UPDATE

Solutions for Success

Consultant/Vendor Sales Group
April 2003

Data with David

SBC PremierSERV℠

SBC announced in January a major strategic initiative designed to enable a wider range of businesses to take advantage of the cost savings and efficiencies of *outsourcing their voice and data communications network design, delivery and management*. While managed service choices for large companies continues to expand, options for medium-sized companies have, to date, been very limited. SBC PremierSERV℠ offers and delivers a range of managed service options designed to meet demand from both large and medium-sized companies. Highlighted in this article are the SBC PremierSERV℠ network management options and SBC's new national PremierSERV℠ Frame Relay service.

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Ron Fischer, SBC

SBC Long Distance Toll Free Services

SBC Long Distance Toll-Free Service is a voice calling plan that allows your customers to contact you at no charge to them, using a nationally recognized 800, 877 or 866 number. Toll-Free Service encourages your customers to keep coming back by providing them with a cost-free method to contact you. Toll-Free Service also helps you to expand your business by encouraging new customers to call. Toll-Free Service lets you receive calls from anywhere in the United States and Canada, with no charge to the person calling. You may also choose to include your number in the National Toll Free Directory Assistance listing database (1.800.555.1212).

SBC Long Distance allows your toll-free calls to be terminated to either a switched access line, dedicated facility or both. You determine which type of facility(ies) you will use for receiving the toll-free calls. When using Dedicated Access, additional features such as DNIS (Dialed Number Identification Service) and ANI are available to help your route calls more accurately.

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SBC CVSG Resources For You

1. Website: sbc.com/cvsg
2. CV Webconnect (Password-Restricted)
3. CVSG Hotline – 1.800.552.5299
4. Breaking News on CVSG Listserver
5. SBC News Broadcasts

(Call your Liaison Manager to get a Password to CV Webconnect or subscribe to Listserver or UPDATE and to attend Broadcasts in person or via stream.)

Vice President's Corner

Kari Watanabe
CVSG Vice President

Rush of Businesses Coming Back To SBC

"Why Are They Returning?"

Never have we seen such a rush of businesses coming back to SBC. There are a lot of companies out there making a rash of promises but businesses are discovering that too many of these firms are having problems living up to their promises.

They're discovering that SBC offers the best quality service, the best network and often major cost savings. For instance, we're one of the few Telecom Companies that's not charging Carrier Access Line Charges, known as Pre-Subscribed Interexchange Carrier Charges, aka PIC-C. One major Southern California Traffic Engineering firm recently switched to SBC Long Distance after finding out from their Telecom Consultant & SBC that they could save more than $10,000 a year on Carrier Access Charges alone! Wow, that's a lot of savings!

Others are streaming back because of the excellent Customer Service SBC offers. A large Accounting Firm in San Francisco just came back to SBC for both Local and Long Distance Service at its Bay Area offices because of the service they weren't receiving from their previous telecom company as well as being able to get both Local & Long Distance charges on a Single SBC Bill. A Real Estate Development Company told us, "We've dealt with other vendors but we believe SBC provides greater value in handling interconnects and cable maintenance."

A Banking Services firm emphasized the critical need for Reliability & Disaster Recovery Backup that SBC offers. "I thought I was getting a better deal going to another telecom company," said the manager of a Transportation Business. "My whole business is Service and the last thing I wanted to do was spend more time worrying about our phone system. It was a nightmare – there were errors in the bills; I had a hard time getting anyone to call me back, and when I wanted a new product it took forever to get. I'm so glad to be back with SBC. Now we get One Stop Shopping, No Hidden Costs, No Account Management Charges, No Maintenance Charges, Great Customer Service and everything on One Bill."

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SBC LONG DISTANCE

SBC Long Distance offers a number of standard routing features to help you complete your Toll Free calls to the proper place the first time. These include:

Origin Routing: You can route calls to different locations based on the State or the NPA the caller is calling from.

Time of Day Routing: You can choose where to terminate the call based on the calling time of the caller. Allows callers to "follow the sun."

Day of Week Routing: You may wish to have different centers handle calls of different types on different days.

Busy/Don't Answer Routing: This allows you to have automatic backup of your Toll Free calls if a main location becomes overloaded or has a temporary outage. If the trunk group being called is busy or out of service, the call will re-route to a location of you choice.

Allocation Routing: This feature allows you to determine what percent of the calls will go to various centers for handling. This can be critical based on staffing concerns.

Alternate Routing: Various back-up scenarios can be pre-arranged so that a simple phone call will have your calls re-routed around a troublesome problem caused by an unexpected situation.

SBC Long Distance also offers a number of very sophisticated Call Center features in the network. These include:

Customized Menu Routing (CMR):
- Route calls via a simple, single level call tree – Press/Say 1, 2, or 3
- Routes calls to different people or departments based on the input of an extension number
- Provides for Authorization Codes to control access to certain applications based on their input of a special code

Network Based Contact Centers (NBCC):
- Sophisticated and multilevel Menu routing
- Network based ACD to route calls to a variety of centers
- Interactive Voice Response (IVR): This feature allows for a variety of capabilities including:
  - Fax back of documents based on selection from a predefined menu
  - Database look-ups of information based on specific inputs: i.e., status of order based on order # being input
  - Text to Speech conversion – system will read information to the caller
- Computer Telephone Integration: Screen "Pop's"

The best part of the feature-rich capability is that there is a group of specialists with extensive call center knowledge to partner with you to develop, design, implement, and manage the simpliest to the most complex Call Center applications.

You've known SBC for a long time. We have a reputation of providing quality products and services. Our entry into Long Distance is just another extension of long heritage of Telecommunications expertise. Let us bring that knowledge to your business applications, especially in the world of your Call Center. Please contact your Liaison Manager for further information, 1.800.552.5299.

Ron is Director of Business Long Distance for SBC.

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VICE PRESIDENT'S CORNER

A huge software company chose SBC because they wanted to connect all their employees effortlessly. SBC delivered a reliable, secure ATM & IP networking solution that uses point-to-point technology to connect over 6,000 employees to their offices without utilizing the Internet. "Our employees no longer have to struggle with long download times and slow response times. We chose SBC because they provide our employees with reliable bandwidth to make telecommuting a viable option, while at the same time being less expensive than today's current high-speed technology offerings," said the IT Officer.

Some folks came back to SBC because they can grow with us as they expand. "As we broaden our presence nationally and internationally, we need companies that can grow with us – particularly in critical areas such as communications," said the Telecom Manager of one of the World's largest retail operations. "This contract with SBC, and its potential for a bundled product approach on a broad geographic scale, will help us lower our overall communications' costs without any sacrifice in quality and flexibility. SBC caught my attention because they could negotiate as one company across a broad area, instead of piece-meal offers for stores in one state or another."

The reasons companies come back to SBC go on and on. We've been helping our customers for more than 125 years. We're here for you. Call us: 1.800.552.5299; Contact us to get a password for CV Webconnect, a special website for you, or see our other website, www.sbc.com/cvsg. Thanks very much.

Kari

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SBC Connections Coming To Small Business Customers

We've listened to our Small Business customers. They have told us that they want us to offer them customizable, flexible solutions to meet the unique needs of their business. They also told us that they want opportunities to save money on their telecommunications applications.

In response, we have created a new offer strategy which provides "the more you buy, the more you save" opportunities for customers who utilizes SBC services to meet their voice, data, and Long Distance needs. Customers with a qualifying SBC Connections voice package will be able to realize additional savings on some of our most popular data products, such as DSL, Online Office, or Dedicated Internet Access. Customers who add one of our Long Distance plans are also able to enjoy savings on both Domestic and International calls. Customers who add both a Data and Long Distance product to their qualifying voice solution will realize even greater savings.

In California, customers can save up to 25% on their overall monthly bill with one of the Connections solutions.

In March, the new Long Distance rates were scheduled to be available in the West for Small Business. High Volume Plans were to be available in California, Texas, Kansas, and Arkansas beginning March 14. These plans were to be available in Oklahoma and Missouri on March 31, and offered in Nevada when Long Distance is launched.

For more information regarding the SBC Connections offers and qualifying voice, Data, and Long Distance component – or to design a customized Connections solution for your clients, please contact your Consultant Liaison Manager.

Caprice de Lorm, Director, Channel Delivery

Surgeons Hold Largest Video Conference in History

The American College of Surgeons held the largest Video Conference in history, using SBC's 1.800.CONFERENCE service. With 276 healthcare professionals on line, the conference topped the previous record of 217. Demand for Video Conferencing continues to soar – up 16% in the last year alone. The reasons include cost, convenience, freedom from the hassles of business travel and a growing commitment among business customers to emergency and disaster planning.

Businesses could also do a better job of selling the benefits that the consumer gets from the collection of information. A reminder to have your car serviced can keep your car running longer. A coupon for an item you are likely to buy is an economic benefit.

Supermarket chains are a great example of selling the benefits of this relationship. I fill out a form with personal information and give it to the cashier. In return the cashier gives me a plastic card that takes real money off the cost of my groceries. I love watching the total go down as the discounts are deducted.

By attaching an economic value to the personal information that it collects, the consumer can make an informed decision to part with personal information and the business can build a longer-lasting relationship with the consumer.

Jerry is a Senior Business Security Manager for SBC Services. He earned an MBA in Information Management & is a Certified Information Systems Security Professional.

An Exclusive UPDATE Security Special Report

Improving Operational Readiness Through Strategic Simulation

By Anish Bhimani and Mark Frost
Booz Allen Hamilton

Late one Sunday night, a cyber attack hits a data center. A worm is released, and rapidly infects all the company's database servers, grinding the network to a halt. The security team, acting swiftly to stem the tide, carries out its standard incident response plan and shuts down ports on the firewall. With the attack stopped, the team can now go about cleaning up infected systems.

Unbeknownst to the team, a major business unit had a batch of funds transfers scheduled for Sunday night. With the ports on the firewall closed, a major business partner was unable to complete the transfers. When the market opened in Asia one hour later, the lack of funds set off a chain reaction resulting in a loss in major positions for the bank. The stock closes down 15%, and the press gets wind of a "security breach" in the bank's funds transfer system. Within weeks, major customers begin moving their business in a crisis of confidence, and Congress calls for hearings on financial integrity, using the bank as a poster child for what not to do.

While the above scenario is fictional, it is indicative of the kind of situation many companies can find themselves in if they don't think through their response plans effectively. Whereas most companies engage in strategic planning for incident response and crisis management, their planning is often grounded in traditional thinking, and based on paper scenarios.

As an alternative, many companies are using strategic simulation, or "wargaming," to "play out" scenarios such as the one described above. Whereas traditional planning relies heavily on traditional thinking and past experience, wargaming often exposes ideas that participants don't know they know and solutions that are not apparent on the surface. Wargaming forces people to think differently, to examine the validity of long-held assumptions about how to respond to specific complex or risk situations. By dividing into "teams" representing the central parties affected by a business crisis and interacting with each other dynamically, under fire, and in a virtual environment, participants experience firsthand the tension and motivations that would exist if the event were real. And by "trying out" this crisis, by living it in a mock setting, they better prepare themselves for how to respond if such a disruption actually occurred.

Rooted in military planning, wargaming is increasingly being used in commercial environments in support of strategic planning. Past wargames conducted by Booz Allen have allowed clients to test the validity of marketing strategies, provided insight into competitive positioning, understand regulatory impacts, and develop new market entry strategies, to name a few.

