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2004 VOIP State of the Market Report

by Steven Taylor Distributed Networking Associates, Inc.

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Introduction

For the third year in a row, users were asked to share their perceptions of Voice over IP (VoIP) and their plans for implementing VoIP in their networks. This 2004 VoIP State of the Market Report is a summary of the findings from that survey and, where applicable, these results are contrasted with similar reports prepared in 2002 and 2003.

Overall, there were few surprises in the data. This is reassuring because drastic changes from the results in the prior years would indicate flux in the market space.

Nevertheless, there were some significant findings. In particular:

- Converged networks are viewed as being significantly more strategic than either traditional voice or traditional data networks.
- Somewhat surprisingly, there was not a major positive or negative shift in satisfaction.
- The most important factor inhibiting implementation has changed from a lack of budget to concerns about security.
- Concerns about security focus more on infrastructure than conversation content.
- There is increased use of the Internet for VoIP transport.
- The importance of upgrading traditional PBXes to those with IP-enabled capabilities and the importance of supporting non-IP phones have both diminished somewhat.
- There is a continued movement from trial implementations to commitment to full deployment.

The bottom line is that VoIP is continuing to have broad acceptance, though several implementation concerns still exist. The majority of those implementing VoIP are pleased with the results, and the appropriate technical challenges are being addressed.

Webtorials State of the Market Reports

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Webtorials, a venture of Distributed Networking Associates, Inc. Greensboro, N.C. www.webtorials.com

Editorial/Research Associate Sarah L Taylor

Design/Layout Artist Debi Vozikis dvozikis@rcn.com

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For Editorial and Sponsorship Information Contact Steven Taylor, taylor@webtorials.com

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Demographic Overview

Before one can draw any conclusions from a study, it's most important to understand the demographics of the respondents.

In this case, the survey was conducted by asking the Webtorials community to respond to an on-line questionnaire. As a rule, the Webtorials community consists of networking professionals who are planning the next generation of networks for their companies. For the 2004 survey, the overall number of respondents increased from just under 300 in 2003 to just over 500.

Even though the Webtorials audience in general consists of end-users, service providers, and other various groups, the respondents in this case were, to the greatest extent possible, limited to end-users. For the 2004 report, 68% of the respondents identified themselves as being Enterprise, 5% as Education, and 7% as Government. A review of those classifying themselves as "Other" (20%) consisted largely of consultants and other classifications that still fit within the and 6% from Canada. A significant percentage of the responses, 22%, came from Europe, and the remaining 29% were from a wide variety of other regions. This represents a slightly less US-specific response base than in the 2003 when 55 % were from the US. A substantial portion of this increased non-US response came from Europe, where there was in increase from 17% to 22%.

One of the demographic questions - whether the respondent has primarily voice or data responsibilities - is meaningful both for demographic purposes and for noting possible shifts in job responsibilities among the target survey group. As shown in **Figure 1**, a notable shift occurred from 2002 to 2003. In 2002, there was a heavy emphasis on the "data" side. The answers are more consistent between 2003 and 2004. At least a part of this difference can be attributed the fact that the same survey base - the Webtorials community - was used in 2003 and 2004. (By contrast, seminar attendees were surveyed in 2002.) But this shift in the responsibilities of networking professionals seems to be significant, and there indeed seems to be

realm of end-users. Some of the "other" category also represented telecommunications service and equipment suppliers. These demographics did not vary substantially from the 2003 respondents where 75% were Enterprise, 5% Education, 8% Government, and 13% Other.

Reflecting the Webtorials worldwide community, the responses came from around the globe. The majority of the responses, 43%, came from the US,



more individuals with 50/50 voice/data responsibilities. In fact, the shift toward shared responsibilities seems to be - at least on the surface - even greater inside the US than outside the US.

Additional demographic charts are provided in the appendix. However. the result of examining the demographics is that they are sufficiently similar from year to year for the comparisons made over time to be meaningful.



Tactical or Strategic?

Over the past couple of years, there has been a widespread belief that VoIP should be moving from the tactical world of toll bypass and cost reduction to the strategic world of increased function and fundamentally changing work patterns. In an attempt to measure this, the survey asked respondents to use a scale where one extreme was "Purely tactical" and the other was "Purely strategic" to characterize their organization's view of both the data network and the voice network.

For the 2004 survey, the measurement of the extent to which the converged network is strategic was also added. Additionally, the "Voice" and "Data" were changed to "Traditional Voice" and "Traditional Data." While this change may somewhat skew the results for this year, it should be substantially better for comparison in future surveys.

