Voice and data convergence

As IP telephony grows more reliable and more affordable, businesses of every size are discovering its real advantages in administrative ease, productivity and cost savings.
Adding voice communications to your network data traffic

IT administrators and CFOs alike are singing the praises of Voice over Internet Protocol (VoIP) phone systems. Is your company ready to consider a switch?

EMERGING TRENDS
Moving from telephones to IP phones
Traditional phone systems are saddled with costly maintenance issues and advanced features such as conferencing and presence awareness (on-demand availability) that are either expensive or unavailable. IP telephony provides feature-rich, easy-to-manage communications for all types of businesses.

SOLUTION INSIGHTS
Securing the message
When voice calls are transmitted as data, they may be as vulnerable as your network. A holistic security plan ensures that sensitive information is protected and call quality is not compromised.

IT BEST PRACTICES
Strategies for success
Plan ahead and address potential bottlenecks and performance problems before deploying a VoIP solution. Once it’s in place, monitor traffic carefully to maximize efficiency and cost savings.

UPCOMING PRODUCTS
Easing the transition to VoIP
VoIP offerings are helping companies merge their voice and data networks, and some products enable a gradual shift, supporting legacy phone systems and VoIP in tandem.
EMERGING TRENDS

Moving from telephones to IP phones

Visit an office complex anywhere in the world, and you’ll see a common theme. Whatever kind of business is being conducted, in whatever language, in whatever location, an individual desktop will have a PC plus a telephone.

The telephones are no more or less important than the lights, the ventilation system and the furniture. You can’t do business without them. And even if the power goes out, the phones are still operable, and help is just a call away.

In a typical office setup, the internal telephone system is managed by a private branch exchange (PBX). This is the “switchboard” hardware that manages extension dialing, call transfers and, often, the voicemail system. When you pick up a receiver and dial a colleague’s extension, the call is routed via the PBX. When you dial a number on the outside, the PBX routes the call via trunk lines to the public switched telephone network (PSTN).

As ubiquitous as the phone systems are, however, research has exposed several pain points associated with managing them. First, companies still have to pay for toll and long-distance calls. These fees aren’t as prohibitive as they were 20 years ago, but firms that conduct business internationally are still affected. A 2005 Computerworld survey of 388 large, midsize and small enterprises found that 27 percent list long-distance charges as one of their top challenges.

Secondly, an even bigger issue with traditional phone systems is dealing with day-to-day administrative chores. In the same Computerworld survey, 44 percent of respondents cited incompatible systems (among branch offices and when setting up new locations), and 40 percent cited costs incurred by moves, adds and changes (MACs) as the biggest challenges to running a phone system.

Enter Internet Protocol (IP) telephony, a set of technology solutions that virtually eliminates the hassles of system incompatibility, management complexity and MAC headaches. In addition to saving money on the back end, IP telephony adds value in a number of ways: supplying advanced features, creating efficiencies and driving productivity gains by merging voice communication with the existing data network.

Nemertes Research provides more insight into MAC costs in its 2005 report, “VoIP Industry Analysis.” According to the report, with a traditional phone system, MAC expenditures range from $90 to $131 per employee, depending on industry sector.

In a survey of 388 businesses, comprising of 40 percent small (1–200 employees), 40 percent midsize (200–2000 employees) and 20 percent large (2000+ employees), Computerworld found that 36 percent of respondents have deployed or are in the process of deploying an IP telephony solution, and another 46 percent are testing or researching potential implementations. (Source: Computerworld, April 2005)
EMERGING TRENDS (CONTINUED)

IP is the established standard for corporate data routing. Several years ago, some companies began experimenting with sending voice calls as data packets via the Internet. The technology was dubbed Voice over Internet Protocol (VoIP). As IP telephony has matured, businesses are exploring the option in increasing numbers, as evidenced by the Computerworld study. Of the 388 companies polled, only 17 percent didn’t have a VoIP research or testing project plan in place.

The theory is simple: Why manage two disparate infrastructures when you can merge the two? Converging the two can be managed easily. Bandwidth can be used more efficiently when voice data is encoded into packets and delivered over the same network that delivers e-mail, files and Web information.

Once the system is in place, the true advantages of IP telephony become apparent. Adding a new user, changing an extension or moving to a new location requires minutes of intervention, not hours. According to Nemertes Research, VoIP MACs cost $8, on average, which represents a 90 percent (or higher) savings over traditional systems. In addition, IP telephony simplifies management and lets administrators and users make adjustments to the system via intuitive software interfaces.

Imagine that a customer is trying to get hold of Joe Smith. Joe may be at his desk, he may be traveling and he may be equipped with a cell phone, a Blackberry messaging device or a laptop. With an IP system, Joe can decide which calls should be routed to his voicemail and which to his cell, and he can choose to be alerted by e-mail, text or instant message when an important call comes through. If Joe is truly unavailable, he can provide the system with a hierarchy of backup contacts, so the customer doesn’t have to wait for service.

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Basic IP telephony setup

In a legacy phone system, individual phones are wired to the PBX, which handles internal call switching and routes external calls to and from the PSTN.