More recently, the concept of wargaming has been applied to the issue of IT security. Although cyberincident simulations have been common for years, most scenario planning in this area falls short of reality. While these simulations adequately portray the potential damage to an IT environment, they generally fail to take into account any of the "ripple effects" caused by an IT incident. As companies become more and more involved with business partners, and their IT infrastructures become further and further entangled, it becomes more important than ever to consider the far-reaching impact a cyberattack may have. Rather than simply worrying about the security level of its own systems, the company must take into account the potential collateral damage caused by an attack on its partner's environment, or vice versa.

Wargaming brings together multiple players and multiple points of view to "experience the impact" and develop solutions together. In the example above, a wargame may consist of several parties, including the IT security organization, the business unit, the business partner, a major customer, and the press. Each of these constituencies brings different assumptions and concerns to the scenario – the wargame allows them to "take the blinders off" and see the situation as others see it. From the play of the wargame, a new story emerges – a shared view of what might happen and how best to prepare and to respond.

In addition to the various stakeholders, a "control" team oversees play of the game, providing structure, introducing external shocks, and serving as an independent arbitrator for conflict that may arise. The control team also facilitates discussion at the conclusion of the game, when the parties analyze the lessons learned from the game, and how they can best be put into practice.

There is no easy way to describe the dynamics of wargaming other than to say it reveals what may happen in the future in a unique and powerful way. Out of the war game, new and novel rules inevitably emerge based on the integrated perspective of the participants and the groups they represent. This is a shared innovative vision of the direction that should be pursued in the future for essential organizational imperatives, such as threat protection, early warning, response, business resilience, and business continuity.

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BANKERS INTEGRATION GROUP

that an innovative application service provider like Bankers Integration Group chose SBC Internet Data Centers for its hosting needs, and are particularly excited about its decision to adopt our SAN solution for their mission critical Data storage – it's a real testament to their confidence in SBC."

With a history of more than 125 years of service, SBC has a solid, unsurpassed reputation in voice and data transport services built on responsibility, reliability and trust. The company today provides an extensive data portfolio, which includes a full range of optical, Ethernet, private line, frame relay and ATM transport offerings, IP-VPNs and managed Web hosting. Fully managed service and networking options are available under the SBC PremierSERV brand.

Patrick Mulvee, IP Specialist, Advanced Enterprise Solutions, SBC

Jerry Hinek, SBC

Privacy: Business vs. Consumer

Introduction

Everywhere we go as consumers we leave an information trail. Most of the information is not very secret. It's mostly all little facts that we shrug off. This information becomes very important when it's collected and analyzed. The picture it makes of a consumer's likes and dislikes, of purchasing patterns and favorite restaurants presents an opportunity for business and a level of anxiety for consumers.

A lot can happen with the aggregated information that businesses collect about consumers. Information gives business the opportunity both to cut cost and increase revenue. Knowing more about consumers business can spend marketing dollars only on those most likely to make a purchase. Since the business has collected the information, it sees the information as its own. The consumer, on the other hand, risks invasion of privacy, identity theft and manipulation in the marketplace. Business does not want responsibility for consumer privacy needs because that means additional cost and less revenue.

Right now the balance is tipped in favor of business. The bottom line effects of cleverly using customer information can be significant. This may change if consumers make a firm's unwillingness to protect customer information into a competitive disadvantage.

I use the example of buying a car in this article only because buying a car normally involves sharing a lot of personal information with the car dealership. The example should not imply any judgements about car dealerships.

Business Interest

A business can do a lot with information about a customer. There is no clear line to determine when this becomes a privacy issue. A lot depends on the viewpoint of the customer and the desires of business management. When a consumer walks into a car dealership to buy a new car, the consumer has to share a lot of personal information to get the car. The salesperson needs to know what kind of car the buyer is looking for, including price range, color and options. There will usually be a credit check; most cars are bought on credit. Is there a privacy issue? Certainly. Does that harm the consumer? Not necessarily.

The consumer drives off in a nice new car wearing a big smile. Hopefully the dealership has made a profit from the transaction. This is where the common interests of the customer and the dealership in making the sale diverge. The business still has a valuable asset in the personal information that was a byproduct of the sale. At this point the handling of the customer's personal information becomes a series of economic decisions for the business. Protecting that information has a cost. Selling that information is a potential profit. Using that information wisely may generate further business from the customer and lower costs. A real win-win for business.

Storing Information

To make most use of customer information business must store it somewhere. Businesses are willing to invest in hard drives and database software, because that's the best way to make the most of the information. Businesses have not been so good about protecting the privacy of consumers. Storing information securely costs more while not generating more revenue or mitigating any risk to the business. Besides business tends to see the personal information as an asset of the business not of the consumer.

Targeting Sales

When a customer buys a new car, the dealer will often send periodic reminders to bring in the car for servicing. This continues the relationship with the consumer and may generate service revenue or future sales. Customers don't tend to mind this kind of use of personal information. It's convenient and the mailing normally brings a discount for the suggested service. It doesn't matter that the dealer knows what kind of car you bought on what date or where you live. It's not received as an invasion of privacy.

Selling Information

If the car dealership sells your personal information to another company that uses it to target sales at you then some people don't like that. Doing this can generate revenue for both the buyer and the seller of the information. The consumer usually never knows that the information was sold, and does not necessarily benefit. The consumer gets a little extra mail or a cold call from a sales person. We're all becoming savvier. We may not know who sells our private information, but we know that people do and we don't like it. If we find out that the car dealer sold us out we may not go back.

Consumer Interest

While business may look at customer private information as a business asset with the potential for additional profits, the consumer sees his or her private information as just that, private. That information should not be used to separate the consumer from the consumer's money. And why should business make all that extra money selling something that the consumer feels he or she owns? That is the rub, isn't it? The economics are reversed and personal property is traded without permission.

Identity Theft

Identity Theft is in the spotlight right now. It's a fast growing industry, used by common thieves and international terrorists as an easy and safe way to steal. Consumers want business to safeguard all the personal information it collects. Personal information has been found in dumpsters or stolen from insecure computers. Dishonest employees have also stolen it. Unfortunately for consumers, business does not want to assume the cost of protecting personal information when all the benefit goes to the consumer.

Manipulation

What businesses see as an opportunity for increased sales with lower cost, some consumers see as an invasion of privacy. Targeted marketing means aiming your message at the people most likely to buy your product or service. Businesses could save a lot of money if their entire marketing budget were spent reaching only the people most likely to buy. So businesses want to do that. Consumers don't like the idea that businesses hold onto information such as their favorite web sites, the economic character of their neighborhoods and other information that might make them a good target for a sales pitch. It feels manipulative, perhaps too personal, for a business to know me so well.

Conclusion

We have a phenomenon that's good for business and intrusive to consumers. Right now business seems to have all the power. Laws don't protect consumers from this invasion of privacy. But business is always a negotiation between buyer and seller. The marketplace will ultimately have to work out this conflict to the satisfaction of both sides.

If consumers are able to find out which businesses do a better job of managing personal information they may choose to reward those businesses. Some businesses may beef up their information security and use that as marketing leverage. That's not happening right now.

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SBC PREMIERSERV℠

SBC PremierSERV℠ offers business customers flexible packages that address the design, delivery and ongoing management of telecommunications services – local, long distance, Internet, data transport, equipment and eServices – all with a single point of contact for network management. SBC PremierSERV℠ services provide fully integrated network management that encompasses a combination of transport services and network equipment needed by individual businesses, as well as customers' LAN and WAN operations – even when network equipment is owned by the customer. SBC PremierSERV℠ services also cover equipment from different manufacturers and providers, enabling businesses to save time by consolidating various service agreements into one plan.

Three levels of SBC PremierSERV℠ management are offered (Basic, Essential, Complete), providing businesses with flexibility to choose the network management solution that best complements their staff, budget and monitoring requirements.

Initial SBC PremSERV℠ options include SBC PremierSERV℠ ATM, Frame Relay, IP-VPN, Managed Remote Access Services (MNRAS), eServices, Video Services, Integrated Access Service, IP Telephony (premise-based available today, network-based later in 2003), and Security.

Highlighted in this article is SBC PremierSERV℠ Frame Relay Service describing our new national service and the network management services available.

SBC PremierSERV℠ Frame Relay Service

Effective January 1, 2003 SBC initiated a company-wide initiative restructuring our Frame Relay service product into a seamless, consistent product across regions and affiliates. With the introduction of SBC PremierSERV℠ Frame Relay comes competitive and common pricing and including SBC Long Distance services, where authorized.

SBC PremierSERV℠ Frame Relay offers standardized product features, functions and pricing structure across the 48 contiguous states. What's different with SBC PremierSERV℠ Frame Relay in California is:

- Addition of SBC Long Distance "Long Haul" PVC's (interLATA/interstate links)
- Addition of SBC Long Distance "zone" rates, to address differences in actual costs of providing Access Links in Out-of-Region and Independent Company locations
- Ability to provide a single bill to the SBC Long Distance customer for all Frame Relay components
- Addition of SBC PremierSERV℠ CNM (Customer Network Management) from SBCLD, Premium SLAs (Service Level Agreement) and SBCLD Tracking Product

SBC PremierSERV℠ Frame Relay couples our reliable transport service with a total package of network management services. Customers receive a complete set of value-added, flexible management services and tools, customized to their special needs. This service can provide the design, delivery and management of all a customer's networking components and services, providing a complete, end-to-end network management solution.

As a quick review, SBC PremierSERV℠ Frame Relay breaks up data transmissions into small individually packaged and routed packets (frames) through logical connections. The frames travel separately through the public network and are reassembled at their destinations. This technology quickly and reliably moves large amounts of data from place to place without expensive dedicated circuits.

The following options are available with SBC PremierSERV℠ Frame Relay:

- User Network Interface Port and Access – connect to the network with a standard interface. A UNI can be purchased with or without the access link. The access link includes the interoffice mileage required to connect the end central office to the ATM backbone. Available interfaces and speeds include DS0 at 56k or 64k; Fractional DS1 at 128k, 256k, 384k, 512k, and 768k; DS1 at 1.5M; and DS3 at 40M.

  When you purchase a port without an access link, you must obtain access to the ATM hub separately.

- Network to Network Interface (NNI) Port and Access – provides connection from another frame relay network into the SBC network. The connection is based upon a standards-defined NNI signaling protocol. These connections are typically used for interconnection with Inter-Exchange Carriers (IECs), Competitive Local Exchange Carriers (CLECs), or private frame relay networks.

  A NNI can be purchased with or without the access link. The access link includes the interoffice mileage required to connect the end central office to the ATM backbone. Available interfaces and speeds include DS1 at 1.5Mbps and DS3 at 40Mbps.

- Permanent Virtual Circuits (PVCs) – provide logical connections between two ports that allow data to be sent from one location to another. PVCs are two-way and may interconnect Frame Relay to Frame Relay ports, or Frame Relay to ATM ports.

- Disaster Recovery Permanent Virtual Circuits (PVCs) – provide secondary connections between remote locations and a disaster recovery site.

  This option does not require additional equipment. We pre-configure the PVC and leave it disabled. It can be activated, upon your request, if you lose access to the primary host site.

- Alternate Routing Permanent Virtual Circuits (PVCs) – like Disaster Recovery PVC, is intended for businesses that have identified a requirement for an alternate back-up of host site processor/server capabilities in the event of an outage at their primary location. Unlike the Disaster Recovery PVC, however, the Alternate Routing PVC is active and available to the customer at all times.

- Alternate Routing PVCs are pre-configured and are available for all speeds. The alternate site must be served by an active SBC-provided Frame Relay or ATM port. This option requires additional equipment.