This year, the respondents were also given the definitions: "If the primary emphasis of the IT organization is to provide only a basic set of services at the lowest possible unit cost, that IT function is largely tactical in focus. If the IT organization also has a strong mandate to help the business achieve its goals, then the IT function is strategic."

Figure 2 demonstrates the responses over the three years that this study has been conducted. The survey used a scale of 1 (Purely tactical) to 7 (Purely strategic) for these values. Thus, a value of 3.5 represents the neutral position between tactical and strategic.

Both the data network and the voice network were viewed as less strategic in 2004, reversing a trend seen in 2003. However, the most likely reason for this change is the addition, as discussed above, of the converged network and the addition of the modifier " traditional" to voice and data. While the data networks have consistently been viewed as more strategic that the voice networks, it is also of interest that the gap between voice and data is significantly larger this year. Again, a primary explanation for this could be the addition of the word " traditional."

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The most striking result from this question, though, is the extent to which the converged network is viewed as being strategic (5.2 on the 1 to 7 scale). Moreover, this result was consistent both when the responses were limited to the Enterprise and when US versus Non-US results were compared.

Satisfaction Rate Stability

There's no question that VoIP is becoming mainstream and those who have implemented it are gaining considerable experience. Whereas in 2003 just over half of the respondents, 54%, indicated that they had already deployed VoIP in some form, this year 58% have already deployed the technology. As shown in **Figure 3**, the US-based respondents had slightly less deployment than the sample as a whole, and the respondents indicating that they were Enterprise users has slightly greater deployment. Since there was an accompanying increase in total respondents, this year's respondents who had implemented VoIP actually exceeded the total number of respondents for 2003.

36%. Those who were "Somewhat satisfied," though, increased from 48% to 57%. In this first perspective in Figure 4, using the 7-point scale, 1 and 2 are "Not satisfied, 3, 4 and 5 are "Somewhat satisfied," and 6 and 7 are "Highly satisfied."

If one digs a bit deeper, this apparent drop in satisfaction might be an artifact of the grouping of the various responses. In fact, the average satisfaction for the entire surveyed population stayed the same (5.03) because within the "Somewhat satisfied" category of responses of 3, 4, and 5 on the scale, there was a larger percentage indicating a "5," increasing from 20% in 2003 to 29% in 2004.

Comparing 2004 to 2003 by the second perspective in Figure 4, those who indicated one of the three "dissatisfied" values of 1 through 3 dropped from 18% to 16%, those who indicated a "neutral" value of 4 dropped by 1 %, and those who indicated a "satisfied" value of 5 through 7 rose by 3%.

We also examined the degree of satisfaction broken down by demographics, but none of this analysis revealed huge discrepancies across demographic groups. For

Overall, the users are quite happy with their VoIP deployments, and the satisfaction level seems to be essentially unchanged from last year. A 7-point scale, in which 7 indicated "Extremely satisfied," was used for respondents to indicate the extent to which they were pleased. The number of respondents indicating either a 6 or 7 out of 7. characterized in the first perspective in Figure 4 as "Highly satisfied," actually dropped from 46% to



instance, the respondents who identified themselves as "Enterprise" had exactly the same 5.03 satisfaction level as the entire population, while US respondents indicated a marginally higher 5.18 level. Even though respondents we asked to respond to the question only if they had actually implemented VoIP, some did not follow this instruction. If the responses are limited to those who answered affirmatively that they had implemented VoIP, the satisfaction level was 5.12.

The bottom line is that the satisfaction level appears to be essentially unchanged. To achieve this, multiple factors are probably canceling each other out. One might expect satisfaction to increase as technology improves and kinks are smoothed out. At the same time, when the technology gains more widespread adoption, the community adopting the technology moves from "experts" to the mass market,



and the mass market might have higher expectations for smooth operation. Additionally, as more widespread adoption takes place, additional scaling issues are uncovered, which could account for a drop in satisfaction.

Type of VoIP Equipment

In 2003 and 2004, respondents were presented with a list of possible types of VoIP equipment and asked to indicate which of these they are currently using and/or planning to start using. **Figure 5** shows a summary of those responding with an answer other than "Don't know;" bar segments show the percentage giving each response.

