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"Leading the Conversation"

The Definitive Guide[™] To

Converged Network Management



Ken Camp

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Chapter 3: Business Drivers and Justification

In business, there are many factors to consider when addressing the shift in networking paradigms to bring about what many today call Web 2.0 integration. Even the phrase “Web 2.0” has spun off variations like Voice 2.0 and Office 2.0. The next generation of network-centric solutions is a key business driver today.

In the earlier days of these technologies, convergence was viewed as a cost-reduction technique for business. Although cost reduction is important and remains a driving factor, it has become a minor factor in voice and data integration for many businesses. For large enterprises, convergence brings about a unified, single-network bill from the carrier. Integrating voice and data can lead to consolidation of staff as telephony and data services converge onto a single infrastructure. This early driver has proven a factor only in the largest of enterprises.

Today, what integration brings about is a competitive edge. And sometimes it brings revenue to the bottom line because it enables new revenue streams that couldn't be fully captured in the past. VoIP services coupled with Customer Relationship Management (CRM) tools in business bring responsiveness, speed, and knowledge about customers that can provide a measurable differentiator in customer service delivery. Years ago, Bill Gates articulated a strategy of business knowledge being central to a company's *digital nervous system*. Today, service integration couples knowledge with responsiveness to deliver business solutions more quickly than ever.

Convergence of voice and data tightly couples business intelligence with business relationships. The real success of Web 2.0 lies not in technology alone but in integrated, comprehensive business services. Chapter 2 looked at some of the technology drivers for convergence. Building on that foundation, this chapter will explore business motivations for service integration and how they may mirror the technological drivers.

Vertical Market Business Drivers for Change

In his book *Telecosm*, George Guilder coined the phrase *disruptive technologies*. In the telecommunications industry as a whole, there have been many disruption points, including the migration from circuit-switched technologies to packet-switching and advances in optical networking in the core and broadband access technologies such as DSL, cable, and EVDO wireless broadband services.

Let's take a brief look at disruptive technologies and variations that aren't directly related to unified communications. Technology change enables business process change, but these changes often occur at different rates. The adoption cycle for new technologies is fueled by success stories of early adopters. In the Internet today, how you learn about new technologies, advances in existing methods, and the success stories that drive business process has changed.

A Side Note on Blogs and Wikis

A Weblog or blog is a Web site presented in something of a journal form. Entries are most frequently displayed from newest to oldest (in a reverse chronological order). Blogs are often focused on a specific subject or interest area, such as technology, a hobby, or regional events. Some blogs are simply online diaries, but others represent citizen journalism or focus on tightly defined interests, such as VoIP. Many blogs use a combination of text, photos, videos, and recorded podcasts as information-sharing methods.

Blogs have become a key component of the Web 2.0 evolution in unified communications. They are a way to communicate. Blogs began as a hobbyist's tool for sharing journal-like information. Today, many companies and corporate executives use blogs as a tool for sharing information with readers and customers.

A wiki is another kind of Web site that allows visitors to add, edit, and delete information. They can be easy to use, simplifying interaction and delivering an effective collaboration tool for multiple contributors. One of the most useful examples is the online encyclopedia, Wikipedia (<http://www.wikipedia.org/>).

Wikis are rapidly becoming another tool used in business to interact with customers and business partners. They can provide a framework for collaboration among developers or early adopters as well as a brainstorming mechanism when working with partners in developing new products and solutions.

In the leading edge of net-centric business, the buzz-phrase Web 2.0 captures the attention of the most competitive business leaders. Blogs and wikis permeate the business environment with one root motivation—the need to share information and support relationships. Many companies, especially in the technology sector, use these tools to partner with customers through online discussion, dialog, and collaboration. This revitalized interest in interactivity is recognized as a highly competitive edge. Open dialog often brings a degree of personalization to an otherwise faceless corporation. Done well, these new tools couple with more traditional business systems to improve results.

These tools also enable vendors to share their new technologies. Blogs and syndication tools such as Really Simple Syndication (RSS) let businesses follow trends and advances more closely than ever. These Web 2.0 trends disrupt every type of business in some way. For some companies, they're a tool for sharing information; for others, they present a tool for learning about how to be more nimble and use emerging technology trends to the best competitive advantage.

Much of the business disruption in the market has been driven by record numbers of small businesses adopting the Internet as an asset. This adoption allows small companies to level the playing field with larger corporations. There is a famous cartoon from the Saturday Evening Post that portrays a key truth that “on the Internet, nobody knows you're a dog.” In more practical terms, on the Internet, the fact that you're operating a small business, or solo enterprise from a home office, may well be completely invisible.

What was learned from the small business trend is that by 2003, roughly 70 percent of small businesses were leveraging network technologies, according to a report from IDC. And according to the “American Business Journal,” small businesses that use the Internet have grown 46 percent faster than those who don't. Although these numbers don't carry across to larger businesses in linear fashion, Internet technologies have clearly become a vital business tool. In this chapter about business drivers and justifications, it's important to remember tools such as blogs and wikis as business tools that can be used to integrate voice and data solutions more tightly.

Implementing new unified communications technology is similar to implementing anything new. Success requires a methodical approach. Integration occurs not just in technology but in business process as well. What these new tools enable is process change, but for many businesses, this change ripples through the entire company, forcing many companies to reinvent themselves in new ways. To succeed, you need to lay out a roadmap you can follow to guide the evolution from the past to the future. You need an integrated roadmap to bring unified communications technologies of today and the next generation into your business process. Figure 3.1 provides a high-level view of one such integrated roadmap.

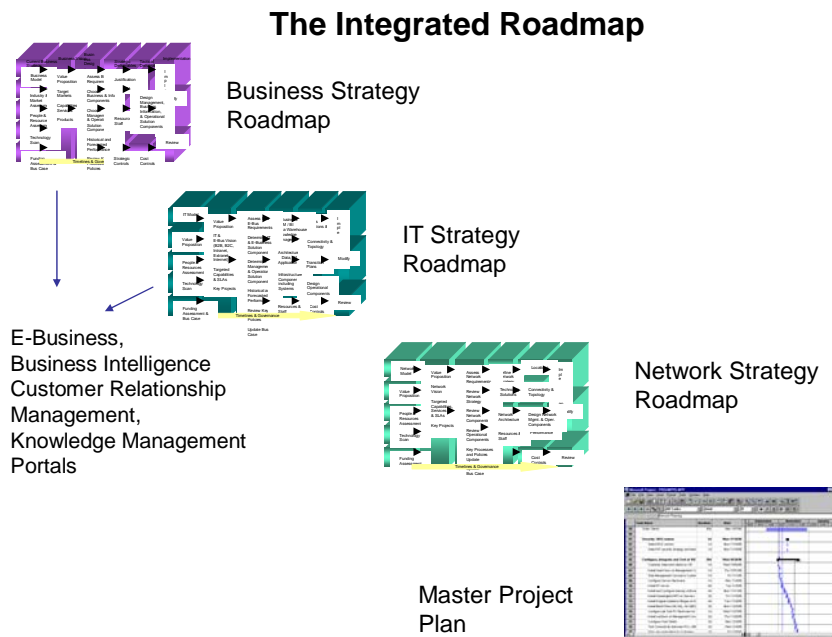


Figure 3.1: Building an integrated roadmap.

