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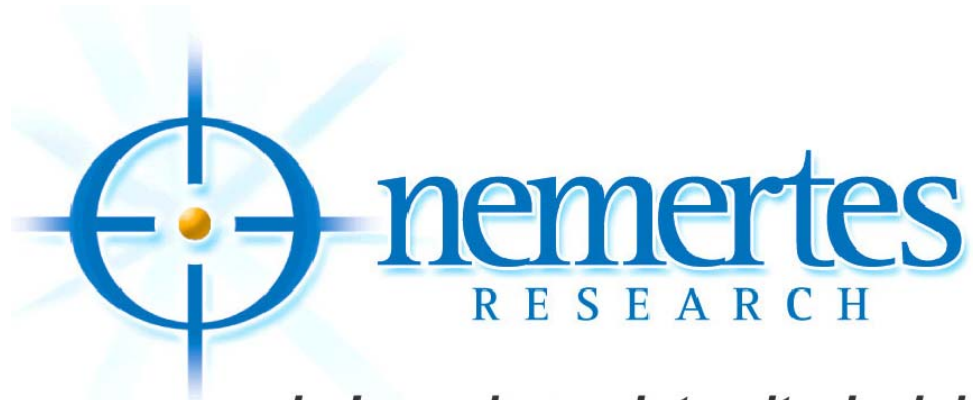


Building the Successful Virtual Workplace:

VOIP Review: Products, Services, Architecture

Analyzing the business impact of emerging technologies.

MARCH 2007



Independence. Integrity. Insight.

VOIP Review:

Products, Services, Architecture

Produced by Nemertes Research
March 2007

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1 Executive Summary

A growing number of organizations are dealing with a growing number of virtual workers. What does it mean to operate in a virtual workplace? Employees work in multiple locations, away from their supervisors or their workgroups at least some of the time. Basically, virtual workers may not have a single place where they conduct all of their business. The number of employees who work from home (either full or part time) has risen to 17% in this year's benchmark, up from 10% last year. And only 8.5% work in headquarters, on average.

These figures are creating new challenges for both business and IT staffs, to make sure the right network infrastructures, collaborative applications, and emerging technologies are in place to make virtual workers as productive as possible.

Building a Successful Virtual Workplace examines several key areas: WAN and branch-office infrastructure, convergence deployments, collaboration and unified-communications best practices, and mobility strategies. Nemertes will detail the findings, based on discussions with 120 IT executives, in nine detailed volumes of this research benchmark, in addition to upcoming vertical-market studies.

In this volume, Nemertes presents and analyzes the latest trends, vendor ratings, and best practices for Voice Over IP. You will find the following information on VOIP:

- ⊕ **State of Deployment:** How are organizations deploying the technology? What stage are they in?
- ⊕ **Architecture:** What are the most common architectures organizations use to leverage VOIP and why?
- ⊕ **Organizational Best Practices:** Who is making the decisions and how should companies organize to best manage the project?
- ⊕ **Vendor Ratings & Summary Analysis:** Who's on top? Who's not, and what are the drivers?
- ⊕ **Management Best Practices:** What tools do companies use to manage VOIP, and what are the latest trends with managed service providers?

2 Voice Over IP State of Deployment

2.1 VOIP Mania

For the past four years, Nemertes has been tracking voice-over-IP deployments. Year after year, a growing number of organizations move toward VOIP and away from TDM technology. This year, only 1% of the benchmark participants have no plans whatsoever for VOIP, down from 6% last year. Does that mean everyone is using VOIP? Not at all. But it does mean nearly all organizations are doing *something*, whether running a pilot, evaluating vendors for a future rollout, installing VOIP, or using VOIP completely. Overall, the percentages of organizations within each type of rollout have stayed consistent, relative to one another, year over year. As fewer organizations say they have no plans, they move into the “pilot” and “planned for 2007/2008” categories.

VOIP State of Deployment

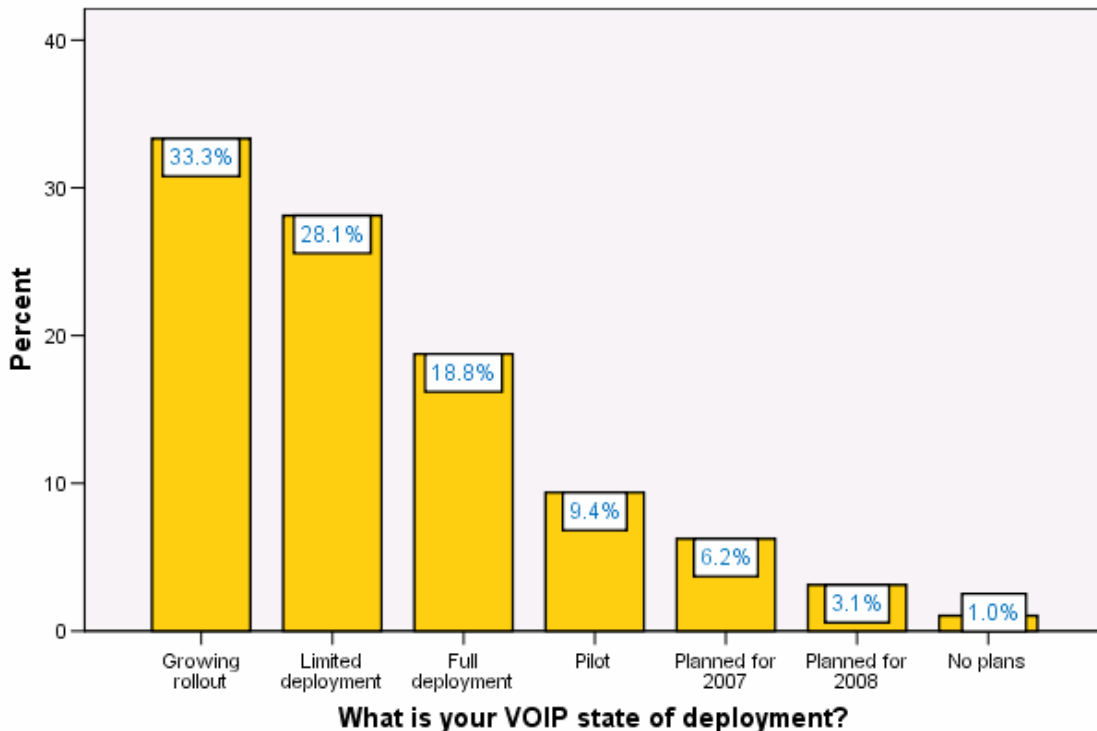


FIGURE 1: VOIP STATE OF DEPLOYMENT

The pace organizations take with their VOIP deployments varies widely, based on overall strategy, staff, company size, and infrastructure needs. Just because a company has started a VOIP deployment doesn't always mean it has selected a permanent vendor, either. For example, several large, global organizations have installed VOIP at locations here and there as their existing TDM gear reaches end of life, or when they open a new facility, but they don't have an overall standard defining which IP telephony vendors or carriers to use in which circumstances. Because one site already has Avaya TDM, they IP-enable the switch, or simply buy a new Avaya IP switch because the staff there is familiar with that vendor. At the same company, in another location, the network team may be installing a Cisco solution because it's familiar with Cisco.

Such situations illustrate one of the largest challenges we're seeing right now: How does central IT and/or telecom regain control of telephony deployments so there is continuity among all locations? In order to explore that subject, let us first understand where companies are in their deployments.

2.1.1 Growing Rollout

One-third of the benchmark participants are engaged in a growing rollout of voice over IP. This means the organization has decided to move entirely to VOIP, and it's in the process of installing it. That process could be quick if it's a midsize company with a small number of locations, or it could take years, if it's a global multinational trying to coordinate telecom contracts. (Please see Figure 1: VOIP State of Deployment, Page 5).

All sizes of organizations are in the growing-rollout state of deployment. The largest percentage of growing-rollout companies is those with \$20 billion or greater in annual revenue (28%), followed by those with \$1 billion to \$9.9 billion (18.8%). Overall, more than half of the organizations (about 56%) in the growing-rollout phase are large, in terms of revenue.

Not surprisingly, large companies take longer to get the technology deployed, despite the fact that they have larger IT staffs to handle the rollouts. Small and midsize companies generally take less than two years to fully implement VOIP, while large enterprises can take up to eight years.

What is your VOIP state of deployment?: Growing rollout

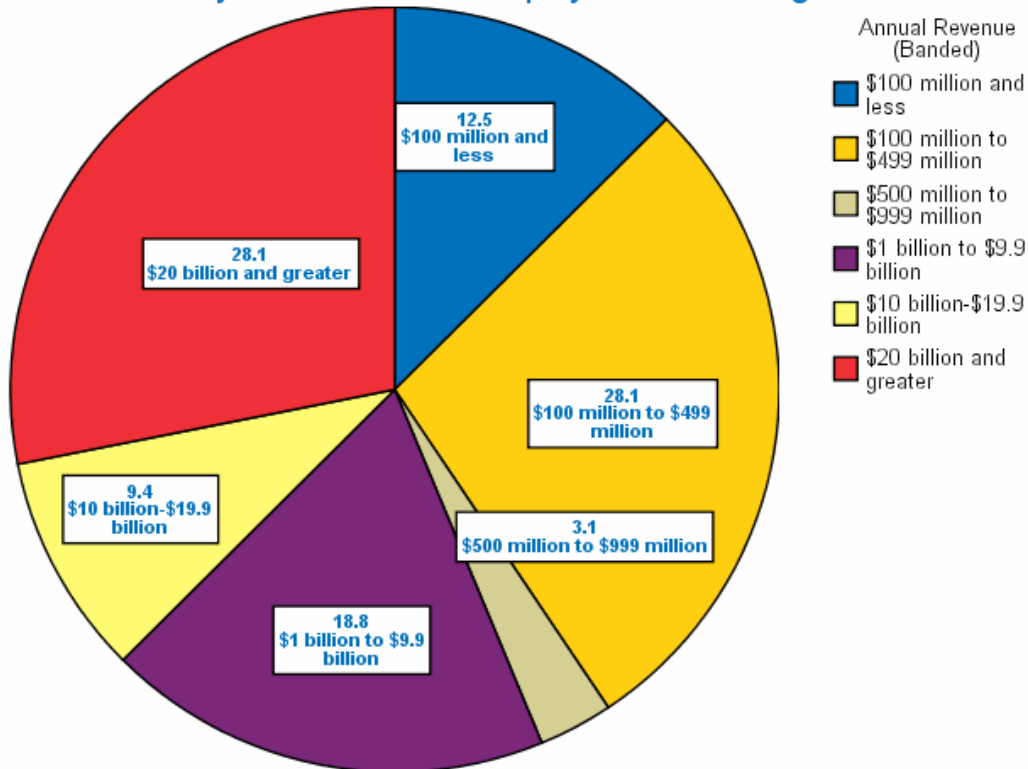


FIGURE 2: GROWING ROLLOUT

2.1.2 Limited Deployment

Other companies—about 28%, to be exact—have no intentions for now to implement voice over IP throughout the organization. But they have found reasons to implement VOIP in a tactical manner—only at new locations or certain types of sites. We call those rollouts “limited deployments.”

The majority of participants (78%) in the category of limited deployment are large in terms of revenue. They often find themselves in situations where their TDM PBX is at the end of its life, and they must replace it, or they need a new PBX to serve a new location. Rather than investing in another TDM switch, they opt for IP or an IP-enabled switch. In doing so, they wind up with isolated deployments at various locations.

“We’re using Cisco VOIP at new facilities right now, or sites where the network infrastructure is capable of supporting VOIP,” says the senior architect for a large pharmaceutical company. “We’re only deploying where it makes sense for depreciation reasons, or need to implement a new system.”

What is your VOIP state of deployment?: Limited deployment

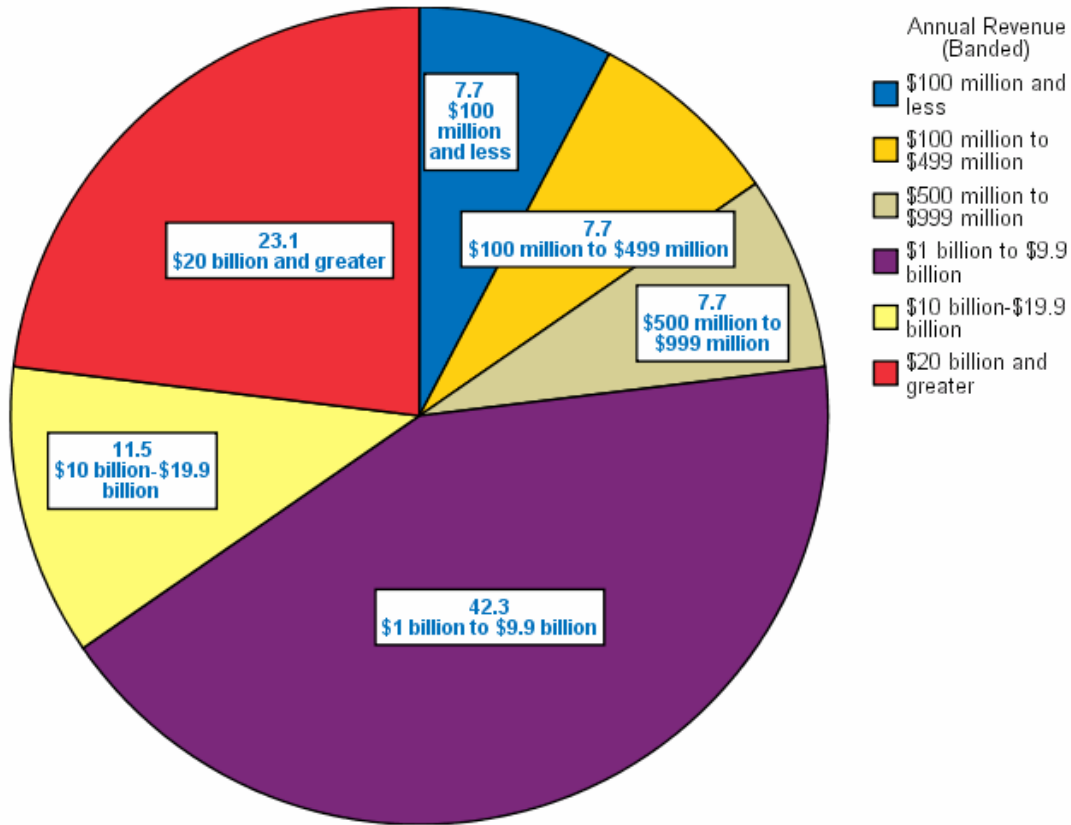


FIGURE 3: LIMITED DEPLOYMENT

Most small organizations find it more effective to adopt an all-or-nothing approach because they don't have a large enough organization to merit staggered rollouts, or using the technology in a specific type of location. They are more apt to do a "rip-and-replace" VOIP deployment, often in conjunction with a network upgrade or other IT project.

