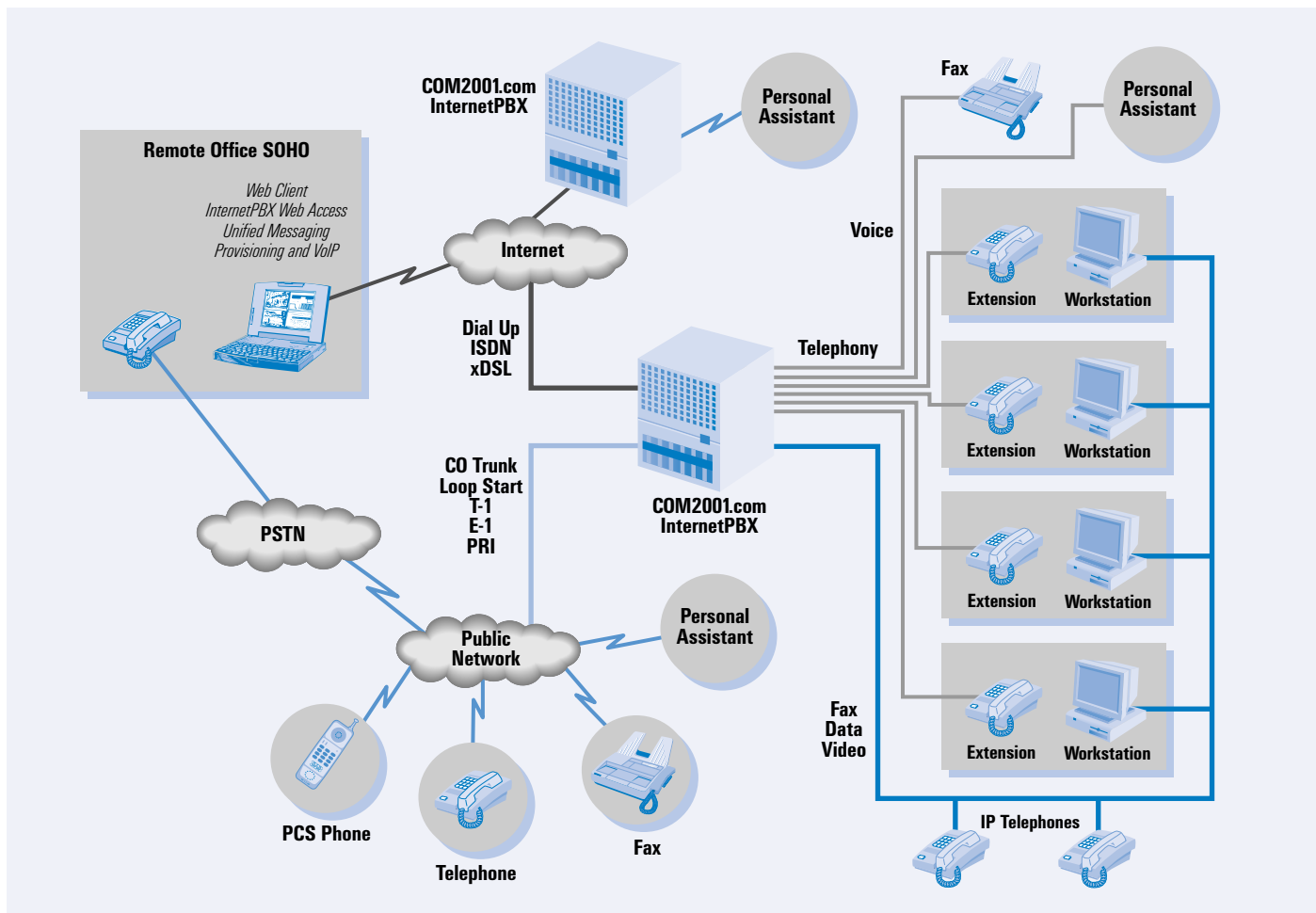


Figure 1. InternetPBX Architecture and Services

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- names and contact information for every participant.
- **Auto Attendant with Advanced Speech Recognition** routes calls directly to the person or department sought. It provides a dial-by-name and dial-by-extension listing directory to give callers rapid access.
 - **Interactive Voice Response (IVR) System** includes an integrated speech recognition and text-to-speech application generator. Specific actions and results can be programmed to enable callers to obtain desired information automatically.
 - **Personal Assistant Server**, or Alexis, greets callers, asks who they are calling, and then connects them if authorized. Alexis uses “Find-me Follow-me” services to locate users who are not in the office. Alexis also responds to voice requests from users to look up addresses and phone numbers and to place calls. Alexis can even use a text-to-speech processor engine to read e-mail to a user over the phone.
 - **Desktop Toolbar** enables users to place, accept, transfer, send calls to voicemail, or forward a call or message with the click of a mouse. Users can perform all their communications tasks more quickly.
 - **Single Number Access** means that users have to provide only one number for their office, home, mobile, and fax phones. They can instruct the InternetPBX system to forward calls to any other number that will reach them, or even to try a list of possible numbers.
 - **Caller ID Screen Pops** let users see who is calling, sometimes before the phone even begins to ring. Users can choose which calls to take and which to send to voicemail or forward to a more appropriate person.
 - **Virtual Office over the Internet** gives users full access to their phone and messaging services in real time through a Windows NT-authenticated and secured Web-based server that can be accessed from any location. Screen Pops and call control features are programmed in HyperText Markup Language (HTML) for real-time remote access.
 - **A Virtual Private Network (VPN)** for each user allows every user to access phone services from virtually any location, using a variety of InternetPBX network and connection strategies, including LANs or WANs, the Internet, and standard and wireless phone networks.

The InternetPBX Interface

In recent years, users have typically juggled an array of communication inputs—e-mail, voicemail, fax, pager, cell phone, written messages, and so on—and dealt with each as an isolated technology. InternetPBX changes this environment by linking all messaging technologies into one box that integrates many services.

The InternetPBX user-centered user interface enables business users to configure their communications services by