- SBC PremierSERV℠ Frame Relay Service – offers you a suite of network management options to enhance any support choice for our PremierSERV Frame Relay transport service giving you end-to-end complete life cycle support and management. A more complete description of the network management options is described below.

Service Level Agreements

SBC Long Distance and Advanced Solutions Inc. (ASI), used for IntraLATA only, have offered Standard SLAs on five industry metrics for their PremierSERV℠ Frame Relay and ATM service. These include Standard Network Availability, Latency and DDR (Frame/Cell Delivery Ratio) SLAs that are edge-to-edge, meaning they do not include the last mile from the wire center to the customer's premises.

However, Standard time-to-provision (TTP) and time-to-repair (TTR) SLAs are end-to-end guarantees. Each Standard SLA contains a penalty of 10-50 percent of the affected ports or Permanent Virtual Circuits (PVC) if the SLA is not met. Standard SLAs are tracked through internal systems at SBCLD and ASI and are offered to all customers.

In March 2003 SBC LD and ASI began offering Premium SLAs, also at no cost to the customer, that provide end-to-end guarantees on the five Standard SLAs previously mentioned and for the same penalty of 10-50 percent of the affected ports or PVCs.

To receive the Premium SLAs the customer must utilize an SBC approved validation tool for SLA validation and reporting in order to receive credits should the metrics not be met. The SBCLD SLA Tracking Product is an SBCLD and ASI approved validation tool. Utilizing SBCLD's SLA Tracking Product, in conjunction with a Cisco router or a Quick Eagle or Verilink CSU and SLA Management PVC, customers can track SLA performance of their network via a web interface. The SLA Tracking Product is only available to customers in SBCLD approved states.

SBCLD & ASI PremierSERV℠ Frame Relay or ATM customers may also purchase from SBC DataComm proprietary solutions from Visual Networks or Verilink that can also validate Premium SLAs. The customer in this case would be responsible for monitoring, tracking and reporting deviations from the standard performance indices. If a failure occurs, customers present their Account Team with an approved SLA validation report. The Account Team will then contact the SBC SLA Management Center to validate and issue credits on failed SLAs.

Network Management Services

SBC PremierSERV℠ Frame Relay - Complete – offers you a suite of network management services to enhance our Frame Relay transport service.

Customers not requiring all of the features included in the Complete may choose to use Essential. SBC PremierSERV℠ Frame Relay - Essential – gives you three network management services to enhance our Frame Relay transport service and offers you several more as optional services. This solution provides Remote Monitoring and Alarming, Fault Management, a single point of contact, coupled with our high-performance Frame Relay network. Customers may choose any of the Complete services (everything from MAC [moves, adds & changes] management to Network Optimization to Premier Tech Support) as add ons to optimize the SBC PremierSERV℠ Essential for their environment.

SBC PremierSERV℠ Frame Relay - Basic – offers you optional network management services to enhance our Frame Relay transport service. And with SBC PremierSERV℠ Basic, you can add network management services a la carte.

SBC PremierSERV℠ managed services has a simple value proposition: we take care of the customers' network performance so they can take care of their business.

The table below shows the available network management services offered with SBC PremierSERV℠ Frame Relay – from our Complete to Basic offerings.

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Network Management Services	Basic	Essential	Complete
Remote Monitoring/Alarming – forward specific events from your system to us	●	✔	✔
Configuration/MAC Mgmt – gives SBC ownership of your configuration issues, including consulting in system configuration and expansion, mapping out the system, and planning for expansion	●	●	✔
Fault Management – Receives, isolates, and reviews faults generated from monitored CPE, then routes he trouble ticket to the appropriate agency for resolution	●	✔	✔
Performance Reporting – generates reports based on MAC and maintenance activity	●	●	✔
Performance Management – identifies performance standards for your needs and business requirements	●	●	✔
Configuration Support – stores the initial router configuration by vendor and product type	●	●	✔
Software Support – provides the current revision of router if software is the problem	●	●	✔
Network Optimization – analyzes your network to improve and enhance productivity	●	●	●
Inventory Management – manages your hardware inventory in our facilities			
Asset Management – manages your system assets including maintaining a site configuration inventory			
Software Management – provides and performs software updates on your hardware	●	●	✔
Carrier Coordination/Management – works with other carriers to solve problems	●	●	✔
Premier Tech Support – assigns you the most qualified of technicians	●	●	✔
Consolidated Invoicing – provides you a consolidated monthly invoice	N/A	N/A	N/A
Provisioning Management – manages all activities required to complete MAC requests			
Single Point of Contact – gives you a single SBC toll-free number to call for the following services: network orders, MACs, disconnect services, trouble resolution, billing inquires, and general inquiries	●	✔	✔
SLAs with Penalties – provides SLA commitments for response and restoration, with penalties we pay if we do not meet the service levels	N/A	N/A	N/A

Bullet = Optional Checkmark = Yes Blank = No

- Telemedicine can make specialty care more accessible to underserved rural and urban populations.
- Video consultations from a rural clinic to a specialist can alleviate prohibitive travel and associated costs for patients.
- Videoconferencing also opens up new opportunities for continuing education or training for isolated or rural health practitioners, who may not be able to leave a rural practice to take part in professional meetings or educational opportunities.
- It improves physician's productivity.

Telemedicine, Telehealth, E-Health (Electronic-Health) and I-Health (Internet-Health) are different terms related to healthcare at a distance via technology. The following chart (Figure 3) represents a paradigm shift for the healthcare consumer with a number of easily accessible services in real time.

Barriers to Telemedicine

There are currently several barriers to the practice of telemedicine. These include:

- **Licensure**: Many states will not allow out-of-state physicians to practice unless licensed in their states.
- **Medical Liability**: Fear of malpractice suits keeps many physicians away from using the tools of telemedicine.
- **Reimbursement**: There are many reimbursement issues related to long distance care. As of October 2002, the Centers for Medicare and Medicaid will reimburse for interactive consults, but not for store and forward.
- **Physician Acceptance**: Some physicians from old way of practice are heavily trenched into their current practice and have closed all doors to learning technology based healthcare service delivery.

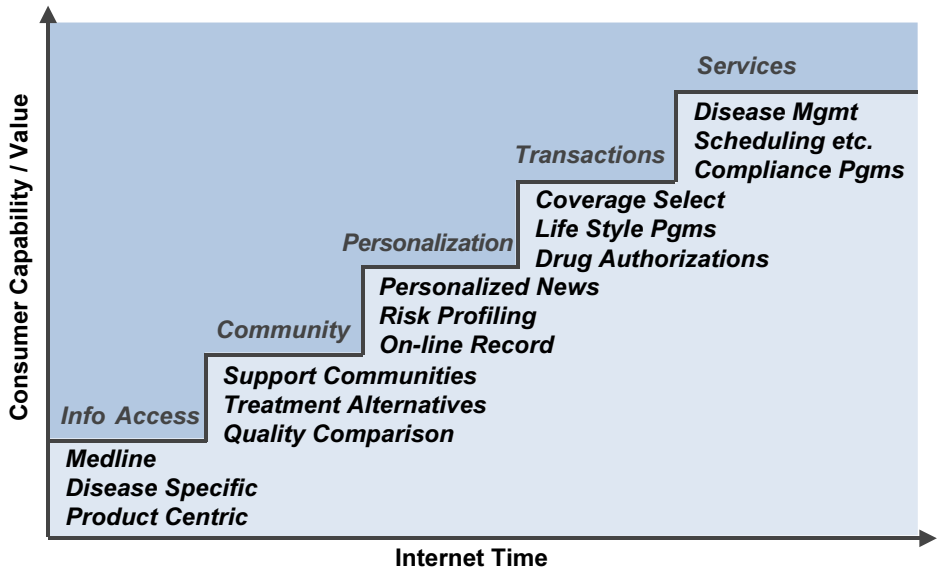
Current barriers to telemedicine can be lowered by:

- Providing consumer education and awareness on the benefits of telemedicine
- Enhancing consumer confidence in the privacy and security of their medical information
- Increasing healthcare providers' commitment to telemedicine
- Creating legislation in support of telemedicine practice
- Lowering the cost healthcare

The skyrocketing cost of current healthcare will drive everyone to embrace the growing telemedicine as an effective means to an affordable healthcare system. The telemedicine journey has just begun on a long road of healthcare.

Jagdish Kohli, Ph.D., is an independent IT and Healthcare consultant. He can be reached at Jagdish_kohli@yahoo.com

Figure 3. Technology Based Healthcare Capabilities



SBC National Data Transport Portfolio Enhanced

SBC has introduced an enhanced, standardized portfolio of National Data Transport Solutions furthering its ongoing strategy to deliver to business customers a new class of integrated data and IP networking services on a national basis. *Contact your Liaison Manager for further information: 1.800.552.5299.*

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VOICE OVER INTERNET PROTOCOL

versa. Voice packets can be compromised as easily as data packets. Firewalls and security programs need to protect voice packets as well as data.

Traditional voice traffic through a dedicated telecommunications system is difficult to capture. However, voice packets are vulnerable to eavesdropping on the LAN and can be intercepted, especially if your enterprise is using soft phones. There are several ways of protecting voice packets. Firewalls and security programs for encryption and authentication are requisite.

Security will add additional costs to a VoIP system. Your IT department, whether in-house or outsourced, should analyze the options before a system is purchased and select the best security solution for your business.

As VoIP gains market share, the price point will drop and applications will evolve. VoIP will appeal to more business and become more cost effective. There are many complex issues to consider. Take time to understand and evaluate them, and then make an informed decision. If you do not have the expertise in-house, you should strongly consider obtaining the assistance of an independent expert to evaluate your needs and identify the best solutions for your organization (an independent expert is one who does not sell equipment or network services and is not affiliated with any such manufacturer). VoIP does not have to be mysterious. However, it can only be a valuable tool if all of the issues are addressed in advance and the implementation is managed properly.

Kevin Mahoney is Vice President of Client Services and Evan Rumbel is a Sales Engineer for Pinnacle Bay Resource Group, Inc., e email: info@pbrg.com

Opinions expressed are not necessarily those of SBC.

SBC Executive News

Yno Gonzalez, Vice President-Network Operations, has been appointed President for SBC Long Distance.

Fred Taylor has been named President of SBC DataComm, Inc.

Frank Jules has been named President-Sales for SBC Telecom.

Angie Wiskocil has been named Senior Vice President-Network Services Staff for SBC Operations, Inc.

Jagdish Kohli, Ph.D.

Telemedicine in the 21st Century

Telemedicine has been defined as the use of telecommunications to provide medical information and services. This area of healthcare has been under development for the past decade with a number of growing applications. The US government is a major stakeholder to provide an affordable quality healthcare for its citizens. An estimated $400 million in federal grants and contracts will be made available during 2003 for telemedicine and related endeavors. When fully developed telemedicine will have a profound impact on the healthcare of the masses.

In this article we explore the following:

An architectural framework for telemedicine
Highlights of selected current and future applications
Advantages of Telemedicine
Barriers to Telemedicine

An Architectural Framework for Telemedicine

An architectural framework is a comprehensive plan for an orderly development of new telemedicine applications. The underlying architecture is the foundation for adding new capabilities. A high level view of a health information service development architecture is shown in Figure 1. This scheme has been endorsed by many standards setting organizations. There are three interactive layers in this arrangement. These layers are "The Telecommunications Layer", "Middleware Layer" and "The Applications Layer." The lower layers provide services to the upper layers. Examples of these services are shown in Table 1.

