

# *Voice and Video over IP: Leveraging Network Convergence for Collaboration*

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## Executive Summary

*For several years, the big question with Voice over IP (VOIP) was whether it actually worked, and if so, whether it worked well enough for corporate ears. Well, the answer is in: Yes! As long as the network is architected properly, VOIP is definitely ready for enterprise use, and convergence projects are running strong in the vast majority of organizations.*

*Better still, while voice typically is the first application implemented on a converged IP backbone, Nemertes is starting to see IT executives explore new applications—such as video, unified communications, and other collaborative tools—that can also leverage the IP network. The benefits can be great, including cost savings and increased productivity in the virtual workplace.*

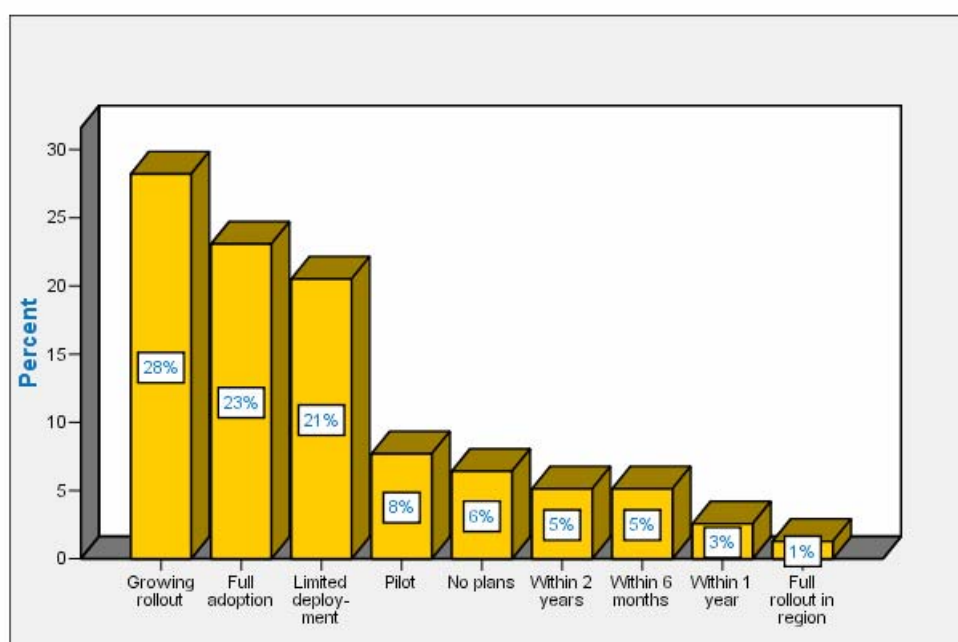
*As they deploy these and other technologies, companies are starting to recognize the need for network optimization, enhanced management tools and tight security. And although most IT executives don't spend a lot of time worrying about specific standards, they like what standards get them—easy integration and interoperability among vendors and networks, both of which are important when it comes to communications technologies. As SIP grows more robust and more common, companies will have more vendor options open to them—and they'll start to take advantage of the benefits convergence brings: Integration, interoperability, and the ability to stay agile in an increasingly global world.*

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## The Issue: Making the Most of Convergence

Only 6.4% of the companies in Nemertes' benchmark, "Convergence & Next-Generation WANs," are doing *nothing* when it comes to convergence. The majority of companies—fully 80%—are using Voice over IP in some way today, and the remaining 14% have plans to do so soon. (For more on companies' plans for convergence, please see Figure 1: VOIP State of Deployment, page 2.) Others are actively considering or using video over IP, both room-to-room and desktop; 40% of companies are using some form of video over IP today.

### VOIP State of Deployment



**Figure 1: VOIP State of Deployment**

Organizations deploy Voice over IP in one or any combination of the following ways:

**VOIP on the LAN:** IP PBXs are deployed in a building, and voice calls travel on the IP-based LAN infrastructure. But going out to the WAN, a gateway converts traffic from IP to TDM. In the absence of VOIP on the WAN or to the carrier, a gateway converts between IP and TDM traffic.

**VOIP on the WAN:** IP PBXs are installed at numerous locations and voice traffic between (and usually within) the locations travels over IP links from end to end. Calls leaving the company's IP network (off-net calls or those going to

locations without an IP link) are converted to TDM either in a gateway at each location, or within the carrier network, or both.

***Toll Bypass:*** Voice traffic among locations travels over IP links, though inside each location, TDM PBXs still handle voice calls.