creating a personal profile with user preferences. The InternetPBX system can route all calls, e-mails, voicemail, and faxes where the user needs them, when the user needs them. Urgent messages are always received immediately. Less important information can be set aside for review at a more convenient time.

Users gain real-time call control and screening via their computer screens. An integrated Microsoft Outlook database provides information about identified callers. A single mouse click enables users to place, accept, or transfer calls.

The same interface delivers unified messaging to InternetPBX users. Microsoft Outlook captures and displays all voicemail, e-mail, paging, and fax mail grouped together and available over the same system. Any message can be played, saved, or attached to other messages for forwarding.

Among users, one of the most popular interfaces is Alexis, which provides advanced Personal Assistant services. Alexis greets callers 24 hours a day with advanced automatic speech recognition, interactive voice response, and “Find-me Follow-me” services that can locate users if authorized. Users can personalize their interface, contact information, and Personal Assistant with an easy-to-use, rules-based Wizard.

InternetPBX, specially designed to provide seamless integration with Microsoft technologies, can leverage the full power of Microsoft applications and services for small businesses. The InternetPBX software turns a commercial-grade Microsoft Windows NT server into a powerful enterprise communications server.

The InternetPBX technology also can be used to add functions and flexibility to departments with older phone technology in place. It can sit behind a PBX or CENTREX system to serve a team that needs the improved speed and productivity of InternetPBX.

InternetPBX Component Technologies and Platforms

InternetPBX is a flexible, scalable, server-based PBX solution built on industry-standard architectures for both telephony and PC technologies, and designed for compliance with Open Telephony Standards set by the International Telecommunications Union (ITU), the Internet Engineering Task Force (IETF), Microsoft, and Intel.

This use of industry standards, popular platforms, and open architectures makes it easy to customize InternetPBX to the exact work environment and specifications and to add third-party software to InternetPBX services. Small businesses can then build custom-tailored phone systems that are common in larger companies.

Figure 2 shows the components that work with InternetPBX.

InternetPBX is configured on the Dell PowerEdge server platform. Dell factory installs InternetPBX through its DellPlus custom factory integration service. DellPlus enables

mass customization to ensure that customers receive systems built precisely to their specifications.