Figure 1. Health Information Services Architecture

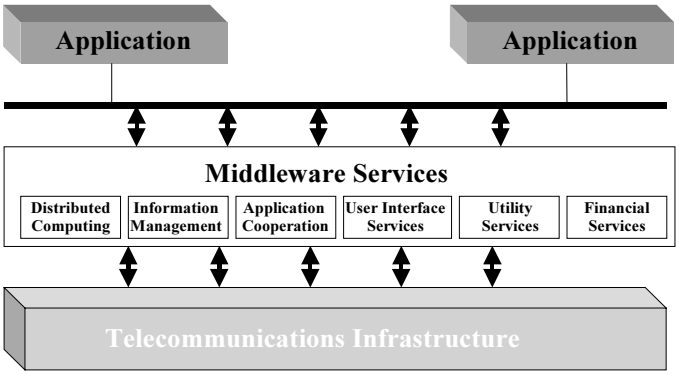
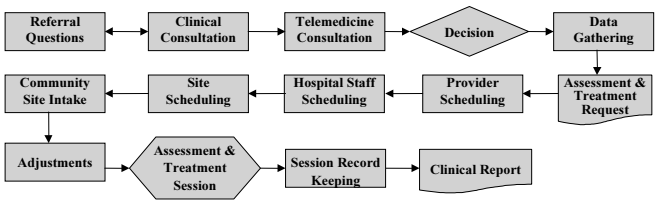


Table 1. Application & Middleware Layer Services

Application Layer User-Oriented Services	Middleware Layer Healthcare-Specific Services
• Clinical Information Services • Administrative Information Services • Diagnostic Imaging Repositories • Other Health-Related Information Services	• Patient Data Directory • Master Patient Index • Terminology Services • Management of Medical Accounts • Revenue Services

In the practice of telemedicine new protocols need to be implemented for an efficient delivery of healthcare. There are many steps involved in these protocols. Example of one such protocol is shown in Figure 2. The application layer will allow the development and implementation of newer protocols for emerging

Figure 2. teleConsult Protocol



applications.

Highlights of Selected Current and Future Applications

A number of telemedicine systems have been developed and are going through an early phase of testing and deployment. These efforts have not yet resulted into large-scale deployments. Thus economies of scale have not been realized. The following are some examples of telemedicine related projects:

- **PhysMed** has developed the PhysMed Network (PMN), a telemedicine system, to provide neuromuscular re-education of patients with voluntary movement disorders. Initially, PMN will be targeted for the rehabilitation of that portion of the 2.5 Million stroke patients in the U.S. who have limited or no upper limb mobility. The key benefits of PMN include expanded patient outreach, reduced cost of treatment, and improved outcomes through the application of neuro-scientific principles.
- **TeleMed** have launched its TeleMedical Directory a global medical portal capable of linking various industry segments of the international medical community. The TeleMedical Directory provides immediate access to physicians, nurses, and allied healthcare providers as well as medical facilities, educational facilities, managed care organizations, medical services, medical products, technologies, and medical associations, worldwide. It provides easy access with specialists and colleagues around the world, sharing expertise, enhancing peer relationships, fostering referrals and second opinions, that ultimately improves the quality of healthcare.
- **Dianon Systems** has launched a new telepathology initiative for cross country telepathology consultations. This pilot project is designed to provide intra-department review of biopsy between its Tempa, Florida laboratories and its headquarters in Stratford, Connecticut. This project will allow Dianon pathologists access to consultations from their team of expert sub-specialists.

Healthcare in the U.S. is more than a trillion-dollar industry. A small saving through the use of technology can lower the overall cost to the consumers. Table 2 lists a number of potential areas of telemedicine, which will enhance the practice of medicine

Table 2. Emerging Telemedicine Opportunities

Telemedicine Application Areas	
• Telecardiology	• Telepharmacy
• Teledermatology	• Teleobstetrics (Pre/Postnatal Care)
• Teleorthopedics	• Teleophthalmology (Eye)
• Telepsychiatry	• Telepathology
• Teleradiology	• Telerehabilitation
	• Telesurgery

around the globe.

Advantages of Telemedicine

Adoption of telemedicine will bring many benefits to care givers as well as care takers. The following points highlight some of the benefits:

Bankers Integration Group Selects SBC to Power Massive Online Financing Database

Software Applications Provider Will Utilize SBC Web Hosting Services and Storage Area Networking Capabilities

Bankers Integration Group has chosen SBC E-Services to provide managed services across its enterprise. The California-based company will utilize SBC PremierSERV℠ E-Services Web hosting and storage area network (SAN) services to enhance its operations as an application service provider in the finance and insurance industries.

Bankers Integration Group's patent pending BIGFNI software solution goes beyond simply automating the finance application process – it provides automobile dealers with a powerful tool for prescreening loan applications and matching them to lender programs, ensuring that consumers are offered the best financing available to them.

To provide additional reliability and stability to BIGFNI's users, the company will locate its primary site at the SBC Internet Data Center in Irvine, Calif. For disaster recovery purposes, and to ensure business continuity, a backup site will be established at the SBC Internet Data Center in Dallas, Texas. SBC Internet Data Centers offer a wide range of transport capabilities connected directly to an OC-192 Internet backbone to provide fast access to hosted servers. These facilities are designed with redundant power supplies, fire protection, and environmental controls to provide a high level of reliability for all SBC hosting customers.

In addition to utilizing SBC hosting services, Bankers Integration Group will also take advantage of SBC storage area networking (SAN) capabilities. Through the SBC SAN infrastructure, data can be accessed, backed-up and restored on-demand with guaranteed service levels. This managed storage portfolio gives businesses like Bankers Integration Group new opportunities to augment or replace in-house data storage or establish off-site data repositories for business continuity purposes. The SBC SAN infrastructure is fully fiber-based, providing for disk-on-demand services with high-scalability and availability, and tape-backup services that offer superior performance and reliability.

"After an exhaustive review, our technical team determined that SBC had the most advanced data centers in the country, providing the highest level of reliability, security and technical expertise in the industry," said Ted Cunningham, vice chairman of Bankers Integration Group. "As an application services provider in the finance industry, we are particularly concerned with security and reliability issues. SBC Internet Data Centers were designed from the ground up with these issues in mind."

"SBC's hosting portfolio offers a wide spectrum of hosting solutions and supporting services for small, medium, and large size businesses with a variety of needs," said Mark Fishler, vice president, SBC Data/IP Services. "We are pleased

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SBC PremierSERV℠ Frame Relay AdVantage and AdVantage Plus

Customers establishing Frame Relay service for the first time with 3 to 15 locations may also wish to consider SBC PremierSERV℠ Frame Relay AdVantage and AdVantage Plus. These package offers combine Frame Relay services with SBC PremierSERV℠ solutions for a single monthly price per site that includes hardware, services and transport.

The AdVantage packages include Interstate jurisdictional Frame Relay access, port, and a permanent virtual circuit with a pre-defined Committed Information Rate, along with a router and managed services from SBC DataComm, and financed through SBC Capital Leasing. Customers benefit from being able to purchase their data networking products from a single source and have a complete turnkey solution. This reduces the complexity of managing multiple vendor contractual arrangements and installation timelines making the decision process simple. And with SBC Capital Leasing there is no up front capital investment and payments may be spread over 24 or 36 months.

AdVantage

SBC DataComm provided equipment and services:

- Adtran NetVanta 3200 56K/64K or FT1/T1
- Project Coordination
- Staging
- Installation
- EssentialSERV Onsite Parts Replacement 8x5xNextBusinessDay
- Carrier Coordination
- SBC Capital Financing 24 or 36 Months
- ASI or SBCLD Frame Relay 2 or 3 year term

AdVantage Plus

- SBC DataComm provided equipment and services:
- Adtran NetVanta 3200 56K/64K or FT1/T1 and Analog Dial Back up Module
- Project Coordination
- Staging
- Installation
- EssentialSERV Onsite Parts Replacement 24x7x4
- Carrier Coordination
- PremierSERV Essential Network Monitoring
- SBC Capital Financing 24 or 36 Months
- ASI or SBCLD Frame Relay 2 or 3 year term

DataComm equipment/services are available to customers within SBC's 13-state region. The following locations outside SBC 13 states will be eligible for the AdVantage and AdVantage Plus.

For more information about our new SBC PremierSERV℠ products please call your Liaison Manager, 1.800.552.5299.

Tom David
Liaison Manager
td1898@sbc.com

Anchorage	AK	Jacksonville	FL	Boston	MA	Bismarck	ND	Memphis	TN
Birmingham	AL	Orlando	FL	Bangor	ME	Omaha	NE	Nashville	TN
Huntsville	AL	Tampa	FL	Portland	ME	Reno	NV	Salt Lake City	UT
Mobile	AL	Atlanta	GA	Minneapolis	MN	Portland	OR	Richmond	VA
Phoenix	AZ	Honolulu	HI	Jackson	MS	Philadelphia	PA	Burlington	VT
Denver	CO	Cedar Rapids	IA	Durham	NC	Pittsburgh	PA	Seattle	WA
Ft Lauderdale	FL	New Orleans	LA	Charlotte	NC	Knoxville	TN		

Terry Young

Public WLANs: Opportunities and Challenges

As described in the November issue of UPDATE, global public and industry interest in Wireless LANs (WLANs) and the 802.11b "WiFi" technology standard has exploded in the past year. More and more industry players are entering the WLAN arena. Recently, a wireless company rolled out a public WiFi service in major airports and 475 hotels across the US. Another wireless company already known for pioneering its service in Starbucks will be expanding its service to an additional 100 US airport clubs and lounges in the next year. WLAN node equipment sales are predicted by ABI to grow three times over the next five years.

So is all the industry excitement over WLAN just more frantic chasing of any new technology that mitigate the sting of the dot.com meltdown, or is there truly a new opportunity with this technology?

A Crowded Competitive Landscape

The WLAN space is becoming increasingly crowded. Once dominated by hardware vendors and by entrepreneurial service providers, more and more major wireless and wireline carriers are entering the industry, largely for strategic reasons. Declining hardware prices and ready availability on new laptops are increasing the addressable market of "WiFi" enabled users. The hardware growth has been helped by the increasing number of enterprises that see the value of private WLANs for enterprise building applications and by the Wireless Ethernet Compatibility Alliance (WECA), which provides conformance and interoperability testing. So far, this group of more than 130 companies has granted its "Wi-Fi" label of approval to more than 185 products conforming to the 802.11b standard.

There are a number of WLAN players, each focusing on different aspects of the market. Initially, focusing on private WLAN products, these are:

- WLAN hardware product (e.g. modem, access points, routers, and PC) manufacturers.
- Semiconductor and component manufacturers.
- Networking software vendors and systems integrators.

The growth in private WLAN has spurred interest in the public WLAN market with several types of players emerging:

- Public WLAN "micro carrier" service providers and start-up carriers (such as Boingo and Wayport)
- Hot spot property owners (i.e. small businesses, regional and national hospitality chains).
- Existing mobile service providers looking for new revenue opportunities and for strategic positioning in the market.

This is an emerging service and providers continue to trial and different types of market strategies and pricing plans. Typically, providers offer a "pay as you go" type of plan as well as a tiered subscription.

The Business Challenges

As a technology, WiFi has many attributes in its favor – it's inexpensive, readily available, relatively easy to install and maintain and provides a high level of performance (speed) within its distance constraints. However, there are growing questions about how companies will make money from the service.

For example, analysts at Credit Suisse First Boston estimate that Starbucks would need to sell nearly 35 tall lattes a day to WLAN users just to break even on delivering the service. While service providers have hoped to lure property owners through additional traffic into their stores, hotel and coffee shop owners are beginning to demand that operators will have to pay them for delivery traffic to the networks. Marriott International is deploying WiFi connectivity in 400 of its hotels and sharing the service revenue with a privately held company that specializes in Internet access for hotels.