Perhaps the best way to examine this figure is from the top down. The first four bars show the plans for both IP PBXes and IP-enabled traditional PBXes. In both cases, there was an increase of 4% to 5% in the installed base. In 2004, the percentage of users having already installed or eventually planning to install IP-PBXes has increased, while the percentage having installed or eventually planning to install IP-enabled PBXes has actually decreased a bit. This is understandable in that, as the technology matures and more of the traditional PBXes are in need of replacement, the ability to upgrade actually becomes somewhat less important. (This trend will also be noted below.)

There is essentially no change in the implementation plans for VoIP-enabled routers. This actually is a little surprising, as one might expect that as worldwide tariffs continue to fall, these devices would be used less since their primary application is reducing toll charges when used in conjunction with traditional PBXes.

Both IP phones and soft phones show relatively high current usage, and the total of current plus planned implementation within the next two and a half years is very high - 85% to 90%.

The number of respondents using - and planning to use -VoIP voice quality monitoring and troubleshooting systems actually dropped. Overall though, the total expected use is quite high. The best explanation for the drop is that as this market has become better defined over the past year, more users have realized that they need to make signifi-



cant improvements before they can claim that they actually have these systems in place.

Finally, there is no great news for IP Centrex. The most positive possible revelation from the study would be that the actual usage has increased from 9% to 15% of respondents, representing 54% growth. (The equipment with the next greatest percent IP growth was PBXes, with 15% arowth.) Nevertheless, the long-range plans for use of this service still fall well below the 50% mark.

Expected Benefits

One of the major goals of this report is to track the evolution of the market's expected benefits from implementing VoIP and the challenges it faces in doing so. **Figure 6** shows the most significant driving forces for VoIP implementation over the past 3 years, based on the percentage of those surveyed who denoted each of the possible responses as an expected benefit. Most of the choices had somewhat fewer users choosing them as major driving forces in 2004 than in 2003. All categories, however, showed a stronger response in both 2004 and 2003 than in 2002. In part, at least, this is due to a difference in the questionnaire instructions. In 2002, respondents were asked to select up to three benefits, and the average number checked was 2.8. In 2003, the respondents were asked to check all that apply, and the average rose to 4.0. In 2004, the respondents who were again asked to check all that apply, checked an average of 4.5 benefits. However, if the new category (Enhanced/converged business processes) is excluded, they checked only 3.9 benefits, accounting for the slightly reduced overall percentage for some.

The top three benefits differ by only 2% in the number of respondents choosing each and, as such, are essentially equal. In a juxtaposition of strategic versus nuts-and-bolts tactical expectations, "Cost of Moves/Adds/Changes will drop significantly" (highly tactical) and "Easier to deploy new integrated applications" (highly strategic) remained two of the top three factors, although they swapped the top position for the second time in as many years. These two factors were joined by the above-mentioned new category of benefits, "Enhanced/converged business processes." The fourth driving force for VoIP deployment, cited by more than 50% of the respondents, was "Deploying enhanced voice functions." This indicates once again that VoIP is viewed as more than just a replacement technology for traditional voice.



"Cost of domestic calls between company sites will drop significantly" came in fifth, just as in 2003, indicating that toll bypass is still a strong factor, in spite of the ever-eroding cost of using the public switched telephone network (PSTN). Even though this choice dropped from 51% to 48%, it is still worthy of consideration as a major positive factor.

Continuing to the weaker drivers, shown in **Figure 7**, the next most frequently chosen driving force was "Cost of international calls will significantly," drop cited by 41% of the respondents.¹ In fact, the percentage of respondents choosing this option has grown by almost 10% per year for the past two years. Clearly, this is a result of continued high international toll rates, especially as compared with domestic toll rates. The choice "Cost of domestic calls other than between company sites will drop significantly" was next to last. Nevertheless, 30% chose this option



as compared with 20% two years ago.

Two operational factors were also included in the list of weaker positive factors. "Ongoing cost of upgrading and maintaining our traditional PBXs will drop significantly" was cited by 39% of the respondents. 34% of the respondents cited "Cost of wiring will drop significantly" as a factor, indicating that this oft-touted benefit is not viewed by users as being one of the major reasons for deployment.

Finally, "Reducing staffing requirements" (by combining voice and data functions) came in dead last for the third year in a row.

Deployment Impediments

If the respondents saw all of these benefits in deploying VoIP, why aren't they moving more quickly towards putting it into place? **Figure 8** shows the primary impediments to deployment cited by survey respondents.