Seventy-five percent of the IT-executive participants who are using VOIP today are running it across their LANs. But nearly 12% have no plans to run VOIP on the LAN, indicating that there is a small percentage of participants who will use VOIP, but perhaps plan to limit its usage to the WAN or for toll bypass.

Certainly, more organizations are using VOIP in the LAN than over the WAN. About 58% of participants are running voice on the WAN today, and 28% have no plans to do so. That's probably because 23% of those 28% have no plans for VOIP period, and 32% are using VOIP in a "limited deployment," meaning that they've intentionally decided to use VOIP only in certain types of locations or situations. As their rollouts continue, they may very well connect those islands of VOIP, but they don't have plans to do that today. We also found more than half of the organizations that have no plans for VOIP on the WAN operate fewer than 30 sites, suggesting that they don't expect the WAN circuit savings to be worth the deployment.

The majority of participant companies that have deployed VOIP have extended or plan to extend some of the functionality to telecommuters. Typically, that functionality is limited to VOIP, but moving forward, we expect other collaborative applications—including desktop videoconferencing, Web conferencing, audio conferencing, and real-time communications dashboards—to be part of a teleworker's IT toolkit.

### **Next Up for Convergence: Video and Collaboration**

During the past three years, Nemertes has conducted more than 200 interviews with IT executives regarding their convergence plans, and with each passing year, IT executives grow more interested in leveraging the technology for more than just voice communications. As a result, they're running trials and considering future applications, such as video, when they design their converged backbones.

Already, numerous organizations are running video over IP. Almost one third of participants in the Convergence benchmark are using video over IP today, and 25% have plans to use room-to room video over IP, while 37% plan to use desktop video over IP. Not surprisingly, more organizations are using video over IP

**37%**  
*The number of companies that plan to use desktop video over IP.*

in a room-to-room environment (30%), as opposed to a desktop environment (22%). But, looking ahead, more participants are evaluating or planning to use desktop video over IP than room-to-room.

Why will desktop outrun room-to-room video over IP? Nemertes' hypothesis, backed by anecdotal evidence, is that organizations already using ISDN-based room-to-room videoconferencing have or will replace it with IP-based room-to-room video conferencing. But only a small percentage of companies that currently do not use room-to-room video conferencing will (newly) deploy it over IP—primarily because IP makes it affordable, where ISDN wasn't. However, desktop video conferencing is a new technology for almost everyone, the cost to entry is relatively low, and IT executives view it as one in a suite of collaborative applications—hence, their willingness to deploy it where no video exists today.

We expect that by 2007-2008, a growing number of organizations will use both room-to-room and desktop video conferencing over IP, not only because of the technology's practical benefits, but also because IT resources won't be as tied up in the voice project. Also, many of the current rollouts of video conferencing

are limited, so we also expect those organizations to invest in the technology and increase the size of their rollouts.

**28%**

*The number of IT executives who list video as a key convergence driver.*

Video is one of the leading drivers for converged networks (28% of participants in Nemertes' latest benchmark name video as a key driver). Video over IP delivers its own cost and performance benefits; we continue to see a six-to-12-month payback when organizations replace an ISDN-based audio- or video-conferencing system with an IP system. But even more importantly, doing so enables remote and virtual workers

to stay part of the larger team—and that can help companies stay competitive and agile in an increasingly global world.

Why is that important? Because between 60% and 70% of all employees are working remotely from their bosses, and as many as 90% are working in remote offices. Indeed, the number of virtual workers has increased 800% over the past five years, according to Nemertes' benchmark, "The Virtual Workplace."

Business growth accounts for a lot of that change. What's more, companies are becoming increasingly global—and that makes real-time communications tools all the more valuable.

"Some groups have grown faster than other groups, and you just can't locate the new people where they... need to be," says an IT director at a billion-dollar professional services company. "We're more flexible in working with people to retain them as employees. Also, we have a lot of services, but our value

proposition comes from working with all of them, and that requires teamwork, even across boundaries.”

Such scenarios are increasingly common. Except in very discrete cases, most employees need to work with others outside their immediate team or peer group at some time or another, and often they need to do so on a regular basis. That’s where convergence-driven, real-time collaboration applications come in: They ensure virtual organizations operate as smoothly as grounded ones—maybe even better, as employees can click among various applications as the situation demands, instantly turning a voice call into a video conference, or an IM session into a Webinar.

### **The Business Case for Voice and Video Over IP**

Whatever department you’re in, knowing what drives corporate or organizational decisions is one key to understanding how to position your project proposals. In IT, this knowledge is vital. For example, recognizing that the No. 1 business driver at your organization is to reduce costs tells you to be prepared to answer how your IT project will help reduce specific line items. On the other hand, if the most important driver is to gain competitive advantage, you’ll need to discuss how your project proposal will help the organization beat the competition.