2.1.3 Full Organizational Rollout

Nearly 20% of organizations have VOIP fully deployed. Interestingly, 59% of them started their deployments in recent years--2004 (11.7%) or 2005 (47%). Nearly 12% started and completed their deployment in 2006.

What does this indicate? Most organizations with 100% VOIP are small to midsize companies that can quickly roll out a new technology without spending years and tens of millions of dollars on it! In fact, 65% of benchmark participants with full rollouts have less than \$100 million in annual revenue, and 30% have between \$100 million and \$500 million. Only about 6% of the full rollouts are

among organizations with \$1 billion to \$10 billion in revenue, and no larger companies fall into this category at all—primarily because their rollouts are more extensive and take more time and resources to complete particularly on a global scale. Many large enterprises say they plan to adopt an evolutionary approach to VOIP, with completion expected in the three- to eight-year timeframe.

What is your VOIP state of deployment?: Full deployment

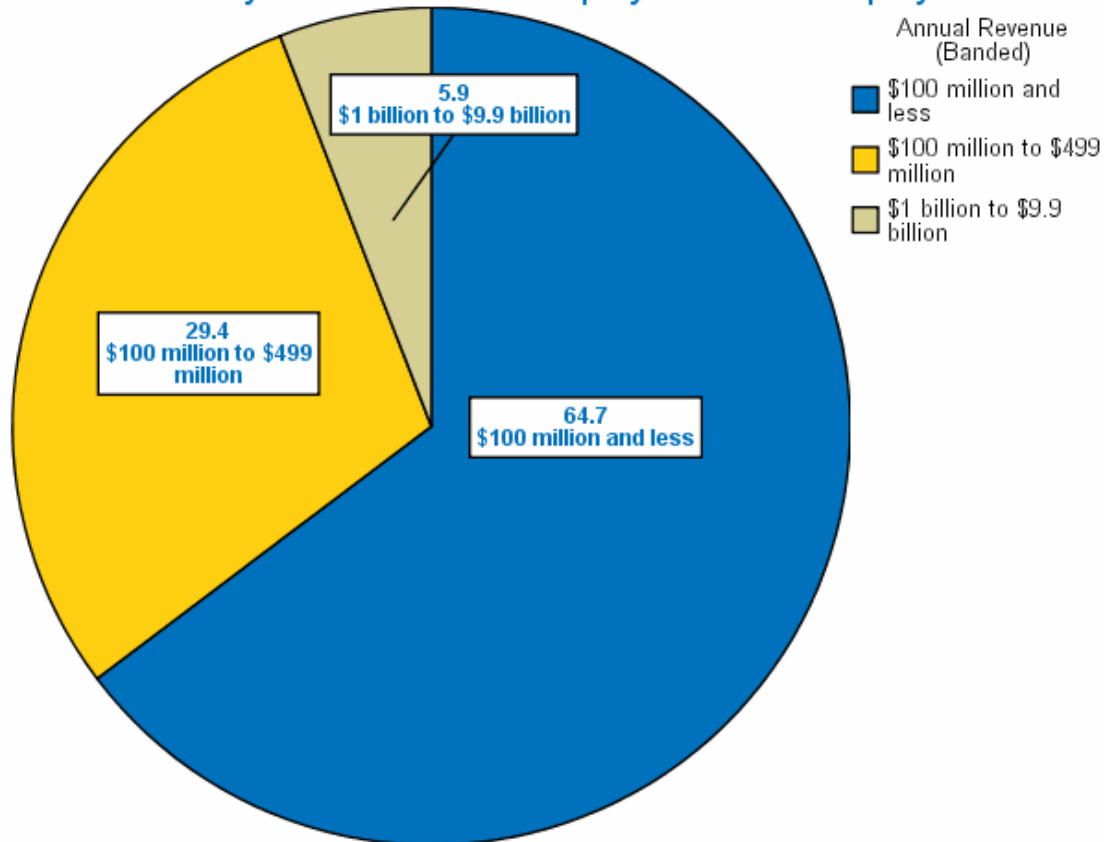


FIGURE 4: FULL DEPLOYMENT

Overall, feedback from organizations with full adoption has been positive, absent the typical problems with installation and initial troubleshooting. “Everybody loves it. It’s made everybody’s job easier, especially for travelers,” says the telecommunications manager for a manufacturing company, which uses ShoreTel. “We did a lot of communications when rolling it out—on the homepage, just talking, tutorials, and formal training. Everything we showed them could be done on their PC and phone. Now they panic if anything is wrong with their computers, but nothing ever went down. I’m a single mom. I can work with the

folks in Mexico from the office [using the softphone], or sit in my pajamas and help them from home.”

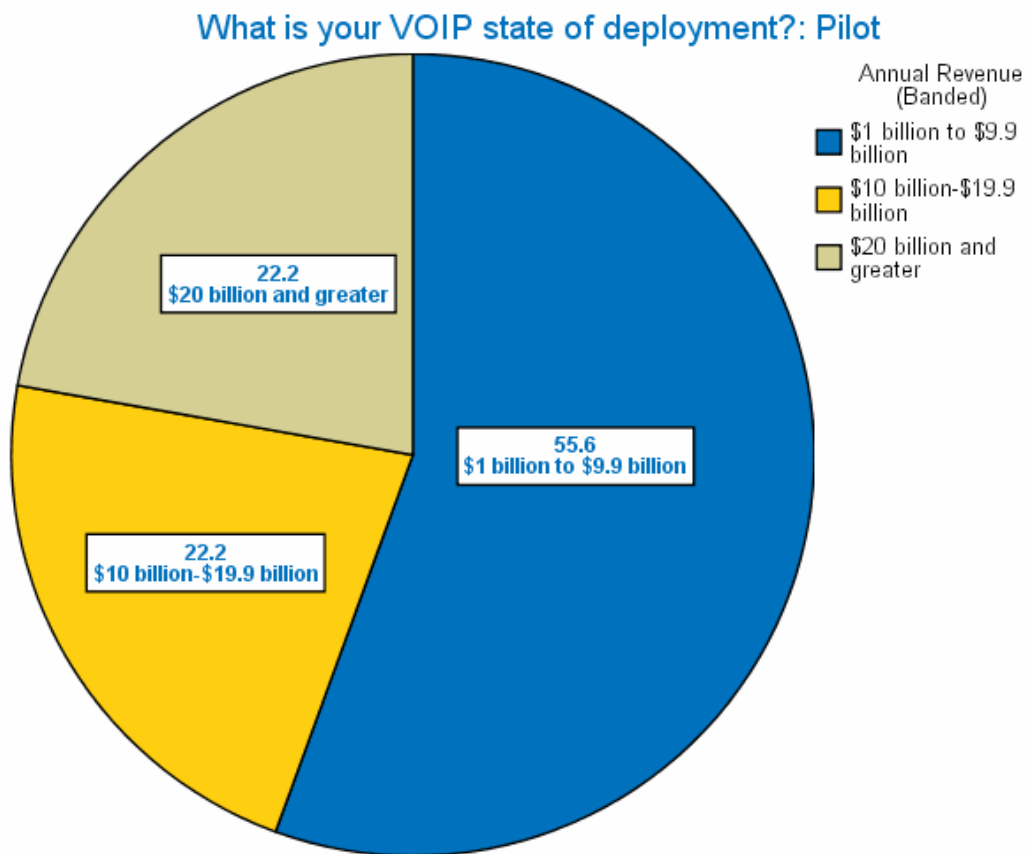


FIGURE 5: VOIP PILOT

2.1.4 Pilots and Planned Deployments

Nearly one in five organizations (18.7%) are conducting pilots of VOIP or planning to use the technology within two years. These pilots, of course, can last for years in some cases. All of the participants engaged in pilots now are midsize or large, earning \$1 billion or more in annual revenue. Those planning to deploy the technology within the next two years span all revenue bands, but the largest segment is among small companies, followed by large enterprises.

One of the most consistent pieces of advice we hear from experienced IT executives who have deployed VOIP is to *slow down!* In hindsight, they found they rushed through their deployments for no good reason. Organizations in the planning and evaluation stage should stay there until they are comfortable with their solutions and strategies.

3 The Master Plan: Architecture Decisions

With an understanding of where companies are now in their VOIP deployments, we can examine the decisions they made to get there. The next two sections will address some key issues, including the architecture decisions and organizational best practices.

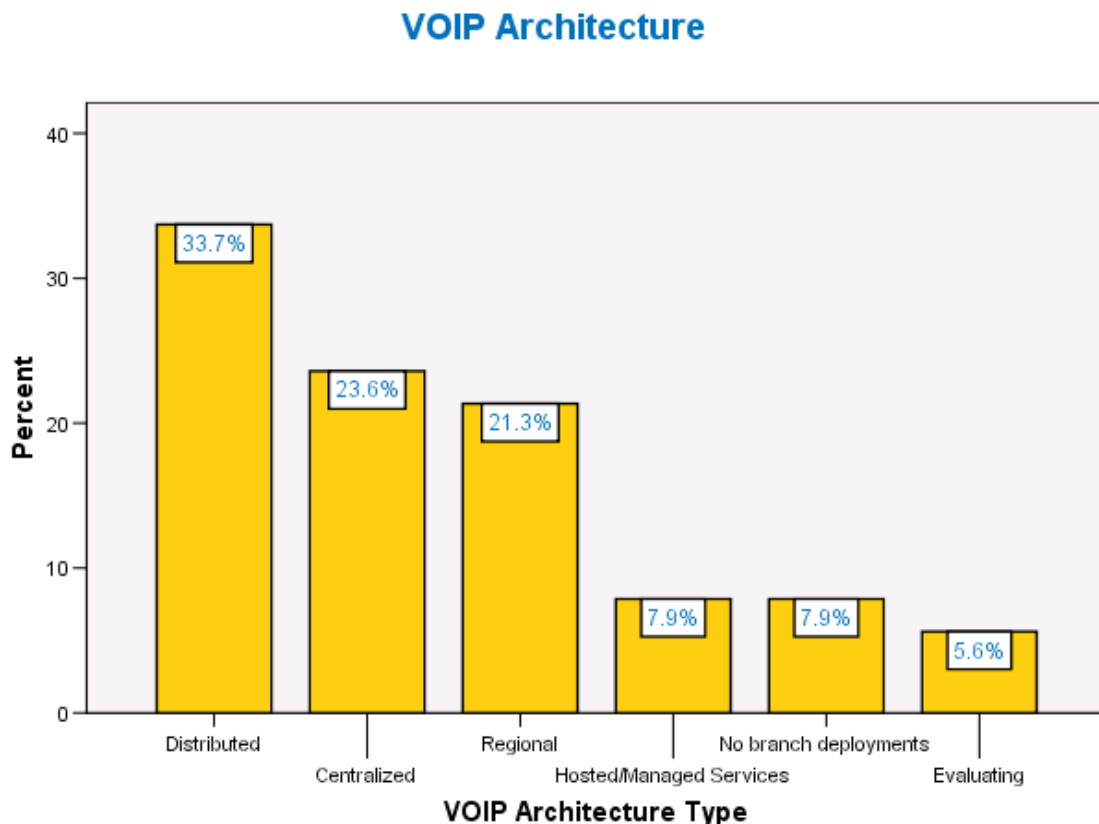


FIGURE 6: VOIP ARCHITECTURE

One of the big changes with a VOIP infrastructure, as opposed to TDM, is that voice, data and video communications becomes streamlined under a single network. In the TDM world, it's common to see independent key systems and PBXs at different locations that operate in isolation. With VOIP, companies want to remove boundaries between locations, so regardless of where someone is located, he or she can use the same features to contact another individual, whether down the hall or across the globe.

VOIP adopters are using a few different architectures to accomplish this: distributed, centralized, regional, and hosted/managed. We asked participants how they were bringing or planning to bring VOIP to their remote locations to create a consistent communications infrastructure with common features, reliability, and predictable performance across all sites

Most commonly, they distribute switches to various sites and network them together. That architecture, in about 33.7% of organizations, places an IP PBX at all or most locations. In another type of distributed architecture, 21.3% of organizations adopt a regional approach, whereby they break their geographic locations into different regions, and implement IP PBXs in key sites within each region, with small branches connecting directly to them. The PBXs in each region then interconnect. Overall, that means 55% of organizations have some level of distribution to their IP PBXs, increasing service resilience but at the cost of an increased management challenge.

In fact, management issues and especially the desire of central IT to have easy hands-on control of the IP PBX is the big reason 23.6% of companies prefer a central architecture. Going along with a consolidated data-center where they centralize all or most applications, they install a huge IP PBX in a central location, typically the data center, with a back-up IP PBX at a secondary site for business continuity.

Nearly 8% of companies are using carrier-provided hosted or network-based managed services for their branch locations. This figure has increased by 2% this year, and all indicators suggest it will continue to increase. For example, 23% of organizations say they're evaluating such services, and another 2% already are planning to use them.

3.1 Business Drivers & Operations

A desire to “futureproof” their networks most often drives businesses to adopt VOIP. IT executives view the strategic move toward VOIP as the first step in preparing their networks for the future of convergence and multi-application IP infrastructure. Other business drivers include improving employee productivity, streamlining communications features and reducing costs.

Those are the high-level drivers that are not independent of each other. In fact, how they interact with each other is complex.

Consider large enterprises. Their TDM PBXs, which generally include dozens of brands, are reaching the end of life. And IT executives do not want to invest in old TDM technology. So if they haven't started their VOIP migration yet, they're scrambling to develop a strategy and set of standards for how to do so.

As they run their cost analysis, they find a mixed bag of results. Capital costs for IP telephony are equal to or greater than TDM, and operational startup costs are higher initially.

Ongoing operational costs drop about 20%, except when it comes time to troubleshoot an outage. Then, it takes from one to three times longer to isolate and repair an IP telephony outage than a TDM outage. (Identifying the actual timeframe is variable, depending on the type of outage or problem. But a TDM outage or performance issue typically takes 30 to 90 minutes to isolate and repair, if replacement parts are not needed. So, IP isolation and troubleshooting commonly takes one hour to 4.5 hours.) Network costs drop by about 23%.