"Concerns about security" has become the primary inhibiting factor, essentially dwarfing the most important concern two years ago, "Lack of budget." In 2004, 49% of the respondents listed security concerns as a major inhibitor to implementation, as compared with only 40% listing it as such last year. This factor was even more pronounced among US-based respondents, 53% of whom listed this as a major inhibitor.

The second most important inhibitor was "Systems for managing and troubleshooting VoIP quality," cited by 47% of the respondents. This factor was also the second most important impediment last year.

The third major impediment was "Concerns about interoperability between vendors' equipment," mirroring the importance of this factor from the past two years. This factor remains of interest in that there is no major difference between the current interoperability of VoIP systems and the interoperability of traditional PBXes. Once again, this

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¹Note that the vertical scale is the same as in Figure 6 for consistency.



"The lack of the people to plan, design, implement, and manage VoIP," which tied for fourth place, was a relatively major concern in 2002, but essentially dropped out of the picture in 2003. It is not at all surprising this concern that ranks essentially even with budget concerns since both are ultimately tied to overall budgeting.

The remaining concerns deserve brief mention. "Do not think that technologies such as QoS are ready for broad

response indicates either that more interoperability would also be desired for traditional systems or that survey respondents underestimate the current interoperability of VoIP systems.

"The lack of the people to plan, design, implement, and manage VoIP" and "The lack of budget" tied for fourth position at 34% each. The decline of importance of budget is most fascinating. For the past two years, money was the primary factor inhibiting implementation, even though it dropped as an issue from 58% to 47% from 2002 to 2003. Now, however, as it has dropped by 13%, it seems to be more of an annoyance than an overwhelming concern.

There are several possible explanations for this shift. One interpretation is that this is a reflection of both a better economic climate and companies' realizing that implementing VoIP can have excellent tactical and strategic benefits. Another is that there has been time to start including budget for VoIP in a normal planning cycle, since the technology has now been around for a few years.

deployment" was cited by 30% of the respondents, indicating that many of the QoS issues either are resolved or can be resolved. Both "Installed base that must be fully depreciated" and "Concerns about E-911 issues" were chosen by 28%. These three factors did not differ substantially from prior years.

On the other hand, "The benefits of VoIP are not compelling enough" was chosen by 27% as an inhibitor, down from 37% two years ago and 32% last year. Clearly, the benefits of large-scale VoIP implementation are being understood.

Finally, "Do not think that a broad deployment of VoIP is easily managed" was last among the choices for inhibitors, being chosen by 23% of respondents. This is a little curious considering that "Systems for managing and troubleshooting VoIP quality" was the second most important factor. This apparent dichotomy, however, is consistent with last year when "Do not think a broad deployment of VoIP is easily managed" also ranked last. Perhaps it indi-



A close examination shows that the percentage of respondents who saw this as a "Show Stopper" or a "Major problem" decreased by 7% from 31% to 24%. However, before one can claim that this issue is resolved, we must also note that uncertainty increased by almost an equal amount, with 19% " Don't choosing know" in 2004 as compared with 13% in 2003. This view that uncertainty may translate into concerns is supported by the fact that

cates more concern about explicitly managing voice quality as opposed to overall system management. It could also reflect a lack of concern for scaling since the qualifier "broad" was included.

E-911 Concerns

For a second year, the respondents were asked, "To what extent do you consider E-911 (or the equivalent emergency response capabilities in countries other than the US) to be a major concern in implementing VoIP?" As shown in **Figure 9**, by far the most popular answer both years, with 38% of the respondents choosing it, was that is was a "Minor problem." Of course, this allows both those who see E-911 capabilities as a problem and those who don't see them as a problem to claim that the data supports their view. In short, however, yes, E-911 capabilities pose a problem, but no, they don't pose a major problem.²

when limited to US respondents, only 12% chose "Don't know" and 31% saw this issue as a "Show Stopper" or a "Major issue."

The uncertainty around this issue does not seem to be diminishing quickly. When respondents were asked in a separate question if E-911 requirements (or their equivalent) exist in locations where they were implementing of considering implementing VoIP, 26% indicated both this year and last year that they didn't know. When limited to the US, the "Don't know" percentage dropped slightly to 23%. Within the entire survey population, 12% of the respondents answered "Don't know" for both of the above questions.

