



## Voice over IP is Transforming Business Communications

Voice over IP (VoIP) is changing the world of telecommunications. It entails the transmission of voice calls over data networks that support the Internet Protocol (IP), the same technology that moves text and images around the global Internet. The technology has matured to the point where service providers of all kinds offer or plan to offer VoIP services, including traditional long distance carriers, incumbent telephone companies, and competitive local exchange carriers.

### Why VoIP?

According to research commissioned by AT&T and carried out by Economist Intelligence Unit (EIU) in 1Q2004, the biggest draw of VoIP for corporations (87%) is its ability to reduce the cost of calls...

The same VoIP technology is also supported in today's newest business phone systems. IP phone systems are becoming popular among businesses of all types and sizes, and are on track to replace the traditional PBX or key telephone system in many offices. In addition to cost savings on long distance calls and easier administration, IP phone systems offer a powerful "convergence" capability that combines access to voice messages, email and faxes through a single browser interface. The resulting cost savings, efficiencies and productivity improvements go a long way toward helping businesses become more competitive in today's fast-paced world.

### Ready for Primetime

VoIP technology is ready to deploy today. According to various industry estimates, up to 50 percent of all companies that have a private intranet are already running or experimenting with integrated voice-data applications and IP telephony. The technology has

### VoIP Market

According to Insight Research, IP voice is projected to be a \$26-billion market in North America in 2004.

progressed to the point that there is little or no reason for companies to delay at least a phased implementation of VoIP solutions. Quality concerns are rapidly being overcome by vendors and service providers.

## How VoIP Works and What it offers Your Business

With VoIP technology, ordinary speech is converted to data, the data is compressed, and the compressed data is arranged into packets. The packets are sent over a data network until they reach their destination, where they are turned back into ordinary speech that can be understood by the recipient.

The data network that carries voice calls in the form of IP packets may be the public Internet, a carrier's private IP backbone, or a company's virtual private network (VPN). Numerous Internet access arrangements are possible, including dedicated facilities and DSL. With an IP phone system connected to an office LAN, voice calls can be made or received by anyone in the organization. Long distance calls can be made to different locations on a company's VPN at no cost, while "off-net" calls are automatically routed to the public telephone network, and are often bundled in a cost effective, flat rate pricing plan.

As many businesses have discovered, Internet voice technologies not only can slash local and long distance bills, they also provide far greater functionality, such as:

- **Unified Messaging** -- All communications -- voice messages, faxes and emails -- are stored in a universal mailbox that can be accessed anytime from the telephone or PC. Remote telephone access can be used to play back voice messages and reroute fax and email messages to any person anywhere. Users can even have email messages read to them if the IP phone system is equipped with text-to-speech technology. This "universal messaging" capability eliminates the need for users to check several devices throughout the day to retrieve and respond to all of their messages in a timely manner.
- **Moves and Changes** -- Many companies that own a traditional PBX have grown accustomed to the expense and hassle of working with a vendor to take care of common moves, adds and changes. Today's IP phone systems make it easy and economical to move people around or accommodate new employees. It's often as easy as plugging the IP phone into a data jack (RJ45) at another location -- the system typically will recognize the move automatically.

- **Calling Features** -- In addition to device recognition, calling features are implemented by management software installed on a dedicated server, which gives users access to commonly used functions such as call hold, call transfer, call forward, and calling party ID. Advanced functions, such as multiple lines per phone, unified messaging, and directory services also are implemented by the management software.
- **Management Information & Reports** -- Businesses that find it difficult to access the information their phone systems generate to monitor and manage call activity will appreciate IP phone systems. With a click of the mouse, the administrator can access the IP system via a web browser to retrieve management reports. Call detail records, saved in a single database for example, enable administrators at any location to easily and conveniently gather telephone and IP call record information. In addition to being able to track calls and improve customer service, this kind of reporting can quantify the cost savings or return on investment of the IP phone system.