Figure 3.1 shows a very high-level view of the cradle-to-grave process for implementing new technologies. Although this sort of process isn't the focal point of this guide, it provides a good foundation for thinking about the upcoming discussion in this and later chapters. Let's briefly touch on the following four key components to provide some framework and food for thought in developing strategies for implementing unified communications technologies in business efforts:

- Business strategy roadmap
- IT strategy roadmap
- Network strategy roadmap
- Master project plan

Each plays a key role in the success of leveraging unified communications for success.

Figure 3.2 doesn't present anything new but shows the many factors that come into play when mapping out a business strategy. This is really just fundamental sound business planning, but it also sets the stage for how a scan of technology—through watching the vendors, reading blogs, and exploring new ideas—must complement the larger corporate vision. Technologies alone don't provide sustainable business processes. They complement your strategy, mission, and vision as a corporation.

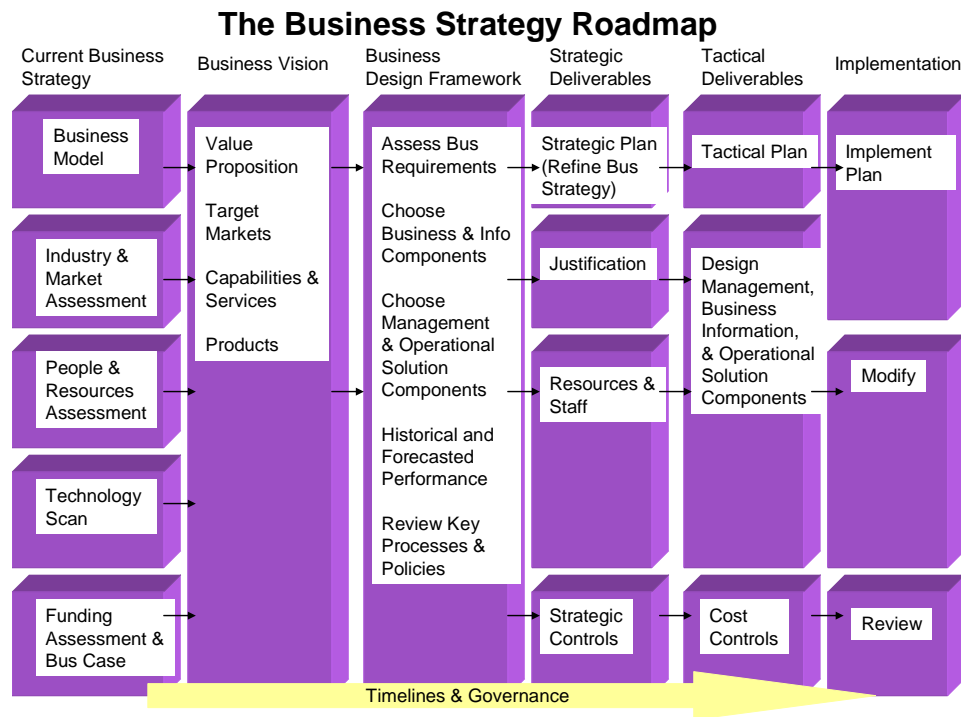


Figure 3.2: The business strategy roadmap.

The business strategy roadmap is the fundamental baseline. It ensures that you focus on the core business. It's crucial that you use the business strategy to drive your other strategies rather than allowing the fanciful attraction of new technologies to drive your business direction. Unified communications must enhance and support the business strategy, for companies both inside and outside of the tech sector. The key for many companies is to remember that new technologies may present more of a temptation than exist as a true business driver. Instead, they should be viewed as tools to enhance what you do.

The IT strategy roadmap in Figure 3.3 is a natural progression from the business strategy. Again, a scan of technologies is a key piece, but now you must really look at how these technologies add value to your business strategy. This area is where you determine your approach to e-business, CRM, Enterprise Resource Management (ERP), and other systems tools.

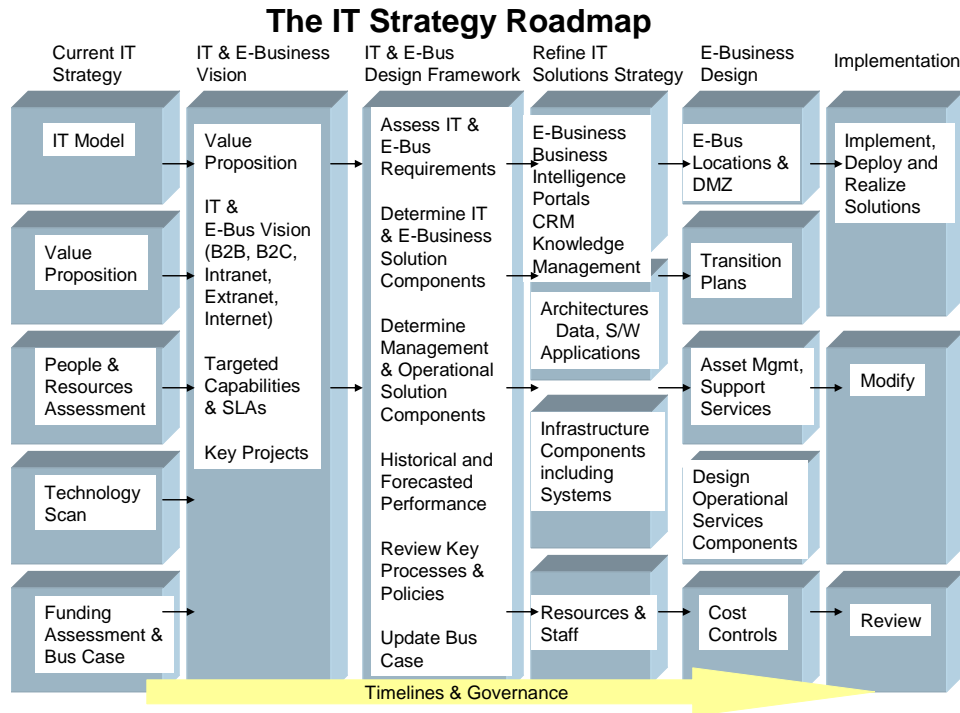


Figure 3.3: The IT strategy roadmap.

When delving into unified communications, as with several other areas, overlap beyond the IT strategy into the network strategy (see Figure 3.4).

