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TEXAS INSTRUMENTS

VoIP Positioned for Growth among Small Businesses:
SMBs Ringing Up VoIP in a Big Way

Introduction

Voice over Internet Protocol (VoIP) has already made its mark in the residential and enterprise marketplaces and now, for a number of reasons, small and medium sized businesses (SMBs) are rapidly adopting the technology. Glowing predictions of phenomenal growth have grabbed the attention of vendors, technology providers, third-party developers, value-added resellers and system integrators, service providers and small businesses themselves. The Yankee Group, for example, projects that the SMB market for VoIP will top one billion dollars by 2009, a vertiginous growth rate considering the market's size was just $41 million in 2003, according to a study by InfoTech.

A number of factors have come together to bring this marketplace to the brink of such phenomenal growth. But, just as critically, several very salient factors over the short and longer term will be critical to establishing VoIP as the dominant voice communications technology for smaller businesses.

The Right Context

Setting the stage for the ascension of VoIP in the SMB marketplace, several contextual factors have fallen into place. Most basically, the ready availability of high-speed broadband Internet access for SMBs has been essential. In addition, VoIP technology itself has overcome the fits and starts it encountered early on in the consumer marketplace. The quality of voice provided by VoIP technology has outstripped that of the "carrier grade" analog voice technology of the public switched telephone network (PSTN). Indeed, the potential for high-definition (HD) voice quality over digital voice channels in the future places the voice quality of VoIP technology head-and-shoulders above that of the analog circuit-switched infrastructure.

The rapid growth in the number of SMBs has also given more than enough impetus to technology developers to target the special requirements and prerequisites of this marketplace. Most experts readily acknowledge that the 35 million SMBs worldwide are a key engine for global economic growth and this will only continue in the future.

Of course, many of the SMBs that comprise this marketplace are eyeing aggressive growth plans that will transform them into larger regional companies and eventually global enterprises. Such is the nature of business. VoIP fits well into these plans because it is pertinent to the two most basic concerns of businesses, revenue-generating opportunities and profit-enhancing, cost-reduction initiatives.

Incentives for SMBs

As the technology continues to evolve, there is plenty of incentive for SMBs, both today and in the future, to migrate to VoIP. Practically speaking, the immediate effect that VoIP has on a business's operational cost structure is plenty of motivation, in and of itself, for the migration. A recent study by IDC found that VoIP could reduce telephony related expenses for businesses by some 30 percent. But the longer term implications and potential that digital technology holds for a firm's costs, revenues, profits and growth is particularly undeniable and powerfully attractive.

With VoIP's ability to reduce local and long distance communications costs, SMBs can be more aggressive about growth since a portion of the company's expenses can be shifted from pure operational aspects of the business to market outreach and sales activities. But beyond the face value of reducing telephony bills, the greater flexibility and scalability of VoIP will also lower the operating cost structure that SMBs face.

In the past, growth-oriented firms have continuously battled to hold down the cost of "moves, adds and changes," those telephone-related expenses that come with growth when new employees join the firm or when facilities are altered and expanded. In fact, these expenses can become quite formidable. Typical service call charges by a PBX vendor can range from $100 to $400 per move, add or change. It has been found that an employee typically moves his or her desk once a year, generating a telephone-related cost of anywhere from $75 to $135. Because of the software programmability and local intelligence of VoIP gateways and IP phones, the cost associated with a firm's growth pains can be mitigated dramatically. The plug-and-play capabilities of VoIP PBXs, gateways and IP phones allow a phone to be unplugged from one location and plugged into another with little or no human intervention at all. Moreover, the resources needed by digital systems to serve a growing number of employees are easily scaled upward as the SMB expands. In addition to reducing those relentless monthly bills every company faces, the flexibility of VoIP gives SMBs the opportunity to streamline business processes by converging what has been two distinct networking technologies – voice and data – into one. Computer/telephony integration (CTI) holds great promise for improving a business' customer relationship management (CRM), telecommunications outreach initiatives and other strategic processes.

Revving the VoIP Engines

Chief among the technologies that are accelerating the already rapid adoption of VoIP in the SMB marketplace are digital signal processors (DSPs). The intense real-time capabilities and low power consumption of DSPs, coupled with a powerful yet flexible VoIP software architecture that operates on top of this hardware has enabled a potent mix of hardware and software that supports the features and performance SMBs demand of their VoIP systems and services.

Texas Instruments (TI) DSPs have the power to support hundreds of voice, video and data channels on a single device. But optimizing the raw capabilities of any processing engine requires fine tuning the technology to the application at hand. TI has leveraged its comprehensive silicon and application-specific software into a variety of highly integrated system-on-a-chip (SoC) devices optimized to the idiosyncrasies of VoIP. Moreover, the company's field proven Telogy Software® has already implemented more than 500 million VoIP ports in the real world. Supporting the most advanced coders/decoders (codecs), sophisti-

cated echo cancellation algorithms and an overarching framework with the flexibility needed for today's current applications and tomorrow's new developments, Telogy Software brings to bear the processing power of TI's DSP technology on the requirements of the SMB marketplace.

In addition, the open nature of TI's VoIP software framework is critical to the third-party developers such as value-added resellers (VAR) and system integrators which have played such a central role in the SMB marketplace. Many of these third-parties bring considerable value to SMBs by adding operational capabilities and processes directed at a certain vertical market segment of small businesses, such as small retailers, medical or law offices, call centers or other types of SMBs.

