



How Small and Medium-Size Firms Migrating to VoIP Technology Can Create Significant Value with UNIVERGE®360

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Executive Summary

According to a recent AMI Partners' research study, small and medium-size businesses (SMBs), or companies with up to 999 employees, are considering adopting converged communications services in greater numbers than ever before; this trend is only expected to become more prominent over time.¹

This paper focuses on how SMBs can benefit from approaching their VoIP migration using a framework called UNIVERGE®360.

UNIVERGE360 provides business decision makers with a logical and comprehensive point of view that makes sense of the confusing array of telecommunications options available to SMBs today. It simplifies the decision-making process by basing the decision on business needs rather than allowing the decision to be based on technology needs.

The UNIVERGE360 approach emphasizes that the first step to migrating to VoIP technology requires determining what SMB employees need to succeed—what they need in terms of information and communications with other employees.

This Viewpoint Paper goes on to review the business benefits of migrating to a VoIP converged network; it asserts that voice is the key VoIP application and underscores the poor outcomes that can result when voice is treated like data.

UNIVERGE360 Overview

The UNIVERGE360 approach places employees of SMBs squarely at the center of communications. Before a technology discussion can begin, UNIVERGE360 asserts the need to look at employees in the organization, taking into account their distinct roles in the organization. Once we have an idea of the business information needs of all the roles within the SMB, we can determine the infrastructure, applications and tools your employees need in order for your organization to compete and win in the marketplace.

The following diagram visualizes the UNIVERGE360 approach. It asserts that every business confronting the need to excel in the marketplace strives for a Unified Business. As a part of the Unified Business and at the most basic layer resides the need for a Unified Infrastructure which corresponds to the basic components of any telecommunication network, i.e., stations, trunking, hybrid/IP connectivity, etc. Building on that Unified Infrastructure layer is the Unified Communications layer, including value-added applications like mobility, desktop integration, collaboration, presence, contact centers, vertical markets, etc. When the elements of these two layers are defined, organizations then look more closely at the needs of the individuals to see if there is a need for integration with business processes such as an ERP, CRM or SCM system. At this level, your company's communications system becomes integrated into other company business processes. This is sometimes called Communications-enabled Business Process (CEBP).

NEC's UNIVERGE®360 Communications Model



Not all SMBs will fit this framework, but many will. The degree of conformity will depend on the extent to which employee roles are defined and rigidly fixed within the organization, and an organization's need to rapidly respond to changing internal and external factors, for example, market conditions. As a result, some SMB organizations that begin by developing a Unified Infrastructure, otherwise known as a converged environment, may not proceed to Unified Communications (UC); likewise, some that progress to UC may not advance to a role-enabled Unified Business status.

The First Step: Role Determination

Before technology is considered, each employee's job description should be considered to learn that person's role-based needs:



- In the case of each employee, the ways technology can be used to:
 - Make the job easier or faster
 - Instantly store data
 - Improve customer satisfaction
 - Reduce cycle times
 - Ensure privacy, if required
 - Reduce cost
 - Improve profitability
- The quality of voice communications required
- Computer telephony interoperability requirements

Step Two: Application Selection

Once role-based needs are defined, the UNIVERGE360 framework requires organizations to select the applications workers need to support their roles and meet the specific requirements identified in step one. Then, armed with the right information, organizations can begin to make a network or infrastructure technology decision.

UNIVERGE360 Generates Considerable Business Value

Adopting this simple, but powerful, framework for thinking about the way information flows through the network, UNIVERGE360, enables organizations to realize significant value. Just a few of the many areas of value creation include:

1. The *focus* of all investment decisions will be worker productivity, process optimization and customer satisfaction, as they should be. Organizations will no longer invest in network technologies and plan for productivity gains; they will instead identify the productivity gain required and plan a network investment that ensures it is achieved.
2. No longer will organizations purchase enterprise-wide software licenses when only specific workers require use of an application. In larger SMB organizations, the numbers of workers using a specific type of software may be sufficient to warrant enterprise-level discounts despite deciding against universal licenses.
3. The worker's role-based need for information and communication will drive network configurations and delivery-quality decisions. IT organizations will not have to gauge whether a byte of data is more important than a packet of voice or the other way around; or whether both must be delivered with equal quality. This insight will drive substantial cost savings when optimized across the organization.
4. Decisions like security protocols and data storage needs will be determined based on workers' role; they will be implemented as required across the organization on a worker-by-worker basis. By optimizing delivery of these costly network elements, organizations can save considerable amounts of revenue.