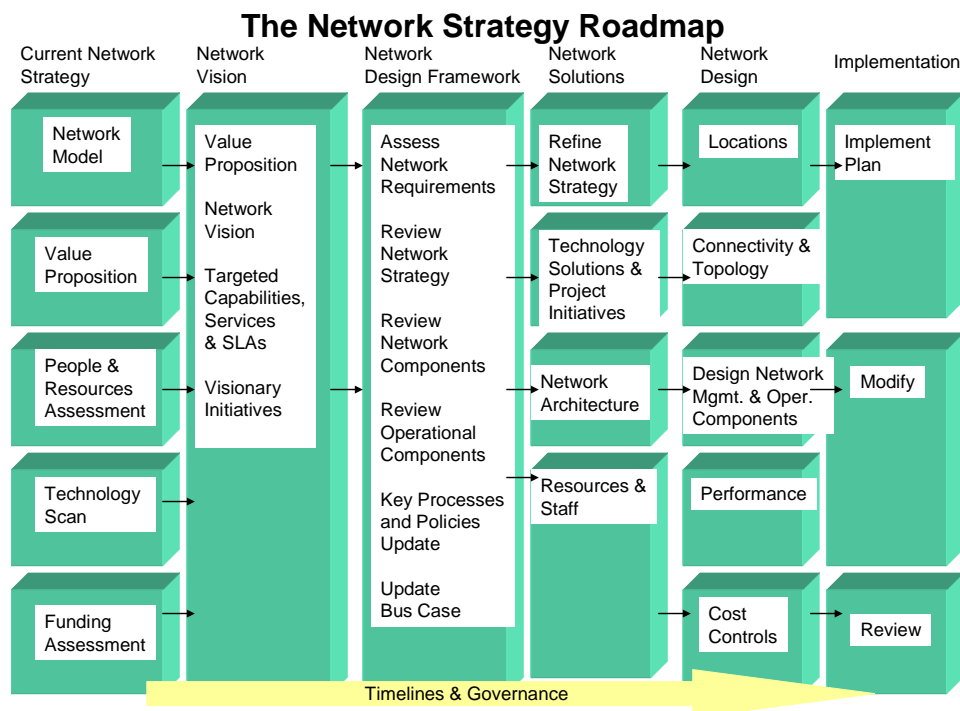


Figure 3.4: The network strategy roadmap.

The network strategy really drives how you will manage internal network services. In a small or midsized business, the IT and network strategies may blend into one unified plan, but for a large enterprise, the IT infrastructure of application services might best be separated from network planning. The two complement each other but often have different characteristics. They are separated here because in most organizations, the IT strategy has already been deployed to support the business strategy. Unified communications, especially in a large enterprise, is most often deployed to leverage existing IT resources. This roadmap discussion simply helps focus on the context of why explore convergence and integration to support the entire chain of business processes.

The last piece of the high-level view is the master project plan. The key is that the project plan comes last in the strategic planning cycle. Whether the roadmap planning described here is followed in excruciating detail, through formal or informal processes, is really a decision for each organization to make based on existing management methods.

The Master Project Plan

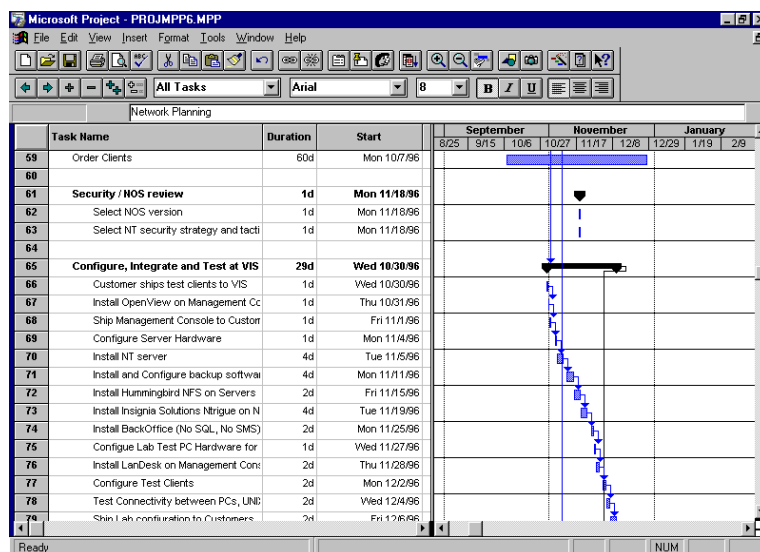


Figure 3.5: The master project plan

The purpose of this review has really been to caution those who are enamored of unified communications technologies because they appear, on the surface, attractive. In order to leverage the convergence of voice, video, and data communications, it's absolutely critical that your eye always be focused on answering the question: What business are you in? You're pursuing integration to improve your processes, create new efficiencies, and better compete in the core business.

Let's move forward and take a look at some of the different business areas and why the converged network really brings value. Later chapters will explore the operation and management of the converged network; when exploring these areas, keep in mind that you manage the network to support the needs of the business while avoiding the danger of letting technology consume more mindshare in your attention than is necessary.

Business Sales

Business sales have evolved into what is today B2B electronic commerce. Business partner transactions often take place in much higher volumes than consumer transactions. Business process automation has driven process change for increased efficiency across all sectors. In the business world, everybody is a customer and everybody is a provider.

This chapter is about the changing landscape of voice and data integration, but those changes have been explosive in nature since VoIP first came on the scene 10 years ago. The Web has caused a “big bang” explosion in managerial and business process. The enterprise has exploded from a compressed mass into many little bits. There are continuing advances in distributed computing. Business units in enterprises are embracing peer-to-peer functionality rather than the historical silos of total separation. And the top-down managerial and business hierarchies of the past are vanishing, giving way to meshed, distributed departments and processes.

This e-business has become more standards-based, with UN/EDIFACT being one widely adopted standard; other standards, such as E-Business XML (ebXML), continue to emerge. The impact in the converged network is now lapping into many areas of business as the idea of a service-oriented architecture (SOA) begins to couple with other business models. SOA really focuses on loosely coupling software services, such as CRM and ERP, with one another, allowing convergence between services on the network. Another view describes this approach as Software as a Service (SaaS).

SaaS treats software applications of all types as network services. It’s more a delivery model than anything else. One unifying trend in converged communications today is that voice services are rapidly moving from the legacy technologies of the PBX to the IP network using VoIP. In the converged network, voice is just another service, an application like ERP or CRM. Video is quickly following voice. Treating communications technologies as a service on the network, enables coupling them with other business applications.

What began as e-commerce has evolved into a broader e-business. Why? You can look to a number of case studies for the details, but operating cost savings and net gains to the bottom line have been huge drivers. Internet procurement of both goods and services continues to rise. Eliminating the middleman in the process reduces overhead and bridges the gaps between suppliers and customers.


Technology has also enabled the creation of virtual teams and workgroups on the fly and on demand. In short, value is being redefined in the world of e-business. Communications technologies can blur the lines between both vertical markets and lateral players within a market. E-business drives new, flatter, dispersed business hierarchy. This drives efficiency, and improved efficiency always helps the bottom line.

Integrating business sales systems with communications systems can bring a new competitive edge by simplifying and tightening processes. For example, an ERP system integrated with a VoIP system allows easy features such as click-to-call. There are many places within the entire business vendor management chain of events that converged communications can streamline and enhance.

There are some obstacles to network convergence. They include:

- Regulatory and legislative issues
- Suitability of network infrastructure to support business needs
- Network reliability and security

Technology always advances faster than legislation can keep up, yet there have been regulatory advances. Security will always be a concern, and will always require constant attention.

 Later chapters will dig into security more deeply.

As customers, we want control. We want technologies that adapt, evolve, and offer convergence. We want independence to use the technologies, both networks and devices, in ways that support our core business. And with the evolution of the Web 2.0 mindset, we require the ability to create global communities of interest on demand.

From a technology perspective we want powerful servers and workstations with unlimited bandwidth and universal access to support survivable, secure networks that are easy to install and maintain, and cheap to operate. When we step back to consider those demands, where we are today in the convergence life cycle shows extraordinary growth from where our technology tools were even 3 or 4 years ago.

Convergence technologies often focus on business sales—selling either products or services. The enablers include:

- E-commerce—payment mechanisms
- Network architectures for Internet connectivity
- Voice and Video over IP
- Client/server architecture advances
- Security methods
- Business process modeling

These components have all undergone continued advances that are being leveraged to create a converged environment of unifying communications tools with data systems and business processes.

As Figure 3.6 shows, convergence brings you into a new life cycle that drives business activity into your information systems, which help you better understand your customers. As your technology converges with your CRM resources, the company converges to an ever-evolving service or product for market, which, in turn, drives new business activities into the cycle.

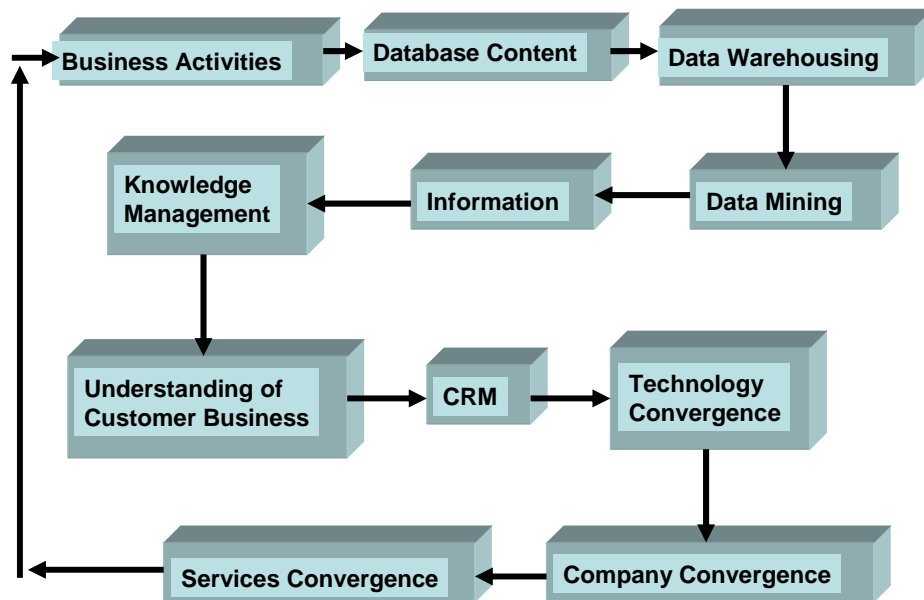


Figure 3.6: *The business-technology convergence life cycle.*

Another way of looking at this is to look at the historical evolution of business. In the industrial/manufacturing era, business was driven by supply and demand. What has changed? Supply was a need for physical resources in the manufacturing process. Mass production could only be fueled by quicker delivery of “widgets.” The industrial-age corporation survived by striving for efficiency in manual processes. As information systems improved, automation led to “just in time delivery” as an effort to cut costs and improve time to market. These improvements brought the idea of virtual organizations, even virtual companies, into play—tightly coupling companies with both supplier/vendors and customers.

Figure 3.7 shows the current step in the evolution of technology convergence: a thriving e-business community that is global in nature, fueled by an abundance of knowledge. Today, we know more about our customers, our partners, and our competitors than ever thanks to the advances in computing and networking power. To win in the market, it is necessary to couple the convergence power of integration voice and data to enhance the services delivered to customers. The converged business becomes a leader in the global e-business community.

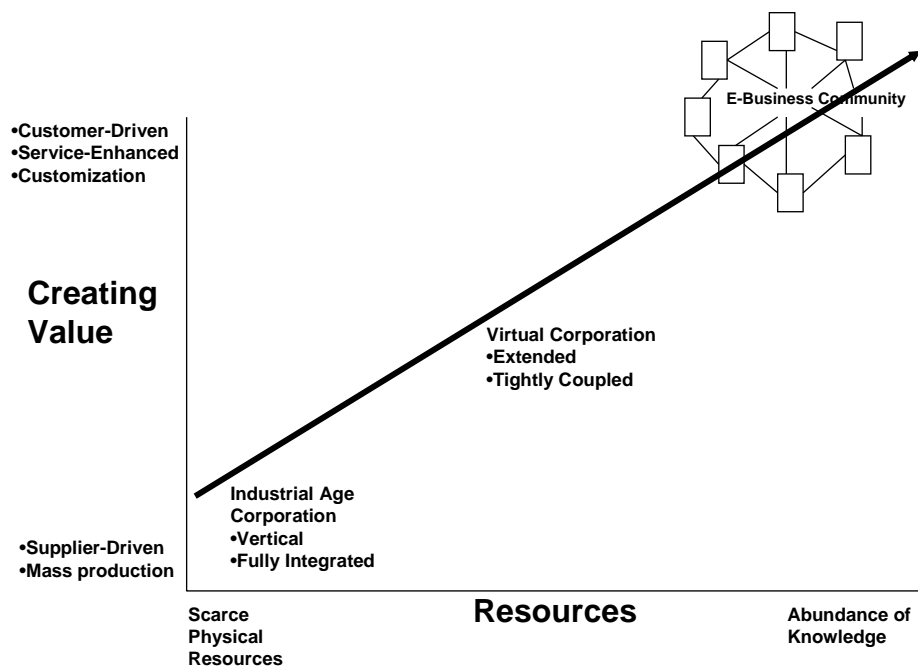


Figure 3.7: The e-business evolution.

Web-Enabled Business

The Web enabled a new kind of business. Web services are often used to implement SOAs. They enhance machine-to-machine integration, using tools such as SOAP-XML, and can couple trusted business partner systems to speed business transactions, which speeds time to market or delivery.

The Web has allowed outreach to a new customer base for many companies. Existing customers may have stuck with existing tools, but the Web created many “little wins” for businesses that didn’t wait for large breakthroughs. Recombining existing technologies with new technologies can provide enhancements that increase the competitive edge. These incremental improvements have assured that small successes offset small failures, so major fatal failure didn’t occur as technologies advanced.

Many Web-enabled businesses also use some form of call center technology. Call centers provide a tool for answering or originating high volumes of telephone calls. Earlier, this chapter discussed how technology can’t be the driver for the business, but VoIP call centers give an excellent example of why technology can and should drive change in the processes you use to support the business. Call centers provide a great example because, in varying degrees, they reach across every vertical segment of business.

Why an Internet Call Center?

With the advent of near-ubiquitous broadband Internet, there has been a rise in the number of teleworkers. Technology has allowed people to focus on family and friends in new ways and to change how they participate in their work environment. Internet call centers provide an approach that offers a work-at-home job but with far more connectivity that we've previously seen.

Call centers have historically moved jobs from metropolitan areas to other locations that offer a lower tax base to businesses. Many US companies now use offshore call centers in other countries where the labor rate is lower, but the distributed call center approach alters the cost structure and provides an effective method to hire domestic staff around the country.

The leading approach for US-based home agents has historically been the Integrated Services Digital Network (ISDN), which really doesn't provide effective integration of services. ISDN costs have proven too high for most companies to invest in this architecture. VoIP is another story. With VoIP, companies leverage significantly reduced cost and far better integration of services than ISDN has ever offered. Many companies now rely on VoIP coupled with consumer broadband to build an Internet call center.

The focus for any company doing business on the Internet has become customer service. There is nothing customers appreciate more than talking to a live person in real time. The call center, in any form, provides that seamless integration capability.

Customers might be anywhere in the world. They might be based in a large corporate campus or at home. They may contact the provider via a Web site or simply by telephone. According to the Gartner Group, more than 70 percent of transactions take place over the telephone. Web sites that offer live voice as a support option for customers report as much as 50 percent increases in sales.

With VoIP softphone technology, the provider of products or services can receive a query for customer support, and through distributed call center technology, seamlessly redirect the call and all data information to a service representative working remotely, often from home. Today's convergence of voice and data allow not just handing off the telephone call. We can pass the customer account information, populating the home-agent's screen with all the necessary information to provide quick and accurate customer support.

Staffing of call centers has always been a challenge. Hiring remote staff, perhaps even part-time remote staff, lets the provider staff the distributed call center with qualified employees. Special services, such as service representatives with special linguistic skills, become more obtainable. This solution also makes available a pool of workforce candidates that may have been previously overlooked. Stay-at-home mothers, retirees, and people without transportation now become potential job candidates, participating in the workforce in new ways that were inaccessible previously.

Distributed call centers do not require VoIP to provide the convergence, but VoIP brings the tightest coupling of services at the lowest cost. In the past, distributed call centers were implemented using PBX solutions and off-premise stations or ISDN lines. Current converged technology solutions make the distributed call center far more cost effective to implement today. IP technologies that integrate VoIP with data systems simply use the network as a "PBX extender," creating a virtual call center environment that can physically be anywhere or everywhere. Most importantly, this distributed call center is transparent to customers, who see a single, unified point of presence for the company.

Distributed call centers' use of a technology for job performance requires that managers take a more "hands off" approach to supervising workers than traditional workflow methods. The call center supervisor does require a comprehensive set of tools to monitor both service delivery and employee productivity. Supervisors can quickly become comfortable relying on integrated systems, both telephone and computer networks, to measure and monitor productivity and worker activity. The idea of a worker being in the corporate office where work can be directly observed is transformed into a measurement of productivity and results rather than oversight of activity.

Although there has been a trend to move call centers offshore, today many companies have become very security conscious and are more reluctant to engage in offshore arrangements. The Internet call center based on VoIP technology can provide for substantial savings above traditional costs without sending jobs outside the US. For those companies using offshore resources, IP telephony works as seamlessly around the world as it does around a city.

Product Sales

VoIP convergence brings creative new solutions to the retail sales market that are limited only by imagination. Converged VoIP phones can easily interact with data network service, providing SKU information about products either via a scanner or RFID tag reader. It's also important to note that VoIP phones today provide kiosk-like screen services and may not always provide voice as a service. A VGA screen on a VoIP phone provides a powerful data sharing mechanism.

One retailer in Japan has leveraged this to maximize customer service. They've learned that if a customer has to leave the changing room to find another size for an item, they are most likely to abandon the sale and leave. This retailer equipped each changing room with a VoIP telephone that can scan the SKU of a clothing item. If the customer finds the item doesn't fit, they can simply scan the tag. The system can then provide feedback to the customer on a touch-screen. For example, "you have blue jeans in a size 12." At that point, the customer can be presented with a variety of menu options, allowing for another size, and even another color. Simple touch-screen interaction allows them to make their selections.

A salesperson on the floor is alerted via a WiFi VoIP telephone that the customer in a particular changing room requires black jeans in a size 10, for example. The salesperson can now take the customer's selection directly to the customer and hand it over the privacy screen. VoIP technology provides information sharing that keeps the customer in the store and helps close the sale.

Business selling products know well that making the act of buying as easy as possible for customers is a huge success factor. VoIP alone is just a way of making voice calls. Convergence of services and applications facilitates the delivery of completely new services and applications.

Service Sales

On the Web, customer service and support have always posed an interesting challenge. Companies struggle with providing help and online support through screens that say "contact us" and through frequently asked questions (FAQs). Some companies now provide interactive text chat with service representatives. To date, most of what we've seen has been rudimentary, but there is huge potential for innovation. The Web is powerful business tool that can indeed be voice enabled to better serve the customer.

Figure 3.8 shows a Web page concept that brings voice directly into the Web page to allow customer interaction directly with the support center service agent. Today, VoIP often requires a softphone client to work—an application similar to the one show in Figure 3.8 requires that the customer install some type of browser plug-in. But that is changing quickly. Development tools such as AJAX, Ruby on Rails, and Flash are beginning to deliver new VoIP connections that embed the VoIP softphone within a Web page or application.

Enabling the Web with VoIP

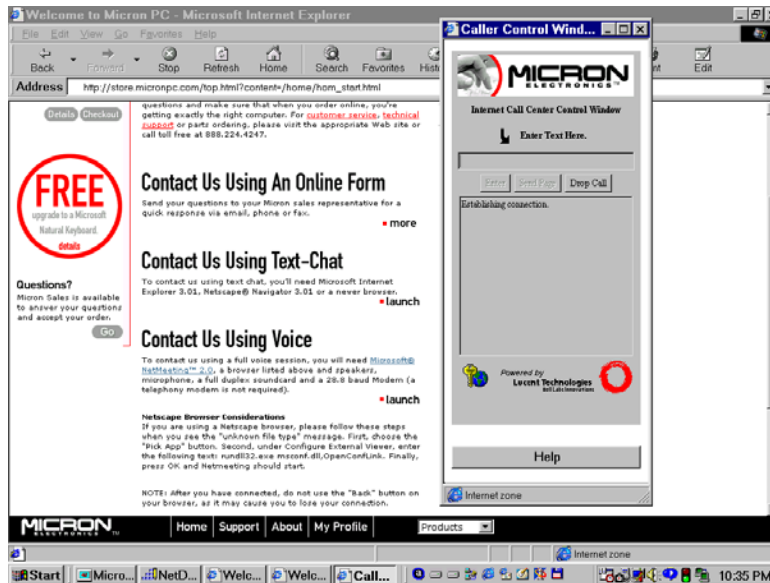


Figure 3.8: The VoIP-enabled Web.

Convergence isn't just about supporting the core services you provide; it's about providing your own business with services to support delivery of your customer-facing services. As Figure 3.9 shows, there is an inverse pyramid that makes up the services supply chain. At the top, is the widest audience—the end clients. These may be retail consumers or business customers, but they make up the largest piece of the service market.

Those clients interact with providers of services. But service doesn't end there. Manufacturers provide service to the providers and component suppliers provide services to them. And although this looks like a supply chain management flow, what you have to remember is that in the information age, although the product has changed, the process flows for business remain much the same. Information is made up of component parts just as manufactured products. Component suppliers in the converged network are data systems and those of business partners. The Web page provides data input about customer trends that feed business intelligence. You need to capture, process, and analyze information at every level to succeed.

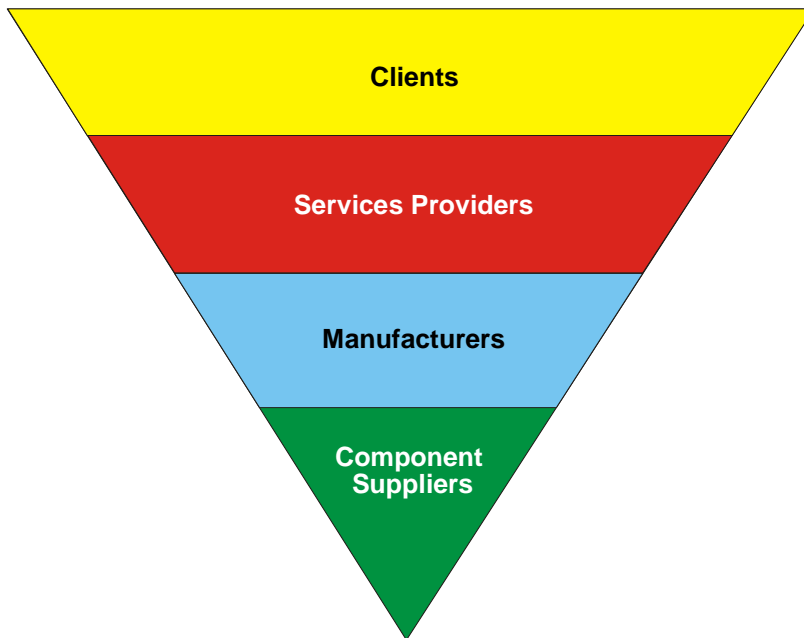


Figure 3.9: The services food chain.

In supporting the services food chain, you can see the potential for a supply chain of information. As information passes through this supply chain stack, it evolves to become more valuable and increase your competitive edge.

Raw data is the basic input—Ken, 360-555-1234, 6 feet 3 inches, Washington. As data is processed through the stack, it becomes information—Ken is 6 feet 3 inches tall and lives in Washington and he has a telephone. Further processing in the service stack matures information into knowledge—It's easier to reach Ken by phone than by email (we don't know his email address). At the highest end of services, we'll know our customer well enough that we'll turn that system knowledge into human wisdom. Our systems gather and synthesize information so that we can they make human judgments to guide our service interactions with clients.

Financial Services

Financial services present an opportunity to use every approach and technique described thus far, with one simple variation. The financial services sector provides an incredibly high volume of data inputs. Transaction data can present an enormous wealth of information for analysis. In the converged network, there is a tendency to be very data-centric when working in financial services, yet the call center provides a key human interaction with customers. Achieving balance between the focus on the data and the focus on service remains a prime success factor.

Health Care

In health care, patients become a focus of activity. Data systems provide information about them in painstaking detail. This information ranges from address and Social Security number to prescription drugs taken, medical history, and financial information. In the health care sector, there is the added responsibility to protect this information and comply with the Health Insurance Portability and Accountability Act (HIPAA), which addresses the security and privacy of health data.

Health care offers many uncharted opportunities to use convergence technologies in new ways. Patient record information can be retrieved automatically with the scan of a health plan membership card. Hospitals rely more and more on wireless devices carried by staff, connected to VoIP phone systems that are tightly coupled with data networking resources. The health care professional needs a wealth of information readily accessible to ensure the best decisions regarding the health and welfare of patients.

The converged network presents the best integration of information, technology, and efficiency in delivering health care. This sector has proven to be far more than a user of converged solutions. Health care providers lead the way in developing new solutions for integrating voice, video, and data services, and delivering it to the health care worker immediately.

Manufacturing

The traditional supply chain flow of manufacturing is also impacted by the convergence of services and applications. Much like the evolution to an e-business community, the linear supply chain is slowly vanishing. It's becoming a meshed supply chain model in which all players in the supply chain interact as peers. This provides immediacy in interaction and redefines many traditional enterprise functions, creating new opportunities for innovation.

Two models emerge from this new meshed supply chain model. One model focuses on high volume and low price, creating economy of scale through volume sales. The other is a differentiated model that uses the "higher-in-price-but-delivers-the-value" approach.

To maintain and keep customer relationship in the converged network supply chain, a technology-based information and knowledge derivation infrastructure is critical. The supply chain player has to gather and synthesize as much information as possible about both the upstream inputs and the downstream outputs.

The supplier who has tightly coupled data with converged services will have ERP and CRM systems integrated to provide customer service. An upstream supplier's inability to deliver a particular widget can effectively trigger alerts in the supplier's CRM system to every key customer who might be impacted downstream. Imagine the customer service impact of being alerted that your deliverables will be a day late because of a component, and being able to notify your key customers immediately.

Convergence gives supply chain players the tools to move quickly, be flexible, and adapt to change. Being nimble and adapting is a competitive edge. It lets you use knowledge about your environment as a differentiator. In short, the supply chain adds value, delivering not just widgets or technologies, but solutions.

Financial Cost Reduction Drivers for Change

The beginning of this chapter mentioned cost reduction as an early driver for convergence and migration to VoIP technologies. Reducing costs in the corporate enterprise can come in several different forms, and telecommunications costs have many different factors to consider.

Infrastructure for voice and data may be entirely separate networks that can now fold into one.

Although cost reduction is seldom the primary driver for convergence with VoIP, it's a business factor that cannot be overlooked. Cost reduction, coupled with delivering new converged services, can drive revenue directly to the bottom line.

Local Telephone Expenses

One cost reduction area of focus in the past has been local telephone charges. For large companies, using an architecture of PBXs distributed geographically across the enterprise, an approach called *least cost routing*, has been widely deployed. In this architecture, local access lines in remote offices, generally T1 circuits, presented a huge cost. Companies offset the expense by routing calls across the internal network of T1 circuits interconnecting all the PBXs to carry the calls internally, then drop them off on the Public Switched Telephone Network (PSTN) as close to the destination as possible. Using this approach, companies circumvented telephone company local access charges, effectively by using their own telephone network to carry what might otherwise be "toll" traffic. Convergence of voice and data further reduces costs by leveraging a unified IP infrastructure to carry all traffic, eliminating costly voice T1 circuits.

Long-Distance Expenses

Local and toll traffic expense wasn't the only cost that could be reduced through local access circuits. Long-distance calling could leverage the same method. Through creative deployment of trunk circuits between PBXs in remote locations, companies achieved control over call routing. This let many large enterprises control how calls were routed, using the cheapest rate available. Many large enterprises built telephone networks rivaling the complexity of small telephone companies in order to control costs.

Businesses meshed their PBX systems together using a combination of point-to-point circuits and, often proprietary, PBX networking protocols. Automatic route selection intelligence was then built on top of the connections, based on dialed digits. Although this approach could effectively reduce telephony expense in a large enterprise, it created a very complex environment requiring increase in staff to manage the voice network. In short, enterprises became their own long-distance company.

This complexity was never a viable solution for many companies. The costs often failed to sustain savings over time. Convergence again provides an architecture that puts all traffic on the switched and routed IP network, eliminating the need for dedicated voice circuits and the specialist telecommunications staff.

Inside the Enterprise

Internal calls within the enterprise were no longer a problem given the approach to local and long-distance costs. Companies used the same internal trunks between locations to carry inside traffic. Typically, this was achieved via access codes as part of the dialing plan. To reach a user in one city, you might dial a “5” followed by the four-digit extension, whereas to reach another office in another city, you might dial a “6.” As technologies advanced, many of these interoffice trunks also evolved. PBX manufacturers began shifting away from proprietary protocols, using IP interface cards to move these trunk offices onto the IP network. In many cases, enterprises simply used the bandwidth available in the data network to also carry voice traffic between PBX systems.

This early step toward convergence often became a competitive issue between vendors who touted “free VoIP” on the data network. This hyped approach caught some customer attention as companies derived cost savings from using a single carrier to provide both data and voice over a unified circuit infrastructure. This beginning of convergence is really only infrastructure convergence—a small piece in the total unification of applications and services.

Outside the Enterprise

The telephone is the lifeline for most businesses. With recognition of the importance of the data network and the value brought by tools such as email, the telephone network has a history of reliability and availability that the data network, in many organizations, still doesn’t quite provide. Telephone service is mission-critical.

When companies evaluate the costs of handling inbound and outbound calling, prudent fiscal management requires business managers to dig deep into the pool of resources to develop new cost-saving approaches. VoIP, tightly coupled with the IP network, offers a compelling cost-savings potential that integrates with other advances in applications used today.

Support Costs

Looking at the techniques described earlier, one fact is obvious: enterprise business accepted the cost of adding a telephone support staff to support creative methods to control costs. Although the savings were often justified, maintaining a full data network staff along with a telephone network staff duplicates many costs. It’s inefficient.

Many companies saw convergence as an opportunity to reduce technical staff by eliminating one of the support groups, but reality dictates otherwise. VoIP allows convergence of the architecture. It can allow for blending of staff, but don’t assume the VoIP service can be designed and implemented solely by the IP network group in a large organization—or that the need for telephony expertise will completely vanish.

It's deceptively easy to overlook the complexity of telephony engineering. The enterprise voice support staff understands traffic engineering for the voice service in ways the data networking team doesn't. Peak telephone calling periods, the busy hour of the day, or the busy day of the week, are an example of an understanding the data networking group won't have. Beyond that, interoffice connections of site-to-site networking for local calling, long distance, and interoffice communications may be very different in voice traffic patterns than those supporting data flows. There aren't many data networking engineers who fully understand the inner workings of voice traffic in an enterprise call center. Although VoIP technology lets you move the traffic over the IP network, the underlying service is still voice, and it remains a mission-critical service.

Rather than eliminate a workgroup entirely, converge staff as you converge services and applications. There may indeed be reduction, but to cut staff prematurely can lead to disastrous consequences. Don't be lured into cutting vital institutional knowledge about your services, network, and business needs in a misguided effort to eliminate cost too aggressively. Cost savings come over time. They don't come immediately, and they aren't necessarily a large factor in convergence for every enterprise.

Help Desk Support

Help desk support in the telephone network seems simple. Most people don't need training on how to use a telephone. When businesses deployed a new PBX, training was often conducted the day before implementation and consisted mostly of dialing shortcuts, how the new voicemail system worked, and an introduction to pretty basic features.

When integrating VoIP into the existing IP data network, features can work in completely different ways. VoIP phones often don't have the same buttons as traditional telephones beyond the basic dialpad. Most VoIP solutions introduce some data workstation, or computer, interaction with the system. Features such as speed dial lists, call pickup groups, and voicemail controls are often reached through a browser interface, coupling the PC with the telephone in a new way that people aren't familiar with.

As services converge onto this new unified communications infrastructure, the company Help desk will get calls about new features, functions, and capabilities that they aren't familiar with. When planning a VoIP deployment, it's important that both users and the entire support staff are involved throughout the project. It's the only way they'll be able to fully support your employees to minimize disruption to normal business operations.

Adds, Moves, and Changes

In the traditional world of telephony, the most expensive part of ongoing operations has always been adds, moves and changes to the environment. To move a computer, in many companies, simply unplugging it in one cubicle and plugging it in to another worked. Many companies use Dynamic Host Configuration Protocol (DHCP) to configure the IP network connectivity.

Telephone moves have been more problematic. Because a telephone number has historically been assigned to the physical jack the phone plugged into, everything required reconfiguration when an employee moved to a new office. Changing work groups might mean complete reconfiguration of telephony services like hunt groups, pickup groups and call coverage.

VoIP convergence may offer tremendous savings here as the IP network is now linked to telephony services. The telephone number and feature might now easily follow the workstation. Moving an employee to another department might be as simple as drag and drop of the employees name in a GUI interfaces to update telephone requirements.

Convergence can mean that when a new employee joins the company, the human resources system provides all the input for the unified communications network so that telephone service is tied directly to network login. When fully implemented, a new employee might be assigned to a work cubicle and log in on their first morning to find all the voice and data services associated with their position are preconfigured and available for use.

Remote and Mobile Workers

The advances in broadband access to the Internet have fueled an exponential rise in remote and mobile workers over the past 10 years. VoIP convergence adds another dimension to the remote workforce. As described earlier, call centers can be staffed by people who are anywhere in the world. Previously inaccessible staffing resources from stay-at-home mothers to contracted multilingual translators to those without transportation have become viable staff resources. Enhancing the widespread availability of broadband Internet with the proliferation of Virtual Private Network (VPN) technologies and VoIP services, employees and contractors can now be anywhere in the world and appear to customers and business partners as if they're at the corporate office. Location has been removed as a barrier to getting work done in the information age.

Teleworkers aren't the only employees who benefit. Road warriors, such as sales people, on-site support engineers, and traveling executives, also benefit from convergence. The company business extension can easily be delivered anywhere with VoIP, meaning these people might work transparently from a hotel room, a client site, or any remote location. All that is required is Internet connectivity.

When a customer calls their sales representative, they don't need to know that he or she is halfway around the world attending a conference in a hotel. The office telephone number becomes as transportable as an IP address, working anywhere. New advances in unified communications, particularly in fixed mobile convergence, will bring this transparency even further as the multi-mode handset becomes a device that can connect transparently anywhere using ubiquitous wireless services.

Strategic Drivers for Change

The strategic reasons for business change are many and varied. Some enterprises have unique applications that apply only to a particular vertical market segment. Inventory and supply chain management tools vary from market to market in manufacturing, but may not play at all in a financial services or health care environment.

Shifts in the market drive changes in business strategies. Earlier, this chapter delved into strategic roadmaps for business, IT, and network strategies. Continual process re-engineering goes on in all businesses. New strategic applications appear. CRM systems evolve and grow to offer new functions and features. Many companies are exploring how to adopt CRM and ERP systems in a blended fashion, while smaller companies may look to application service providers to integrate new strategic applications on a *pay-as-you-go* basis.

Whether you're deploying a major SAP platform, developing an in-house Web application, or integrating something like salesforce.com into business flows, any strategic change in data applications will drive other impacts into your voice services. For many companies, the act of integrating voice and data to a converged service network will be a key enabler for business process change.

New Applications

New applications emerge daily, and many present new features previously unavailable. With programming tools today—such as the .NET framework, Java, AJAX, and Ruby on Rails—the speed to market for new applications is increasing. Things we couldn't dream of doing in applications last year are the realities of this year.

Application developers in today's convergence market are often seduced by the lure of Instant Messaging (IM), syndication (RSS), the idea of online *presence* (an indicator of a user's online status and availability), and how these all complement VoIP services. Certainly there is a danger that this Web 2.0 development mentality of slapping together components will create problems.

As developers embrace these technologies, they quickly migrate to the more mature view of SaaS. The SaaS model isn't new, but speed with which converged applications move through the adoption cycle from early adopters to broad consumer acceptance is increasing. We're seeing shorter time to market and shorter time to adoption in many unified communications technologies. We can expect to see this trend continue, and for many businesses, these new applications and service combinations will provide a strategic impetus for change.

Obsolescence of Legacy Systems

Older telephone systems were based on Time Division Multiplexing (TDM), just like the public telephone network. Many of these systems had a planned lifetime of about 10 years and were amortized as such within the corporate financial systems. Although advances in technology have left many of these systems appearing obsolete, they were still within a planned life cycle.

Data networks have been managed differently. Typically, the network elements for business were smaller than a PBX. Data technologies in switching and routing have advanced rapidly. Data networks are often redesigned every 3 to 5 years, and data networking equipment is commonly amortized over 3 years in corporate financial systems.

What this means is that many traditional telephone systems are now reaching the end of their viable life at a point in time when convergence and the benefits of moving to VoIP makes good sense from both a technical and financial viewpoint.

Stop Investing in Legacy Technologies

Although obsolescence of a system or the fact that it's amortized off the books in terms of financial value may drive some companies, others, especially leaders within their market, simply tend to look to the future. For these companies, the need to migrate to newer technologies may be driven by other factors. Many companies stop investing in older technologies prior to the end of life just to ensure they're future-proofing the technological assets of the enterprise. Seeing the end of life for a technology on the horizon may be enough incentive to pursue a change for many organizations.

Manufacturer Discontinuation of Product and/or Support

Equipment vendors and manufacturers announce they are discontinuing support for old products in the voice and data marketplace daily. Often, products have become costly to manufacture, difficult to support, or parts have simply become scarce, complicating hardware repair.

In many cases, a vendor will make a conscious decision to declare end of life for a particular product in order to motivate customers to purchase a new product the vendor is promoting. In the traditional telephony PBX environment, this resulted in what was often referred to as a "forklift upgrade."

There is a danger for vendors to consider when taking this approach. Motivating a customer to replace a system with something new might also motivate them to look elsewhere. Many an incumbent vendor has found themselves losing a customer using this approach. Whether telephony customers upgrade with their incumbent voice vendor or migrate to a new vendor, some migration to VoIP will be driven by manufacturers who are discontinuing existing products.

Rising Support and Maintenance Costs

Aging systems cost more to support and maintain than new ones. Availability of parts may drive what were once reasonable prices upward. The technical skills needed to support older systems become less available as fewer and fewer of these systems are in operation. Sticking with a technology, like a phone system, that is 10 years old, when the market has shifted to a newer technology can become an expensive proposition. Several studies have shown that telephony systems reaching 10 years of age may cost as much as 30 percent more to support and maintain today that they did when they were new.

New systems, based on new component technologies, bring another operational support factor into play. Every new technology also needs to be updated through its life cycle. When you deploy a voice or data networking solution, a series of patches and upgrades follows for the life of the equipment. New components allow for more efficient patching and upgrades, driving support costs down on new technologies, while costs continue to rise on older systems.

Inability of Legacy Solutions to Support Business Needs

Another strategic driver for change is simply the practical limitation of hardware and software. The hardware providing voice services today may not be able to support new software because of limitations in CPU processing power. Port capacity may be constrained to an internal architecture that can't be expanded further. In short, the system may do what it was designed for several years ago perfectly well. When telephony systems hit the market, they do so with a combination of features, functions, and price point to serve a defined set of needs. For businesses that evolve quickly, needs often outrun the ability of a system to evolve. Older systems may simply be unable to support features and functions your business requires.

That brings up an important point about system evaluation overall. When evaluating a new solution, remember that you're making a strategic investment to support the corporate roadmap. Supporting the operational needs of today only serves the present. For some companies, system extensibility may be a key factor over 3 or 4 years, while others may strategically plan further ahead. Look at the enterprise tactical plans for today and strategic plans for tomorrow and evaluate solutions based on a full set of requirements for the present and the future.

Summary

Network convergence, unified communications, integrated services—whatever you call the impact of VoIP, video, mobility, and the combination of voice and data communications, it's clear we're faced with changes in how we manage the environment. Information flow is both vertical and horizontal between systems. And it flows not just inside the enterprise but outside to customers and strategic partners.

Linear thinking and development taught us to build and sell, but today, you need to leverage information so that you can probe the market and respond. Knowledge, or intellectual capital, is for many, the largest asset; thus, we build databases and pull information from them. However, collaborative technologies that integrate voice and data aid in tying information assets to people.

Convergence will make the network indistinguishable from the enterprise. It will create, over time, a virtual community of the enterprise. The technology, converged and blended, becomes completely transparent, yet absolutely necessary.

Convergence isn't simply about voice and data blending into a single network architecture. It's the full integration of voice, video, and data into the core of the network, the access options, myriad network-connected devices, and the applications running over everything. It's a four-layered convergence of the network, services, applications, and end points. The next chapter explores how to use this combination of sustaining, disruptive, and emerging technologies to improve productivity and differentiate your business in delivering products and services to customers.

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