A near-term resolution does not seem to be in sight. The apparent confusion is amplified a further problem: The

²It is worth noting that this low ranking is not because of "positional bias." The term "positional bias" is used to describe a phenomenon where the first few items in a list of possible concerns are more likely to be chosen than the items farther down the list. In this question, and in other questions for which the method is appropriate, the survey software presented the possible choices in a randomized order.

existing E-911 methodologies were defined for the world of telephone instruments being in a static location, and this fundamental assumption is no longer valid.

Details on Security Concerns

As noted above, essentially half of the respondents said that security was a major impediment to their deployment of VoIP, making it the most frequently chosen option. In order to drill a bit deeper into the question of VoIP security, a necessary first determination is the relative concern about security of the voice/data network infrastructure versus the security of individual conversations. For instance, concern about Distributed Denial of Service (DDOS) attacks is a network infrastructure issue, while hacking a conversation via a LAN sniffer is a conversation security issue.

As detailed in Figure 10, 56% of the respondents considered security of the network infrastructure to be either a major or minor problem, as compared with 53% last year. Slightly fewer, 50%, considered conversation security to be either a

the content, the majority of the shift came from the "Somewhat secure" to "Minor problem" category.

In addition to asking about absolute security of VoIP, the respondents were also asked about their impression of the security of VoIP versus traditional telephony. As demonstrated in **Figure 11**, the vast majority did not think there was a significant difference between the security of VoIP and the security of traditional voice. Over two-thirds of the respondents, 68%, thought that the security was either about the same, slightly more, or slightly less secure. This percentage remained the same over the past two years.

From a larger perspective, however, the overall perception of security of VoIP versus traditional telephony has declined. In 2003, 10% thought that VoIP was much more secure than traditional telephony, while 22% thought it was much less secure. In 2004, only 7% thought that VoIP was much more secure than traditional telephony, while 25% thought it was much less secure. Also, the percentage choosing the option "Slightly less secure than tradi-

major or minor problem, as compared with 48% last year. However, for both years, network infrastructure is considered to be a major (as opposed to minor) problem by significantly more of the respondents, with essentially the same percentage vear-toyear. Only half as many of the respondents had neutral feelings about infrastructure security, and there was a small increase in the percentage who felt that the network infrastructure was either "Somewhat secure" or Verv secure." For security of



tional telephony" jumped quite significantly from 24% in 2003 to 37% in 2004.

Figure 12 highlights the respondents' reactions to specific threats. The three greatest concerns remained the same for both 2003 and 2004. Topping the list both years with over 60% was "Voice server or IP-PBX might be the target of a Distributed Denial of Service (DDOS) attack." Two similar concerns, "Voice server or IP-PBX might be hacked" and "Voice server or IP-PBX might be a back-door to the corporate network" came in second and third, although the two swapped positions for 2003 and 2004. The largest shift in this category was that the concern over VoIP being a backdoor to the corporate network actually dropped from 58% to 49%. Nevertheless, this is a quite significant percentage.

In 2004, three other concerns solicited a much lower response of about one-third of





respondents each, just as they did in 2003. These included interception of conversations in the WAN, in the LAN, and on the Internet. This year, though, there did seem to be more considerable concern about conversations being intercepted in the Internet than in the corporate WAN or the corporate LAN.

Finally, the option, "Concerned that all LAN segments have access to all conversations," was added as a bit of a red her-



ring. In reality, there are very few shared media LANs in existence, so this is seldom a problem because the only place that there is access on the LAN should be in the wiring closet. The good news is that only 20% of the respondents saw this as a problem. The bad news is that there are almost 20% of the respondents who will cite this as a problem even though it is not a true concern in a modern network. Consequently, there is still a need for basic education concerning this point. Coincidentally, there is indeed a realistic concern about shared media when wireless LANs (WLANs) are used to transport VoIP traffic, but this topic that was not asked about.

VoIP and the Internet

One of the most persistent misconceptions about VoIP is that VoIP necessarily implies use of the public Internet. This has historically raised concerns - unfounded for the most part - about security and quality of service. Last year we noted that the planned use of the Internet was quite limited. While still far less than ubiquitous, there is a significant increase in planned Internet usage this year.

Figure 13 summarizes the responses to the question, "To what extent would/does your VoIP implementation involve using the Internet for voice transport?" While the vast majority of the respondents indicated that they would have limited or no Internet use, the percentage that answered that they would have "No Internet usage" decreased from 28% to 23%. This shift from no usage is reflected at the opposite end of the spectrum, where those indicating "Extensive Internet usage" increased from 14% to 20%.