Looking at Your Company in Context: The VOIP Revolution

VoIP technology holds the promise of greater flexibility, control and, ultimately lower cost for the organizations that adopt it. It is this promise that is driving the migration from traditional telephony to Voice over IP (VoIP) telephony, turning it into a major technology trend. According to a BT INS study, 62% of respondents either have deployed or are in the process of deploying VoIP across their networks – up from 44% in 2005.² Another 18% are designing or testing VoIP deployments for limited network segments,” reported Network World.com in April of 2007.³ The survey included 157 IT professionals at companies of all sizes. If VoIP is inevitable, it is crucial to understand why as well as how to make it work for your company.

But when should organizations consider the transition to VoIP? And how can they best take advantage of its features and benefits?



First and foremost, the UNIVERGE360 approach suggests that VoIP (or any other network level technology) should be implemented when the organization needs it to support emerging applications and worker’s needs or when the total cost of ownership of an existing (older) system becomes too high.

In the case of VoIP, most experts agree the preponderance of business voice applications will be VoIP-based in just a few years. In fact, Jeffrey Snyder, manager of enterprise communications for Gartner has been quoted as saying, “By 2009, there will be no sales of traditional phone systems. Sales of traditional TDM endpoints in the U.S. will be under 10% of all endpoints systems. And those will be extensions to existing systems. All new system sales will be pure IP, or hybrid systems that can support both [TDM and VoIP].”⁴

As one can see, organizations are facing a revolution of sorts. As voice and data applications have trended toward increasing interoperability between the two previously separate platforms, equipment providers have stepped up the manufacturing of VoIP solutions in support of those applications. And organizations have begun migrating to VoIP.

If your organization has not yet adopted VoIP, or if currently installed VoIP is not supporting role based applications as effectively as desired, a thorough review of VoIP’s basic advantages - and particularly the critical voice element of the technology - can be a useful exercise.

VoIP Advantages

Even in the absence of advanced applications, VoIP provides companies with a highly useful, flexible set of capabilities. When role-based applications are enabled by VoIP, the advantages multiply.

A key benefit of VoIP is a single converged architecture. Instead of having to maintain two infrastructures—voice and data—voice packets travel over the data network. Thus, companies only have one infrastructure to maintain and experience significant savings. In addition, VoIP enables value-added applications such as Unified Messaging, presence, one-button conference, find-me/follow-me call forwarding and many others that together simplify the calling process. When these applications are integrated for maximum usability the resulting application is called Unified Communications.

For SMB companies, market drivers include:

- *Replacement of aging traditional equipment.*
Time Division Multiplexing (TDM) equipment with limited feature-sets can constrain organizational efficiencies. Replacing infrastructure with VOIP, otherwise known as IP Telephony, can improve reliability and employee productivity
- *Future-proofing.*
A VoIP enabled infrastructure provides the foundation upon which emerging devices and applications can be supported. Examples include: smartphones, SIP trunking, voice recognition, attendant solutions, automatic call distribution software, web-based services, etc.
- *User mobility.*
Once VoIP is installed, employees can move their phone to any extension, log in with their user name and password and access their entire feature-set and message store from anywhere in the company. Likewise, they can load softphones on their laptops and make calls from anywhere on the network. In addition, once VoIP is installed, the network can be used as the starting point for a fixed-premise wireless network or voice over wireless LAN (VoWLAN) network.
- *Easy-to-use system management tools.*
SMBs have limited IT staffs, thus, simple-to-use management interfaces are essential. NEC's VoIP solution is noted for its ease of use.
- *Cost-effective support for call transfers between widely dispersed branch offices.*
- *Lower costs for long distance calling between offices.*
Studies show that the up front cost of adoption is not likely to be lower than traditional telephony systems in the first year – and may actually be a bit higher depending on how smoothly the implementation process goes, how quickly users adopt the new system's features and whether the organization is adding functionality.