TI's VoIP technology has been deployed in a wide range of devices targeted at the needs of SMBs; among them are IP Phones, low density voice gateways and the infrastructure equipment used by hosted service providers. TI provides solutions including SoCs, DSP devices, and VoIP software that are optimized to shorten equipment manufacturers' time-to-market and support service providers' ongoing requirements for manageability and scalable growth (see Figure 1).

VoIP System or Service?

The flexibility of TI's solutions for IP phones, gateways and other VoIP products is also playing a part in hastening the widespread adoption of VoIP among SMBs. Because of this flexibility and processing capability, a variety of different features are available to deliver the benefits of VoIP to small businesses.

On one hand, an SMB may decide to replace its old analog PBX or analog key system with a new on-premise VoIP PBX or gateway. Assuming the business has employees who have been managing the old PBX, this scenario could work effectively, following the proper training and learning process for the on-site managers of the VoIP systems. Third-party VARs, system integrators and service providers could also provide ongoing support to businesses that are deploying VoIP systems in their central offices and outlying locations.

But a substantial number of SMBs will probably not have the required technical expertise on-staff to manage and coordinate a converged communications/computer network. Because of the flexibility of VoIP technology, these businesses will not be excluded from the benefits of VoIP. Service providers and network operators are seizing this opportunity to generate additional revenues by launching hosted VoIP services targeted at smaller businesses. Depending on the size of the SMB and other considerations, the locally deployed hardware for hosting a VoIP service can be minimal, or the business might opt to implement gateways or other types of VoIP systems for aggregating calls locally.

Of course service providers and network operators have their own set of requirements when evaluating technologies to deploy and one very critical capability is always manageability. To obtain and retain users for their services, providers must have a quality management system that will ensure customer satisfaction by maintaining a high standard of service. TI's PIQUA™ technology performs this function. It has a broad range of quality management elements that have been deployed in several of TI's VoIP solutions. Since the company's technology is present at practically every level in IP-based networks as well as the public infrastructure, PIQUA management elements can provide unprecedented operational visibility to service providers. In fact, PIQUA can be used along with management programs to monitor the ongoing performance of network nodes in real-time so that corrective actions can be taken to ameliorate less than optimum operating conditions and retain the goodwill of users.

Serious Security

When it comes to security, the reality of VoIP is that a phone essentially becomes a computer connected to the Internet. The security hazards relating to personal computers and other types of data processing systems connected to the Internet have been well publicized. Lapses in security can range from the inconvenient to the catastrophic; from malicious hackers to denial-of-service (DoS) attacks, viruses, worms and other sorts of security breaches. TI has devoted considerable effort to developing strong yet transparent security measures for its VoIP technology. For instance, static packet filters (SPF) protect IP phones, gateways and IP PBX systems from DoS attacks while hardware-accelerated encryption and authentication algorithms form a strong layer of security against viruses, worms and other types of harmful active software programs.

Future-proofing

Even a cursory examination of the trajectory of digital technology over the last decade would indicate that the upward slope of VoIP technology is still in its early stages. Certainly new levels of integration with computer and data processing technologies can be expected over the short term. In addition, the coming of age of new infrastructure architectures like IP Multimedia Subsystem (IMS) will allow further integration of wireline and wireless IP technologies. With IMS, service providers will be able to operate one IP-based infrastructure for all voice, data, computing and video services.

Moreover, totally new and currently unforeseen applications of VoIP can be expected in the SMB marketplace. For example, workspace virtualization on VoIP systems or through VoIP service offerings will give smaller business access to voice features and functionalities that were previously only available to large enterprises with expensive on-site PBX systems. As a result, the SMB's voice-based customer support and management systems will have the same responsiveness and integrated computer capabilities as those of global enterprises.

Continuing the Growth

Given its position as an industry leading provider of silicon and software for a broad range of VoIP technologies, including infrastructure systems, IP phones, customer-premise gateways and IP PBXs, TI will continue to perform a central and critical role in the rapid growth of VoIP among small and medium size businesses.

Example End-Equipment Enabled by TI VoIP Technology for the SMB Marketplace

System	Characteristics
Low-end IP phone	BOM less than $15 Single channel, no conferencing One- or two-line LCD 10/100 Ethernet TI embedded OS - BIOS
High-end IP phone	Wideband audio/HD Voice Color LCD USB Bluetooth Support Video streaming Security/Denial of Service Prevention High-Level OS – Linux, WinCE Java applications Multiple codecs (G.711, G.729ab,G.722.2, G.722, GSM, etc.) Multi-channel conferencing on the phone
High-end IP phone	Two or four full-featured voice channels. Support for multiple configurations (FXS and FXO) Multiple codecs (G.711, G.729ab, G.723, GSM, etc.) Advanced Routing
Four- or Eight-Channel Gateway	Up to 8 full-featured channels with low bit rate (LBR) voice codecs on a single chip Up to 16 PCM channels T.38 fax support Industry recognized echo cancellation (64 ms tail) SRTP Security
24- or 32-channel T1/E1 Gateway	Up to 32 full-featured channels with low bit rate (LBR) voice codecs on a single chip Up to 64 PCM channels T.38 fax support Scalable for single or multiple T1/E1s Conference bridge application Industry recognized echo cancellation (128 ms tail) Packet loss recovery support SRTP Security Modem over IP (V.152)

Table 1

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