The idea of going to VOIP solely to save money has slowly subsided. In the early years of VOIP, companies had to find an ROI in order to justify replacing tried-and-true equipment with new technology.

Now, they're moving more into the TDM-replacement phase, so ROI becomes less important. To be clear, there *can be* a net savings after the first two years, but organizations are focusing on other benefits, such as streamlined features, improved productivity, and integrated voice/data/video collaborative applications.

They then face the challenge of running this new "telecom" network internally, or they choose to rely upon third parties that now have some experience to reference.

Many are simply applying the money they had been spending with vendors, VARs, or service providers on maintenance for MACs to overall management and monitoring of IP telephony. (External MACs for TDM environments cost \$168 on average, and range from \$65 to \$400 each, while IP MACs cost only about \$10, so these budgets quickly added up.)

The bottom line is that enterprises are willing to spend money to outsource management of IP telephony. It's something they have been doing for years with their telecom maintenance contracts. Now, they can just get more for the dollar in the IP world.

We will discuss in much greater detail specific pricing, cost models and other business issues in an upcoming volume of this benchmark.

4 Organizational Best Practices

4.1 VOIP Decisions: Organizational Roadmap

In Section 2.1, we raise the question of how central IT/telecom regains control of IP telephony to streamline its management. One of the best ways to do that is to develop set of standards to address how the company must implement VOIP.

After discussing this with numerous organizations that have both succeeded and failed, Nemertes has developed this best-practices summary (with further details in our ***VOIP Strategy Sessions***):

- ⊕ Budget six to 12 months to address staffing concerns and to “team-build” with voice, network, applications teams.
- ⊕ Converge staffs or create cross-disciplinary project team.
 - ⊕ Large companies tend to create project teams rather than converge staffs.
- ⊕ Define the skill-sets of, and needs of the team.
 - ⊕ They must be able to devote enough time to stay updated on VOIP changes, common causes of outages. This takes *time and resources*. Without this, outages will last long!
 - ⊕ VOIP requires often costly management/monitoring tools, so budget for them up front.
 - ⊕ Merger and acquisition may require staff to learn new vendor system.
 - ⊕ The team must include a mixture of experience. In order, we recommend telecom, networking, applications, security.
- ⊕ Don't rush! Take time to research technology, vendors, carriers, and overall solutions.
- ⊕ Assign one person to oversee project, but select that person based on philosophical direction of project.
 - ⊕ Is it a voice project or a data project? Or is it both?
 - ⊕ Assign a leader with the appropriate background.

- ⊕ Provide the leader with a team of people with complementary backgrounds.

4.2 Current Decision-Makers

There are two levels of decisions when it comes to convergence. First, there is the strategic decision to shift to VOIP and an overall converged IP network. We find that decision comes from a high-level individual, such as the CIO, or a group of high-level people, including the CIO, CTO, CFO, and business-unit leaders.

The second level of decision-making becomes more tactical and includes the vendor, architecture, and often operational decisions. The biggest shift year over year is that more groups are making vendor decision, validating the trend that organizations are putting together project teams. Fewer CIOs are making decisions, indicating they have become comfortable enough with the technology to offload the vendor decision to the staff, or to rely upon a larger group of which CIOs may be a part. Directors also are making more decisions (Please see Figure 7: VOIP Decision-Makers, 2005 and 2006, Page 16).

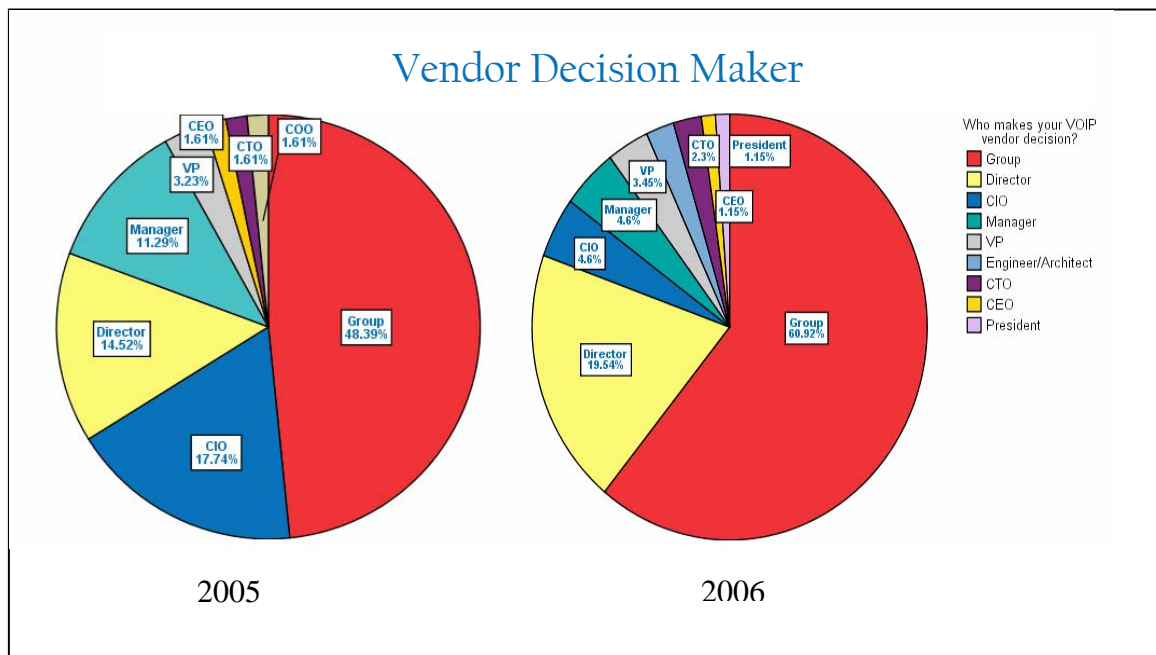


FIGURE 7: VOIP DECISION-MAKERS, 2005 AND 2006

4.3 Vendor Selection

On average, organizations are assessing 3.15 vendors, which increased from 2.7 in 2005. At that time, 57% of organizations assessed only one or two vendors. This year, that percentage has decreased to 39%. Still, though, it's too high. Nemertes recommends organizations do a cursory assessment of six to eight vendors or carriers, and a detailed evaluation and pilot of three to four vendors or carriers. Organizations assess anywhere from one to 13 vendors, although rarely did we find any that ran detailed pilots or even lab test on more than six vendors.

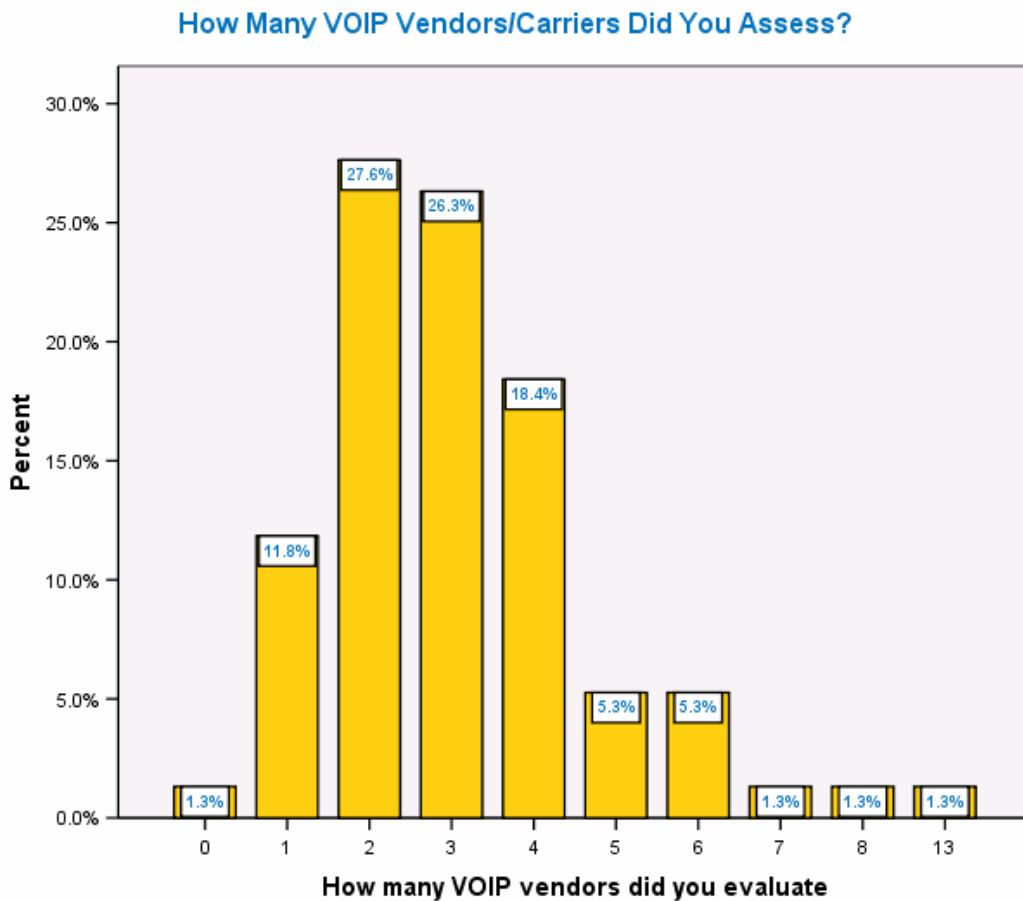


FIGURE 8: VOIP VENDOR EVALUATION

The vast majority of organizations evaluated Cisco (80.5%), followed by Avaya (57.3%), and Nortel (46.3%). IT staffs assessed and continue to assess

numerous other vendors, including those highlighted in Figure 10: VOIP Vendor Assessment, Page 19.

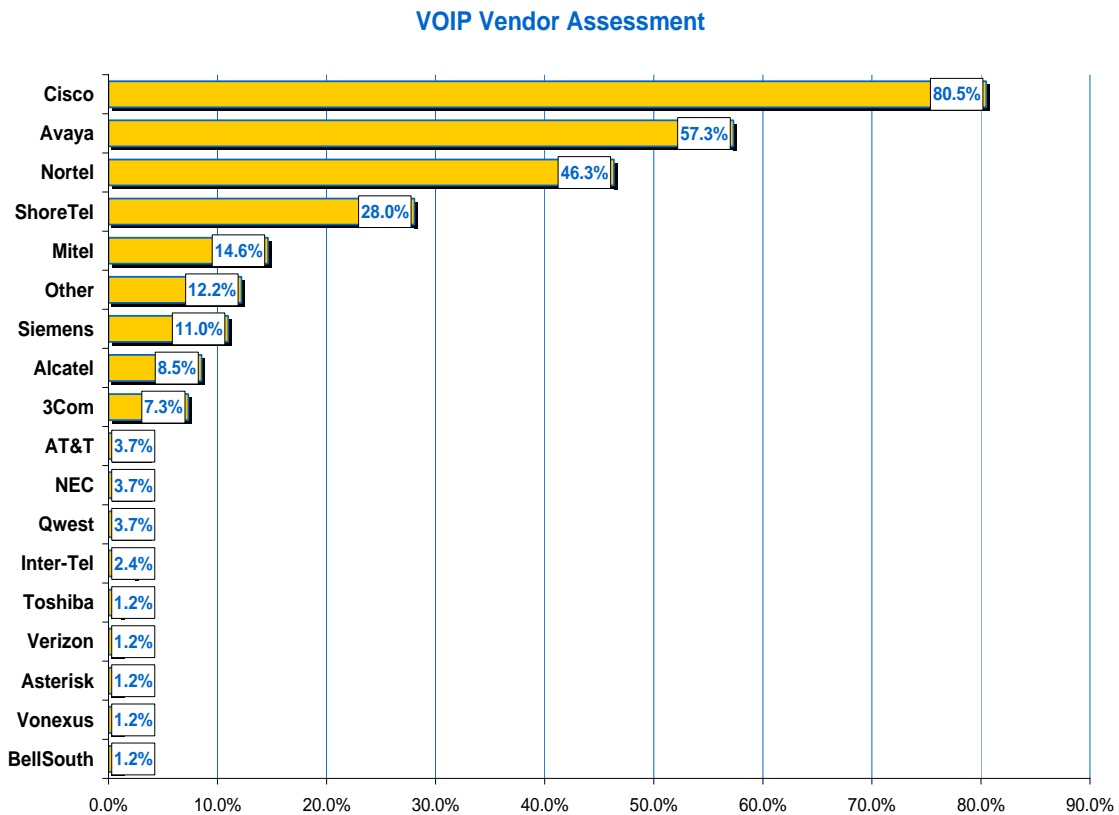


FIGURE 9: VOIP VENDOR ASSESSMENT

In terms of selection, Cisco and Avaya were at the top again, but the gap between them narrowed significantly, with 29.6% for Cisco and 27.4% for Avaya. (Please see Figure 9: VOIP Vendor Assessment, Page 18). Next in line was ShoreTel, with 21%. Customers for Cisco and Avaya were significantly larger in terms of the number of end units when compared to ShoreTel, and to Nortel also, with only 11.1%. It's important to note that 12.3% of organizations remain undecided about their permanent VOIP vendor or vendors, so these numbers will continue to change as they continue to make their supplier decisions.