Despite all these market drivers, only about 36% of large businesses, 23% of mid-size businesses and 14% of small businesses have adopted VoIP as of 2006⁵, though many more are “working on it” in 2007.⁶

Basic Advantages of VoIP for SMBs

- **Replace antiquated equipment**
- **Future proofing technology**
- **Compatible with small IT staff**
- **Lower cost long term**

Voice is the Key to VoIP

In the UNIVERGE360 approach, VoIP is one aspect of the Unified Infrastructure or Network layer and should be transparent to the user. However, if the quality of voice service isn't at least as good as traditional voice, it will soon be very apparent. End-users see voice and data as very different entities and have far higher expectations about the quality of voice.

Consider the effect of a conversational pause. It may indicate hesitation, disagreement, discomfort, thoughtfulness or elation. It may be a simple tactic used by one person to get the other to keep talking to “fill the void” and therefore impart a piece of information they would not otherwise have intended to say.

But it may also be caused by a voice packet getting delayed in a data stream.

In order to ensure that voice quality – in all its nuanced subtlety – is preserved when carried over a data network, organizations must:

- Understand the nature of voice communications and its importance in their business
- Learn in advance what can go wrong in a VoIP implementation
- Adopt a structured implementation plan and
- Choose a partner with a strong track record in *voice communications*

The danger of treating voice like data

VoIP horror stories abound, and they often center on poor voice quality. A 2006 study by *Integrated Solutions* cites a company that went straight to live implementation without either assessing their network or conducting a pilot.⁶ Not surprisingly, telephony quickly saturated their network, resulting in call quality that was consistently unacceptable, user dissatisfaction, and low productivity. The organization had to roll back 75% of its IP phones to resolve the problems.

NetworkWorld reported a similar example on November 11, 2006 article *The good, bad and ugly of a VoIP implementation* about the VoIP implementation at Gold's Gym in Dallas, Texas.⁷ One of the most important drivers for upgrading the voice network was reduced costs of local, long-distance and conference calling. Instead, the company found itself unprepared for the challenges and decided to bring up the data side of the network and then add voice at a later time, significantly delaying return on investment.

Data networks “pulse” packets

Humans hear voice as a continuous stream of sound. Data networks, however, treat data packets as little envelopes of information with an attached tag that delineates its importance. Depending on how the network is set up, the tagged data packets are sent through the network pipeline one at a time but some get priority over others.

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Voice applications require the network to provide some features that are not very important to data applications. For instance, file downloads and database programs require every byte to be delivered correctly, but they are flexible with regard to how long it takes to get the bytes from one location to another. Voice, on the other hand, requires the bytes to arrive in a very timely manner, although it is more flexible about losing a few bytes here and there.

The first thing that VoIP requires of a network is its basic ability to deliver most packets on time and in order. In general, IP networks do not guarantee that every packet sent will be delivered. Routers along the way have the option of dropping packets, if necessary, so some packets never arrive at their destination. Since each packet can take a different route from the source device to the destination device, they can arrive out of order and take a different amount of time to travel the same distance

The result for a voice conversation can be frustrating: the call can “cut out”, words can be dropped, a great deal of static might interrupt and delays may be common.

Mission critical data can be disrupted

Any time new applications are loaded onto a data network that carries mission critical data, there is opportunity for disruptions. Typically, these interruptions are minimized by directing the network to prioritize mission critical data over other packet streams, increasing overall network bandwidth and other similar techniques. When voice packets are introduced into the mix, an interesting, and potentially potent, negative situation may occur. Most organizations want both toll quality voice (like that you would receive over the Public Switched Telephone Network – PSTN) and very fast accurate delivery of mission critical data. In order for existing networks to handle both requirements, investment in additional bandwidth, equipment and network grooming is usually required. If these priorities are not handled well, the result can be devastating from an operational, IT and customer quality perspective.