There are significant business challenges facing the widespread adoption of public WLAN:

- The business case is not strong – while initial capital investment is cheap, the ongoing operations including leased line backhaul from the hotspot is expensive.
- There are not enough "hot spots" to enable mass adoption of public WLAN. Users will require relatively ubiquitous access of service. The public WLAN start-ups do not have the capital funds for large scale build out of hot spots and many of the larger incumbents are financially constrained with the current negative economic conditions.
- A mutually successful business model has yet to be developed. (Property owners are just as eager to capture new revenue opportunities as service providers.)
- Uniform user interfaces between mobile, fixed, and PWLAN services have not been developed. Users are unlikely to want to use a different service provider for each new city they visit.
- There are important IT security concerns for enterprise users and WiFi has no quality of service guarantees.

Despite these challenges, industry continues to work towards resolution of the technical challenges and operators continue to show willingness for calculated investment in services.

Who Will Use P-WLAN?

Much of the revenue hopes lie on the willingness of business travelers and other mobile workers to access the service while traveling or in between locations. There is some concern about the extent to which mobile workers will be willing to use the service.

For example, a recent study at London's Heathrow Airport suggested that travelers would rather use their airport time to relax rather than work. And from a purely practical viewpoint, lack of table space at a coffee shop like Starbucks makes using a laptop a challenge. Because of these concerns, hotels in particular are considered prime locations for hot spots because business travelers spend significant amount of time there.

Still, public WLAN fits a specific niche not currently available with wireless or wireline access. WiFi provides high-speed wireless access within a limited range while stationary. WLAN is simply a wireless access mechanism for reaching an Ethernet LAN, the wired Internet, or corporate/institutional intranet/extranet. As such, the WLAN user has high-speed nomadic access to all the information and IP-based rich media services currently available on the wired Internet. Thus PWLAN is often described as a "portable" access service rather than a "mobile" service. WiFi technology cannot currently be used while moving, especially in a vehicle. This is illustrated in Figure 1.

While there is potential opportunity on the consumer segment, (especially in gaming and entertainment), most public WLAN initiatives have focused on the business market of mobile workers in areas of high traffic concentration.

The addressable market for public WLAN includes mobile workers with the following characteristics:

- Full-time and part-time teleworkers and remote workers, business travelers and other workers that must frequently work away from their main place of business;
- Who have mobile communications needs that are "portable and event driven" rather than truly "mobile";

Cassandra Jessie-Johnson, SBC

DSL DATA NEWS

DSL Basics

On February 1, 2003, the monthly rate for the SBC Yahoo! DSL Basic Package was reduced to $39.95/month. This allows your customers to save a minimum of $36 annually. The customers on the old rack rate of $42.95/mo for Up To 384 Kbps were notified via direct mailer and subsequently migrated to the lower price. Your customers will continue to reap the great benefits of having the service, now at an improved rate.

New Shipping & Handling charge

In February, SBCIS began charging customers a $12.95 fee to recover the cost of shipping out the CSI kits. A Shipping & Handling (S&H) fee is now applied to all Customer Self-Install orders released in CPSOS. This charge is only to recover costs; it is not for profit, so it will be re-evaluated every quarter. It will be adjusted as necessary.

The availability of the new speeds is contingent upon the distance the customer's premise is from the Central Office, loop length. If the SBC Yahoo! DSL service is out of a Remote Terminal (RT), the loop length limitation does not apply. The guaranteed speed is the minimum speed in the speed range selected. Actual throughput speeds will vary due to Internet congestion and other factors associated with the Network or the customers' computer.

We're still having fun!

FORTUNE Magazine's 2003 Annual Most Admired issue has named SBC the Most Admired Telecommunications Company in America. This is the fourth consecutive year and the seventh time in the past eight years that SBC has been No. 1 among all U.S. Telecom Companies.

Introducing Basic Static and Expert Dynamic

At the end of this month, SBCIS will introduce two new enhancements to the SBC Yahoo! DSL product suite. Your customers have asked for it, and SBC is now answering to them! The SBC Yahoo! Basic Package can be ordered with either dynamic or static IP's – providing all SBC Yahoo! DSL customers with a static IP alternative. Additionally, there will be a dynamic IP alternative available for customers who need the greater bandwidth of the SBC Yahoo! Expert Plus Package. Unlimited choices to help customize solutions to fit your customers' needs!

For more information on either of these two new SBC Yahoo! DSL Packages, call your Unique Services Center South Consultant Queue today at 1.866.234.4DSL (4375).

DSL & Hunting… Did you know?

SBC Yahoo! DSL will not work on a line in a Multi-line hunt group because the lines in a Multi-line hunt group are virtual numbers – they have no physical loop.

No need to worry, SBC Yahoo! DSL is allowed on lines with Series Completion hunting.

However, since most Series Completion hunting lines terminate on multi-line sets or PBX equipment, those customers must order DSL as a full technician installation. They won't be able to self-install. In this situation, in order for the DSL to work properly, a SBC ASI technician will need to install a special filter before installing the common equipment

Make sure that you have this conversation with your customer and the rep on the consultant queue before submitting the DSL request.

SBC Yahoo! Business Portal

Coming late this summer, a new portal tailored for business customers. The SBC Yahoo! Business Portal offerings will include SBC Yahoo! DSL and Dial-up. These offerings will include customized services, applications and capabilities, including many optimized for broadband, which will help your customers improve productivity and become more competitive. We'll get more specific information out to you as we approach launch.

Discounts, bundles and more…

We introduced SBC Connections for Business in March. SBC Connections is an innovative packaging strategy that integrates bundles including our voice packages, SBC Yahoo! DSL, SBC Yahoo! Dial, Shared Web Hosting, Online Office, Dedicated Internet, Cingular and SBC Long Distance. The more your customers buy, the more they save. Additionally, SBC launched phenomenal promotions in early February. Now, more than ever, your bundled customers can expect even steeper discounts, with SBC Yahoo! DSL rates as low as $29.95/month. Look for direct mail drops and listen for radio ads.

SBC Yahoo! DSL Vital Statistics

SBC continues to focus on serving your customers, building their trust, while maintaining integrity, displaying industry leadership by expanding the availability of DSL Internet access service. We have over 2.2 million DSL lines installed with service available to more than 28 million customer locations. To date we have nearly 1,950 Remote Terminals (RTs) with over 11,490 Distribution Areas (DAs) ready for service, in ASI West and SBC California and Nevada. For more information, to qualify your customers for SBC Yahoo! DSL Internet Service, as well as to order the service for your clients, contact the Unique Services Center South Consultant Queue at 1.866.234.4DSL (4375).

Cassandra is Associate Director of Voice & Data Solutions, SBC California & SBC Nevada

Rates at-a-glance for SBC Yahoo! DSL Internet service:

Product Name	Speed (downstream x upstream)	Loop Length	Rack Rate
SBC Yahoo! DSL Basic Package	Up to 384Kbps x 128Kbps	16K ft	$39.95/mo
SBC Yahoo! DSL Standard Plus Package	384Kbps – 1.5Mbps x 128Kbps	12K ft	$49.95/mo
SBC Yahoo! DSL Standard Plus – S Package	384Kbps – 1.5Mbps x 128Kbps	12K ft	$64.95/mo
SBC Yahoo! DSL Deluxe Package	768Kbps – 1.5Mbps x 256Kbps	9K ft	$59.95/mo
SBC Yahoo! DSL Deluxe – S Package	768Kbps – 1.5Mbps x 256Kbps	9K ft	$79.95/mo
SBC Yahoo! DSL Symmetric 384 – S Pkg	384Kbps x 384Kbps	12.5K ft	$119.95/mo
SBC Yahoo! DSL Expert Plus – S Package	1.5Mbps – 6Mbps x 384Kbps	7.5K ft	$159.95/mo

to unified communications. VoIP was created to consolidate the need for multiple interfaces to retrieve information from multiple mediums. It makes unified communications a reality.

The buyer interested in VoIP has several things to consider:

How does your company plan to use VoIP?

Are you upgrading because your company considers itself leading edge and VoIP will help project that image? What are the VoIP applications you plan to use? What is VoIP going to do for your business that your current systems do not?

The two most widespread applications for VoIP are the enterprise that has remote sites, and businesses with "Road Warriors" (associates that are constantly on the move) that need real time access to the entire business enterprise via the LAN. Both are excellent VoIP applications. But what about the 50 user, single site business that may have no choice except to consider VoIP in a new PBX?

After the Y2K upgrades were installed in 1999 and 2000, almost all telecommunications systems support IP and allow data transport and video teleconferencing through the switch at fairly high speed with high quality and QoS protection provided by the PBX. These PBX's are commonly referred to as IP-enabled, versus IP-based. Whatever the PBX is called, it may be adequate to protect your enterprise's investment until some "killer apps" for VoIP are deployed.

Killer applications are what drive technology mainstream. In a Virtual Private Network (VPN), VoIP is the killer app. In the LAN/WAN space, WLAN (wireless) is the killer app. VoIP is in its infancy. It has taken switched circuit technology 20 years to advance from "analog to analog" connections to what we have today. VoIP applications will pickup from where traditional products have stopped. The killer apps will be defined by need.

Can your company save money by implementing VoIP?

The sales pitch for VoIP ranges from lower wiring infrastructure cost at a new location or remodel to reducing or eliminating long distance costs. It is also espoused that a business will save money on moves, adds and changes (MAC) because the VoIP switch knows where a workstation is when it is plugged into the LAN connection, so there is no need for reprogramming the switch or updating a database. Staff reduction is also on the list of money saving items.

Be wary of cost-saving claims and carefully evaluate the potential savings in your own enterprise. When it comes to wiring and outlets, more is always better. IP PBX wiring schemes typically require a single Category 5 wire run to connect both the PC and telephone to the LAN. It is cheaper to install wire during construction than after move-in when all the desks and partitions are in place. It never fails that more network printers are needed than were planned for or that office space is reconfigured to house two or three associates, when the plans specified only one. The additional cost for more wire runs to a location during construction is mostly material. Higher labor costs can be expected after move in.

Presently, long distance cost reduction is only available to a business that has multiple sites networked together. This allows a business to take advantage of existing bandwidth to reduce or eliminate long distance charges between sites or by jumping off the network at a remote sight to make a local call.

The costs for moves, adds and changes may be significant with some systems, but the costs with most systems are nominal. The ease with which a workstation can be moved on a VoIP switch creates the highest risk. Someone in the organization needs to maintain the E911 database. At the present time, most VoIP switches cannot deliver location information to E911. There are manual work-arounds that require the database be kept current. Most VoIP vendors ask clients to sign a waiver acknowledging this requirement and limiting the vendor's liability.

VoIP vendors will also state that a business can reduce staff by putting voice communications over a computer network and training the IT staff to administer the phones, eliminating the need for a separate telecommunications staff. VoIP equipment is susceptible to the same problems as legacy telecommunications equipment. Telephone system administrators will prevent old problems such as toll fraud from creeping back into a business, but will the IT professional have the experience to configure the VoIP equipment to do this? A better solution is a partnership between a company's IT and Telephony professionals.

Will your LAN/WAN/IT department guarantee QoS by delivering bandwidth and giving priority to voice and video over data?

Data transmission is not sensitive to delays, but both voice and video traffic are. Without QoS assurance, a voice call can sound like a bad cell phone connection. Video conferencing requires even larger bandwidth. High quality video connections require a minimum 384k of bandwidth for each end of a call. Most video equipment will require a static IP address, either from your network or network service provider for ease of call setup. Before making the leap to VoIP, make sure the bandwidth you need is available.