The respondents were also asked in what manner they use (or would use) the Internet in support of a VoIP implementation. As demonstrated in **Figure 14**, the dominant Internet usage in 2003 was for transport using an Internetbased VPN. In 2004, however, using the Internet only in a VPN setting is more evenly balanced with using the Internet for a balance of internal and external communications.





Last year we opined that communications to external partners via the Internet was still in its infancy. Clearly, the idea of using the Internet more extensively is spreading. However, this growth is probably reflected in the "growing pains" of increased concerns about security.

Performance and Infrastructure

In response to ongoing concerns about the impact of VoIP on other applications - especially due to bandwidth requirements - the respondents were asked whether they were concerned about the impact that implementing VoIP would have on the performance of existing data applications on the LAN and/or WAN. Separate responses were requested for the LAN and WAN.

In a nutshell, there was significant concern about VoIP having a negative impact on the performance of other applications on the WAN, but only limited concern about application impact on the LAN. Of course, this is consistent with the reality that LAN bandwidth is abundant, while WAN bandwidth continues typically to consist of a relatively small fraction of the LAN bandwidth.

As shown in **Figure 15**, fewer than 20% of respondents are "Very Concerned" about performance of other applications on the LAN. This represents a drop of about 5% from the 2003 results.

The WAN picture, though, is quite different. While there is a significant drop in the percentage of respondents who are "Very Concerned," this concern is still expressed by roughly a third of the respondents.

In addition to being asked about performance concerns, the respondents were asked whether they felt their current infrastructure for the LAN, WAN, and cable plant was ready for VoIP. As shown in **Figure 16**, none of the three areas had a higher percentage reporting that

they were "Ready today" this year than last year. This is, of course, counterintuitive. Networks do not degrade that quickly. Rather, this seems to reflect that there is a heightened awareness that network upgrades may be needed and that adding VoIP isn't always "just another application." From the opposite perspective, however, it is also interesting that a smaller percentage indicated " Major upgrade needed" for the WAN, reflecting a signifi-



cant increase indicating that they would be "Ready with planned upgrades."

Migration Plans

For most companies, the question is not whether they will eventually adopt a VoIP strategy. Rather, the question is how to get from where they are currently (usually a traditional PBX) to the world of VoIP.

The respondents were asked for the past two years about the importance of being able to upgrade and/or re-use their existing equipment. In particular, they were asked about the importance of the ability to upgrade traditional PBX to add IP-PBX capabilities (as opposed to installing new IP-PBXes to gain these capabilities) and the importance of the ability to support traditional (non-IP) telephones on the IP-PBX. As demonstrated in **Figure 17**, both capabilities are seen as quite important, and for both 2003 and 2004, the ability to re-use phones is slightly more important than the ability to upgrade the PBX.

We noted last year that the most striking result from this question was that respondents more chose the most extreme selection. "Extremely important," than any other answer. This is actually quite unusual in any question, as the most popular answer is seldom one of the extreme responses.

This year we are seeing a bit of moderation. In the question concerning the ability to upgrade the existing PBX to include IP-PBX functions, the percentage rating this as



"Extremely important" dropped from 30% to 17%. While this capability is still considered to be rather essential, the percentage of respondents who felt that this was "Not at all important" climbed from 14% to 19%.

The results concerning new networks' ability to support non-IP phones showed similar, but less dramatic, movement. In this case, the percentage of respondents rating this capability as "Extremely important" dropped from 32% to 25%. However, the percentage rating this as "Not at all important" was 9% for both years.

This change is most likely a result of the maturing of the market. When the market is quite new, having a migratory path is of utmost importance. However, as the traditional PBX installed base ages out, moving to a totally new system is a less drastic step.

The Bottom Line?

The reports in 2002 and 2003 both ended with the statement that there was a clear direction of moving ahead with some caution, and we could expect the deployments to pick up when major impediments were resolved.

This ultimate message was summed up with the responses to the question asking respondents which of the following best describes your company's current approach to deploying VoIP? The choices were:

- We are committed to a complete deployment of VoIP and are heading in that direction
- We are committed to deploying VoIP, but only in certain parts of our network
- We will trial VoIP in selected parts of our network and evaluate how well it works before going any further

Figure 18 clearly demonstrates that, as predicted, this acceleration in deployment is exactly what is occurring. Over

the course of just two years, the number of respondents selecting the option for being committed to a complete deployment more than doubled from 18% in 2002 to 38% in 2003. The " parcommitment" tial selection has grown steadily, from 24% in 2003 to 26% in 2003 to 29% this year. The major movement to total commitment came from the trial group, with the number of respondents who were in the trial phase dropping from 59% in 2002 to 32% this year.³



The direction remains clear. The respondents are moving from trial to deployment. There are some identified challenges yet to be met, but the advantages of deployment are sufficiently strong to outweigh the effort needed to meet the challenges. Because the integration of telephony functions with redefined fundamental business processes has an impact of the future viability of the corporate entity, the future for VoIP looks brighter than ever.