Voice will be exposed to data security issues

It seems almost counter-intuitive to think that voice communications could be “hacked”; after all, what could a hacker do to a voice packet?

It turns out that a lot can be done to disturb voice communications. When voice is transitioned to a data network, it will be exposed to the same security risks that data is plagued by, such as viruses, hackers and SPAM attacks. For example, the easy administration and user controlled call routing features of VoIP can be controlled by a hacker if proper security features are not implemented. This means that a person from outside the company could use the system for free, or worse, could use the system against the company by causing call routing errors or shutting down call features altogether. Suddenly, the old reliable desktop phone may no longer be available to close deals, coordinate disasters or pull up patient records when they are needed. They can also cause denial of service attacks (where a system receives so many requests for service that it can shut down completely – imagine a hospital that can’t take emergency calls) and SPIT (Spam Over Internet Telephony). Unfortunately, the anti-SPAM measures used in traditional data networks will not work against SPIT because they cannot recognize voice traffic.

A closely related issue is fraud. If an outside party can hack into voice communications, they can use a call center’s predictive dialers to flood consumers and businesses with calls or cause payments to be made to the wrong accounts. They can also combine email and voice “phishing” techniques to make their scams seem more legitimate than email alone, which most users have learned to avoid.

Getting voice right requires experience – which may be fading away in the enterprise

One of the cost saving measures organizations contemplate is phasing out telecom managers. After all, if voice will now be carried on the data network, why would an organization need a telecom manager?

The job of the telecom manager for many years has been to ensure toll quality voice services every time a customer, employee or vendor picked up the phone. And, even though phones and PBX systems continued to add features, toll quality voice has continued to be the standard. This level of quality was generated through techniques such as:

The Danger of Treating Voice Like Data

- Data networks “pulse” packets
- Implementations can be highly disruptive
- Mission critical data can be disrupted
- Voice will be exposed to data security issues
- Getting voice right requires experience – which may be fading away in the enterprise

- Efficient call routing
- Ensuring quality of service QoS
- Negotiating telecom contracts
- Setting up efficient virtual private networks (VPN’s)
- Proper use of VLAN’s

These capabilities must be understood by data managers as they become responsible for voice services. This is one of the areas where the right external partner, one that is known for voice communications, is a distinct advantage when implementing VoIP.

Assessing network capacity needs in a converged voice/data environment

Voice delivery expectations are different than data delivery expectations. And early adopters learned the hard way that they could not simply estimate the total load of voice and data traffic, add it together and assume they had planned for appropriate network capacity for a VoIP network. This approach probably accounted for many of the VoIP “horror stories” that have passed into CIO lore.

Migrating an existing IP network to carry VoIP traffic along with the data packets also requires an understanding of the features needed in the routers and switches of the network, the acceptable quality of voice communications, the directions that must be given to the voice packets when they are decoded and a host of other issues not usually completely understood by any one internal telephony or data manager.

Many Vendor Choices, Few Voice Experts

As we've established, the ability to manage all the issues associated with delivering acceptable voice quality requires more than an understanding of data networking alone. As such, it pays for organizations to consider a vendor like NEC that has a 100-year history of voice technology excellence and is well known for both its voice-based offerings and its interoperable equipment choices, which have been developed to be forward and backward compatible with each other and often interoperable with other vendor's equipment can make the migration path to VoIP more cost effective and successful.

Conclusions

UNIVERGE360 communications structure can give organizations a methodical way to assess, plan and implement advanced role-based applications and the network technologies required to support them.

Companies seeking to implement VoIP as a supporting technology for voice-based applications must understand the fundamental potential for improving human communication and the challenges that can arise when marginalizing voice in a data environment. VoIP is a powerful network layer tool that, when properly planned and implemented, can open the door to a wide range of role based applications that can drive competitive advantage and increase satisfaction and loyalty among key stakeholders.

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