VOIP Vendor Assessment/Selection

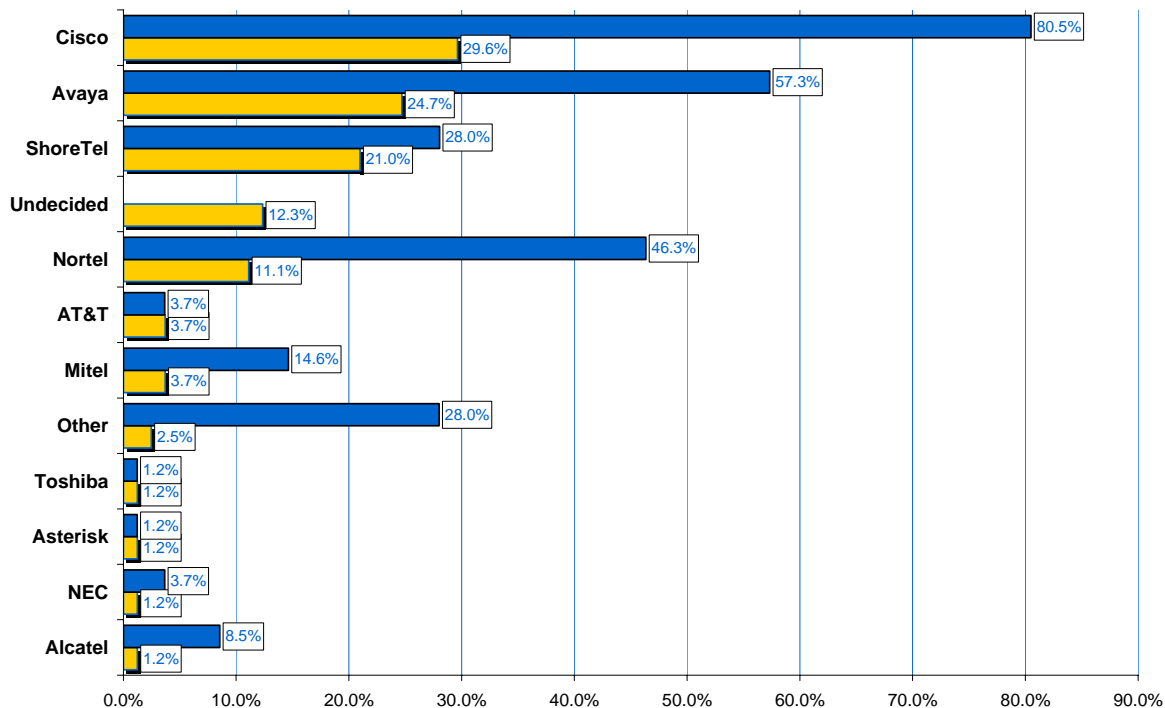


FIGURE 10: VOIP VENDOR ASSESSMENT

The average number of end units (meaning IP hardphones, IP softphones, audio bridges, or actual users) for each VOIP rollout has changed this year. The average number of users or end units on the average Avaya implementation has increased to 11,261, beating the former large-rollout-leader, Cisco, which has 4,270 this year. Nortel has an average of 504 end units, and ShoreTel has 369.

5 Vendor Ratings

Nemertes has been tracking IP telephony vendor performance for the past four years. We ask IT executives to rate the vendors they use or used, either in production or detailed trial. They were allowed to rate multiple vendors, if applicable, in the following areas: Value, technology, VAR expertise, management tools, customer service, solution experience, product features, installation, and performance. They rate vendors on a 1 to 5 scale: 1= unacceptable, 2=poor, 3=fair, 4=good, 5=excellent.

We garnered enough responses to include Avaya, Cisco, Nortel, and ShoreTel in the individual rankings. We also gathered a smaller number of ratings on Alcatel, Mitel, NEC, and Siemens, which provides some direction on their performance, as well. For the purposes of this volume, we will provide data on Avaya, Cisco, Nortel, and ShoreTel and follow up with the additional vendors in an upcoming addendum.

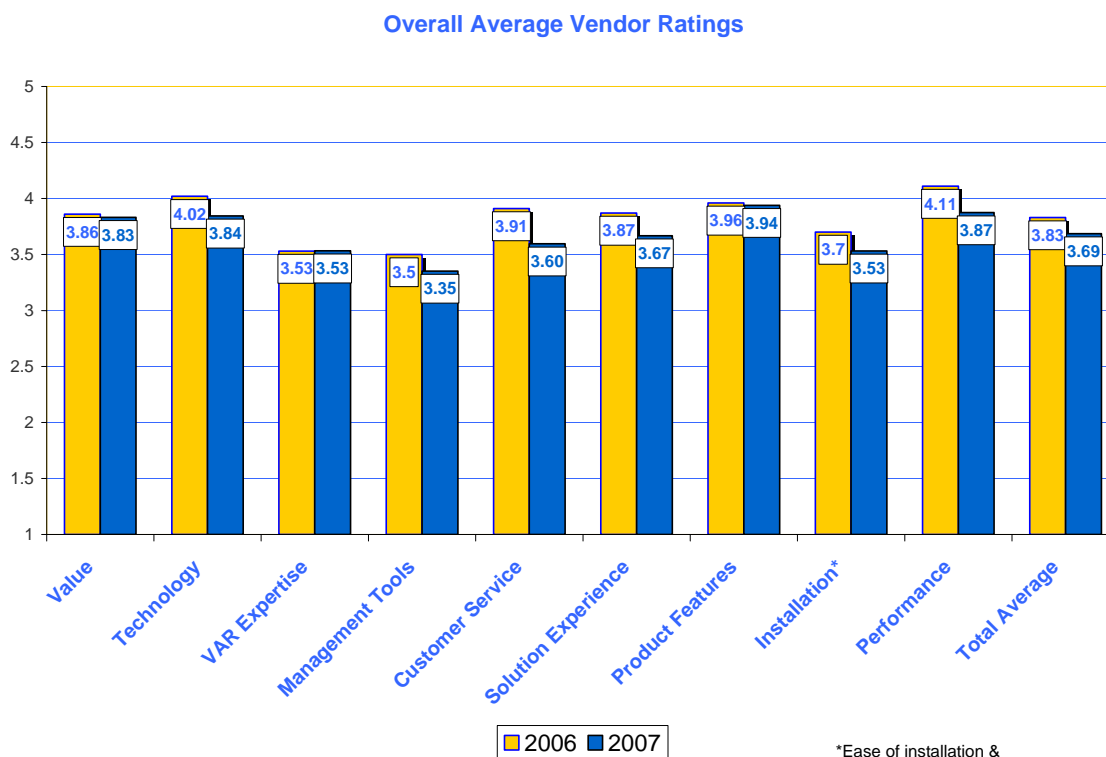


FIGURE 11: OVERALL COMBINED VENDOR RATINGS

When averaged among the major vendors, the ratings declined this year, from an overall of 3.83 to 3.69. It's surprising no single category improved, and VAR expertise was the only one that stayed steady. Technology, management tools, customer service, solution experience, and ease of installation and troubleshooting all declined fairly substantially, while value and product features declined only slightly. (Please see Figure 11: Overall Combined Vendor Ratings, Page 20).

A few reasons are behind this trend. First, networks are becoming more complex, with additional applications contending for shared bandwidth and end users' performance expectations on the rise. IT executives expect the vendors to help ease VOIP implementation and operation. Additionally, IT executives' expectations have increased regarding what products should include. For example, buyers expect vendors to provide sophisticated management tools, but they don't. And they don't expect rollouts to be as complex as they often are.

5.1 Consolidated Rankings & Analysis

For the fourth consecutive year, ShoreTel has won every category in Nemertes' ratings. Nortel scored the lowest in all but one category. Avaya and Cisco shared the middle ratings. (Please see Figure 12: Ratings, by Vendor, Page 22).

Nemertes has detailed feedback from IT executives, as well as recommendations for each vendor. In this benchmark volume, we provide the highlights and the overall summaries for the previously specified vendors, reserving the additional detailed analysis for strategy sessions with each vendor. This allows Nemertes to provide targeted recommendations confidentially to each vendor, rather than doing so more "publicly" in the benchmark volumes. We also provide detailed analysis on numerous VOIP vendors/carriers in the *Nemertes VOIP Workshops* for enterprises. In these sessions, we discuss detailed results for each of the vendors to help enterprises that are evaluating the VOIP market and specific vendors. For more information on these sessions, please contact client-services@nemertes.com.

Consolidated Ratings, 2007

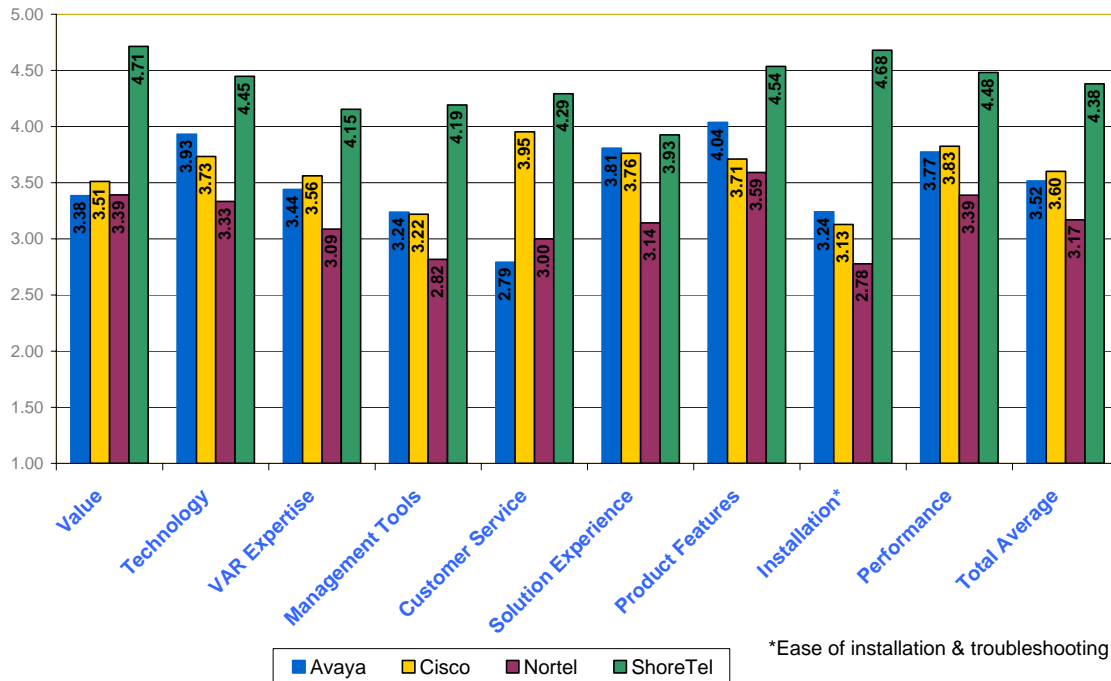


FIGURE 12: RATINGS, BY VENDOR

Each benchmark participant can rate multiple vendors, providing the organization has used the products in a production environment or very extensive pilot. It's important to note the difference between the sizes of companies rating each vendor. The figures don't equate to exact customer size, since some IT executives rated vendors they ultimately decided against. Customers for ShoreTel and Nortel are primarily small and midsize companies, and those using Avaya and Cisco are primarily large companies. The median size, defined by annual revenue, of the respondents for each vendor is as follows:

- ⊕ Cisco: \$3.2 billion
- ⊕ Avaya: \$2.6 billion
- ⊕ Nortel: \$530 million
- ⊕ ShoreTel: \$175 million

That tells us overall that Cisco and Avaya typically handle the larger, more complex rollouts overall. That influences some of the overall ratings. When implementations are small and straight-forward, we would expect to see higher ratings for areas such as "VAR expertise" and "ease of implementation and

troubleshooting.” But in areas such as “value” and “customer service,” we do not believe the size of the implementation plays as big of a role because vendors either have solid customer service and sound value or they don’t—regardless of whether they’re handling implementations for large or small companies.

5.2 Avaya

5.2.1 Competitive Analysis

In assessing the so-called “Big Three” IP telephony vendors—Avaya, Cisco, and Nortel—Avaya wins five of our 10 categories, and it comes very close to being the first vendor to beat ShoreTel in one category—solution experience. We find Avaya competing most commonly with Cisco: 76% of the organizations that assessed Avaya also evaluated Cisco, compared to 46% that assessed Nortel and 30% that also assessed ShoreTel.

Avaya’s strengths are product features (4.04), technology (3.93), and solution experience (3.81). This isn’t surprising. Avaya has had a long list of features in its TDM product line that it has been able to port into the IP world. “The call answer group is absolutely critical for retail organization, and the ability to pull up features from analog phones were key differentiators vs. Cisco,” says the IT director for a larger retailer.

Its technology is evolving, and many IT executives considered Avaya to be a thought leader in the IP-telephony space, particularly considering its contact-center product line and its strategy for integrating IP telephony with mobility and collaborative applications. Avaya also maintains partnerships with other vendors, including Juniper and Extreme for network equipment and Nokia for mobility. These relationships make it much easier for Avaya to evaluate customers’ total networks and craft a solution for them. “Avaya has the expertise of voice. They seem to have really invested in the transformation of voice over to IP. They have some really good strategic partnerships with the data world. I’m not real fond of putting all eggs in one basket. With Cisco, you’re Cisco end to end. With Avaya, you have choices. Avaya follows standards. Cisco follows standards, but likes to add proprietary features,” says the director of telecom for a college, which uses Avaya and Extreme, and has had 100% uptime on IP telephony in the past two years.

Avaya's weaknesses are customer service (2.79), management tools (3.24), and ease of installation and troubleshooting (3.24). Customer service has emerged as Avaya's biggest weakness this year, primarily because of inconsistency among account teams and regions. "With international, it's like two separate companies. We spend millions of dollars with these guys. The account team here [in the U.S.] is good, but we also have to talk to an account team overseas. It's a nightmare to get equipment. There is lot of bureaucracy. What makes it really tough is that the guys are not used to the New York frame of mind. They can't imagine why 'next Thursday' isn't good enough," says the IT director for large financial-services firm. Further, customers have complained about changes in account teams and slow response to product and implementation questions. The main concern with implementation was among larger enterprises, where IT executives were surprised at the number of third-party experts they needed to help.

