Are IP Phones For You?

Steven Taylor and Larry Hettick

Steven Taylor is president of Distributed Networking Associates, Inc., a consultancy based in Greensboro, NC, and editor/publisher of Webtorials.Com, which provides free on-line telecom training. He will be presenting a session on "A Framework for Implementing Voice over IP" at Strategic Interop in Las Vegas.

Larry Hettick is an independent consultant specializing in convergence. He has nearly 20 years of industry experience and can be reached at larry@larryhettick.com

Ironically, IP phones don't necessarily play a pivotal role in enterprise voice over IP (VOIP) implementations. IP phones look, more or less, like a traditional phone, although some have additional bells and whistles, and they can connect to an on-site PBX or to a service provider delivering an "IP Centrex" service.

The starting point for evaluating what these new phones can mean for your organization is to understand the role they play in the overall VOIP architecture, and the advantages and disadvantages of IP phones as compared with the traditional telephone sets. Indeed, don't assume that just because you are interested in VOIP, you have to put IP phones on each and every desktop.

As illustrated in Figure 1, working from the core of the network out, calls can be transported over an IP infrastructure using totally traditional telephony devices at each end. Most PBX vendors offer the option of a phased migration to IP telephony, so you can continue using traditional desk sets even after the core of the switch has evolved to IP. Similarly, there are options for using IP-PBXs without IP phones—for example, Shoreline Communications sells a core IP-PBX that, at least for now, only supports traditional telephones.

For enterprise locations where there is no PBX, you can get the effect of an IP phone with basic calling features. For example, Clarisys' Internet phone connects to the USB port on a user's PC. The phone can use Internet access for toll bypass, without requiring a configuration of any other part of the telephony infrastructure.

Similarly, Linksys offers a cable/DSL voice enabler that can work with traditional telephones. Lynksys sells a model that works with traditional routers, and another that can be integrated into a cable/DSL router. The Linksys device is currently bundled with services from Net2Phone.

All IP phones support compression algorithms that reduce bandwidth requirements to 5.3–8 kbps per conversation—about 15 percent of the bandwidth a traditional phone set needs. Most deliver adequate sound quality, some are as good as a "normal" phone and, compared to the quality provided by cell phones, IP telephony sounds great.

As described by Allan Sulkin in the December 2001 issue of BCR, the feature sets on IP phones continue to improve. But, as Sulkin also pointed out, the current generation of IP phones is equal to and often more expensive than traditional phones with comparable features. So should you invest in new technology that doesn't produce direct cost savings?

Advantages And Limitations

The most obvious advantage IP phones provide is the ability to have "one pipe" for all desktop communications. IP phones use a data connection—e.g., an Ethernet or USB port—and are managed like any other device on a local area network (LAN).

While supporting one infrastructure rather than two may be viewed as an advantage by some, it may not be welcomed by all; for example, the incumbent telephony staff. Nevertheless, a recent analysis by Cisco for implementing an IP-PBX in a "greenfield" environment showed that the customer could shrink its support-staff requirement from six to four—a 33 percent improvement in efficiency. (Note, that this analysis was based on staffing requirements for the entire VOIP network —not just IP phones.)