An IP phone system also supports all the common management functionality of a traditional PBX and more:

- **Call billing** – This feature is used where calls have to be linked to client accounts for future billing, as would be the case with a legal firm, advertising agency or consultancy. With the call in progress, the user selects a name from the list of the company's clients. The corresponding case/ticket number and call details (e.g., time, duration, ANI) are saved so phone time can be documented and billed back to the client.
- **Call detail reporting** – This feature allows the administrator to view the current call detail records in a Web browser. Calls can be filtered by date range, extension and direction (inbound/outbound/local network). This information is typically used for internal accounting and charge-back purposes.
- **Real-time monitoring** – This feature includes the status of analog and digital trunks, including their level of utilization, voice mail storage capacity, IP bandwidth utilization and the relative quality of the IP network. Key IP network-monitoring metrics that greatly influence VoIP voice quality include latency, jitter and dropped/lost packets.

## Managed vs. Premises Based Implementations

VoIP solutions can be implemented in several ways. Large companies that already manage their own IP networks will likely already have the technical expertise onboard to add VoIP. Smaller businesses might be better off subscribing to a carrier-provided, managed service. Still another alternative is to rely on a systems integrator to choose appropriate products and configure them for reliable operation on the data network. Internal staff can then be trained in maintaining, expanding and managing the VoIP system. The possible implementations of VoIP can be summarized as follows:

- **Managed VoIP (IP Centrex/Hosted VoIP)** -- The easiest way to implement VoIP technology is to subscribe to a carrier service in similar fashion to the way Centrex is offered. Instead of relying on a premises-based IP switch, the carrier offers VoIP services from its IP telephony switch at the central office. The carrier takes on the burden of maintaining and managing the equipment so the subscribing company can focus on running its business. With shrinking telecom budgets and limited capital availability businesses of all types and sizes are looking at hosted solutions like IP Centrex as the next productivity platform.
- **IP Telephony Add-ons** -- Another way to implement VoIP is simply to buy an add-on system that interfaces with a PBX. This strategy preserves the existing investment and saves money on the cost of upgrades, while providing a smooth transition to VoIP technology and a more cost-effective way to accommodate organizational growth. The two systems can even work together such that the VoIP system (i.e., gateway) only handles call overflow from the PBX, thus minimizing traffic load on the data network. Calls that are directed to the data network will first pass through the add-on system, where call management software determines the call routing. Phones that are directly connected to the add-on system will have calling features configured and controlled from there instead of at the PBX.
- **New IP PBX** -- Of course, a company may choose to entirely replace an existing PBX with a VoIP system. This approach may suit companies that are convinced of the inevitability of VoIP and the advantages convergence can bring to their business in terms of productivity, customer service and competitiveness.

## VoIP Standards –The Basis for Interoperability

First-generation proprietary VoIP products have given way to those that adhere to accepted standards for interoperability. The two important standards are the H.323 umbrella recommendation from the International Telecommunications Union (ITU) and the Session Initiation Protocol (SIP) from the Internet Engineering Task Force (IETF).

Both H.323 and SIP define mechanisms for call routing, call signaling, capabilities exchange, media control, encryption, and supplementary services. H.323 is the older of the two protocols, valued for its manageability, reliability and interoperability with the PSTN. SIP is a newer, more streamlined protocol that offers scalability, flexibility, and ease of implementation when building complex systems over IP networks. SIP is widely regarded as the successor to H.323.

Neither H.323 nor SIP, however, addresses the issue of Quality of Service (QoS). This is where routers come into play -- rather than deal with this issue by adding more bandwidth, which could negate the cost savings aspect of VoIP, routers have to be programmed to prioritize all traffic offered to the network, giving preference to voice.