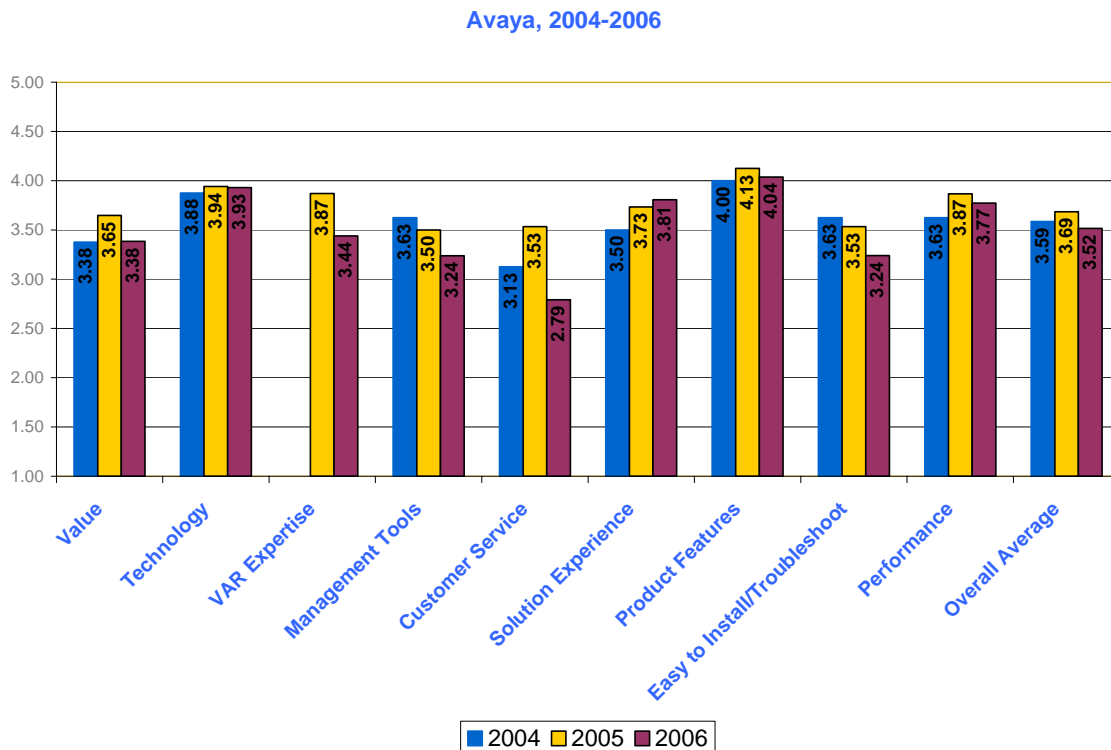


FIGURE 13: AVAYA RATINGS, 2004-2006

Across the board, participants rated management tools low (with the exception of ShoreTel). Avaya has solid management tools for its contact-center environment, but it needs to bolster the management tools for its regular IP telephony products. Those who use Avaya’s tools say they are decent, but could be better in terms of consolidated reporting, report customization, and in measuring the network’s affect on VOIP performance. We are seeing a few key management vendors, including Integrated Research (Prognosis) now and Infovista later, offering third-party management of Avaya.

5.2.2 Avaya: Trending Analysis

When comparing Avaya’s performance this year to previous years, we see some disappointing results. (Please see Figure 13: Avaya Ratings, 2004-2006, Page 24). The only category that consistently improved in the past three years was solution experience. Technology, performance, and product features remained steady, meaning they didn’t show a consistent improvement or decline during the three-year period. Rather, the ratings hovered in the same area, whether increasing or decreasing slightly. Avaya declined in value, VAR expertise, management tools, customer service, and ease of installation and troubleshooting.

At-a-Glance Vendor Analysis: Trending		
AVAYA		
Looking Up	Holding Steady	Needs Improvement
Solution Experience	Technology	Value
	Performance	VAR Expertise
	Product Features	Management tools
		Customer Service
		Installation/Troubleshooting

FIGURE 14: AVAYA TRENDING

Let’s look at a few key ratings. We are not too concerned about the slip in the value rating, as they remain close to the previous two years. Avaya’s costs, as you’ll see in a future volume, are highly competitive. But, of course, value doesn’t equate solely to cost. One of the reasons participants rated Avaya lower in this area is because of licensing costs. They simply don’t see the value in those fees, nor do they feel they get a “bang for the buck.” “Their gear isn’t any more expensive, it’s just their licensing. It’s so damn expensive,” says one IT executive.

VAR expertise is a key concern among participants, particularly in Asia, Latin America, and the Middle East. If Avaya wants to focus on global growth, this should be a high-priority item. Though management tools are declining, we're seeing a concurrent entrance into the market from third-party providers, who have the expertise to develop better management tools. We would not focus heavily on improving internal management tools, but instead, forging partnerships with management vendors and managed service providers.

5.3 Cisco

5.3.1 Competitive Analysis

Cisco wins the five categories Avaya doesn't among the "Big Three" IP telephony vendors. When companies evaluate Cisco, they most commonly also evaluate Avaya (71%), followed by Nortel (58%), ShoreTel (35%), and Mitel (19%).

Cisco's strengths when compared with competitor rankings are customer service (3.95), performance (3.83), and solution experience (3.76). The strong customer service rating is the biggest surprise this year with Cisco, which blew Nortel and Avaya out of the water and nearly caught ShoreTel. Cisco has been making significant efforts in this space. The company has become more available to resolve level-2 and level-3 troubleshooting issues when partners can't resolve the problems. Cisco also is paying more attention to crafting solutions overall for customers. "I've been doing this for 23 years. I'm not stuck on vendors and their products. What's really important is their ability and willingness to understand who we are and applying their products to us, rather than them telling us who they are and shoehorning us into their products," says the IT director of a large financial institution. "Nortel and Avaya don't flex very well. Cisco says, "Wow, you're using it this way! Let's see how we can help or improve it. I've been in multiple meetings with Avaya where we're trying to explain how our business works, and they keep trying to fit us into where they are. They're not listening to where we are."

Cisco also has done a good job getting customers involved with user groups or beta tests to solidify their involvement in the development process.

Overall performance of Cisco rollouts is good—once customers get them up and running.

Cisco’s weaknesses include ease of implementation and troubleshooting (3.13) and management tools (3.22) Cisco implementations continue to be challenging. One IT executive said, “With Cisco, I practically need a staff of PhDs.” We have seen some improvement in this area, though. And, the fact that Cisco has bolstered customer service in order to facilitate troubleshooting questions has helped the overall implementation experience. We expect as vendors, VARs, and enterprises gain more experience with the technology, we will see the ease of implementation ratings increase. But we don’t expect substantial improvements for about three more years.

In terms of management tools, Cisco’s scores are lower than both Avaya and ShoreTel’s. Cisco in recent months has been aggressively marketing and pricing its enhanced management tools, and the jury remains out as to the success of those tools. As companies move toward multi-vendor environments, we expect them to increasingly look at third-party tools or services to consolidate the number of management products required to manage VOIP.

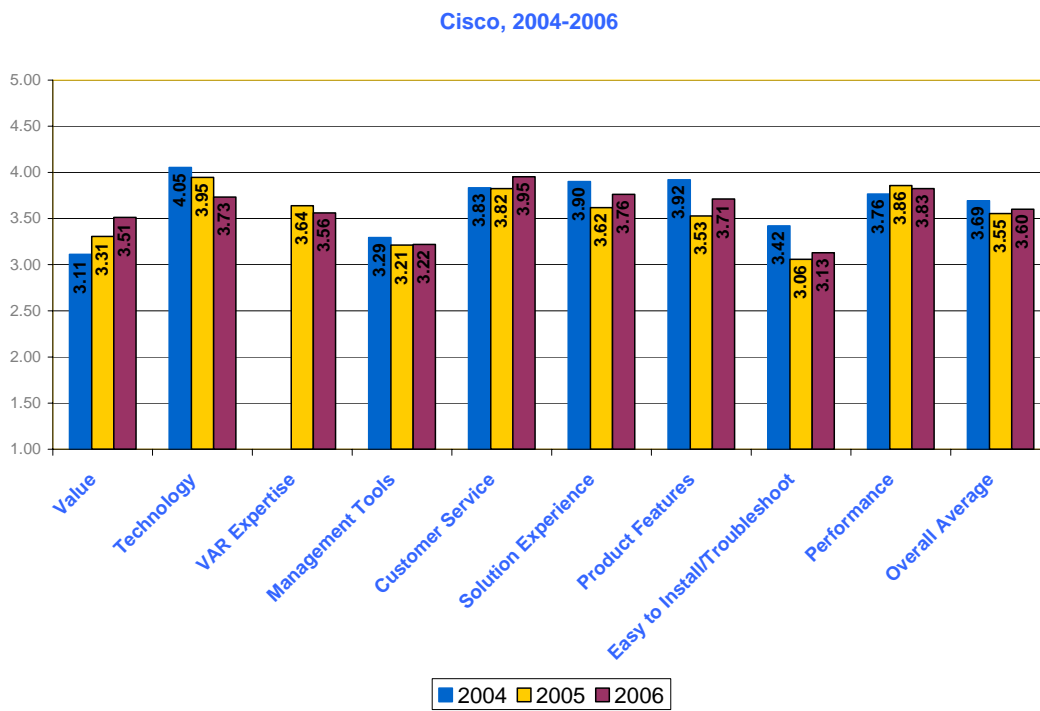


FIGURE 15: CISCO RATINGS, 2004-2006

5.3.2 Cisco: Trending Analysis

When looking at Cisco's ratings from this year compared with previous years, we find some fairly decent results. (Please see Figure 15: Cisco Ratings, 2004-2006, Page 27). Cisco has consistently improved in the areas of value, customer service, and overall solution experience, the latter driven in part by Cisco's focus on the vertical market.

Cisco has shown no decrease or improvement in the areas of management tools, overall performance, product features, and installation/troubleshooting. And, it is showing a decline in technology and VAR expertise.

As customer demands and expectations continue to increase, it's vital for Cisco to focus on a few key areas. It must improve the stability and reliability of Call Manager 5.x, the Linux version of Cisco's IP telephony solution. Those who complained about technology primarily focused on concerns with its new platform, or about the security of the older Windows-based platform. Though Cisco was one of the first vendors to offer IP telephony, it can't rest on its laurels because the competition is strong when it comes to combining VOIP with overall unified-communications and mobility strategies.

<u>At-a-Glance Vendor Analysis</u> CISCO		
Looking Up	Holding Steady	Needs Improvement
Value	Management Tools	Technology
Customer Service	Performance	VAR Expertise
Solution Experience	Product Features	
	Installation/Troubleshooting	

FIGURE 16: CISCO AT A GLANCE

5.4 Nortel

5.4.1 Competitive Analysis

For Nortel, the news isn't promising this year. Nortel lost nearly every category of the VOIP ratings compared to competitors, except for customer service and value. Further, each of Nortel's ratings decreased year over year. When companies evaluate Nortel, they most commonly also evaluate Cisco (95%), followed by Avaya (58%), ShoreTel (32%), and Mitel (21%).

Nortel is positioned well in many large enterprises because of its installed base. But it needs to better illustrate its strengths over Cisco in order to keep that

business when it comes to VOIP. “Almost 95% of our infrastructure is Nortel here. Where we can enable, we enable VOIP. But the direction is Cisco,” says the director of global telecom for a large entertainment company that has 5,000 Cisco VOIP phones implemented.

Nortel needs to focus on improvement more than any of its competitors. Nortel did not beat Cisco or ShoreTel in any area, but it did beat Avaya in customer service and value.

The positive reading that we can draw from Nortel’s value rating (3.59) is that customers find value in being able to IP-enable existing TDM switches. “What I hope they’ll do is focus on continued development of their current voice platforms and extend and refine that architecture,” says the CIO of a large university. “We want to keep our investment there. We don’t want to forklift it out and start with something new.”

Nortel’s Microsoft partnership also influenced participants’ value ratings. Some viewed the relationship as a positive development that would make Nortel’s products more valuable; others felt the opposite. “At this point I don’t know. ... The Microsoft relationship has me worried. I’m not a big Microsoft fan; it makes it difficult to manage,” says one CIO. “We have some Microsoft servers now that are incorporated into the IP PBX infrastructure, and we’re having difficulty.” (We will discuss the details of the Nortel/Microsoft partnership in the next volume on *Collaborative Applications*).

On the negative side, Nortel’s gaps between competitors were the greatest in customer service, solution experience, and VAR expertise.

Several participants said Nortel isn’t focused enough on the customers’ needs. “We were disappointed in their forcing their agenda on us,” says the director of IT for a school district. Others said they were frustrated with Nortel’s ability to articulate its strategy around the Microsoft partnership and how that would affect existing products.

The main issue with VARs emerged when companies used partners who were inadequately trained in Nortel VOIP gear. Several said they needed to bypass their VARs and go directly to Nortel, and Nortel wasn’t as responsive as it should have been. “We have experience with Nortel and would have rated them

higher before we experienced them [with VOIP],” says the CIO of an insurance company. “You have TDM VARs putting in VOIP systems, and you have a disaster.”

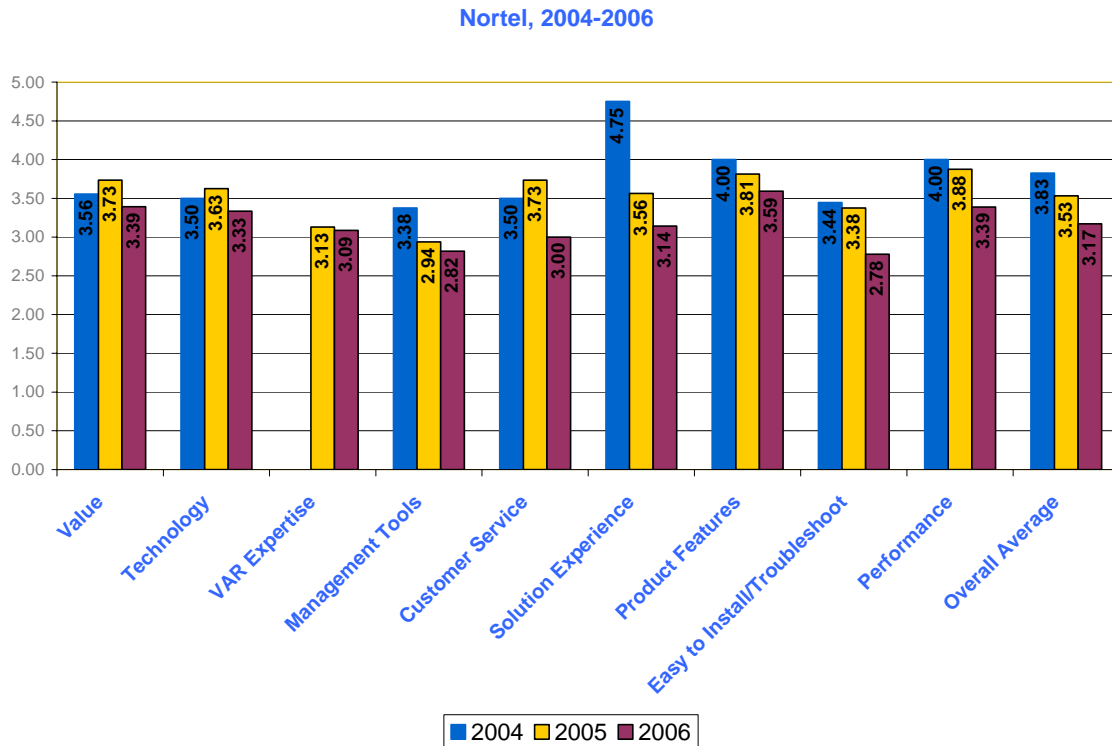


FIGURE 17: NORTEL RATINGS, 2004-2006

5.4.2 Nortel: Trending Analysis

As stated, Nortel’s year-over-year ratings declined in every category. The lowest score this year was in ease of implementation and troubleshooting (2.78), followed by management tools (2.82), and customer service (3.00). We recommend that Nortel focus on customer service and ease of implementation and troubleshooting as top priorities. Nortel needs to work with third parties to improve management tools, as this isn’t a core area of expertise for the vendor and would require too many resources to improve management internally.