Having "one pipe" brings other good news—easier management. But, because the IP phone competes for Ethernet resources like any other network element, it's been necessary to develop new management capabilities for running real-time communications over packet networks. Depending on how heavily your LANs are loaded, IP phones may require managing with the IEEE 802.1p spec for Ethernet network traffic prioritization and IEEE 802.1Q to manage the devices as part of a virtual LAN (VLAN.)
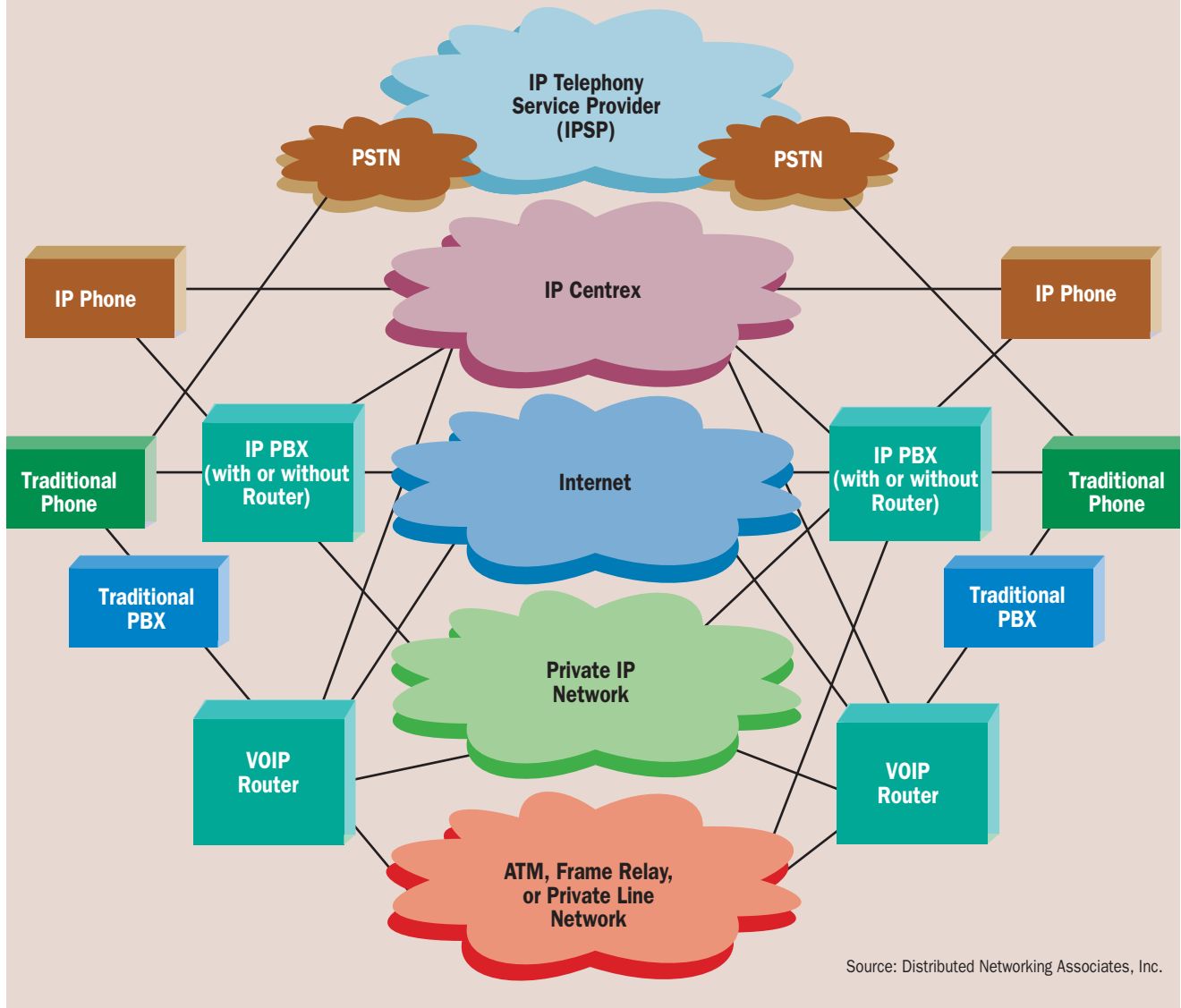
Another, more subtle advantage is that an IP phone is really a computing device. While today's traditional phones have memory, they were designed principally for static features like redial and stored-number memory dial. Similarly, the traditional phone "monitor" was designed to display nothing more complicated than names, numbers and programming instructions.

As a computing device, the IP phone offers as many features and display options as the set's computing power can process and application developers can design. For example, moving beyond just a names-and-numbers display, the IP phone offers the promise of full-color "Web surfing," video

FIGURE 1 VOIP Network Architecture

IP Telephony Service Provider (IPSP)

PSTN

PSTN

IP Phone

IP Centrex

IP Phone

Traditional Phone

IP PBX (with or without Router)

Internet

IP PBX (with or without Router)

Traditional Phone

Traditional PBX

Traditional PBX

Private IP Network

VOIP Router

VOIP Router

ATM, Frame Relay, or Private Line Network

Source: Distributed Networking Associates, Inc.

display. While IP phones will not replace PCs for many functions, vendors are putting touch-screen capabilities into their IP phones and anticipate that IP phones will interact with the "wireless Web."