Microsoft Corporation provides the software platform for InternetPBX, which shows evidence that Windows NT can be reliably used for lights-out telephony applications.

InternetPBX is specially designed to leverage and build on the power of the Microsoft architecture.

InternetPBX supports all major standards for bidirectional communications related to messaging, speech processing, telephony, and Internet voice and fax. The line interfaces include primary rate integrated services digital network (ISDN)—PRI and T-1/E-1—and analog loop start lines that are designed to run on readily available, standards-based, off-the-shelf DSP-based boards currently supplied by PIKA Technologies Inc.

In 2000, InternetPBX will run on Intel's Dialogic Media 3 (DM3) platform using the CT bus H.100 standard. The IP telephony gateway supports DSP resource boards from several vendors, including Analogic, Brooktrout Technology®, and DSP Research Group.

The telephone switch supports both analog and digital lines and operates using generic analog 2500 station sets (from vendors such as Nortel®, Lucent®, Sprint®, GTE®, Panasonic®, and Siemens®) and mobile phones (from vendors such as Nokia®, Ericsson, and Motorola™). Phones are wired using standard cabling. Desktop control and unified messaging are delivered through separate connections to the LAN or WAN.

System sizes range from 12 ports supporting 4 trunks and 8 extensions to 144 ports supporting 48 trunks and 96 extensions. Systems with IP gateways support up to 60 Voice over IP (VoIP) and Fax over IP (FaxoIP) channels—all H.323 compliant.

COMPONENTS THAT WORK WITH INTERNETPBX

- Any industry-standard business telephone system
- Standard Microsoft Windows-compatible PCs
- A Windows NT LAN or WAN
- Microsoft BackOffice applications, including:
 - Exchange Server
 - Internet Information Services Server
 - Transaction Server
- Microsoft Outlook contact management software
- Microsoft Management Console for system administration
- Microsoft speech recognition and text-to-speech software
- Lernout & Hauspie speech recognition and text-to-speech software
- PIKA, Dialogic®, DSP Research Group, and Analogic voice processing boards
- A Dell PowerEdge server with Intel Xeon processors

Figure 2. Components That Work With InternetPBX

The Evolving InternetPBX Platform

Forthcoming releases of InternetPBX will increase the number of ports supported in a single-rack solution from 144 to 1,440. InternetPBX solutions for distributed call centers also will be introduced. Solutions for service bureaus and telemarketing services are now in advanced development. Backward integration with legacy PBXs also will be made more robust.

Another important technology initiative is InternetPBX support for handheld digital appliances such as the Palm Pilot. Rapid adaptation of wireless telephony into these highly portable platforms will soon make it possible to use InternetPBX with these devices.

Broadband is rapidly becoming an important opportunity for small companies. It gives them faster connectivity at prices they can afford and a means for digital delivery of both resources (coming in) and products (going out). InternetPBX was designed to support the greater bandwidths that will rapidly become universal.

Broadband, in turn, will make video a part of many solutions and a popular component of digital documents. Advances in compression, as well as the development of streaming technologies and increasing bandwidth, will open the door to wider use of digital video in daily business communications.

Streaming video and audio are becoming increasingly important. Internet PBX already supports streaming audio. Support for streaming video and T.120 application sharing will be added very soon.

Why Businesses Should Install InternetPBX

InternetPBX provides businesses with more than a simple increase in number of features and services. The most important reason is improvement in the speed and quality of communications in both directions.

Easier to reach employees. Important callers like customers and suppliers find it easier to reach employees. The single-number, "Find-me Follow-me" service, and the Alexis Personal Assistant help to keep customers connected and to increase the number of successful connections with users, even when they are on the road. Users can return calls quickly and access e-mail while on the move.

Improved call control. Because users can see who is calling, often before the phone even rings, they can prioritize their calls, answering the most important ones and sending the others to voicemail. Listing voicemails in the user's personal Microsoft Outlook database makes it easier to respond to voicemail. Voicemail can be played and calls returned by voice or e-mail, all with a single mouse click. An integrated Operator's Console lets users see and manage all incoming calls and view activity on all other user extensions.

Additional ways to communicate. Users can easily and quickly decide whether to return a message by e-mail or

voice. Both are equally easy when the party is listed in the user's Microsoft Outlook database.