Some of the participants still are running trials of, or are assessing Nortel. But those who have implemented the products say the technology isn’t user-friendly, and that’s making installation and troubleshooting a challenge. “We have had problems. BCM is quite complex, and learning the command line was

extremely challenging,” says the telecom manager for a city government. “The hardware is easy; the programming side is quite challenging.”

The chief architect for a large energy company describes his installation experience with Nortel as a “very poor experience,” stating the products didn’t work and the site survey Nortel conducted was inaccurate.

Nortel has stayed fairly consistent with its value and technology ratings for the past three years. In fact, one scientific research organization says technology was a key factor in its Nortel deployment. “The MCS 5100 was the holy grail. We needed a virtual tool to support the goal of building a collaboration environment to shift culture of how people work together,” says the CTO.

At-a-Glance Vendor Analysis		
NORTEL		
Looking Up	Holding Steady	Needs Improvement
Customer Service	Value	Installation/Troubleshooting
	Technology	Management tools
		Solution Experience
		VAR Expertise
		Product Features
		Performance

FIGURE 18: NORTEL AT A GLANCE

5.5 ShoreTel

5.5.1 Competitive Analysis

When companies evaluate ShoreTel, they commonly evaluate a large number of other vendors: 91% evaluated Cisco, 61% Avaya, 52% Nortel, 30% Mitel, and 31% 3Com.

ShoreTel has won all categories for the fourth year in a row. The reasons for this are multi-faceted. First, ShoreTel does have the smallest implementations compared to the other vendors. So its rollouts aren’t as complex as those Cisco and Avaya handle. As a result, ShoreTel doesn’t have as much opportunity to really botch an implementation. However, we are seeing this change in terms of the types of customers ShoreTel is winning. We expect ShoreTel to continue its strength in the small and midsize market, but we also see ShoreTel moving upstream with some recent large customer wins.

That said, there are certain ratings that are size-independent. As stated earlier, it requires the same best practices for any size company to offer solid customer service, value, and product features. So, while we can attribute some of ShoreTel's success to the size of the rollouts, some of it also is due to the company culture and best practices.

ShoreTel has strengths across the board, but its highest-scoring areas are value (4.71), ease of implementation and troubleshooting (4.68), and product features (4.54).

ShoreTel scored high in value—in fact, the highest rating overall in the benchmark—for a few reasons. ShoreTel's operational and capital costs are among the lowest (though they have increased in the past year). ShoreTel is good at marketing how companies can cut operational costs because of IP telephony, with things like its automated-attendant feature, which enables a single receptionist to handle multiple offices. Value was the main reason a \$190 million manufacturing company selected ShoreTel, after an exhaustive evaluation. “We liked the Cisco product, but some of it was Java, and I'm not an engineer, so I would have to be involved with them more than I wanted,” says the telecom analyst. “Pretty much all systems could do what I wanted, but they cost more. Cisco had a separate price for separate email/voicemail server. Avaya got shutdown because of customer- service and arrogance. Nortel didn't have all the features I was looking for. Cisco got me interested initially, but ShoreTel caught my eye [because of price] and I could reuse analog phones with the system.”

ShoreTel systems are simple to implement, customers say. Many report having sales reps come into their offices and have a trial up and running within two hours. This is a strategy ShoreTel resellers have used for a few years with success to illustrate how easy it is to implement the system. Rarely do we hear of companies who have had problems with installation or troubleshooting.

ShoreTel has been around longer than most people think: It opened in 1996, and sold its first telecom system in 1998. Still, it doesn't have the history of a Nortel, for example. What it does right is engage customers extensively to make sure it has the *right* set of features, rather than the longest list. As a result, customers are happy with what they have.

On the negative side, ShoreTel is showing some weakness in the area of solution experience (3.93) and customer service (4.29), the latter from a competitive standpoint. Both Cisco and Avaya were close to tying ShoreTel in solution experience. This indicates two key problems: VOIP is increasingly a part of a broader unified-communications strategy, and ShoreTel has not excelled in crafting broad UC solutions for companies. And, it needs to specialize more heavily in some key vertical markets—and market that expertise. For example, one CIO of a university selected ShoreTel but still feels it needs more expertise in higher education.

ShoreTel’s customer service remains solid, but Cisco is investing heavily in this space. If ShoreTel wants to continue having an edge, it must respond with further customer-service initiatives. For example, ShoreTel has given its customers access to internal resources for troubleshooting. “The problem was that when you bought through a VAR, supposed to get service through VAR. But when you can't get through to the VAR, ShoreTel wouldn’t help directly. That recently got changed,” says the CIO of a retailer.

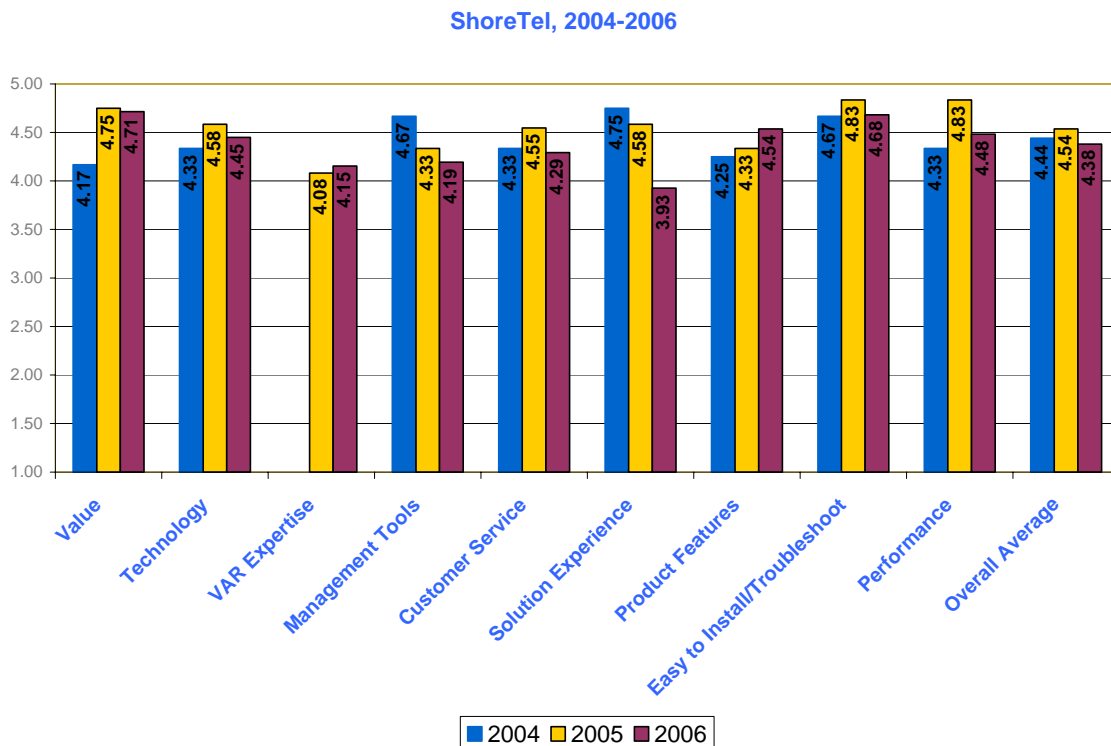


FIGURE 19: SHORETEL RATINGS, 2004-2006

5.5.2 ShoreTel: Trending Analysis

ShoreTel increased its year-over-year ratings in only two areas this year: VAR expertise and product features, the former bolstered by its steady VAR training and support and the latter by some solid product releases in 2006.

But in all other areas, ShoreTel declined, even if slightly, from 2005. As stated, year-over-year ratings declined in every category. The key areas for improvement are in management tools (4.19), solution experience (3.93, as discussed previously), and overall performance (4.48).

As stated, management tools are problematic for all vendors. “The main analysis tool for line condition is all there is,” says the director of IT for a professional-services firm. “You can’t customize reports. The predefined reports are very generic, and they need to offer better reporting. I’m sure as they grow older they will add bells & whistles that competitors have.”

ShoreTel recently partnered with a small management vendor, which is helping address those issues and improving ShoreTel’s management tools overall. This strategy is the right one for ShoreTel: Rather than internally developing management tools, it’s imperative to partner with a third-party management expert, particularly as ShoreTel starts winning more large enterprise accounts.

<u>At-a-Glance Vendor Analysis</u>		
SHORETEL		
Looking Up	Holding Steady	Needs Improvement
Product Features	Technology	Management tools
VAR Expertise	Value	Solution Experience
	Customer Service	Overall Performance
	Installation/Troubleshooting	

FIGURE 20: SHORETEL AT-A-GLANCE

6 Management & Monitoring: Rise of the MSP

VOIP has, in many ways, revolutionized the way people communicate. The technology itself doesn't get the credit, though. Rather, it's the way many companies have leveraged their VOIP projects. They have used them to streamline their wide-area networks, standardize their voice infrastructure and calling features, unify their voice-messaging platforms, and implement collaborative applications that integrate in with their IP telephony systems. It's a movement, more than anything, wherein VOIP is the first application in a broader strategy that unifies voice, data, and video communications.

But with these advancements comes unprecedented network complexity and a lack of internal expertise on how to implement, troubleshoot and optimize the networks. During a time when IT staffs are lean to start, IT executives must bring their teams up to speed to manage their newly converged infrastructure and applications—starting with IP telephony alone. As such, a growing number of IT decision-makers are using or evaluating third-parties, or Managed Service Providers (MSPs), to monitor and manage all or a portion of their converged networks, which connect a growing number of remote locations.

6.1 VOIP Management Strategies: The Numbers

The majority of organizations (86.1%) continue to operate their VOIP networks internally, and most (53.2%) use tools that come with their PBX. (Please see Figure 21: VOIP Management Tools, page 36). As we have seen for four years now, organizations with more than five locations find the need for more sophisticated products or services within 12 to 24 months of putting VOIP into production. From that point on, they begin to understand the type of metrics and services they need to continually perfect the information they have.

What Management/Monitoring Tools Do You Use for VOIP?

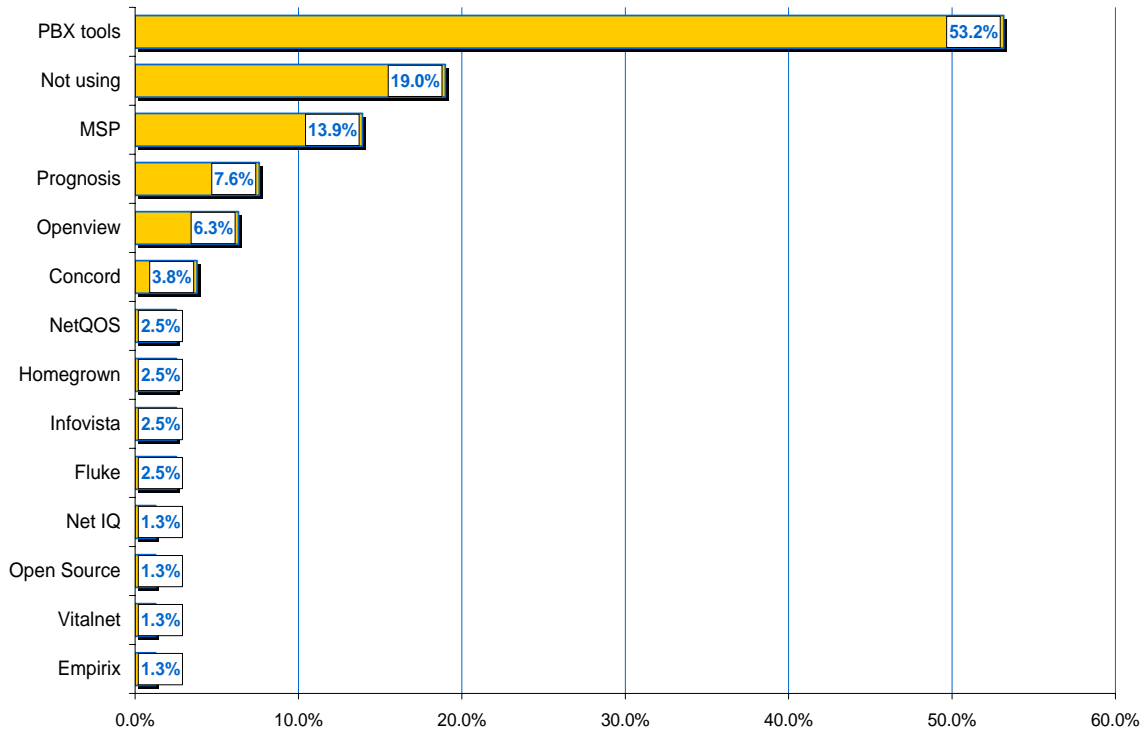


FIGURE 21: VOIP MANAGEMENT TOOLS

“We want to get a lot more proactive. We have to wait for someone to call us now [to tell us there is a problem]. We want to have indicators for problems. As far as actually monitoring for call quality, we can't do that,” says the IT director of a large university that uses Nortel.

At that point, we see management teams using a bevy of specialty and/or network tools, or start looking at third parties. Specialty vendors include Integrated Research (Prognosis), NetQOS, Infovista, NetIQ, Fluke Networks (through its Visual Networks acquisition), and Empirix. The teams also rely upon network and system monitoring tools, from vendors such as HP, IBM, and CA, to provide some insight into overall performance affecting VOIP.

The IT staff of a university, as a typical example, had developed its own tools and used some of Cisco’s tools, those that came with the PBX. Then, it began using Prognosis and found it could get information otherwise unavailable.