So Nemertes asked participants in our “Convergence” benchmark to rate on a 1-to-5 scale (where 1=unimportant; 2=somewhat important; 3=important; 4=very important; 5=vital) how important the following drivers are: Growing revenue, boost employee productivity, gain competitive advantage, reduce costs, and meet regulatory/legal requirements. (Please see Figure 2: Business Drivers, page 6.)

Increasing revenue is the No. 1 business driver when assessing all organizations, all sizes, with a 4.38 rating. Next in line is meeting regulatory/privacy requirements, with a 4.07, followed by reduce costs (4.02), gain competitive advantage (3.84), and boost employee productivity (3.8). When tying these general business drivers with overall IT budgets and, more specifically, convergence projects, we see some interesting parallels. As organizations demonstrate new top-line benefits with VOIP and convergence projects, the adoption rate increases—squarely addressing the high rating for increasing revenue.

Reducing costs also comes in as “very important,” and that’s a big reason why return-on-investment analyses are so important before beginning a convergence project. On the other hand, productivity gains remain a soft cost

and are generally difficult to identify. Given the cloudiness around such savings, it's no wonder "improving employee productivity" is the least-most-important business driver of those we asked participants to rank.

### Business Drivers

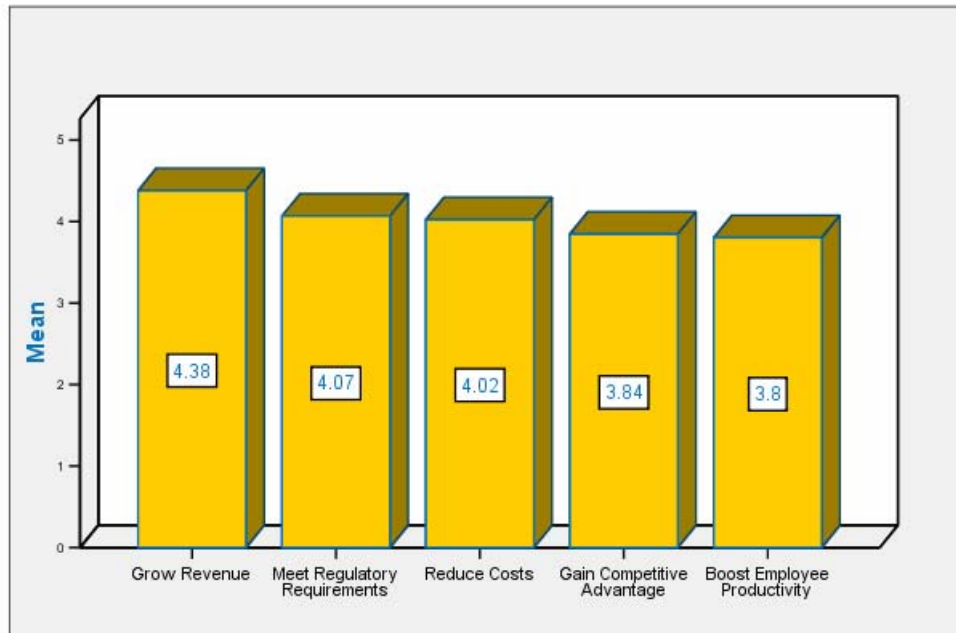


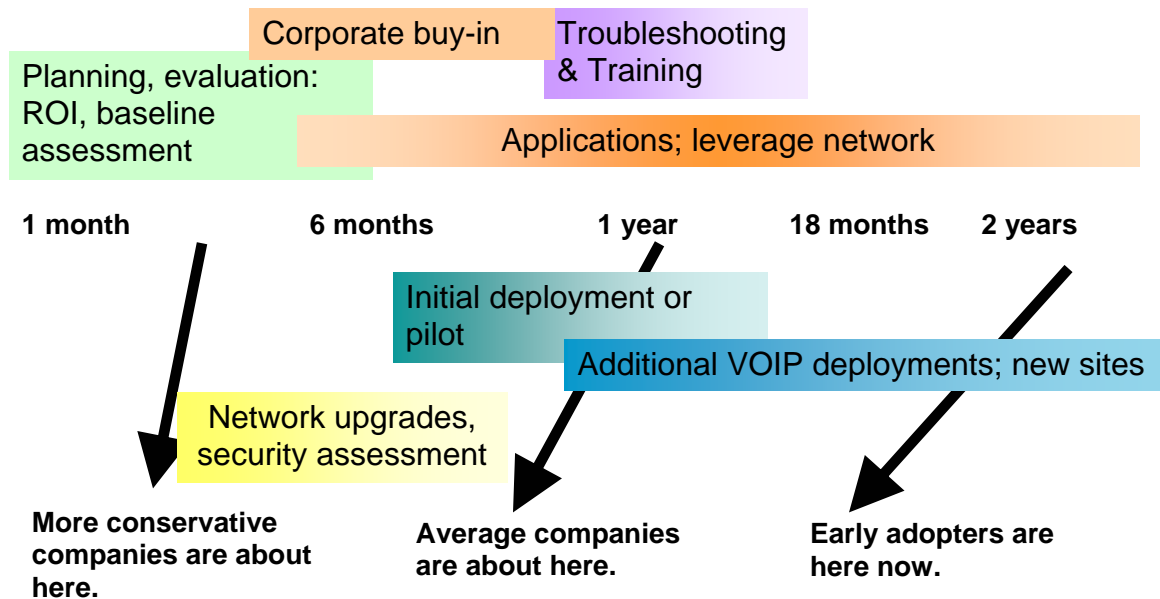
Figure 2: Business Drivers

Improving any of these key business drivers should help a company gain some competitive advantage, explaining why that rating alone isn't at the top. In a way, it relies on all the others.

The good news is, convergence projects can drastically help companies meet their first business driver, growing revenue. But how do companies get from the bare bones of a VOIP deployment to the "nirvana" of converged applications, including video?

Organizations typically take about two years to go from initial Voice over IP deployments to implementing the applications that help them leverage the converged network and well spreading the initial VOIP rollout throughout the organization. During the first year alone, IT executives can expect to spend up to six months planning, evaluating and assessing their network readiness, about six months performing network upgrades and security evaluations, and six months for obtaining corporate buy-in for the wider project. But shortly after they launch their initial deployment or pilot, many organizations are ready to implement

applications, such as video conferencing, instant messaging, and presence, which leverage the IP backbone.



**Figure 3: Convergence Deployment Timeline**

Despite the fact that the true benefits are revenue growth, before deploying VOIP, companies often (and should) do a “back-of-the-envelope” calculation to capture some of the anticipated hard-dollar cost savings. These cost savings are not the point of the VOIP deployment—the goal is to future-proof the network and enable advanced applications that grow revenue—but they can help IT executives obtain the necessary corporate buy-in and increase awareness of some of the ancillary benefits that come from a VOIP deployment.