Has your vendor successfully implemented VoIP?

Before committing to a VoIP solution, ask vendors for installed references for your application. Call their references and arrange for a site visit. Ask the reference why they selected VoIP. Ask the reference to demonstrate the application your enterprise is planning to use. Ask the references for an honest appraisal of the implementation process. Ask the reference for hard dollar savings and what benefits they have derived from their decision to implement VoIP.

What is your contingency plan for a system outage?

How does your company respond when your host computer or LAN server fails? How does your business respond when the telephone system fails? When they are one system, how will your business respond to a total outage?

Traditionally, when the LAN or server fails, businesses manually track information and input the information when the system recovers. Although a major inconvenience, there is still a degree of tolerance for a computer or network failure.

Voice communication is essential to most, if not all businesses. When the telephone system fails, work activity is curtailed. Customers, vendors and employees cannot verbally communicate in real time.

With a VoIP solution, your business will have your LAN, host and telecommunications on one server. Consideration must be given to a major system failure. If remote offices are being provided dial tone from the primary location, they will lose their communications system as well. Companies need to know the cost of redundancy and if it will provide the company a fail-safe backup. The installation of an Uninterruptible Power Supply (UPS) is mandatory. A business disruption plan needs to be a priority.

How safe and secure is VoIP?

VoIP equipment is just as susceptible to viruses and hacking as a data network, and it presents a few additional challenges. As VoIP converges networks, a hacker can use the voice side of the network to attack the data side and vice

continued on page 17

- Whose business activities can be conducted from hot spot locations such as hotels, airports, conference centers and restaurants;
- Who are located in developed countries or in developing countries with high mobile growth;
- Who need to exchange amounts of data when conducting business activity outside of their main place of business.

Thus potential users for public WLAN service would include a wide range of application types. For example, the communications needs of mobile executives are infrequent but planned, for longer periods of time, and driven by specific events. Mobile Executives needs are more "portable" in that they conduct more intensive work in different locations, but are fairly stationary while conducting work.

On the other hand, mobile workers such as field sales, technical and engineering service workers more often work out of their homes or vehicles, or conduct their work activities in local, non-public areas (e.g. customer sites) and are therefore less able to use public WLAN hot spots. Field sales and service communications applications can be characterized as more frequent (perhaps several times daily) at many different locations, and are therefore considered more "mobile and spontaneous" rather than "portable".

Public WLAN more closely fits the needs of the mobile executive, but the field sales mobile worker might be more likely to use a "3G" cellular data service.

Implications For SBC

Still WiFi and public WLAN fill a market need for portable access to inexpensive high-speed Internet access that is not met by either fixed broadband or advanced mobile ("3G") technology. To the extent that WiFi and PWLAN can continue to provide a less expensive, higher performance service than other access technologies, it is likely to capture its share of the broadband access market.

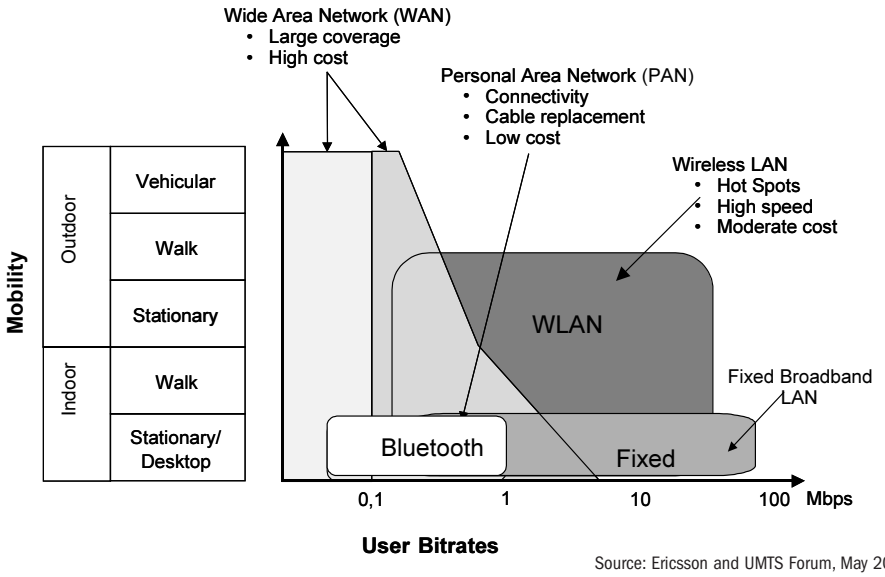
WiFi technology provides a viable substitute for traditional wireline broadband access services. Technology constraints, business model issues, and security problems typically tend to get resolved over time by new industry players eager to capture a new opportunity. WiFi can be a threat to incumbent local wireline operators such as SBC because it reduces entry barriers for new competitors in the local access space. But it also provides new opportunity by enabling network access in places and in situations where it was not previously available. This is new usage, not just substitution from an existing service.

Cellular phone service has grown to over 50% adoption in the US simply by providing basic voice telecommunications virtually anywhere using a simple interface. As a result, cellular service has nearly replaced market revenue from pay phone. WiFi has the potential to have the same level of impact. It is an area that should be carefully evaluated by incumbent operators.

Future Articles

Look for future articles on WLAN players, pricing, target market and revenue potential or contact Terry Young at Healy & Co for further information.
E-mail: tyoung@healy-co.com.

Figure 1. Level of mobility for wireless and wireline technologies



Source: Ericsson and UMTS Forum, May 2002.

SBC & 3Com – Just Launched: 3Com SME (Small/Medium Enterprise) Products

3Com SME Products Description:

OfficeConnect

The OfficeConnect LAN family, (made up of small scale, stackable, switches hubs, and firewalls) provides robust solutions for the SOHO (Small Office/Home Office) part of the SME market. Although smaller in size and price than the SuperStack line, they provide many of the high-end features and benefits previously available only with large enterprise products. (I.E. 10/100 Autosensing and Priority Queuing.)

SuperStack

The SuperStack family of switches, hubs and firewalls are available in a variety of port configurations and feature sets. They support 10, 100 and 1000 MBPS Ethernet connections over both copper and fiber. The SuperStack family has support for Layer 2, Layer 3 and Layer 4 switching. Features include VLAN Support, Priority Queuing, Link Aggregation (port trunking), Resilient Links, Automatic Prioritization of Voice traffic and free Network Management. (All features not available on all models.) These products provide complete solutions for the SME space and some niche solutions for the large enterprise. These 3Com offerings all carry a Lifetime Warranty.

Wireless LAN Solutions

3Com's LAN and mobile access solutions – including desktop and server network interface cards and wired and wireless LAN and LAN+modem PC Cards – deliver industry-leading performance, reliability and intelligence. On the wireless mobility front, 3Com's systems free LAN users by extending high-speed wireless connectivity to conference rooms and other business spaces that up until now haven't been accessible to the network. 3Com supplies installation and management tools that lessen complexity and lower costs for smaller businesses that want to go wireless.

3Com Perimeter Firewalls & Filters

3Com perimeter firewalls and website filters cost-efficiently secure Internet access and give IT managers a critical first line of defense against network attacks and unauthorized access. For protecting the perimeter of your network, choose the 3Com® SuperStack® 3 Firewall for enterprise environments. For your small business, choose the 3Com OfficeConnect® Firewall DMZ or 3Com OfficeConnect Cable/DSL Secure Gateway. To help control website access, choose our convenient content filtering software subscription service.
Contact liaison managers for more information: 1.800.552.5299

Top Three Priorities Of Your Clients in 2003

Steven R. Green, S R Green & Associates

Unlike many previous years in our 17 years of practice in the consulting industry, we ended 2002 and began 2003 extremely busy. Typically the late November through December Holiday season results in some slowdown in client projects and requests. This past season's exception was a "spike" in a new trend lasting now over a year, at least for our practice.

We have represented our clients as telecommunications managers for many years and as insulated as they have been in years past from the upward/downward trends in the telecommunications industry, now more than ever before have they been aware of the "meltdown" in the industry, as the pundits refer to it. Our direct experience, involvement and close working relationship with hardware and service providers in the industry have often shown a worse picture. As we now have two offices and clients nationwide, staff/associate time has increased to accommodate new client requests and project management. Essentially much of our recent heightened effort has focused upon move, add and change activity to address and realize improvement for our clients in the areas described below. If not move, add or change activity, our clients' requests are as a result of one or more of these areas.

The stories as to who-failed, who "downsized," who filed bankruptcy, who sold their customer base, who left the market, who sold their data customer base to one provider and voice customer base to another and who whose stock now sells for $.10 could fill many pages of UPDATE. We certainly are not going to mention any names, but beside the high profile bankruptcies and failures in the telecommunications industry, this "meltdown" seems to have also affected the more stable, profitable or marginally profitable hardware and service providers with employee turnover and layoffs – not to mention the fallout from direct or indirect interaction of these more stable firms with the service providers either in bankruptcy or that have altogether failed.

We are independent consultants and contract telecommunications managers for our clients. Our clients observe our efforts either directly or indirectly as time expended on their behalf. Of course, we speak for our clients here and as they have always been privy to all our communications with hardware and service provider vendors, they have very valid observations of the past 12 to 18 months as to the current trends in service levels, industry-wide. For the first time in the history of our practice, we have been asked to achieve improvements in these areas below and increasingly be our client's advocate; this more than technological upgrades, capital improvements and new network construction or otherwise. As clients sense slippage in service levels, they call upon us to provide quality assurance.

Not necessarily in this order:

Priority 1: Customer Service and Support – This applies to both the hardware and service provider/vendor sides of the industry. Among other variables, good customer service would include responsiveness to move, add and change requests and the accuracy of the execution of orders. Also, billing inaccuracies, prompt correction of billing records and errors and the prompt issuance of credits or refunds for billing errors seems to have plagued the industry of late.

As hardware and service provider vendors have become more stressed in the marketplace, communications and interaction with the customer/consultant appears to have slowed or deteriorated. This is manifested as less feedback from the vendor, fewer progress reports and an inability of the vendor to provide a due/delivery date of sufficient advance notice to be of value.

Priority 2: Stability – Our clients now want to know more about a vendor than just its financial stability. They often want us to provide information as to a vendor's commitment to continue operations supporting a particular product line, service or marketplace. On some occasions we have relayed information as to a vendor's treatment of its employees and staff and management changes as we feel a responsibility to inform our clients as best we can. Although we have always provided our clients with an assessment of a particular vendor's stature and position in the industry and marketplace, they take a much more active interest in reviewing that information than ever before.

Priority 3: Reliability – In many cases we have introduced our clients to the latest in telecommunications technology – often from a "green field" environment of very outdated technology. Although enamored initially with a new product or service, our clients quickly become disillusioned with outages or service interruptions. We all understand from personal experience how something viewed as a luxury a decade ago has now become a necessity. In 1999 our clients were eager to jump generations forward in technology with certain less thought of reliability than now; but in 1999 the Dow Jones Industrial Average was at 11,000+ and clients did not refer to their retirement plans as "301K's". In short, our clients and the general user community appear to be more wary of technology and its vendors and have reduced cost and price in relative importance vs. reliability and other variables. Our clients are more inclined to take interest in vendor references than ever before and have actually participated in checking them with us.

If we were asked for a "Fourth Priority", it would be **Billing Accuracy**. However, this issue fits easily within the above three, but in widely varying portions.