“Prognosis allows us to look at everything centralized. There is a quick and easy way to look at charts and graphs. It’s relatively easy to give data over lengths and periods of time. We couldn’t get that from Cisco. In fact, a lot of the data from Prognosis comes from Cisco, but Cisco doesn’t give us views we want and it isn’t flexible enough. Prognosis allows us to customize and create default views.”

When asked about VOIP-management tools, the IT director of an automotive company that just started implementing VOIP last year, says, “Good question. The answer is we don’t have specific VOIP-management tools other than what Avaya has given us with the solution.” Give his team another year, and they’ll determine they need the specialty tools or services.

One of the most startling findings in our research is that 19% are not using management and monitoring tools for VOIP *at all!* Many—but not all—of these are small companies with only a few sites. But there are some multi-site organizations flying blind entirely when it comes to their VOIP performance, stating, “We’re not doing anything *yet.*”

The sheer percentage of organizations shifting to managed services for VOIP has drastically increased in the past year, from about 6% to 13.6%. (This figure includes all providers, not just carriers. As cited above, the percentage for carriers alone is 8%). Most companies shift entirely to managed services; some continue to operate some of their own reporting and analysis tools.

6.2 Defining Managed Services

The world of third-party services is a bit foggy in terms of what actually comprises them. There are a few key distinctions:

Hosted Services: Companies generally buy hosted VOIP from the carriers but in some cases, even equipment vendors or resellers offer them. The IP PBXes are physically located on the provider network/data center. The carrier owns, monitors and manages the PBXs, and provides access to management portals for customers.

So far, we see primarily small and midsize companies buying these services—not because the demand doesn’t exist from large enterprises, but because the hosted services available today don’t meet those demands. They don’t

cover the necessary geographical areas, nor do they provide the in-country support needed for global organizations.

Network-based Managed Services: Some companies want to own their IP PBXs, perhaps for financial reasons, but they don't want to house them or manage them on-site. So they contract with an outsourcer, carrier, reseller or systems integrator to host and manage the equipment (ie, keeping up with software updates, repairing problems, making sure hot standby equipment is available).

Managed Services: In this scenario, companies own the equipment and house it in their own locations. They then hire a third party to manage the infrastructure. The third parties either install remote monitoring tools and manage each site from a central location, or they assign their staff members to work on the customer premises (or a combination of the two).

Often, companies install their VOIP system with the full intention of managing it themselves. But after doing so for about 12 to 24 months, they decide for a variety of reasons (which we will discuss shortly) to instead rely upon a third party to manage the infrastructure.

Professional Services: Companies buy professional services for a specific task, including engineering and design, installation, baseline assessments, security audits, and training.

6.3 Business Drivers for VOIP and MSPs

As we established in Section 3.1 above, enterprises are willing to spend money to outsource management of IP telephony. It's something they have been doing for years with their telecom maintenance contracts. Now, they can just get more for the dollar in the IP world.

Not surprisingly, there are advantages and disadvantages to using MSPs. On the plus side, some IT executives have found cost savings when compared to internal 24 x 7 operations. They also have been able to eliminate or reassign internal staff to reduce operating costs or improve strategic areas of IT. In cases where companies are using more than one IP telephony vendor, they eliminate the need for training and employing experts on each system.

On the negative side, companies have found MSP services to be more expensive than internally managed systems—which is why it's key for MSPs to know their market dynamics and price their services accordingly. Also, the customer loses control of the network by giving that up to the MSP. This could be negative if the MSP doesn't do a good job managing the system or providing appropriate reports and success metrics.

The biggest challenge for the MSPs is pricing these services attractively enough to win the business. Several IT executives said they wanted to use MSP services, but the payback simply didn't exist, particularly with U.S.-based carriers. "The Verizon costs had a 10-year payback; ours was a three-year payback," says the director of unified communications for a major financial-services company. "If we get everything built and roll to managed services, it might work. But we don't see the carriers being very aggressive now."

"We talked to AT&T and Verizon. If they can do it as well as or as cheap as us, then it's a homerun. The longer you wait, the more opportunities you have. Now, pricing is all over the place," says the VP of voice services for a financial-services company.

So far, the majority of those considering or using MSPs have turned to the carriers, including AT&T, Verizon, Sprint, Orange, Telstra, and others. Nearly 10% say they are using or planning to use hosted/managed VOIP services from the carriers, and another 23% are evaluating such services. Also in the past year, several global enterprises started using or evaluating the traditional outsourcers, who had been quietly watching the VOIP market without much to offer in terms of formal managed services. These major outsourcers, including IBM, EDS, CSC, each have won some key deals to manage the VOIP infrastructure of large global enterprises.

Using/Planning to Use Hosted/Managed VOIP From Carriers?

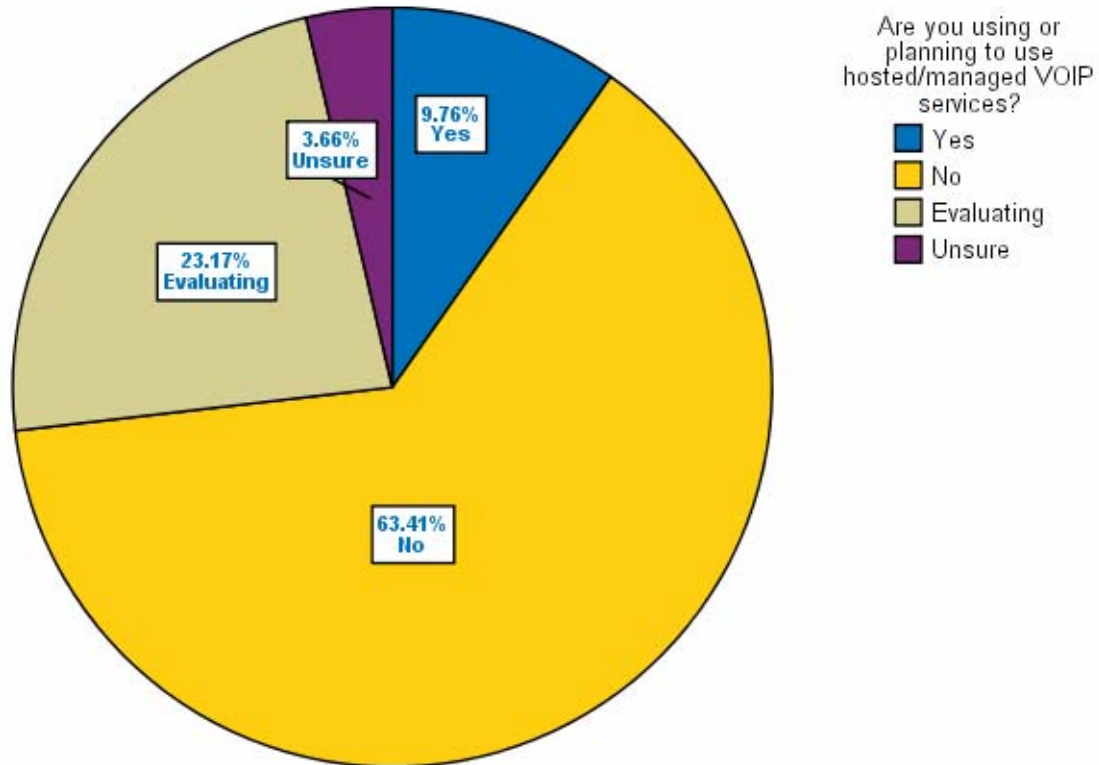


FIGURE 22: CARRIER HOSTED/MANAGED VOIP ADOPTION

Midsize companies face a different set of dynamics. Many were early adopters of VOIP. They deployed IP telephony and managed the technology internally. What they found was that it only took them about 20 hours a week, on average, to manage the system. So they were faced with having, effectively, a part-time person running telecom. That person had other responsibilities, so when an outage happened, he or she didn't have time to keep up with training to help isolate the problem.

Consequently, many midsize companies have turned to MSPs to help. They have found success with regional or even national resellers, integrators, or outsourcers, such as Aimnet, Black Box, CenterBeam, Dimension Data, and INS. Those types of MSPs have been implementing and managing VOIP for two to six years now, and they are pricing their services aggressively. For example, the VP of

IT for an upscale health club chain says his VOIP-management provider charges about 20% of the cost of the phone system annually for 24 x 7 coverage, training and user support.

6.4 MSP Best Practices & Success Strategies

Based on discussions with hundreds of IT executives in the past four years, we expect the trend toward using MSPs to continue. Like any technology, there always will be companies that chose to keep management and monitoring internal. But if the MSPs can price the services right and provide consistent, high-quality service globally, they will see some solid results.

So what do MSPs need to do today and tomorrow to serve this market? There are a few key focal points:

- ⊕ Offer the right mix of services, and give customers the option of how much or how little the MSP will control. For example, offer the following as table stakes:
 - ⊕ Manage equipment, including all software upgrades for the switches and handsets;
 - ⊕ Repair any outages or problems on the network;
 - ⊕ Provide access to monitoring portal so IT and telecom managers can get insight to performance on demand;
 - ⊕ Provide reports illustrating key performance metrics weekly, monthly, quarterly, and/or annually. We recommend providing statistics and reports for all of these time frames for the first 12-24 months, and then you can ratchet back;
 - ⊕ Reports and SLAs should meet or exceed the following metrics:
 - ⊕ Mean Time to Repair: 3 hours;
 - ⊕ Uptime: 99.999% (this will require some redundancy to achieve);
 - ⊕ MOS (Mean Opinion Score): 4.0, using G.711 for codec compression (Scale is 1-5, with 5.0 the best. MOS will drop with higher compression);
 - ⊕ Round-trip delay: <150 ms;
 - ⊕ Packet loss <0.25%;

- ⊕ Jitter: <40 ms.
- ⊕ Know what's driving customers to use you and make sure your company or division is organized around those drivers. For example, cost savings, highly responsive customer service, and expertise are big drivers.
 - ⊕ Be prepared with interactive cost models to help illustrate your cost savings, and price your services competitively to illustrate those savings. Make sure you include soft costs in those models.
 - ⊕ Provide references to validate your customer service, and make sure you're highly responsive during the sales process. (Sounds basic, but some of the large outsourcers have displayed solid customer service only selectively).
 - ⊕ Demonstrate your expertise by discussing experiences with similar customers and by highlighting the specific experience of the people who are actually doing the day-to-day management. Stress that you have the expertise to make them feel comfortable reassigning some of their team to other more strategic tasks.
- ⊕ Plan for growth. Multi-vendor IP PBX environments are becoming more common, increasing from 10% to 20% year over year. MSPs, particularly those serving the mid-size business market, tend to focus on managing a single vendor. That's a good start, but as time goes on, we expect to see more companies with more than one IP PBX vendor, driven by merger and acquisition or demand for new features.
 - ⊕ Buy VOIP tools that monitor and manage multiple IP PBX manufacturers. Check their roadmaps and make sure multi-vendor support is in their plans.
 - ⊕ Offer enhanced services. IT staffs prefer to deal with a single third-party for engineering, installation, training and management. If you can provide those additional services without sacrificing quality and service, it could help you win more business.
- ⊕ Focus on the IP telephony management lifecycle. Nemertes built this framework based on comments and input from hundreds of IT executives

and managers in response to what they wanted from their IP telephony management products. Please see below:

- ⊕ Focus on four key areas: Planning, operations, troubleshooting and reporting.
- ⊕ Make sure you can address or have on your roadmap to address the sub-bullets referenced in the framework.

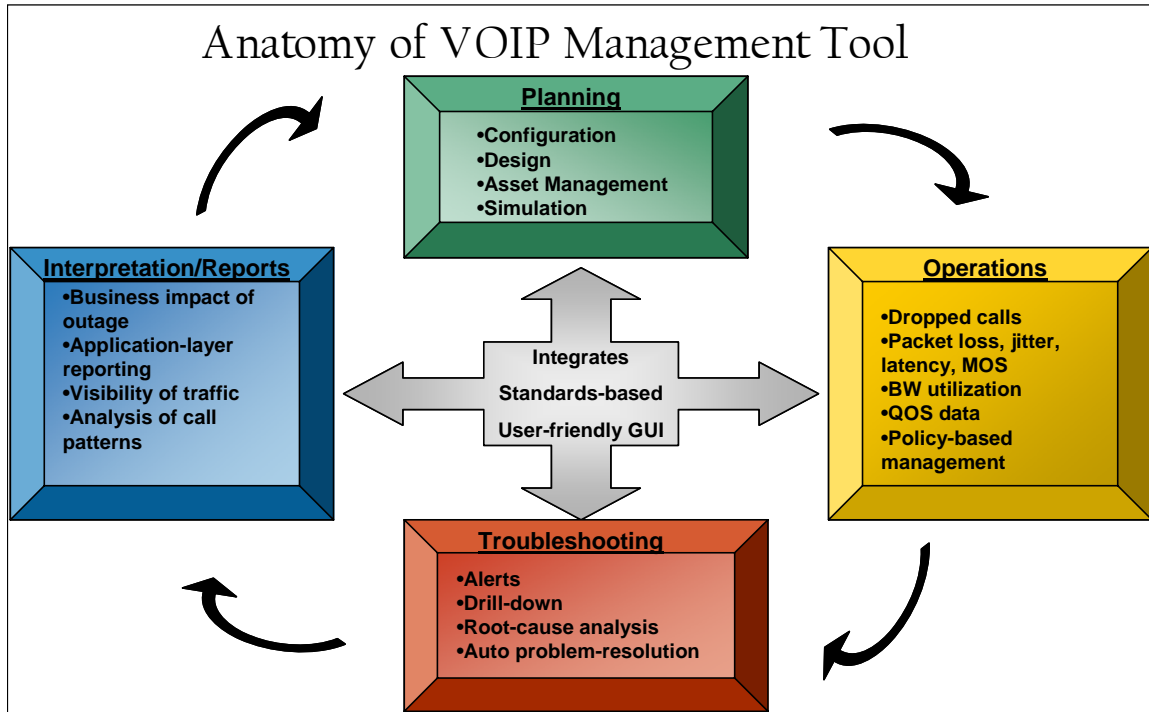


FIGURE 23: IP TELEPHONY MANAGEMENT FRAMEWORK

7 Customized Findings

Vendors or IT executives who want to learn more about Nemertes' cost models can schedule a customized briefing. Nemertes' expert analysts will provide you with correlation analysis, industry-specific findings, and other customized methods of presenting the cost figures, coupled with recommendations to help your organization.

How much **YOUR PEER GROUPS** spend on convergence?

