

HEISON CHAK

VoIP watch



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VOIP (VOICE OVER INTERNET

Protocol) is becoming an increasingly popular tool for business. For the system administrator, VoIP means new protocols to learn, new security issues, and new servers to be configured and supported. You will also want to become familiar with a long list of acronyms, as VoIP, like the telecoms that precede it, is speckled with TLAs and FLAs (three- and four-letter acronyms). Over the next year, I will expound upon these topics and more, so you can understand how VoIP works and how to support it in the networks you manage, as well as how to take advantage of it personally.

VoIP is now known as the emerging technology that allows home users and businesses to save money by placing calls over the Internet. It brings innovative applications into telecommunication, mainly through the ability to remove the constraints of circuit switching and replace it with packet switching. As a result, larger call volume is achievable on the same raw bandwidth as the PSTN (Public Switched Telephone Network). While developers are striving to improve reliability and availability of VoIP, security experts and government agencies are trying to put in place regulations and processes to protect the interests of end users as well as operators.

Many are using the terms IP Telephony and VoIP interchangeably. VoIP samples analog voice signals, digitizing them into 1's and 0's, then packetizing them before placing them on an IP network for transmission; IP Telephony takes it one step further and supports other POTS (Plain Old Telephone Service) services (e.g., facsimile, modem communications) that PSTN subscribers have been using for decades. In essence, VoIP can be thought of as a subset of IP Telephony.

Benefits of VoIP

Although VoIP has only gained popularity and momentum in the past two years, the technology has been around for much longer. In the mid-1990s, while most homes were using long distance service provided by their local telephone carrier, a.k.a. ILEC (Incumbent Local Exchange Carrier), a wave of CLECs (Competitive Local Exchange Carriers) offering competitive long dis-

tance and international rates were born. Many were early adopters of VoIP technologies.

Corporations budget hundreds of thousands of dollars every month on communications to maintain operation of their businesses. With the growth of the Internet, the improved reliability and availability of this global network allow IT managers and decision makers to offload more and more voice calls onto this public network. Interoffice communications and calls destined for PSTNs (Public Switched Telephone Networks) are equally suitable for VoIP switchover. Besides reducing the per-minute cost (or bypassing toll charges altogether), many corporations also find themselves receiving large tax benefits. What was previously budgeted for talk time may now be allocated to expanding the IT infrastructure to cope with the higher demand of bandwidth and stability on IP networks.

Home users may find themselves overwhelmed with billboard and TV commercials, and there are mixed reactions to the introduction of VoIP service. While many are enjoying the convenience and portability of VoIP, others worry about the reliability of the service. Typical features of VoIP in SOHO (Small Office, Home Office) deployment may involve:

- Simplified subscription process and easy setup
- Ability to receive calls on a hometown number in another city or country
- Free or bundled pricing on calls made nationwide
- Voice-mail delivery via email
- Failover from VoIP to landline
- Ability to modify call features (e.g., call forwarding) online

In 2005, 16% (42 billion minutes) of all voice calls were made using VoIP,¹ and that number is growing. Despite the popularity and acceptance of VoIP, there are a number of ongoing concerns. Many early adopters have reported problems with VoIP, such as:

- Dropped calls
- Line echo
- Clipping sounds
- Touch tone recognition
- E911

While some of the problems require changes in legislation or government intervention, most are the result of placing real-time media in networks originally provisioned for different purposes. With VoIP-aware networks and improvement in protocols and codecs, many issues that adversely impact one's experience with VoIP can be eliminated.

Opportunity to Gain User Trust

One of the benefits of VoIP is the consolidation of voice and data networks running over the same physical wiring. Although this brings great savings to the IT infrastructure, it may also be one of the contributing factors to deployment failure. In traditional PBX systems, dedicated telephone (e.g., Category 3 Twisted Pair) wirings provide the physical connectivity between handsets and the telephone switch. Not only is quality of service maintained, but PBX systems often provide security by transmitting proprietary digital signals across these cablings. With traditional PBX systems replaced by VoIP, security and availability become significant considerations. With voice and data packets mixed together, anyone with access to the routers and switches the packets are transmitted on can potentially compromise the integrity of the media stream. VoIP-ready networking equipment is essential to a successful deployment, as it makes it easier to

1. Statistics from TeleGeography:
[http://www.telegeography.com/press/
releases/2005-12-15.php](http://www.telegeography.com/press/releases/2005-12-15.php).

differentiate between voice and data packets, allowing it to prioritize time-sensitive media according to the urgency of those packets. Improving QoS can better ensure timely delivery of packets and, therefore, higher availability.

On traditional PBX systems, it is not unusual to see telephone switches and small UPS units all crammed into tiny riser rooms. When these legacy systems are replaced by VoIP, UPS power may need to be increased to support network switches, routers, and VoIP handsets. Cooling capacity and air circulation will very likely require adjustments. Due to the nature of IP networks, VoIP outages are more likely to occur as compared to the PSTN. It is considered good practice to keep a couple of POTS lines for emergencies.

Communication between IT professionals and users plays a significant role in the success of any major project. Since VoIP allows for deployment in phases, it may be worthwhile to spend time and share with users the potential enhancement that VoIP can bring to their communication needs.

Gathering Requirements

VoIP provides many features, but not all may be beneficial or suitable for an individual or organization's needs. It is important to understand which VoIP application can most significantly enhance business development or daily communications. For example, if a corporation has high-volume teleconferencing requirements, it may be more cost-effective to acquire VoIP conferencing-capable servers to work with existing legacy systems rather than spend resources replacing the entire system with technologically advanced handsets.

CDR (Call Detail Records) logs and phone bills are generally good places to start investigating where telecom resources are spent. If long-distance or international calls show up frequently in these log histories, it may be time to investigate more competitive pricing. Some VoIP providers offer 3–5 cents per minute charge to major cities when most PSTN long distance providers are still selling 20–50 cents per-minute rates.

In terms of providing VoIP services, some VSPs (VoIP Service Providers) only provide call termination (e.g., allow incoming calls only for toll-free service), while others provides call termination as well as call origination (i.e., incoming and outgoing calls). Most residential VoIP service on ATA (Analog Telephone/Terminal Adapter) provides incoming and outgoing capabilities, but may not support simultaneous calls. There exists VSP wholesalers that support multiple incoming and outgoing calls, with toll-free numbers termination, and the best part—no monthly charges.

Moving Forward

There are pluses and minuses to any technology, and VoIP is no exception. On one hand, it allows for feature-rich deployments with relatively low ongoing costs. Communication becomes much more efficient and affordable, especially for those who travel a lot (e.g., salespeople, field engineers). In larger corporations, savings as a result of toll bypass may be significant. End users of commercial deployment are likely to enjoy the flexibility of taking the VoIP ATA away from their hometown while they travel, or the ease of giving overseas relatives a hometown number to save on long distance charges.

On the other hand, VoIP is one of those technologies that is evolving quickly. Because of that, there aren't very many standards and guidelines to allow long-term survivability. Carriers and IT managers are having to face the pros and cons of different technologies and interoperability issues. A classic example would be the two competing protocols H.323 and SIP. Although favored by the academic world, SIP still has some of the same problems that have haunted H.323 (e.g., NAT/firewall issues). Until one of these protocols becomes dominant, deploying VoIP-aware routers and switches that support both protocols will guarantee a safer investment.

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