About the Author



Steven Taylor is president of Distributed Networking Associates and publisher of the Webtorials networking-education Web site, which conducted the survey for this report. An independent consultant, author, and teacher since 1984, Mr. Taylor is one of the industry's most published

authors and lecturers on high-bandwidth networking topics. His articles appear in *Business Communications Review* and *Network World*, and he co-authors the "Convergence" and "Wide-Area Networking" newsletters distributed by *Network World Fusion*.

³For the last two years, there has also been an "Other" option for this question - particularly because a "We don't plan to deploy VoIP" option was not given in this question. This is especially important since in a separate question concerning IP-PBX migration plans, 18% of this year's respondents indicated that they had no plans to deploy. This "Other" category was chosen by only 4% to 5% of the respondents, perhaps because this statement of the question was more general. This apparent discrepancy is also partially explained by the fact that "trialing" certainly does not equal a "plan to deploy." Nevertheless, of those indicating "Other," there was a range of responses. Some indicated that they were analysts or consultants. Some indicated that indeed they had no plans. Others indicated, however, that they had already complete deployment.

The City of Richardson embraces growth with a **Converged network solution**

Success Story

950 employees, 17 locations, 1 big problem

New network architecture delivers performance, dependability... and IP Telephony

Challenge: Richardson, Texas, a suburb of Dallas with a population near 100,000, experienced steady growth for a number of years. As a result, the communications infrastructure of the City of Richardson became strained. The city's 950 employees faced inconsistent network performance, and the congestion was particularly troublesome to the fire and police departments. With a new dark fiber network being installed, the city needed a new network design that delivered reliability, scalability and consistency— without putting undue strain on the city budget.

Solution: Nortel Networks and Verizon designed a switch-based solution that improved system performance while providing maximum stability and availability. The impact on the city's bandwidth was dramatic, as data speeds increased 10 times over. The new system included IP Telephony services that utilized some of the city's existing voice gear, increasing productivity while helping the city to realize substantial first-year cost savings.

Richardson, Texas is a fast-growing suburb of Dallas that is home to the Telecom Corridor®, one of the highest concentrations of telecommunitechnology-based cations and companies in the world. Richardson has traditionally been very progressive in terms of technology; it was the first city in Texas to accept utility payments over the Web. However, steady growth had put a strain on the network utilized by city employees. With 950 municipal government employees spread between 17 different facilities, the city's existing T1 line was becoming too congested. Larger, heavy-traffic sites such as fire and police facilities were experiencing potentially dangerous slowdowns. To make matters worse, the old network infrastructure was expensive to maintain and difficult to upgrade.

Steve Graves, the city's Chief Information Officer, needed a cost-effective way to update the network infrastructure and give dependable high-speed network access to employees in 17 different locations. As they began exploring network upgrade options, city officials had five primary goals in mind:

- Replace unreliable systems
- Minimize expenses
- Deliver consistent high-speed network access to employees in 17 different locations
- Ensure scalability for long-term usage
- Provide maximum flexibility

Timing is everything

When the local school district put out a Request For Proposals to get a private dark fiber network run between all of its schools, city and school officials recognized an opportunity. A joint venture was proposed, and a new RFP went out to have the network installed between all the schools, as well as 17 city facilities. This enabled the two entities to share the cost and minimize the impact on their budgets - and on the taxpayers. As engineers were brought in to design the new network, it became apparent that the city's existing Nortel Networks* phone systems were in need of an upgrade as well. The new fiber installation presented the ideal opportunity to investigate IP Telephony. The advantages of a converged network

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were apparent, and a requirement for IP Telephony capabilities was added to the RFP. This new wrinkle eliminated many of the contenders, and a single IP Telephony provider quickly rose to the top.

We felt that Nortel Networks had the best IP Telephony solution for the city of Richardson's needs at the time.