For instance, savings on Moves, Adds, and Changes (MACs) are one of the most important ways organizations justify their VOIP rollouts. Benchmark participants estimate the time involved for a TDM MAC at 30 to 90 minutes. But an IP MAC takes only 10 minutes or less. So the total cost savings, depending on the number of MACs at a given organization, can be significant: On average across all companies, the savings would be \$2.88 million per year. IT executives also tell us they save as much as 50% on circuit and cabling costs by using VOIP.

The next step in a successful VOIP rollout is for the IT manager to ensure he or she has done the appropriate benchmark testing, security analysis and a standards evaluation (for both existing apps, and those that might be added to the network down the line).

And then comes the fun part: adding the collaborative applications that can, along with VOIP, help companies reach their top business driver, increasing revenue.

### **Key to Success: Network Assessment and Management**

All too often, IT managers say they're overwhelmed with the growing complexity of the network. The performance suffers from certain locations, at certain times of the day, and when certain combinations of traffic are riding on the network in certain ratios. A well-run network requires more detailed data, often in real time.

It's imperative for IT staffs to evaluate exactly what they want early in the process. Indeed, this requires some crystal-ball forecasting to determine what parameters will become paramount as the network evolves. Adding a line item in the budget in the initial ROI assessment is critical to ensuring that funding for management tools exists, whether network managers actually purchase the tools right away or shortly into the lifecycle of the technology.

Benchmarking network performance is critical to determine changes, successes and failures. We strongly recommend that companies benchmark performance levels of the data network prior to any changes to optimize performance. That way, they will have a basis for comparison. The second benchmark comes after the network is optimized for voice traffic. The third benchmark takes place immediately after voice traffic is successfully running on the IP network, and monthly after that for at least the first year, and quarterly from that point onward.

One huge benefit of doing so is for their own protection. If end users complain about quality, and network managers can quantitatively show that the performance benchmark has, in fact, improved, that helps resolve the perceived problem. Or, if it's time to request budget for the next project, before and after benchmark figures showing success will breed confidence in the upcoming implementation.