Users also are being offered integrated applications like instant-messaging indicators, speech-to-text and visual voice mail; directory services are being driven by contact database applications like Outlook Express or the user's PDA. While some of these capabilities are also found on traditional PBX terminals, the PDA capabilities, as well as visual voice mail, are only available on IP phones. Moreover, it's easier to upgrade IP phones with new software loads, so applications or the newest protocol versions, like SIP or MGCP, can be easily loaded.

Because an IP phone brings more intelligence to each desktop, feature integration and customization are enhanced. Just as users personalize their PC desktop, they can personalize the user interface

and applications as authorized by the network manager—for example, adjusting their own "follow me-find me" routines, setting "do not disturb" or even establishing call-acceptance priorities (e.g., always accept calls from Fred and Steve, but always route Harry and Sue to voice mail).

One of the coming struggles, however, is deciding where certain applications should reside —on the PC, the phone or both. In spite of the movement toward convergence around IP, a single, integrated phone/PC device will not be common any time soon; nobody expects to be doing Power-Point presentations on their phones. The perceived advantage of having "one pipe" does not extend directly to having "one device" on the desktop. But what is expected is a scenario where IP phone users would be able to click on the phone screen to see logs of emails sent by an incoming caller pop up his/her contact information and then press click to talk.

Options expand for powering IP phones

Perhaps the most significant advantage of IP phones is that moves, adds and changes become much simpler. In the same way that Dynamic Host Configuration Protocol (DHCP) enables PC users to avoid having to reconfigure their IP address every time they connect their PC to an Ethernet connection, user profiles and identities can be triggered during log-on, regardless of the IP phone's physical location. This enables "office hoteling" and greatly simplifies phone administration.

There is a down side to disconnecting the user's presence from a pre-set physical location—emergency services like 911 become more problematic, because the phone and user are not tied to a particular street address or desk location. The process of integrating user location updates to the 911 call center (i.e., Public Safety Answering Point—PSAP) must be resolved jointly by the IP phone system supplier and the network administrator.

Another area of concern is power—how to sustain IP phone operation in the event of a power failure. The good news is that the vendors and IEEE have made steady progress to allow DTE power across Ethernet cabling. As specified in IEEE 802.3af, most solutions now use the Ethernet cable to supply an uninterrupted power source.

Another uncertainty is just how much "ease of use" IP phones deliver. On a recent visit to a company that makes IP phones, we were sitting in the lobby waiting for an appointment. The receptionist—who is no dummy—was attempting to connect a caller to an employee. It took her three attempts: The first time, she hung up on the employee. The second time, she transferred the call to the wrong phone in the lobby (we guessed that the IP phone didn't have a point-and-click

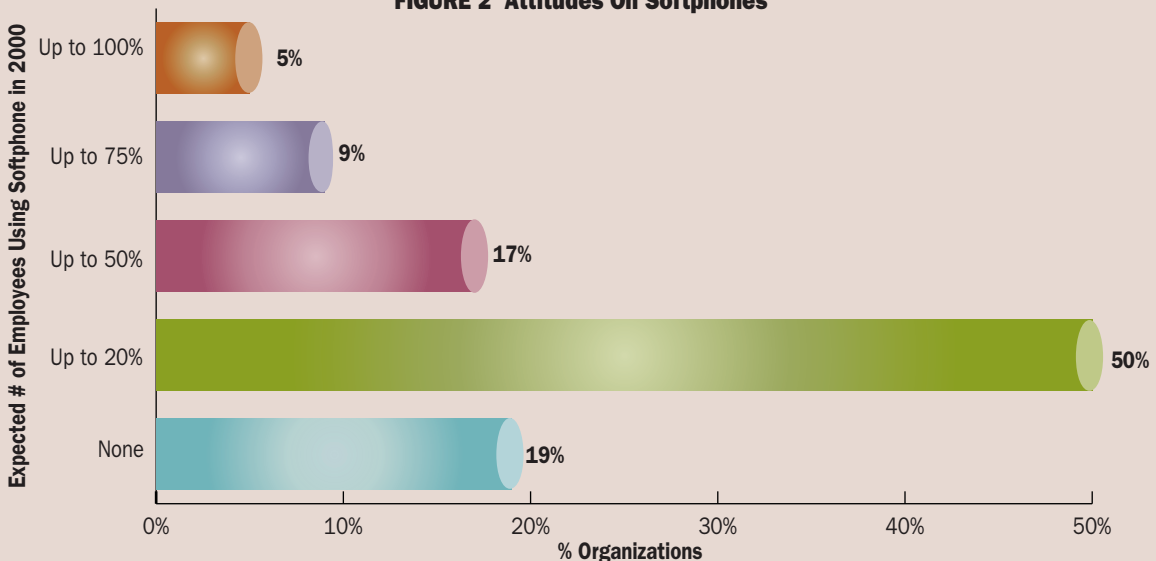interface with a picture of the lobby.) Finally, the third time, it worked.