In a VoIP setup, the softswitch (software switch) connects to the PSTN and handles call control functions — relying on the IP network to deliver service — while the gateway translates voice data into packet data and vice versa.
IP telephony is not without obstacles — security concerns, voice quality and power interruptions come up most often.

At the most basic level, voice packets are just as vulnerable to network attacks as data packets, and experts urge companies to approach network protection holistically.

“You have to consider the underlying infrastructure,” says Infonetics directing analyst for enterprise voice and data Matthias Machowinski, in the 2005 InformationWeek article, “Arming Against the Worst VoIP Dangers.” “If worms and viruses bog down your network, it’s a data security issue, of course, but that’s also going to affect voice quality and reliability.”

VoIP brings some concerns of its own to the security table, too. SonicWALL senior director Jonathan Zar points out that unlike closed-circuit telephone connections, where wiretapping requires some physical intervention, voice packets on the IP network can be intercepted. Encryption is the answer here, so the information is garbled in transit and only decoded upon arrival.

Zar adds that when companies roll out IP telephony initially, it’s often to link branch offices with one IP PBX. Because interoffice data traffic is usually carried on a virtual private network (VPN), the packet stream is already protected from general access.

Other concerns include the hijacking of a voice gateway to place unlimited, unauthorized calls across the globe. Spam over Internet telephony (SPIT) is also starting to appear in some consumer versions of the technology. Again, when voice traffic is traveling over a VPN, it’s less susceptible to these threats. But when the Internet “cloud” comes into the picture, problems may arise.

To help guard against such infractions, encrypt your computer-based softphones and/or IP handsets directly. User access should be controlled through password protection, and managers should configure the system to block certain types of unauthorized calls (international, 900 numbers and so on) based on a given user’s rights.

Other general suggestions from industry trade publications Internet Telephony and InformationWeek include:

- Encrypt the voice stream
- Monitor the network with intrusion-detection software
- Use a VoIP-aware firewall and update it regularly
- Secure your servers as you would any mission-critical hardware

To ensure crystal-clear voice calls, corporate VoIP implementations get around the problems of latency and lost packets — which lead to audio jitter and echo — by using network protocols such as Multiprotocol Label Switching (MPLS), which prioritizes voice traffic over other packets in the data stream. Another way to ensure clear voice calls is to employ codecs that encode and decode voice signals with high audio quality or tight compression when there are bandwidth limitations.

Another concern when switching to VoIP is Enhanced 911 (E911) service (which requires that phone numbers be linked to physical location information) and backup electricity in case of a power interruption. Traditional phones draw their power directly from the phone connection, so IP devices must be able to keep users connected even when power is not available. VoIP vendor ShoreTel suggests that managers confer with local emergency service authorities to ensure E911 compliance. In addition, certain ports in each voice switch should be reserved for emergency phones that draw power over Ethernet from the switch or from an uninterruptible power supply (UPS).
When deploying a VoIP solution, managers have to balance the needs of end users with their own wish lists. IT managers polled by Computerworld said they consider system reliability of utmost importance; ease of use, ease of management and scalability to be of high importance; and advanced features to be of less importance. End users cited audio quality as most important, with ease of use and consistent dialing and feature sets a close second and third.

With this in mind, experts recommend a thorough assessment of the existing data infrastructure and the available solutions to maximize reliability and ensure the smoothest transition for end users.

Thomas Nooning, writing for CNET Networks’ TechRepublic, suggests that companies should baseline their networks and determine whether the additional bandwidth, memory and CPU utilization brought on by VoIP will overburden the system. “Evaluate possible bottlenecks, network errors, and average bandwidth usage before putting phones on the network,” Nooning says.

“We saved the cost of the [VoIP] system in toll charges, conference, and long distance, during the first year alone.”

– Henry Svendblad, vice president of information systems and technology, ChartOne (300 VoIP seats)

“Communication is vital to project success and customer satisfaction. With VoIP functionality, we have better access to our workforce and so do our customers. In addition, our workforce has constant access to the resources on our network.”

– Gregg Davis, senior vice president and CIO, Webcor Builders (800 employees)
As businesses explore the cost savings and new revenue opportunities created by VoIP, several product categories — including PBX units that feature Ethernet together with traditional phone connections — have emerged to help ease the transition from legacy branch exchanges.

VoIP-enabled hardware must replace the PBX or work in tandem with it, using a media gateway to translate voice signals into data packets and a softswitch to control call routing. These devices connect to the IP network via Ethernet and to the PSTN via trunk lines, and they often integrate voicemail boxes and auto-attendant features, so callers can navigate the employee hierarchy with their phone keypads.

The latest of these are aimed at different organizations based on size and often include a built-in network router and firewall software. Once a VoIP system is in place, it’s eminently scalable; adding new devices is practically a matter of plug and play.

In addition to the IP PBX, companies may want to deploy IP phones or PC-based phone software to take full advantage of the new features enabled by VoIP.

The initial outlay in terms of infrastructure and devices may seem costly, but as Nemertes Research analysts Robin Gareiss and John Burke point out in their 2005 “VoIP Industry Analysis” study, the savings driven by MAC ease management simplicity, and improved productivity can exceed $50,000 per user per year, depending on industry. It follows that judicious spending on VoIP products can be a very sound investment for the future.