If we were asked for a "Fifth Priority", it would be **Price**. Almost never the highest of priorities for any of our clients, including the non-profit/government sector as well as the private sector, this variable before would have ranked in the top three but is now displaced due to recent events.

We have hope that as the general economy improves and the prevailing providers find their market niche and specialties and the telecommunications industry stabilizes with all major bankruptcies and failures specters of the past, the excesses of 1999 will mostly be remembered for what "not to do". Technological advancements within the industry itself will continue to improve productivity – just as technology has improved productivity in most other industries worldwide. When this reversal occurs we will be positioned to again assist our clients in improving their productivity as their first priority – with the latest telecommunications technology.

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Kevin Mahoney & Evan Rumbel

Voice Over Internet Protocol (VoIP) – Considerations for a Successful Implementation

There is a tremendous buzz about Voice Over Internet Protocol (VoIP). What is VoIP? Where did it come from? Is it really better than what we are currently using? How do we migrate to it? Do we really need it now? Can I save money on long distance with it?

To understand how we have reached the point of changing to VoIP, let's look at the development of circuit switched transmission technology and how IP has grown into the voice realm.

Telecommunications experienced minimal changes for the first 50 years of its existence in North America. The materials used to make phones became lighter and the sets grew more stylish. The transistor, and then the microchip, made central offices and premise equipment smaller, less labor intensive and gave us wonderful features like call waiting and voice mail. But the basic telecommunications network technology, the Public Switched Telephone Network telephone (PSTN), did not change until the early 60's with the introduction of digital data transmission services (T-1). (Bell Labs introduced the T1 in 1962 although I don't recall when we began offering it to end users as a product. They may be referring to the early 80's when this was offered to business customers.)

As the need for faster and more efficient data and voice services grew, digital T-1 circuits gave users dedicated connections to their service providers allowing for more efficient methods of routing high volumes of data and phone calls. For the majority of businesses today, there are three primary services being transmitted over digital telephone networks: voice, data and video. A PBX (Private Branch Exchange) phone system could use a full T-1 to handle up to twenty-four voice calls at a time. A LAN (Local Area Network) could use a full T-1 of data to provide up to 1.542Mb of dedicated Internet access. Video conferencing however, requires a lot of dedicated bandwidth, and most video conferencing manufacturers prefer Integrated Services Digital Network (ISDN) circuits for optimal transmission.

ISDN was a significant leap in network technology. It was the first serious attempt at integrating telecommunications networks for services other than voice, primarily data and video. ISDN remains one of the most reliable technologies for video conferencing, and it also provides one of the highest voice quality transmissions as well.

Interoffice communications created the need for leased lines, or point-to-point circuits, giving multi-location companies continuous connections between their offices. Channels on point-to-point T-1 circuits can be split apart for voice and data traffic, making dedicated circuits cost effective ways for communicating with branch offices. This type of connection created voice networks and data networks known as WANS (Wide Area Networks). Although WANS were a leap forward in shared technology, they still required that voice, data and video be on their own circuits and networks.

Shared technology is the ability to have multiple mediums share the use of one network service provider for communications over one circuit. It would, for instance, permit businesses to have voice and data calls sent across the same circuit. One of the first solutions created to consolidate the need for multiple circuits for multiple networks is called ATM.

Asynchronous Transfer Mode (ATM) was introduced to the telecommunications industry in the mid-90's. It is a powerful multi-service network protocol that can handle voice, data, and video better than previous protocols. ATM is a cell or packet-based system, not circuit switched. ATM takes a voice, data or video stream and breaks it into fixed length packets for transport across the network, and reassembles the stream at the distant end. ATM has the ability to differentiate between different types of service (i.e.: voice, data, video) so bandwidth is allocated on an as needed basis. A major application for ATM is LAN/WAN interconnection, and it was a primary reason why the protocol was developed. A broadband protocol, very large enterprises have turned to ATM for speed and reliability. Price has kept ATM out of reach for most businesses. Internet Protocol (IP) is commonly used within core ATM networks.

Internet Protocol is a packet-based protocol, but unlike ATM, it does not currently have the ability to automatically differentiate between types of service. Bandwidth must be allocated in advance to assure the quality of the communication. Data is not sensitive to delay and is well suited to packet switching, where packets take different paths across the network. But voice and video are sensitive to delay and require specific bandwidth. Quality of Service (QoS) is a critical element within IP transmission.

As the Internet has become mainstream, and personal computers are on everyone's desktops, Internet Protocol (IP) has become widespread. It is the standard developed to communicate over the Internet. This standard has nurtured the need for unified communications.

Unified communications enable people to consolidate multiple interfaces to gather the information they receive from multiple mediums. Most businesses check e-mail with computers, make voice calls with their phones, and use standalone videoconferencing units to participate in a videoconference. Unified communication is the bridge that allows businesses to do all three using one device such as a computer.

The current and future product offerings of the major telecommunications vendors (Avaya, Nortel, NEC, etc.) and the network equipment providers (Cisco, 3Com, etc.) are all geared toward unified communications utilizing Internet Protocol. Take a look at their websites. They are not upgrading or enhancing existing products and they are moving away from support of their legacy products. VoIP will optimize high performance multi service networks that will provide expanded e-commerce applications and truly unified communications. Streaming video, broadcast video, and other applications are the windfall of IP. This is where the next leap in network technology is taking place. IP will deliver more features and options to speed up and improve our communications. Circuit switched communications have reached a threshold. IP communications is picking up at that threshold and leaping forward to the next step, converged voice and data. The major equipment manufacturers are betting on it and have committed themselves to it. The network service providers are already using it.

Most major network service providers have been transferring voice calls from one central office to another via VoIP for quite some time. They have all spent a lot of money on the fiber optic networks that make this possible. IT managers and business owners need to make sure their network can handle voice grade traffic if they want to play as well. As the growth of IP based traffic continues to expand at 60-70% per year, it will put new demands on the network in terms of traffic patterns. Network management and QoS will be vital to successful implementations of Voice over IP networks.

VoIP is the true convergence of voice and data applications. The world has embraced the technology. What ATM means to shared technology, VoIP means

Mark Fei

The Significance of Web Services

In the last **Update** I wrote about Grid Computing, a new model for sharing computing horsepower across the Internet. This time I'd like to turn our attention to something related to the idea of sharing, but a little more specific in terms of applicability to today's business problems. The topic is "Web Services", a term that has been receiving a lot of attention recently. My aim here is to provide a little background and an overview so that the significance of Web Services can be better understood.

We have recently (late 1990s) come through a period of extraordinary investment in Information Technology. These investments encompassed not only hardware expansion (computers, networking gear, fiber, etc.) but huge sums were also spent on deployment of new applications. As an example, massive Enterprise Resource Planning (ERP) projects, often costing many tens of millions of dollars to a single enterprise, were all the rage in the rapid growth period of the late 1990s. Unfortunately, much of this investment has not yet produced the returns that were envisioned.

Executives today are understandably leery of any proposal to make investments in new technology, regardless of the promised benefit, when such proposals involve projects that will be years in the making. We've seen a dramatic decline in spending over the last 2+ years directly as a result of this new pragmatism. However, given an opportunity to make an investment today that will provide real business benefits in the near term, most executives will at least take the time to consider such a proposal. This is, in part, the promise of Web Services and the reason that it is so relevant today.

So, what are Web Services?

In the simplest possible terms, Web Services are all about making application code (software functionality) and data available across the Internet (or within an intranet) to different processing platforms, without regard for the specific characteristics of each platform. True application-level interoperability, with a minimum of work required to get the various applications "talking to each other."

To understand the significance of Web Services it's helpful to take a step back and look at what made the World Wide Web so powerful and attractive nearly 10 years ago. For those of us that remember the early 1990s and before, we know that platform and application differences created nearly constant headaches for anyone needing to move information between systems. Remember the days when different word processing programs couldn't reliably exchange documents without loss of formatting information? Anyone recall the joys of trying to get documents reliably exchanged between PCs and Macintoshes?

Tim Berners-Lee and the other WWW pioneers recognized a basic fact of life in those days: people would select different hardware platforms and different software environments according to their individual needs and tastes. There wasn't any point in debating the relative advantages of Macintoshes versus Windows PCs versus Unix workstations-they all existed and needed to share information reliably and easily. The WWW made tremendous strides in this effort through the introduction of standard protocols that could be implemented on different platforms. Thus, it doesn't matter if a web page is hosted on a Linux-based server or a Microsoft-based server because all the browsers will be retrieving the page using HTTP and the page will be formatted according to HTML. Notice as well that it doesn't matter what particular environment the browser is running in either (Mac or PC for example.)

Web Services extends this idea beyond the simple exchange of information between browsers and servers to the real-time integration of business applications across (potentially) heterogeneous computing platforms. I.T. managers have always struggled with integrating information from multiple platforms, usually needing to employ very expensive and interface-specific solutions to bridge the gaps. The deployment of Web Services will dramatically mitigate those expensive efforts.

Web Services is not magic, any more than the web itself is magic. We have the wonderful web with all its richness and diversity of content because important underlying protocols (e.g., HTTP and HTML) were designed, agreed upon, and implemented. Much the same is true with Web Services. Although there is a large list of protocols needed to deliver the full capability of Web Services, they are primarily built on four main components:

- Extensible Markup Language (XML). XML is a markup language that enables one system to fully describe the contents of a document so that another system can read and understand the document, even if the two systems have never communicated before.
- Simple Object Access Protocol (SOAP). SOAP enables one piece of code to communicate with another piece of code without regard for each environment's programming language choices (e.g., Java, Visual Basic, C++, etc.)
- Universal Description, Discovery, and Integration (UDDI). UDDI defines the structure for a registry in which Web Services are cataloged, or advertised. A process looking for a service – a "consumer" or "subscriber" – can search a UDDI registry to discover Web Services offered by "publishers" or "providers."
- Web Services Description Language (WSDL). This is an XML-based specification for exactly how a Web Services provider describes their particular Web Services. It includes details such as what information should be passed to the service and what results will be returned.

In wrapping up, let's go back to the economic picture. I mentioned earlier that executives might be more inclined to make a technology investment that offered near-term pay back as opposed to those that won't bear fruit for several years or more. Why does Web Services fit into this category?

There are numerous vendors providing the tools necessary to implement Web Services today. An I.T. manager can start slowly with a modest Web Services project that will not cost a lot of money and can be providing specific, measurable benefits in well under a year. From careful first steps, larger and more ambitious projects can be instigated, each building on the demonstrable successes of previous efforts.

Work has been proceeding on Web Services standards and enabling technologies for several years but is just now starting to become discussed in the mainstream of I.T. Stay tuned to this important area for it will soon be on the minds of many of your clients, if it isn't already.

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Opinions expressed are not necessarily those of SBC.

Paul Bedell, SBC

Ethernet Over SONET ("EoS")

Karen Barton, VP of Marketing at Appian Communications, was quoted as saying "every once in a while a great new architecture comes along that, if you could start over from scratch, you'd use the new architecture. That's what Ethernet is today. Unfortunately, with the existing base of SONET, it's unreasonable to think about its wholesale replacement. But, because SONET is so widely deployed, you can build on it."

SONET technology is globally deployed and *still growing*, with an estimated $8B spent in 2001 on equipment for metro areas alone. The advantage of SONET is still found in a highly resilient, fully managed network foundation that has back office systems ready to be used across carrier networks.