How do costs/savings/ROIs vary based on:

- COMPANY SIZE
- NUMBER OF EMPLOYEES
- INDUSTRY



Schedule your customized, on-site briefing and learn how to leverage the findings.

research@nemertes.com

ASK NEMERTES

8 Appendix A: Report Methodology

8.1 Process

To compile the Virtual Workplace benchmark report, Nemertes conducted detailed interviews with 120 IT professionals from 99 companies. The qualitative insight in the report draws on discussions with more than 300 IT professionals.

To ensure the report was relevant to the largest possible group of readers, we deliberately sought to reach the broadest possible range of industries, with the only exception being companies engaged in providing convergence, collaboration, mobility, or branch-office services or the manufacturing of related products.

We conducted in-depth interviews with all of the individuals, ranging in duration from 60 minutes to two hours. We also conducted several short follow-up calls or exchanged emails to clarify and augment data. We asked a pre-planned list of questions to ensure that participants answered the same set of questions, and asked many open-ended questions to ensure an opportunity for our participants to provide their own unbiased insight and observations. In particular, we asked open-ended questions about best practices, strategic goals, business drivers, vendor successes and failures, and challenges along the way. We also asked participants to describe their organizational and operational structures, and to position their convergence decisions and operations within the context of IT and overall business goals. As a result, individual interviews varied in the degree of insight provided for each particular interview topic, based on the interest and expertise of the participant involved. We did not provide the list of questions to participants ahead of time.

The participants came from a combination of Nemertes' client base, and from publicly available news releases and case studies that described companies that would be relevant to topics in this report. We asked vendors/carriers for customer names, and we interviewed them where we felt appropriate and objective. We guaranteed confidentiality and anonymity for participants and their companies. As a result, the report includes quotes from real individuals who are identified by title and/or industry affiliation. Please note these are exact quotes spoken by real individuals, with no changes in content or wording. In

compiling the various charts and diagrams that make up this report, we tabulated all responses to a given question. Since not all participants responded to all questions, the actual number of responses varies by question.

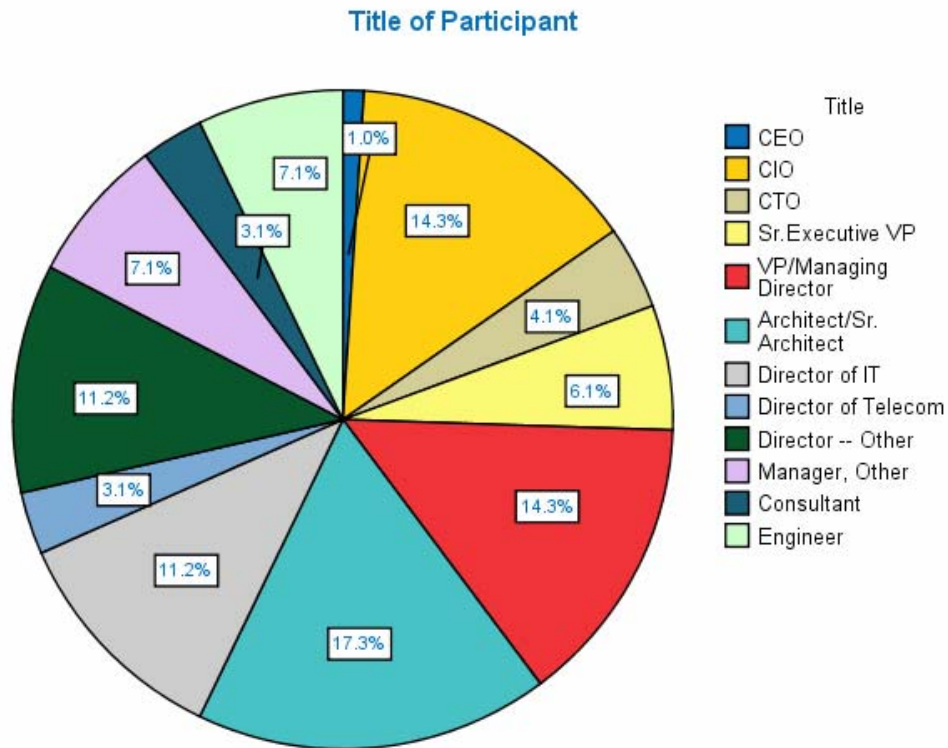


FIGURE 24: TITLE OF PARTICIPANT

In parallel with the IT executive interviews, we surveyed available documentation from the Web and contacted manufacturers of IP PBXs, IP phones, collaboration tools, mobile devices, management, monitoring, and optimization tools, and VOIP services, inviting them to participate in interviews to better articulate their products' architecture, functionality, and differentiators. The information provided, therefore, comes directly from the manufacturers, and Nemertes makes no claim to its accuracy.

8.2 Timeframe

We conducted interviews with report participants from IT organizations from September 2006 through January 2007. We asked participants to provide us with insight into ongoing network convergence initiatives and those planned for the next three years (though most plans reflect a 6- to 18-month timeframe).

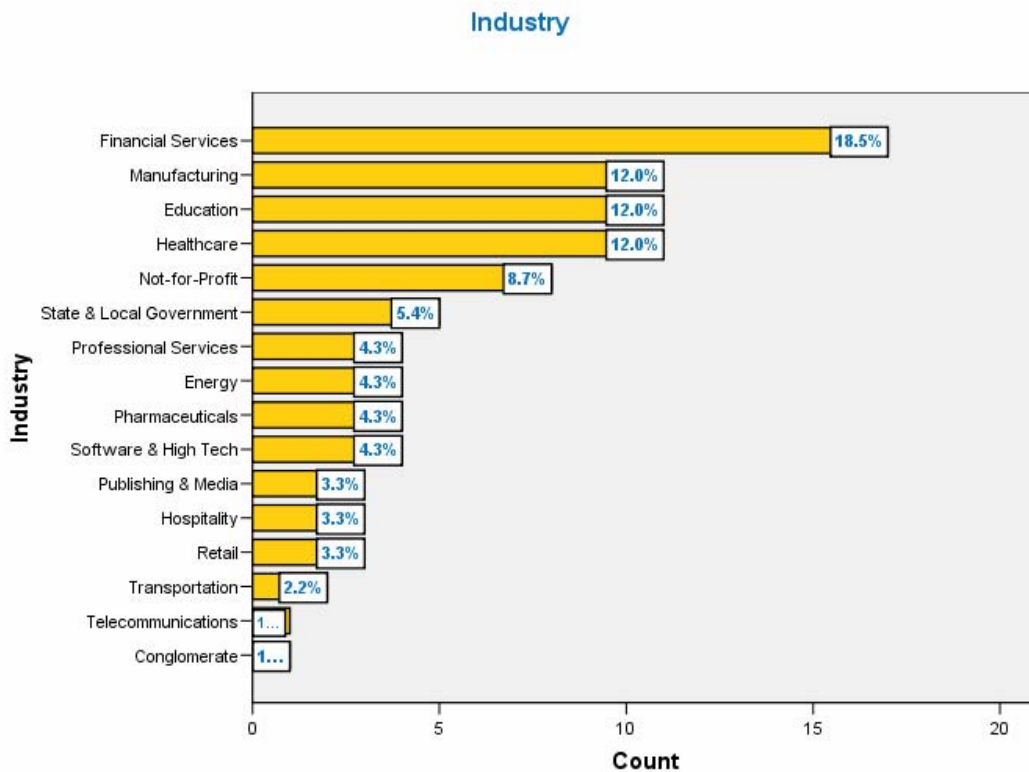


FIGURE 25: PARTICIPANTS, BY INDUSTRY

8.3 Participants

In selecting individual participants, we asked to speak with the individual or individuals most closely associated with convergence, collaboration, and/or mobility, in terms of the network infrastructure, business goals, and applications. If the particular individual we contacted did not meet those specifications, we asked for the appropriate individual. For some large organizations, we interviewed more than one person. Participant job titles are outlined in Figure 24: Title of Participant, Page 46.

8.4 By Industry

As noted, we sought to include the broadest possible range of industries in our report. There was a solid, even distribution of industries. Financial services is the largest industry reflected, with 18.5% of participants, followed by healthcare, manufacturing, and education—each at 12%. The exact coverage of each type of industry is indicated in Figure 25: Participants, By Industry, Page 47.

Annual Revenue

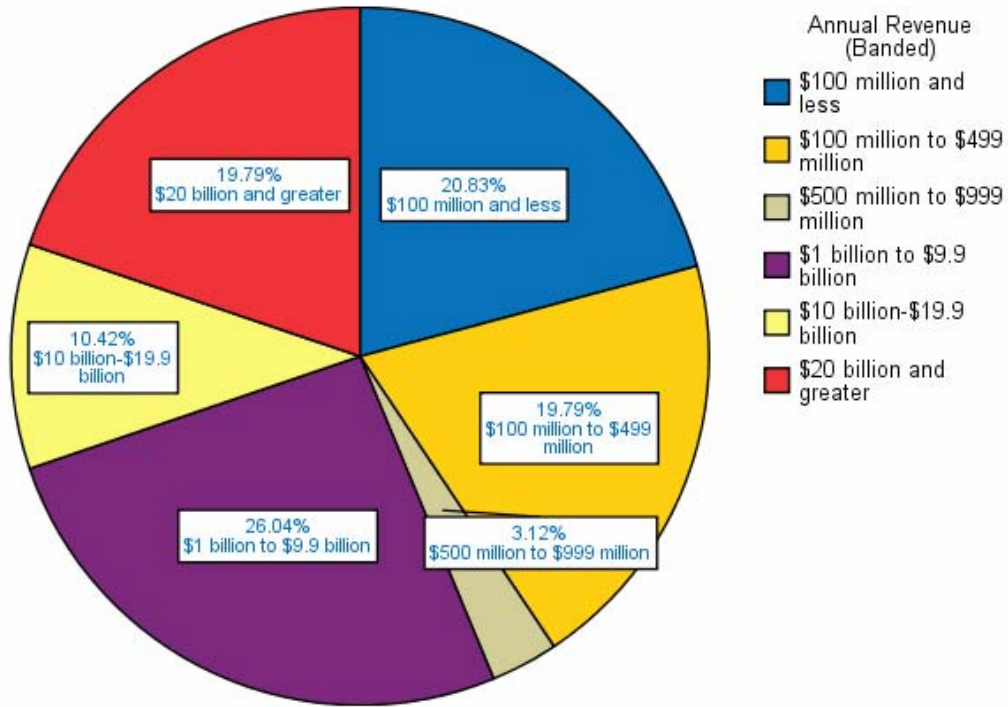


FIGURE 26: ANNUAL REVENUE

8.5 By Size

As noted, we sought insight from a range of organizations: large enterprises make up 56.25% of the total participants, with 26% posting revenues between \$1 billion and \$10 billion, 10.42% with revenues between \$10 billion and \$20 billion, and 19.79% with revenues greater than \$20 billion. Midsize organizations make up about 23% of the benchmark, with 19.79% earning \$100 million to \$500 million per year, and 3.12% at \$500 million to \$1 billion. Finally, small firms account for 20.83% of the benchmark, with revenues less than \$100 million.

As for IT budgets, nearly 12% have IT budgets exceeding \$1 billion (many, far in excess of \$1 billion); 21.05% have budgets between \$100 million and \$1 billion; 28.42% have budgets between \$10 million and \$100 million; about 26%

are between \$1 million and \$10 million; and the rest (12.63%) are less than \$1 million. (Please see Figure 27: Annual IT Budget, Page 49).

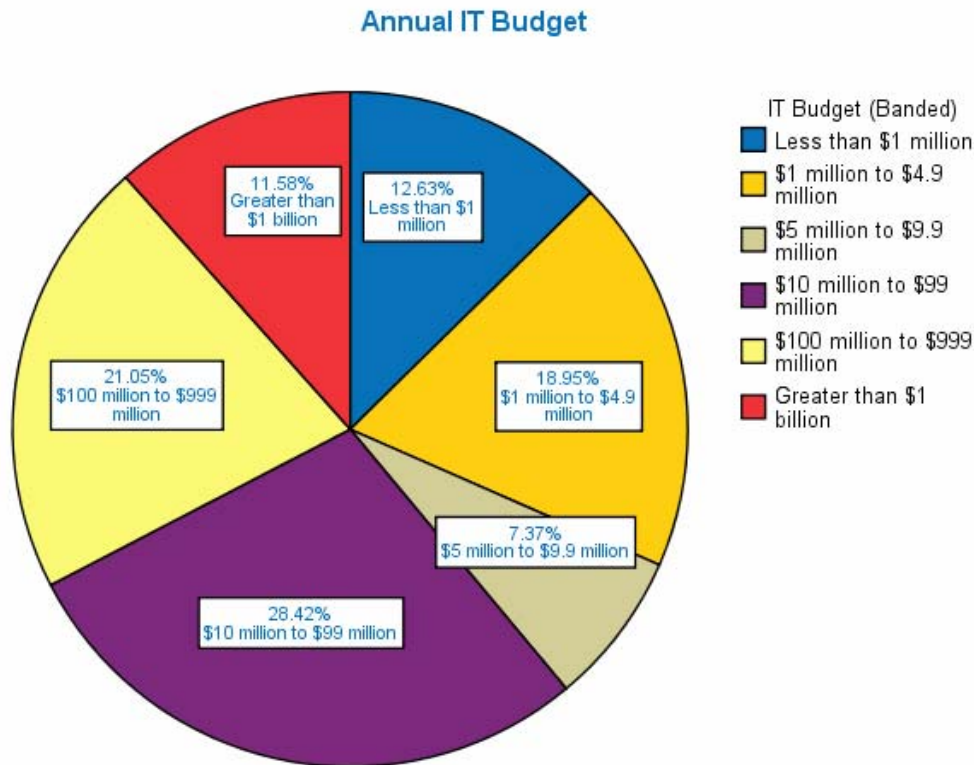


FIGURE 27: ANNUAL IT BUDGET

8.6 Disclaimer/Distribution

Throughout this report, we occasionally use phrases such as “we believe that” and “we recommend.” These represent the beliefs of Nemertes’ principals and should not be construed as legal counsel. Research services are provided by Nemertes “as is” without warranty of any kind, and Nemertes expressly disclaims all warranties of any kind, whether express or implied, including but not limited to warranties of merchantability and fitness for a particular purpose. Where appropriate, we strongly urge readers to seek independent advice from qualified legal counsel.

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