We've seen a slight improvement in 2005 in the number of organizations that budget for management tools up-front, but the number that is budgeting is still far too low. Only about 15% of organizations actually budget for such tools up-front, but more than half wind up seeking specialty tools within 12-18 months of their rollout.

"We're assessing [management tools] now," says the CTO of a city government. "We're using existing management tools and some that we used for our network. We wanted to take it to another level. For some of the hard, hard problems, we wanted to be ready."

Among organizations that are budgeting for or buying third-party management tools, the amount they're willing to spend has increased in the past year. This is primarily because they recognize that they need solid tools—and a new class of tools—to effectively manage a converged network.

### **Focus on Security and Compliance**

Security is a high priority for IT implementations these days, including convergence projects and applications. When it comes to their overall real-time implementations, fully 67% of participants in Nemertes' benchmark, "The Virtual Workplace," rate security as "vital"; the remaining 33% rate it as "important."

When it comes to security, there are three main areas of focus:

- ⊕ Unauthorized access to data and resources (which is where access control and encryption come in);
- ⊕ Malware (such as viruses, spam.);
- ⊕ Compliance with government and industry regulations.


Typically, security is controlled by PINs and access numbers, which, depending on the vendor, can often be customized to a wide degree, and SSL 128-bit encryption. Companies can add more layers, depending on their needs and the ability of the applications to accept it. Convergence applications require security in three key areas: user access, data protection, and delivery security. Policy management can also play an important role.

**67%**  
*The number of  
IT executives  
who consider  
security  
"vital."*

We saw security budgets double from 2003-2005 largely because of the increasing importance of regulatory requirements. Although companies don't implement VOIP specifically to address privacy or regulatory issues, IT executives are asking the right questions about how the projects can help with their compliance efforts. And although Voice over IP is not yet governed by archiving requirements in government regulations, companies that deploy other collaborative applications should pay attention to these issues.

### **SIP: Open Standards for an Open Future**

The most common standards for real-time communications are SIP (Session Initiation Protocol) and SIMPLE (SIP for Instant Messaging and Presence Leveraging Extensions). SIP, which got its start in the telephony world, is unquestionably the standard of choice for telephony vendors, all of whom are



basing their soft phone and real-time communications dashboard technology on it and, as much as they need to, SIMPLE. Most major applications vendors, including Microsoft, also back SIP and SIMPLE.

The importance of open standards is that they enable interoperability and integration, two issues that are top-of-mind for IT executives—70% of whom, for instance, say “interoperability” is the issue they most want vendors to focus on. And when asked to rate the importance of interoperability on a scale of one to five, with one being unimportant and five being vital, 83% of IT executives say it’s “vital” and the remaining 17% consider it “very important.” These issues are not so important for voice, where interoperability already exists for point-to-point calls of course, but they’re critical for other forms of real-time communication, including presence and the applications that leverage it.


Today, IM and Web conferencing don’t work together out of the box, for instance; nor do different IM clients or services work with one another. That leads to complexity and management headaches, but it also renders the technology less useful. SIP and SIMPLE aim to change that by enabling integration across and among communications technologies.

Furthermore, a well-integrated real-time communications implementation can deliver real benefits, especially when all the applications are drawing on a common source of presence over a converged network. It’s important for users to be able to move seamlessly from one collaboration application to another, and from collaboration tools to other enterprise applications. It’s also important for users to be able to see where their co-workers are regardless of what application they’re using at the time, and to be able to click-to-act (whether that action is a phone call, video conference, or text message) as the need arises. Finally, open standards ensure IT executives can choose best-of-breed applications and feel confident they’ll all work together as needed.

## **Conclusion & Best Practices**

One of the big promises of a converged network is increased agility in an increasingly virtual business world. Typically, companies start a network convergence project by adding voice traffic to an IP backbone network. But they don’t stop with voice. The converged network soon becomes a conduit for numerous collaborative applications, delivering voice, data, video, audio and imaging traffic at once.

A convergence project requires planning, budgeting, and testing to ensure that it starts—and continues—on a successful path. But the benefits are many, including the increased revenue that comes from supporting a virtual workplace, easier compliance, lowered costs, and simpler management. What’s more,



convergence applications can help companies stay nimble as business grows, hiring and keeping the best employees, wherever they are.

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**About Nemertes Research:** Founded in 2002, Nemertes Research specializes in analyzing the business value of emerging technologies for IT executives, vendors, and venture capitalists. Recent and upcoming research includes convergence and the WAN, collaboration technologies, information stewardship, data centers, and application quality management.

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