IP Phone Offerings

All the incumbent PBX vendors—Alcatel, Avaya, Mitel, Nortel and Siemens—have IP phones that deliver a multitude of features as part of their IP-PBX implementations. Mitel Networks, for example, offers integrated Personal Digital Assistant (PDA) hot sync for contact management, and has implemented voice-enabled commands for easier use. It also has demonstrated, although not yet delivered, full-screen color capability.

Avaya, the long-time U.S. market leader in enterprise voice systems, has announced that its new IP phones scheduled for release early this year will use the wireless application protocol (WAP) to capture streaming text—e.g., stock tickers and news headlines—from the Web. Users can program the phones to access and display wireless markup language (WML) content from the Internet or from an intranet. Avaya also can bridge calls from both IP and traditional desktops to an external cellular phone via Avaya servers, and it has a full color, touch-screen IP phone which can access the Internet and corporate websites.

Cisco's IP Phone series, designed under Cisco AVVID (Architecture for Voice, Video and Integrated Data), can interoperate with IP telephony systems based on Cisco CallManager technology, H.323, Session Initiation Protocol (SIP) and, in the future, Media Gateway Control Protocol (MGCP). Cisco claims to have shipped more than 500,000 IP phones, and recent reports from InfoTech and Synergy Research Group rank Cisco as the leader in overall VOIP, including the IP phone market.

FIGURE 2 Attitudes On Softphones

Expected # of Employees Using Softphone in 2000

- Up to 100%: 5%
- Up to 75%: 9%
- Up to 50%: 17%
- Up to 20%: 50%
- None: 19%

% Organizations

Q: Which of the following best describes the future use of softphones (software-based phone) for your organization's employees?

Source: Sage Research, Inc.

Polycom also has jumped on the bandwagon. Its SoundStation IP has a full-duplex speakerphone and can be field upgraded to multiple protocols and platforms. SoundStation comes with graphical LCD display to provide conference room users with a screen-based interface for features like local phonebook and PC access via a Web browser.

Looking Forward

Over the next five years, there's little doubt that the migration to VOIP will make huge progress. With virtually no R&D dollars being spent to develop a next-generation circuit-switched TDM PBX, the migration is inevitable, albeit gradual.

Analysts at Cahners In-Stat predicted last summer that enterprises would spend more than $3 billion for LAN telephony handsets, servers and applications by 2005. That same report identifies the U. S. LAN telephony market-share leaders in 2000 as 3 Com, Alcatel, Avaya, Cisco, Shoreline and Siemens, and claims that those six vendors accounted for 94 percent of the market.

Despite this level of spending, IP phones will not become ubiquitous for some time. According to Lindsay Hughes at Sage Research, the enthusiasm for IP phones is more muted than for VOIP in general. Sage's survey of 141 enterprises evaluating or deploying VOIP found that 31 percent of the respondents expect 50 percent or more of their employees to be using IP softphones by the end of 2002 (Figure 2). Fully half of the respondents expect 20 percent or less of their employees to be using IP softphones in 2002, and another 19 percent do not expect to use them at all.

For now, the most prudent course for enterprises is to evaluate the role IP phones can play in their network. While there are advantages, there is no "killer application" that makes IP phones stand head-and-shoulders above traditional telephone sets. Also, price points are not yet sufficiently attractive to support a widespread, immediate swap-out. Factors within each individual enterprise will ultimately determine when the time is right to begin the migration in earnest□

There's no "killer app"— yet

Companies Mentioned In This Article
3Com (www.3com.com)
Alcatel (www.alcatel.com)
Avaya (www.avaya.com)
Cisco (www.cisco.com)
Clarisys (www.clarisys.net)
Linksys (www.linksys.com)
Mitel (www.mitel.com)
Net2Phone (www.net2phone.com)
Nortel (www.nortelnetworks.com)
Polycom (www.polycom.com)
Shoreline (www.goshoreline.com)
Siemens (www.siemensenterprise.com)