Increased productivity. This results from better communication with and control of calls from both external and internal customers. The advanced user interface and tools help users to miss fewer calls, receive all their messages—voicemail, e-mail, and faxes—from a single system, and return calls faster. They waste less time playing phone tag. A Personal Assistant can forward calls and seamlessly connect the caller to any destination or device (wireline or wireless phone).

Reduction of costs for long distance and international calling. Many providers are using IP solutions to reduce the costs of providing services. InternetPBX was designed to give users direct access to IP telephony—especially for long distance and overseas calling between offices. The cost of IP telephony using an existing Internet connection is almost zero.

Easy customization of services. The Microsoft-based architecture of InternetPBX ensures easy customization of services for dedicated segments. Since the software is built on open industry standards for both data and telephony networks, it can be easily integrated with third-party applications. Both COM2001.com and third-party providers can easily support specialized functions such as distributed call centers and service bureaus.

Lower capital costs. InternetPBX is substantially less expensive than traditional, proprietary, voice-only telephone systems in terms of capital costs to install, integrate, and change services. Installation takes a few days because InternetPBX uses existing network wiring and can operate with virtually any handset. Services or locations also can be easily added because of the flexibility of using almost any kind of networking; it is similar to adding one more service to a company LAN or WAN.

Investment protection. The COM2001.com integration strategy helps to protect customer investments and ensure that they will always have up-to-date technology. InternetPBX is built from robust and mainstream technologies. These proven hardware and software technologies, essentially off-the-shelf components, are continually upgraded by vendors such as Dell, Intel, and Microsoft. The InternetPBX Support Plan gives customers the opportunity to stay current with best-in-class price/performance.

InternetPBX for Small, Growing Businesses

InternetPBX was designed for small businesses, businesses with mobile workers, and especially businesses that are experiencing rapid growth. It provides the flexibility and extensibility those companies need but cannot get from traditional business phone systems.

For example, sales departments can place the InternetPBX server between their legacy PBX and their customers, obtaining improved services and features without causing an enterprise-wide overhaul of telephony services.

Individual users save time with the unified messaging solution provided by InternetPBX. Recent productivity studies, for example, indicate that executives may save as much as 27 minutes per day by obtaining improved access to e-mail and the ability to work while mobile. Individual users benefit from InternetPBX whether they are on the road or in the office.

InternetPBX on the Road. While waiting in traffic or even on an airplane, users can review, act on, and forward e-mails, voicemails, and faxes by using the text-to-voice Personal Assistant over their cell phones. When traveling, users can connect to the Internet using a dial-up connection and a standard browser such as Microsoft Internet Explorer or Netscape Navigator®. An incoming phone call to the home office instantly prompts the InternetPBX to display a Screen Pop on the user's laptop showing the caller's ID and asking where the call should be transferred. Calls can be accepted remotely, transferred to another person, or sent to voicemail.

InternetPBX in the Office. InternetPBX gives users a unified look at all voicemail, e-mail, and faxes in their Microsoft Outlook inboxes. The Busy Lamp Field of the system allows all users to see the status of all other users (in or out of the office, available or unavailable). Users can save time by waiting until other users are available before they try to communicate with them. They need not waste time listening to busy signals or to lengthy voice messages to learn that someone is on the phone or out of the office. Because users place phone calls simply by dragging the contact name to the toolbar, they never need to look up a number, and misdials are impossible.◆

Additional Resources

For additional information on the InternetPBX, please visit www.COM2001.com or call 1-888-COM2001 ext. 2100.

David Perez cofounded COM2001.com in 1996, after launching other high-tech companies in the telecommunications and consumer electronics industries. From 1988 to 1991, Mr. Perez served as president of Cellular Solutions®, Ltd., where he was involved in designing, developing, and marketing computer software programs to major cellular service providers in the United States and abroad. After selling Cellular Solutions to TeleSciences, Inc., Mr. Perez worked from 1991 to 1994 as a consultant to major cable and telecommunications companies. Mr. Perez has more than 12 years of experience in the cable and video industry and the interconnect and cellular telephone industries. He attended Rutgers University.