When choosing a VoIP system, vendors should be thoroughly quizzed on the relative advantages of the standard they rely on and any interoperability limitations, if any, which may arise. Some offer converters that translate between H.323 and SIP devices, allowing both protocols to coexist on the same network. Find out if this arrangement adds complexity to network management. Other vendors claim to support H.323 now, but will adopt SIP when the interoperability issues are solved. In this case, find out if your system is upgradeable, how easy it can be upgraded, and if you will be charged for the upgrade.

## Be Aware of Possible Technical Hurdles

As with any popular technology, there is plenty of marketing hype about VoIP. However beyond the hype are some technical issues that should be investigated thoroughly before determining that VoIP is the way to go.

Among these issues is what impact VoIP may have on other network applications. As a real-time application, VoIP traffic must have priority over other, less urgent applications if the system is to perform comparably to the Public Switched Network. So implementing VoIP may mean having to add bandwidth or upgrade routers to implement traffic prioritization schemes. A good provider will help you assess your company's network readiness for VoIP and recommend ways of correcting any deficiencies before you commit to a solution.

Call capacity is another issue that must be considered. There are fixed-configuration VoIP systems that cost less, but cannot be upgraded to handle increased call volumes resulting from organizational growth. There are VoIP systems that can be upgraded to handle increases in call volume to keep pace with organizational growth, but which may entail higher up-front cost. Choosing wisely may require analysis of historical traffic averages and an assessment of peak usage. A reputable vendor will assist you in gathering and analyzing this information.

Redundancy should be built into the VoIP network to ensure that calls can get through during periods of congestion or link failure. Users are accustomed to experiencing brief outages of the data network, but have a very low tolerance for phone service failures simply because they are not very common on the circuit-switched PSTN. Find out how the vendor or service provider handles these situations.

## Are You Ready for VoIP?

Businesses that have been following the progress of IP telephony, but are still undecided about its relevance to them need not put off a decision any longer. If any of the following scenarios apply to your company, IP telephony may be the answer:

- A business is a good candidate for an IP telephony solution if it currently has separate voice and data networks, as well as separate personnel and budgets, for maintaining these services. VoIP eliminates these redundancies and associated costs.
- Likewise, a business that seeks administrative simplicity and ease of use to increase productivity and contain costs is a good candidate.
- Any business that continually incurs extra expenses when integrating new office employees, remote workers or telecommuters into the current telephone system should also look at VoIP.

Finally, if your business wants to become more competitive through better management of calls and capturing every opportunity when the phones ring, an IP telephony solution offers features such as voice mail, auto attendant, and automatic call distribution. And with easy access to all kind of management information, performance, spending and savings can be readily and continuously measured in real time.

## Steps to Selecting a Provider

As your organization begins to consider IP Telephony it is a good idea to address these important issues when selecting an appropriate solution.

- Make sure the new system supports open standards so you won't get locked into one company's proprietary technology. Find out if your existing investment in equipment can be used during the transition.
- Determine how the new system would transform work in your company. Is there support for real-time collaboration, plug-and-work for remote employees, multimedia access? How will these new capabilities improve how you operate?
- Look for location transparency, integration with mobile devices, and visual access to call handling features.
- You've been using tried-and-true features with your current telephone system, so ensure that the new system will continue to support what you need. Make sure the IP system you select can do it all now, or can be upgraded in the future when you grow and need important new capabilities.
- Establish buying criteria to evaluate all potential providers based on number of years in the business and financial stability. Review the range of telecom and networking products they offer.
- Make sure providers offer service guarantees and extended warranties. As a gauge to service quality, find out what certifications their technical staff has achieved. Above all, ask for and check customer references.
- Finally, determine your projected return on investment by evaluating the savings and the combined expense of equipment and services. This will enable you to perform an "apples to apples" comparison.

## The Bottom Line

After the number of providers has been narrowed down, start with a phased implementation and if the quality and performance of the VoIP solution meets your expectations and the price is right, you're ready to negotiate a timetable for installation across the enterprise that supports your organization's requirements.



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