> - Steve Graves, Chief Information Officer, City of Richardson

The decision comes down to dependability

Nortel Networks, with its U.S. headquarters in Richardson, partnered with Verizon to provide the City of Richardson with the technology it needed to optimize its new network and implement IP Telephony.

The city's IS department felt the design of the Nortel Networks solution was the most dependable of its options. It was not just the quality of the hardware, but the design of the overall solution that had the greatest impact. Most other companies proposed systems that utilized software often susceptible to viruses, worms and Denial of Service attacks. There were concerns about the stability of such a system. Because the city's network has to support emergency services such as 911, dependability and availability are crucial. The Nortel Networks design employs telephony systems that use the highly reliable VxWorks operating system. The design placed switches at each of the largest facilities, using the fiber as a backbone.

The broad portfolio of products available from Nortel Networks allowed the city's existing Meridian 1* systems to be enabled for IP Telephony, providing a more cost-effective solution.

The Nortel Networks deployment included:

- (6) Passport* 8600 Routing Switches with CWDM capabilities
- (35) BayStack Business Policy Switches
- (1) Meridian 1 Option 11C
- (4) ITG trunk-side cards
- (5) ITG line-side cards
- 200) IP phones
- Symposium* Express

These were deployed in conjunction with the city's existing:

- (2) Meridian 1 Option 61Cs
- 3) Meridian 1 Option 11Cs

Performance equals productivity

Nortel Networks designed a system that provided:

- A simplified network with voice and data delivered on the same fiber
- Improved, uniform network performance
- New technology using familiar protocols without all new equipment
- Reduced costs related to telco services
- A clear migration path for future upgrades

The system changeover has been practically seamless for the City of Richardson's 950 employees. With little downtime and no new training, data speeds have gone from 1.2-1.5 MBps to a minimum of 1 GBps per site. The transition from traditional telephony to IP Telephony has also been painless, and the resulting improvement in functionality has drawn raves. A particularly popular feature is the CallPilot* unified messaging application that enables users to get their voicemail, e-mail and fax messages from a single mailbox on their PCs.

The IS staff remains constant at 20 employees, 10 of which are technicians. Their jobs have actually been simplified, since five servers that were previously at five different locaNortel Networks helped us reach our goals by supplying a cost-effective solution that does not require additional expertise or people.-

- Steve Graves, Chief Information Officer, City of Richardson

tions have now been consolidated into a single centralized server.

The City of Richardson will realize considerable savings through the years thanks to this new network. Savings on telco costs alone will total \$10,000 a month. In addition, by remaining with the Internet Protocol, there is no need to add more IS staff, resulting in an estimated savings of \$130,000 a year. There were savings on equipment costs as well. Without the Nortel Networks hardware, the city would have had to purchase over \$50,000 in new servers this year.

Thanks to these savings, the IS department has been able to reduce its budget by roughly 8% while increasing the performance of its network. In the current economy — with tax revenue down and budgets under tight scrutiny — this fiscal perform-

ance is as critical as the network's performance.

The future is always a factor

Nortel Networks investment protection strategy was a key factor in Richardson's decision. The ability to incrementally upgrade as new features and services become available means the city's investment is protected and that there will be quick and cost-effective pathways to grow the system as the city's communication needs grow. The expanded bandwidth of the network will benefit the citizens of Richardson as well by enabling the city to increase its Web-based services. In the next year, the city plans to enhance its Web presence and give citizens greater access to city services and information. From a single seamless interface, a citizen will be able to pay traffic citations, receive utility service payment information and more.

> I am counting on Nortel Networks to keep us techsavvy and to help us move toward our future goals.

> > - Steve Graves, Chief Information Officer, City of Richardson

Another key application will be in the wireless arena. In the future, the city is considering providing WiFi services in the city's library that will provide Internet connectivity to visitors with notebook PCs. The police and fire departments will also have its own WiFi "hot spots," where emergency service vehicles can park to receive secure system updates without leaving their vehicles.

A role model for the modern city

Steve Graves, the city's Chief Information Officer, has received numerous calls from other cities, requesting details on the Nortel Networks design of the improved network. As Richardson continues to take advantage of this technology to increase the efficiency of the city's employees and implement new services for its citizens, it is sure to be a model for other forward-thinking communities throughout the country.

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Demographics: The respondents to the survey represented over 500 networking professionals from around the world. This number is quite sufficient to ensure that the overall results would not vary significantly by having more respondent. In fact, the number of respondents far exceeds the number needed to have consistent results among the surveyed population.







Figure A-3:



