



# A New Era in Telecommunications

Intelligent Communications, Commerce, and Content<sup>SM</sup> Services



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*Roman aqueduct near Segovia,  
Spain still in use today*

#### + Introduction: The End of an Era?

“There was complete change, far-reaching transformation, and at one period a violent dislocation; but it would not be correct to speak either of the blood or the culture of Old Rome as extinct. It has suffered a complete transformation, partly by natural growth, partly by absorption of totally alien elements... but the process was not one of extinction, but one of growth and transformation, both from within and by the accretion of outside elements... Moreover, the permanent spreading of Roman influence was not limited to Europe. It has extended to and over half of that New World which was not even dreamed of during the thousand years of brilliant life between the birth and death of pagan Rome.”

— Theodore Roosevelt

It is a quality of human nature to want to characterize eras as beginning or ending. We talk about the Age of the Railroad ending the Age of the Steamship or, to use a more modern example, the Age of the Internet ending the Age of the Telephone. And while the Internet is indeed transforming the way we all interact and communicate—more often than not, such neat divisions prove to be oversimplifications.

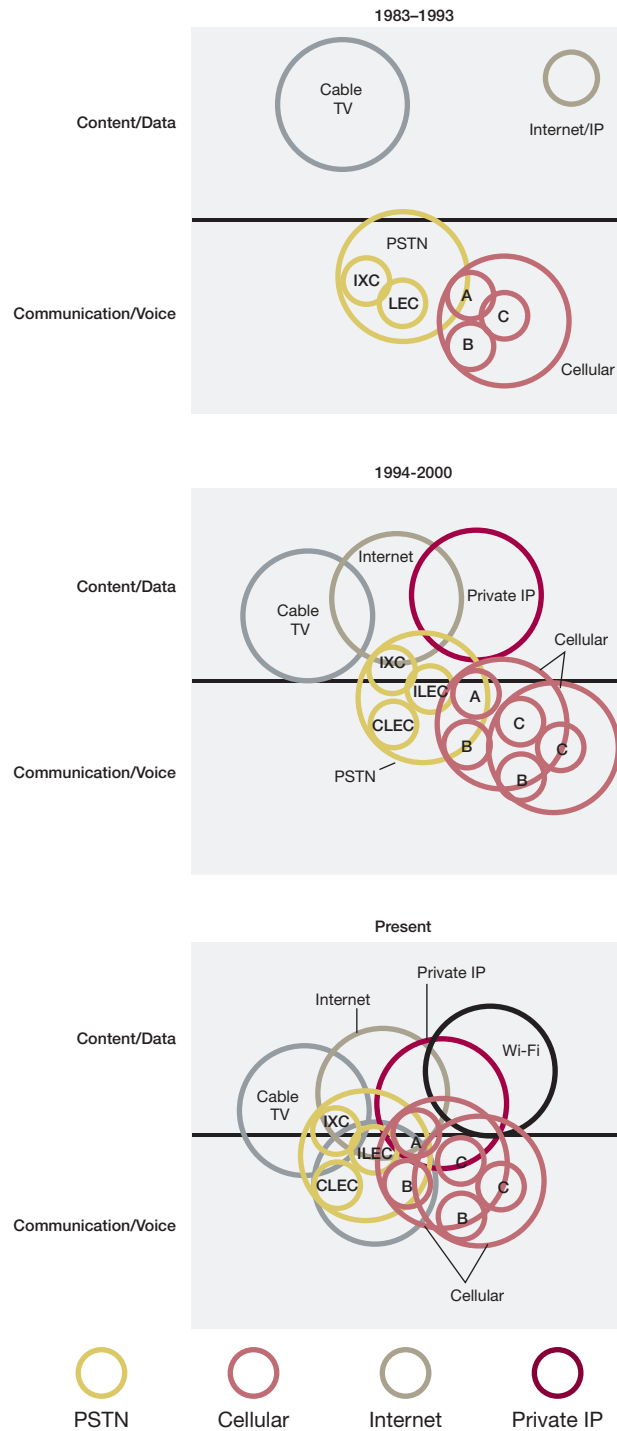
For example, for centuries, scholars debated the exact date when the Roman Empire ended. Some pointed to the conversion of Constantine in 312, others to Odoacer's raid in 476, and others still to the fall of Constantinople to the Turks in 1453. Gradually, however, a consensus has emerged that the question itself may be misguided. While the Roman political state itself may have ended, Rome in the broader sense—its cultural, architectural, and engineering developments—did not. In fact, its legacy transformed and evolved to influence many aspects of the world we live in today.

The last several years have seen a proliferation of punditry about the end of the telecommunications industry. This theme first appeared in the nineties in a series of utopian articles outlining the “brave new world of convergence,” and has been repeated in discussions of the high profile restructurings during the early parts of this decade. Most recently, it has re-emerged in the spate of articles about VoIP, 3G mobile, and the new wave of next-generation providers offering voice and data services.

The reality is that the industry is not experiencing the end of telecommunications as we know it, but instead is undergoing a series of fundamental transformations. These transformations will be shaped by the legacy of telephony as we have known it for over a century, and by the newer influences of Internet and mobile technologies. *Figure 1* illustrates this evolving complexity in telecommunications.

This chart demonstrates the dramatic convergence of voice and data and the breakdown of barriers between different types of service providers over the last ten years.

Figure 1:  
INDUSTRY COMPLEXITY (YANKEE GROUP)



No longer simply about “reaching out and touching someone,” the evolving communications era must allow end users to find, connect, secure, and transact using a variety of devices over a variety of networks.

The assumptions that shaped the industry’s approach to technology, business models, user behavior, competition, and deployment over the past five decades are being fundamentally altered. Communications Service Providers (CSPs), including traditional and non-traditional carriers, that recognize the potential of this evolution are shifting their operations to address these transformations. They are positioning themselves to take advantage of the emerging opportunities in commerce and content—as well as communications. No longer simply about “reaching out and touching someone,” the evolving communications era must allow end users to find, connect, secure, and transact using a variety of devices over a variety of networks.

#### + Addressing Transformation

To survive the dramatic changes in communications and flourish in a new landscape, CSPs must evolve from the models they have employed in the past. While they are managing ongoing issues related to regulation, security, and globalization, CSPs also must squarely address the following five key areas of transformation:

1. *Technology*
2. *Business Model*
3. *User Behavior*
4. *Competition*
5. *Deployment Model*

##### 1. Technology

The growth of new communications technologies has created a complex landscape for CSPs. While the convergence of these disparate technologies presents a major challenge to CSPs, it also offers a unique opportunity to transform the end-user experience. The promise of converged technologies goes far beyond superimposing voice services over IP networks. It involves unifying voice, data, wireless, public, and private networks into an integrated, end-to-end infrastructure for service delivery.

As shown in *Figure 2*, the IP, PSTN, and mobile networks were developed with fundamentally different approaches to the basic functions of finding, connecting, securing, and transacting—and these approaches must be harmonized. While there are forces driving the legacy PSTN to become more IP-like (i.e., more open and inexpensive), there will also be significant challenges as IP environments are forced to live up to the standards of security and reliability that characterize the PSTN. To survive in this new technological environment, carriers must be able to effectively bridge both IP and the PSTN. Understanding the drivers behind the IP and PSTN evolution requires an understanding of both underlying architectures and their impact on service delivery. With this knowledge, CSPs will be empowered to deploy new suites of services for users and new sources of revenue for themselves.

## KEY ISSUE: REGULATION

Telecom providers have historically faced stringent and costly regulations. These include consumer and public safety regulations like CALEA and 911; privacy regulations such as the EU Privacy Laws, number publishing, caller ID blocking, telemarketing prevention; and taxation such as the Universal Service Fund. Though the evolution of technology has become increasingly rapid, the regulatory framework has not adapted to the new world of converged voice, data, and mobile services. New communications offerings such as VoIP and Wi-Fi have so far been exempt from most regulations, and the United States FCC Chairman Michael Powell recently stated, "It ought to be the burden of the government to prove why it needs to regulate something, not on the innovator to prove why not."<sup>22</sup> Regulatory uncertainty has made long-term economic and technical planning difficult for many carriers. Complying with existing regulations, preparing for an uncertain regulatory environment in the future, and taking advantage of new technologies create both an opportunity and a challenge for existing telecom providers and new next-generation market entrants.

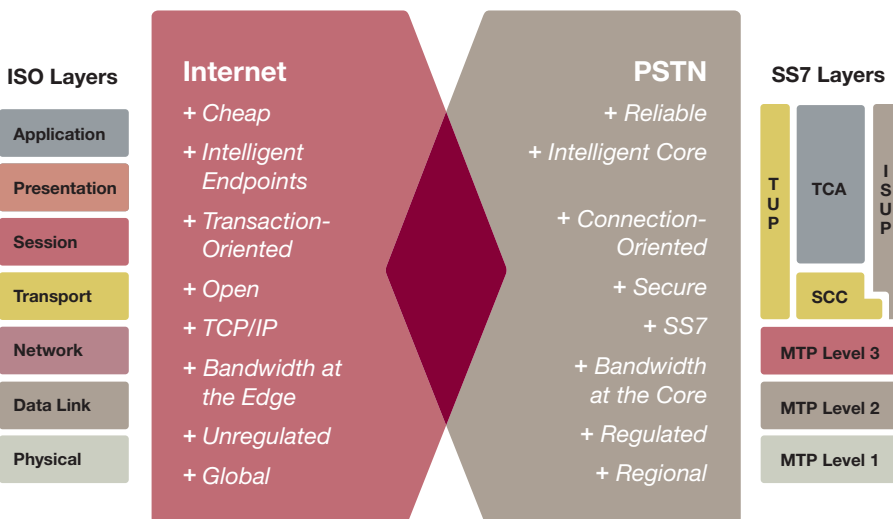


Figure 2:

DIFFERING DEVELOPMENT OF IP AND PSTN

As these disparate network types come together, new opportunities will emerge for CSPs to provide innovative services to their customers. For example, by integrating emerging technologies for Wireless LAN, IP PBX, and 3G mobile services; CSPs will be able to offer customers ubiquitous network services. With a single phone number or URL, the network can notify a subscriber of an incoming call request to a PDA, wireless handset, and PBX extension—seamlessly. The user can select which device he or she wants to use, and transfer calls back and forth between the devices with a touch of a button. The power of each technology such as mobile, Internet, and fixed line is increased exponentially by the integration of each component into a unified communications infrastructure.

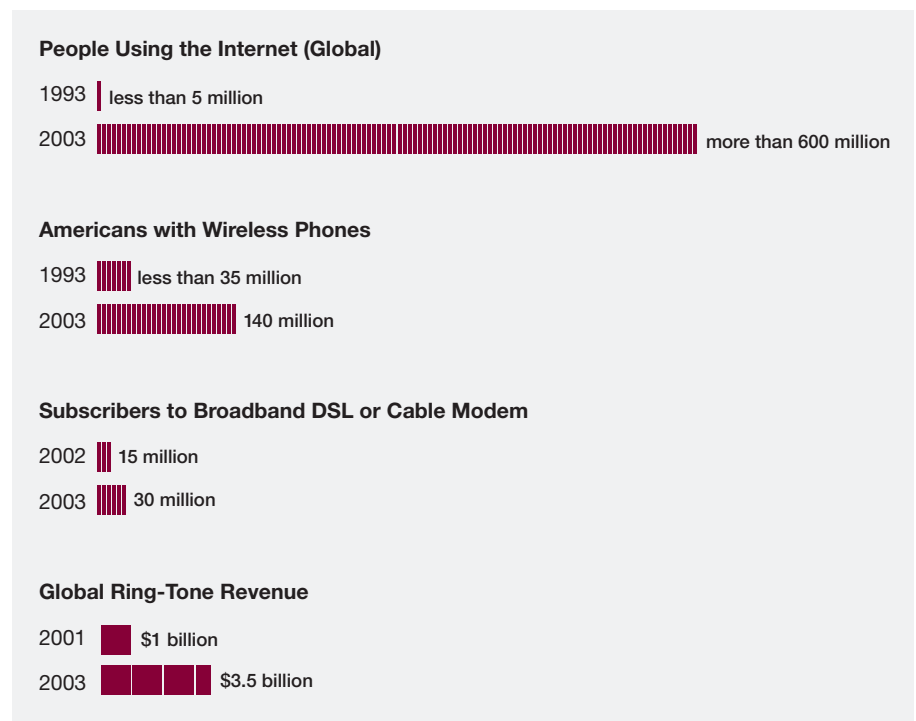
## 2. Business Model

For the past two decades, carriers have been able to drive their economic engines primarily through the delivery of bandwidth and connections. With relatively stable prices, driving a higher quantity of bandwidth and connections from a plant with high fixed costs and high regulatory barriers-to-entry seemed a sure strategy. However, as both supply and demand factors cause bandwidth and connections to become commoditized, carriers must alter their business models to make money on the delivery of content, commerce, and richer communications.

The traditional business model has been based on two fundamental metrics—time and distance. The general rule is that services are billed and delivered based on how long you interact with the network, and how far away you are from the receiving party. The communications networks of tomorrow will be built on more flexible subscribe and transact models. The subscription model collects fees for access to bundles that are driven by customer preference and provide the right to use services on one or more networks, via a variety of devices. New value to CSPs will be driven in the transaction model. Fees per transaction will allow users on-demand access to any network service they wish to use, including content, commerce, multi-media, and other rich data services. The mobile downloads sector is now a \$1.3 billion market in the Asia-Pacific, according to new research from Pyramid Research, with 55 percent of Asian mobile users downloading content, from SMS-based downloads like ring tones and logos, to more advanced content like animations and games.<sup>3</sup> The Danish consultancy Strand has estimated that the current value of the European market for mobile data services is already €1.65 billion—a figure that is set to grow to €20.7 billion by 2005.<sup>4</sup> M-Commerce revenues are also on the rise globally with digital content making up 79 percent of m-commerce revenues and mobile financial transactions at 16 percent of revenue and growing.<sup>5</sup> The underlying network is the enabler, but the true value is in an application's infrastructure that is now accessible in real-time. *Figure 3* illustrates just a few of the dramatic changes in recent years.

*Figure 3:*

RAPID CHANGES IN TELECOMMUNICATIONS



While convergence is beginning to occur at the network level, customer demands are calling for a new definition of convergence as the integrated delivery of services to the device or individual, or convergence at the end user.

### 3. User Behavior

More than ever, market demands are driving the innovation in telecommunications. While convergence is beginning to occur at the network level, customer demands are calling for a new definition of convergence as the integrated delivery of services to the device or individual, or *convergence at the end user*. Whether it's a teenager downloading a ring tone to his cell phone, a businesswoman text-messaging her assistant, or a mobile employee retrieving email on his PDA; consumers and businesses are demanding mobility, access, and ease of use at the user and increasingly at the device level. CSPs must continually work to maintain or grow user loyalty by providing these services.

The model of simply using the network to connect to other people is being augmented by two new capabilities: customization and control. A director for a major wireless manufacturer described the telephone as evolving beyond a tool for voice into "a remote control for life." Consumers have demonstrated a strong appetite for services that personalize their communications devices, and customization services have grown from almost nothing in 1999 to a multi-billion-dollar business in 2004. Ring tones and custom face plates for mobile phones combined for more than \$5 billion in revenue in 2003, and new services such as celebrity greetings, announcements, and busy tones will be introduced globally in 2004. These new services, along with the adoption of customization technologies by wireless operators, are expected to more than double the size of the market in the next three to five years.<sup>6</sup>

Users are also demanding more control over network services including the ability to manage incoming calls, block unwanted calls during certain times of day, and turn services on and off with the touch of a button. For example, with traditional phone networks, turning on a new phone line typically required a call to customer service and sometimes took several days to complete. Today, both VoIP and wireless CSPs offer consumers the speed and convenience of provisioning new phone lines over the Web or by using an automated service on the phone device itself.

### 4. Competition

In the past, it was easy to identify a telecommunications provider. They were companies that owned and operated switches, bandwidth, and services to enable subscribers to make and receive phone calls. Today, that definition is blurring, and traditional phone providers are finding new competitors entering the market from every direction. United States FCC Chairman Powell explained the complexity of the new field in a speech earlier this year, "Some providers...are offering Internet voice services using the public Internet and a consumer's broadband connection to allow consumers to make calls to other broadband Internet users or to people using plain old telephone service. Many cable operators, on the other hand, are offering IP-based voice services using their private digital networks to inter-connect with the PSTN and not using the public Internet at all to transmit voice services. We are also seeing the development of computer voice services (which) employ peer-to-peer technologies to allow those using the service to transmit to one another."<sup>7</sup>



## KEY ISSUE: SECURITY

When communications consisted of fixed, dumb terminals transmitting across centrally managed lines, security was relatively simple. However, as endpoints have grown more sophisticated and more mobile, the transmission networks more open, and the type of data transmitted more sensitive, security has become an increasingly important issue for CSPs and customers alike. Wireless carriers, for example, struggle with the specter of application downloads introducing viruses into vulnerable networks. Similarly, enterprises looking to deploy VoIP must contend with the issues of configuring firewalls to external traffic randomly allocated across thousands of ports. As has proven to be the case with securing IT networks, securing communications networks will require the conscientious application of network security, application security, transaction security, and strong authentication technologies and techniques. Paramount is the ability to integrate intelligence from inside and across networks, to allow carriers and customers to proactively control their security environments.

Next-generation carriers can offer consumer phone service over existing broadband networks—all without owning a single thread of fiber or traditional telecommunications equipment. By simply purchasing a software-based, call-control server (such as a SIP proxy), new CSPs can provide a complete set of voice services. In addition, systems integrators and VARs are also entering the telephony market by providing hosted PBX and data networking services for large enterprises. Finally, even consumer-oriented retailers are offering phone services as part of their retail channel. In Europe, for example, several major grocery stores and consumer electronic chains now offer the ability to buy phone service—at the same time one purchases a liter of milk.

## 5. Deployment Model

Most carriers have traditionally been highly vertically integrated in their service delivery model, owning and operating virtually everything that lies between the subscriber handsets, including transmission lines, physical plants, OSS, signaling infrastructure, customer care systems, etc. However, this model began to shift with deregulation and its significant impact on the traditional revenue structure.

This transition from a cost-plus model to one driven by the more basic economic principle of supply-and-demand is confounded by other deployment pressures: capital-constrained financial structures, the need for rapid deployment of services, the limited useful life span of many new services, and the raft of new skill sets required for emerging services. With the decoupling of the network from the services infrastructure, CSPs no longer have to own the physical connection to the subscriber in order to deliver services. More and more service offerings for voice and data will resemble virtual service models such as Yahoo! and Amazon, which deliver services to millions of customers without the necessity of owning all of the underlying infrastructure.

Increasingly, users are becoming nomadic—with several different kinds of devices, running different kinds of applications, and invoking diverse services as they obtain agile access from multiple differently deployed infrastructures. Dual 802.11 and 3G-enabled devices are combination phones, PDAs, and even RFID readers. Transport-less service providers like Pulver.com, Vonage, and Skype, are blazing new frontiers, even as major application platform vendors like AOL, Microsoft, and Yahoo! are bundling similar services into their offerings.

For a deployment model to successfully address rapid development of new applications—rather than rigid management of infrastructure—the primary goal is not simply cost avoidance, but also enhancement of the CSP's ability to quickly provision new services to business and consumer end users. The solutions cannot be completely deployed by the CSP, nor completely outsourced to a third party; therefore CSPs are expanding the use of managed services as shown in *Figure 4* from the Yankee Group. This requires a new breed of partner who empowers the CSP to

## KEY ISSUE: GLOBALIZATION

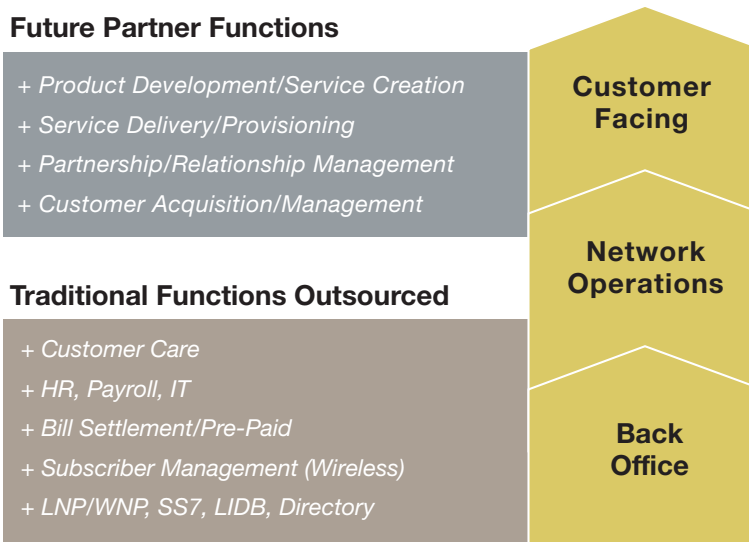
With predominantly localized and national usage of many standards and protocols, the problem of inter-connection becomes a barrier to globalization of services by a CSP. The need to communicate beyond country and continental borders is becoming increasingly important. Some international markets developed around an inter-connected GSM network. However, many countries are only starting to support standard GSM networks including the U.S., Canada, Korea, Japan, Australia, Hong Kong, and Mexico. The growth of richer data services and content around the world will only increase demand for seamless access to services and content no matter where you are. Like the World Wide Web, physical borders must be invisible to the user. Given the need to increase average revenue per user (ARPU), CSPs must seek solutions for inter-connection and seamless delivery of services across literal and technological borders.

provision competitive, revenue-producing services quickly and seamlessly—without capital expense. These services will form the core of the CSP deployment model in the future and will enhance their ability to provide connectivity, control, and customization to both business and consumer markets.

The new nomadic environment will require services that many providers may not be able to effectively implement, such as authentication, fraud detection, and high-performance directory or signaling services. As regulatory agencies have also made clear, some public service obligations are still likely to remain in place—obligations which can also be met through some kind of partnership.

Figure 4:

MARKET-CENTRIC PARTNERING (YANKEE GROUP)



### + A New Breed of Partner

“We’ve got a transformation going on that’s moving at warp speed. The only way you are going to be successful in this marketplace is to find the great partners,” claims Jonathan Crane, executive vice president of corporate development and chief strategic officer for MCI. VeriSign proposes that CSPs need and deserve a new breed of partner to help them thrive in this dynamic new era of communications. This partner is not a traditional outsourcer. They should be more than an entity that provides CSPs with an alternative financial model for obtaining capabilities that they have in-house, merely meeting objectives for reducing capital or operating costs. Rather, this is a partner who can deliver a set of capabilities and expertise to carriers, along with supporting services that help to monitor, bill, and report on them. More than 75 percent of North American telecom executives surveyed by Booz Allen Hamilton in 2003 said they consider outsourcing a “key component” of their business plans. In a European survey, they found that “outsourcing is seen as an important tool

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—Jonathan Crane  
EVP, CSO, MCI

to realign activities around core capabilities.”<sup>8</sup> This new breed of partner delivers intelligent infrastructure services that give find-connect-secure-transact capabilities to CSPs, enabling them to focus on their core business while providing the differentiated content, commerce, and rich communications services that the market demands.

#### + Intelligent Communications, Commerce, and Content<sup>SM</sup> Services

To address the unique needs of the dynamic communications industry, VeriSign has identified this new model as Intelligent Communications, Commerce, and Content Services or **IC<sup>3</sup> Services**. This model helps CSPs make the most of their existing infrastructures, address transformations in the industry, and capitalize on new revenue and expanding market opportunities. CSPs will thrive in this evolving market with increased intelligence throughout their own network and beyond to inter-connecting networks. With IC<sup>3</sup> Services, they will be able to quickly deploy the content and customization that their users demand and meet necessary functional competencies (*Figure 5*). The essential principles of this new model are interoperability, revenue realization, access independence, pervasive intelligence, and adaptability.

*Figure 5*

FUNCTIONAL COMPETENCIES NEEDED



*IC<sup>3</sup> Services and VoIP*

The IC<sup>3</sup> Services principle of interoperability comes into sharp relief as organizations begin to deploy VoIP solutions. The use of VoIP as a tool to integrate legacy networks with emerging applications can be a powerful mechanism to enhance communications revenues for CSPs and increase convenience for end-users.

However, different VoIP platforms, whether they are based on H.323 or SIP, typically do not interoperate with each other; nor do they inter-connect to existing legacy equipment. An important point to make about protocols is that there is no right answer—what makes sense for one enterprise may not be appropriate for another. To solve this problem, services like IP Voice Brokering have been developed as an end-to-end VoIP solution that normalizes protocols at the network border. These services manage the inter-connect point between carriers, enterprises, and application providers to enable seamless inter-connection between various IP PBXs and the networks that link them together. By normalizing protocols at the network edge, IC<sup>3</sup> Services should ensure that end-users have access to a wide pool of high-value applications—from traditional conferencing and messaging solutions to new applications such as video and collaborative workflow tools.

## Principle 1. Interoperability

The past few years have witnessed a great explosion of protocols, devices, and technologies. Technological diversity is nothing new to telecommunications, as CSPs have deployed dozens of different standards for networking and signaling over the years. And data networks still consist of multiple protocols such as ATM, Frame Relay, and IP—with many variations of each. With the introduction of mobile and VoIP services, the complexity increases with protocols such as H.323, ANSI-41, MAP, and SIP. But while networks may employ hundreds of different protocols, end users require seamless access to services regardless of the network type or protocol. CSPs will succeed when they are seen as the single point of access and delivery of all the richer data and communications services available. In order to maintain customer loyalty and benefit from the increased ARPU, CSPs must engage partners who can provide interoperability among the multiple protocols, platforms, and network types to successfully facilitate transactions.

CSPs must also provide access to third-party networks and other CSPs—even though those networks might use different protocols and architectures. For example, the U.S. cable industry has developed a standard version of SIP for all MSOs to use for voice services. However, this version of SIP is not compatible with the protocols used by most IXCs and international carriers. Developing partners to provide interoperability services and link various networks, content, and applications will be a critical feature of the integrated, end-to-end communications network of the future.

Inter-connection across these different network types is a key capability for IC<sup>3</sup> Services providers. At the same time, the IC<sup>3</sup> Services provider must also play a critical role in mediating traffic between carriers—again independent of the protocol or network type involved. The ideal partner provides a broad range of world-class solutions that help CSPs manage and streamline interoperation between content providers and subscribers including content hubbing, short codes, authentication, mediation, rating, billing and payments, settlement, and aggregation. “Rather than debating which broadband wireless network will be ubiquitous, think about moving between ‘islands of broadband connectivity’ including fixed, 3G, Wi-Fi, Wi-Max... The winner will be the carrier that most intelligently manages these disparate networks, taking into account user preferences, economics, and applications context,” recently wrote Mark Lowenstein, managing director, Mobile Ecosystem.<sup>9</sup>

*IC<sup>3</sup> Services and Billing and Payments*

"The data world has created one of the most significant challenges in the billing space... a data transaction could represent many different types of traffic—a video conference, for example, or a song clip—and all should be billed differently."<sup>10</sup> The IC<sup>3</sup> Services principle of Revenue Realization is exemplified in a broad range of billing and payment services to help CSPs meet the evolving challenges of the marketplace. These challenges are nowhere more evident than in the addition of wireless data and text messaging services to customer rate plans. CSPs will increasingly look to partners who offer a fully integrated pre-paid/post-pay billing and payment platform with robust rating and real-time account monitoring. These services will enable CSPs to easily modify rates and service plans to respond rapidly to evolving market opportunities. These services seamlessly blend the ability to handle data transactions alongside more traditional voice services. This platform gives CSPs a solution for their value-added billing and payment needs and dramatically reduces the cost and complexity of delivering compelling new services in wireline and wireless voice, VoIP, data, broadband, and cable markets.

## Principle 2. Revenue Realization

The business model for CSPs is shifting from charging for time and distance to monetizing the rich communications, commerce, and content that traverses their network. CSPs who do not implement the rating, billing, and settlement capabilities to capture this value, can very easily find themselves in a position of realizing little or no revenue for the services that they deliver. Even for purely voice-based services, the emergence of sophisticated rate plans—including bundles, buckets, peak, off-peak, local, roaming, rollover, family plans, all-you-can-eat, pre-paid, post-paid, advanced pay—has turned what was once a commodity set of back-end functions into a critical strategic differentiator. To this dizzying array, CSPs must now face the complexity of rating data by the byte, by the minute, or by content including ring tones, graphics, games, and BREW. Furthermore, to truly monetize content delivery, CSPs must have capabilities for content on-boarding and management, soft-goods fulfillment, hard-goods fulfillment, and various vending and payment options such as carrier bill, credit card, debit card, and pre-paid card.

The ideal IC<sup>3</sup> Services partner can help transform a CSP's infrastructure to better manage a broad spectrum of their billing, payment, and revenue realization needs. By delivering in a managed services model, IC<sup>3</sup> Services partners also relieve CSPs of the need to manage the integration of these disparate software solutions with their own infrastructure for billing and CRM. For CSPs, this integration has traditionally been riddled with problems from the square-peg-in-a-round-hole syndrome to delayed responses to the rapid progression of new technologies. CSPs need to reduce the complexity of these systems and look to partners that can ease the burden of this integration.

## Principle 3. Access Independence

For years, telephony services have been tightly coupled with the access networks, and this has limited subscribers' ability to use some network services. Applications were built and deployed as vertically integrated solutions, rather than as modular, standardized components available across the network. For example, services like call waiting, call hold, and call forward were integrated tightly within the carrier infrastructure, and could not be decoupled. Voice mail was deployed as an add-on to the switch, so your home voice mailbox could not be shared by your mobile or office phones. And to make matters worse, the user interfaces and feature sets were often different—pressing 7 may mean "save" on the local voice mail system, but "delete" on the mobile system.

Not surprisingly, this created significant confusion for customers and slowed adoption rates of network-based services. It also increased costs for CSPs, because subscriber records and service data had to be provisioned in multiple places across the network. Turning on a service for a customer could mean provisioning literally dozens of systems, all with the same data. With evolving communications, the applications and services that were once coupled to the transport layer have been released and allow for more flexibility and speed.

*IC<sup>3</sup> Services and Secure Mobile Messaging*

A survey of global companies in 2003 reported that 39 percent of those surveyed plan to give their mobile worker wireless email access by 2005. Nineteen percent said they would provide wireless access to company information systems such as databases and intranets.<sup>12</sup> This increased access and traffic will depend on security, reliability, and interoperability—all required characteristics of the IC<sup>3</sup> Services model. Secure mobile messaging platforms will enable enterprises to mobilize their communication, collaboration, and workflow applications on any mobile device including pagers, one- and two-way SMS phones, WAP phones, and PDAs on current and emerging wireless technology. Wi-Fi networks have suffered from a variety of security problems and lack of roaming capabilities that have contributed to lackluster adoption by the enterprise and mobile professionals. Services employing IC<sup>3</sup> Services principles that combine security and roaming capabilities to drive revenue generating service offerings for CSPs can ameliorate that issue. The IC<sup>3</sup> Services model shapes services that are comprehensive—putting all the necessary pieces together for a singular solution to what are often complex problems in communications.

With the adoption of IP technologies and open standards for telecommunications equipment, CSPs are now rapidly moving to build access-independent services infrastructures. By decoupling the application layer from the physical transport network using open protocols like SIP and VXML, carriers can now build services that can be accessed and used regardless of how subscribers plug into the network. Whether it's a laptop, PDA, VoIP over Wi-Fi, a GSM mobile handset, an IP PBX, a traditional telephone, or a Windows Messenger client, the services are the same, the user interface is transparent, and subscribers have one identity in the network. Not only does this make services easier to use for subscribers, it reduces the cost and time to market for CSPs introducing new, innovative services for their customers.

## Principle 4. Pervasive Intelligence

The PSTN networks evolved with a centralized model of intelligence. Users were able to work with relatively dumb terminals (traditional handsets) to engage in highly complex interactions, due to the rich set of signaling, directory, and control services provided from the core of the network. By contrast, IP networks evolved with a highly decentralized model of intelligence. Users relied on the intelligence of the endpoints (computers) to enable complex interactions, due to the paucity of signaling and control services provided from the core. Other than the DNS system, which rests upon a highly reliable set of authoritative naming and directory services, almost all of the intelligence in IP networks resides at the edge. In order to enable the kinds of next-generation services users desire with the levels of reliability, security, and interoperability that the market demands, intelligence will have to pervade both the core and the edge. IC<sup>3</sup> Services providers worthy of the name must have the capability to derive and provide this intelligence.

An excellent example of network- and edge-based intelligence inter-working to provide a pervasive service is instant messaging (IM). In its brief six years of existence, IM has transformed both consumer and business communications and created a new category of near real-time communications. IM technology relies both on intelligent clients at the edge which set parameters and process communications, and intelligent directories in the network that house buddy lists, set reach-ability parameters received from the edge, and route messages among users. Applying the concepts of IM, e.g., smart endpoints and smart network routing and control engines, will allow carriers to optimize voice services to provide both reach-ability and privacy at the touch of a button.

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#### Principle 5. Adaptability

Telecom equipment lifecycles have typically lasted from seven to ten years. That means equipment CSPs purchase today will probably still be in the network in 2014. This creates enormous challenges for carriers, because networks need to be able to adapt quickly to new technologies, market demand, and other changes. Maintaining open, flexible architectures and establishing partnerships to allow more rapid introduction and upgrade of network equipment is critical to meeting the new service requirements of customers in the future. In a recent article in *America's Network*, Joe McGarvey wrote, "In the past two years, service providers and analysts alike have described two methods for improving the bottom line—reducing costs and introducing new money-making services off the existing infrastructure."<sup>11</sup>

IC<sup>3</sup> Services providers must enable CSPs to rapidly deploy the services that the markets demand today, but they must not do so at the expense of the carrier's ability to deliver the services that the market may demand in the future. Since VoIP technologies began to emerge in the late 1990s, the general assumption of most observers was the VoIP would subsume and replace the PSTN over time. While it is true that more and more communications will move to a native IP environment over the long term, for the foreseeable future VoIP will actually be used to compliment and add value to existing sunk investments in circuit-switch technology. What enables this new orientation of investment preservation rather than replacement is the open application delivery architecture inherent in IC<sup>3</sup> Services.

With the speed of change in communications continuing at breakneck speed, it is impossible to predict all of the features and applications consumers will demand five or ten years from now. In fact, many of the services that we now consider ubiquitous such as instant messaging, text messaging, mobility, and Wi-Fi did not exist five years ago. By decoupling the network access technology from the supporting applications infrastructure, new features and services can be added quickly and easily—allowing the network to adapt to new service demands from customers.

“Consumers and businesses are demanding a converged experience, whether they are using wireline phones, their cell phone, their PDA, or their computer. IC<sup>3</sup> Services allow convergence to happen literally in the hands of the user.”

—Stratton Sclavos  
CEO, VeriSign

#### + Where It All Comes Together<sup>SM</sup>

After significant challenges, the telecommunications industry is regaining life, spurred by several transformations. Indeed, Gartner reports, “Telecommunications services are a catalyst for growth in the national economy at large, a driver of productivity, and a force for innovation that reaches far beyond its own sector.”<sup>13</sup> The growth in revenue for these new services is increasing exponentially each year and will continue to grow with increasing global demand and expansion. The end user—whether a business or individual—is driving demand for richer services delivered in a seamless, secure, ubiquitous manner. Traditional CSPs are challenged to keep up with the market and to provide rich communications, commerce, and content services that are outside of their legacy business. Like the ancient Roman Empire, the age of telephony will not literally end—but must take the best of its dominant era and evolve to build a new world.

The answer to this challenge will not be found in the historical model of telecommunications operations. CSPs, once used to doing it all on their own, must turn to partners who deliver a new model of managed services: IC<sup>3</sup> Services. “The market simply will not wait for companies to catch up with its needs. As we’ve seen with the growth of wireless customization, downloadable content, and enterprise VoIP systems—the market will find its own solutions if carriers won’t provide them fast enough,” argues Stratton Sclavos, chief executive officer of VeriSign.

For the newest era in communications, a new model is needed. As technologies converge to exploit the best characteristics of telecommunications and the Internet, experts in each must come together to provide new services—and to provide them in a manner that realizes seamless, ubiquitous delivery. Despite the challenges brought about by transformations in the industry—IC<sup>3</sup> Services can help CSPs expand their business and thrive in the new era of communications.



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#### + Figures

*Figure 1.* Brian Van Dussen, Yankee Group, "Managed Telecommunications Service Providers Improve Agility in an Increasingly Complex and Converged Market" ©2004

*Figure 2.* Differing Deployment of IP and PSTN, VeriSign

*Figure 3.* Sources include *Wireless Week*, *America's Network*, and 2004 Verizon Annual Report

*Figure 4.* Brian Van Dussen, Yankee Group, "Managed Telecommunications Service Providers Improve Agility in an Increasingly Complex and Converged Market" ©2004

*Figure 5.* Functional Competencies Needed, VeriSign

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