Ethernet Over SONET ("EoS") describes the mapping of Ethernet frames into SONET payloads (based on the ITU X.86 and T1x1.5 GFP standards). EoS effectively transforms a portion of the SONET network into an invisible tunnel between LANs to provide transparent LAN (TLAN) service. Instead of creating another network overlay, many carriers are leveraging a proven infrastructure to create carrier-class Ethernet over SONET services featuring:

- 50 millisecond restoration/recovery
- Metro and wide area service scope and scale
- Easy integration with back office systems
- End-to-end service level management

SONET technology was designed for a different time and a different set of network services: Voice Communications. SONET is a circuit-oriented, TDM-based solution that is well suited to the transport of voice and private line data traffic. But today's traffic and revenue growth is coming from packet applications, not voice. These applications are characterized by *bursty* traffic patterns, diverse connectivity requirements and a demand for bandwidth that can fluctuate widely based on application, time of day, season and location.

Service providers who can leverage their existing SONET infrastructure will also have the advantage of more cost effectively deploying new packet services without building a parallel network infrastructure, or being limited to a regional scope. One downside to this approach is that service providers will pay an equipment-cost "penalty" as SONET networks must be over-built to accommodate growth in packet traffic. A better solution, according to the RPR proponents, would be a new packet MAC that uses rings efficiently but also exhibits the resilience and QoS of SONET. This "better solution", of course, is RPR.

But although SONET scalability is also a benefit of this approach (OC-3/12/48/192), the scalability is very expensive, clumsy, difficult to provision and burdensome compared to Ethernet's near-instant capability to scale one-megabit-at-a-time.

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Key: SONET is a layer 1 transport technology that relies on higher-level protocols and switching systems to establish logical connectivity. This allows SONET to support multiple services including TDM, ATM, frame relay and IP-based traffic.

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Data Over SONET

Neither SONET approach-BLSR or UPSR – is optimized for data traffic and for new, emerging Ethernet services. Per many carriers, the way around this limitation is to embed packet efficiency into existing SONET infrastructures. This would result in much lower cost of ownership (per megabit) by aggregating traffic from many customers onto shared SONET/SDH paths.

IDC believes that incumbent service providers, who represent the vast majority of equipment spending, will leverage their existing SONET infrastructures to maximum effect. And why not? It makes economic sense considering the billions they've spent on the technology. This bodes particularly well for equipment vendors building Ethernet functionality onto SONET equipment (i.e. Cisco, Nortel, Ciena and Fujitsu).

Service providers like their existing SONET rings, and for good reason. The rings reach more customers with less fiber than other network topologies and require fewer switch ports at busy hub sites. But it's clear that SONET wastes bandwidth when carrying packet data traffic. Packet Over SONET (PoS) offers a partial solution, but only for point-to-point links.

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Key: The carrier-class resilience of SONET underlies all higher-level network services, ensuring that transport network failures are healed before the higher layer protocols or network users detect a fault.

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Carriers stand to gain some benefits with a network solution that adds packet switching efficiency and flexibility to their existing SONET networks. *The ability to share previously dedicated SONET time slots across multiple customers is central to providing efficiency in next-generation SONET systems*. It is also a prerequisite to protect carrier-grade security and service level guarantees.

There are *four key service parameters* required to deliver a next-generation packet optimized SONET solution: secure traffic aggregation; explicit rate quality of service (QoS); a distributed switching architecture; and Resilient Packet Ring (RPR) protection.

Secure Traffic Segregation assures that traffic to and from each individual customer port is completely isolated from the traffic of all other customers. To bring the efficiency of packet switching to a SONET network, the first requirement is to share what has historically been a dedicated, single service (one customer) time slot among multiple users. The ability to securely isolate one customer's traffic from another's is primary to achieving this goal. In the most secure example, an individual Ethernet private line (EPL) service can be mapped to a dedicated (SONET) time slot. While this approach does not leverage shared path economics, it still provides lower cost of ownership to both the customer and the carrier. This is because special-purpose WAN access equipment is replaced with Ethernet equipment that can be remotely provisioned to new service rates with much greater granularity. It also offers the benefit of physical layer security with the service level guarantees typical of today's private line services such as DS-1.

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Key: The ultimate effect of the design described above is much lower cost per connection as many customers securely share network resources. This requires that the traffic for each service be isolated via standard (VLAN) tagging or labeling mechanisms (802.1q or MPLS).

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Early Ethernet-over-SONET (EoS) implementations used standard IEEE 802.1q VLAN tags to separate one customer's traffic from another. Unfortunately, this approach does not scale well and is inherently insecure. For example, the IEEE 802.1q standard defines a 12-bit tag that is specific to a physical port interface but it limits the maximum number of virtual connections (or isolated customer flows) to 4,096. Proprietary solutions have been developed to resolve these inefficiencies, but because they're proprietary they don't have the capability to extend across the wide area. This inhibits the appeal of

Ethernet in the WAN, but it's overcome by the other benefits listed above.

Security is a major concern. It's possible for any switch on a network to join a VLAN by learning the tag assigned to the port. Since a VLAN is a broadcast service, once a user group has been dynamically added it can reach any other node on the network. In effect, this puts every node at risk. Since each layer three switch makes an independent forwarding decision, end-to-end service guarantees are not feasible. Also, traffic is typically rate limited versus shaped, with indiscriminate clipping or dropping of packets. This type of transport instability is unacceptable for many applications.

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Key: The multi-protocol label switching (MPLS) standards work currently underway proposes a direct link between Ethernet and MPLS, which means wrapping Ethernet frames in MPLS labels to enable separation and prioritization of each customer's traffic. In this context, the key values of MPLS are:

- The ability to define an end-to-end connection similar to a permanent virtual circuit (PVC)
- A labeling scheme for defining connection service levels
- A labeling scheme that scales across a large community of users

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As MPLS is more fully deployed in the core of carrier networks, it's also envisioned that signaling information contained within the service header can be used to achieve end-to-end bandwidth guarantees and service level monitoring.

Explicit Rate Quality of Service can support shared SONET path network economics, while delivering services with explicit rate guarantees, and flexible burst rate options.

QoS is a critical requirement to bring packet data economics to legacy SONET networks. While the objective is to securely share a SONET payload across multiple users or services, the risk is that traffic bursts from one service can rob the others of required bandwidth. A sophisticated QoS and prioritization scheme is needed to deliver packet services with the service level guarantees expected by end users, especially if carriers will pay penalties for not meeting SLA levels.

QoS is also required to deliver multiple services via a single subscriber interface. For instance, an Ethernet subscriber interface that provides access to an Ethernet Private Line (EPL), internet access and frame relay corporate VPN service must ensure that each service is given its committed bandwidth and service level.

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Key: This multi-service Ethernet model greatly reduces complexity and cost for the customer. It also enables per-customer revenue to grow with a minimal investment in new infrastructure by service providers.

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Similar to ATM transport, bandwidth in these new systems should be dynamically managed using QoS mechanisms that control the guaranteed minimum and maximum burst rate characteristics of each individual service. Class of Service (CoS) prioritization should also be employed based on DiffServ, MPLS, or the 802.1p specification. *This will ensure that higher priority traffic gets forwarded first*. This type of network architecture would ensure that network bandwidth is efficiently and fully utilized.

A Distributed Switching Architecture is needed for EoS that provides the ability to switch any single service on a subscriber interface to any SONET path in the network – in both point-to-point and multi-point configurations. A distributed packet architecture that allows traffic from multiple customers to share a common payload or path through the network would be ideal. Statistical multiplexing should also be employed to ensure bandwidth on all "pipes" and routes is fully optimized.

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Key: This configuration could be thought of as a "secure Ethernet cross connect", distinguishing itself by allowing any single service on a given subscriber port to be mapped to any SONET payload, while retaining explicit bit rate guarantees. *Once traffic is in a path, it can be switched to another path without requiring SONET-level reconfiguration.*

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Allowances for multiple ingress and egress points on a particular path should also be included in this design. This would provide even greater network-level bandwidth efficiency while also enabling a broader range of point-to-multi-point services. *Different services and different customers could dynamically use any part of a path through the network instead of dedicating many separate point-to-point paths for all of them*. This would optimize the heck out of the network !!!

Resilient Packet Ring Protection is needed to provide a highly efficient and resilient mechanism for packet services to share SONET paths in widely deployed ring networks. Here, Ethernet provides a simple layer 2 entry point to services that are far more granular and scalable that traditional TDM services.

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Key: IP directly over SONET is expensive and difficult to manage when the number of links becomes large. Ethernet over SONET, on the other hand, adds a switching capability that can "route" a number of point-to-point links (i.e. a full mesh may not be required).

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EoS allows LAN, MAN and WAN networks to be combined to form end-to-end connections, thereby reducing the need for format and protocol conversions within the network. By replacing circuit-oriented WAN access technologies (ATM, frame relay) with an Ethernet demarc, carriers can provide simple, software-provisioned access to point-to-point or multi-point services that include Ethernet Private Lines, Layer 2 VPNs and Transparent LANs (TLANs). They'd also have the opportunity to greatly reduce network transport costs by aggregating Ethernet traffic from multiple customers to shared SONET paths that terminate directly at a particular carrier point of presence (POP).

A variation on the scenarios above is to transport Ethernet over a WDM-based physical layer, with or without a "thin SONET" interface. Here, a small subset of the SONET header would be used – the majority of the overhead is eliminated. This solution avoids most of the complexities of SONET TDM functions, the stringent SONET physical layer specifications, and the need for a separate SONET element management system (EMS). The key advantage here is that the overheads of ATM and SONET can be eliminated. Both 1 GbE and 10 Gibe are more affordable, more practical and simpler than ATM, the major alternative for high speed WANs.

Virtual Concatenation: The Best Option For EoS?

In December 2001, a company known as PMC Sierra, Inc, announced development of a silicon chip that "sandwiches" two gigabit Ethernet channels into an OC-48 (2.5 Gbps) SONET signal. The chip uses virtual concatenation (VC) and generic framing procedure (GFP) standards that were finalized in late 2001. Both standards have been developed to offer more bandwidth-efficient ways of packing Ethernet traffic into a SONET/SDH transport network.

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Key: Generic Framing Procedure (GFP) makes it possible to transport any protocol over SONET, including GigE, Fibre Channel, ESON and digital video broadcast (DVB). The key benefit to using GFP is that there is no degradation of service and no waste of bandwidth.

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To understand why virtual concatenation is so valuable involves looking at how data is transported over existing networks.

Simply put, SONET channels are the wrong size for carrying Ethernet traffic. In "concatenated" SONET, the channel is simply treated as a fat pipe. For example, putting a single GigE data stream (1 Gbps) into an OC-48c (2.5 Gbps) channel wastes 58% of the bandwidth of the SONET channel. Table 1 below illustrates this point by showing how much bandwidth is saved versus wasted when using virtual concatenation.

An improvement on this scheme is "channelized" SONET, which allows carriers to carve up capacity in an OC-48 link into units of STS-1 (51.4 Mbps), STS-3 (155 Mbps) or STS-12 (622 Mbps) channels. *But it's just not possible to mix and match these units because there's no guarantee that the same combination of units will be available at both ends of the network, if at all.*

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Key: Enter virtual concatenation. In a nutshell, it's job is to "right size" SONET channels so more efficient provisioning of bandwidth can occur, namely for Ethernet (packet) traffic. Notice that "more efficient" isn't necessarily "ideal".

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Transporting Ethernet over SONET using virtual concatenation (VC) could be a better option than native Ethernet networks for established carriers. Carriers wouldn't need a forklift upgrade to their existing networks, which are predominantly built on channelized SONET. To support VC, a carrier only has to upgrade the equipment on the ends of the connection. Further, SONET offers features that native Ethernet currently doesn't have such as bandwidth guarantees and protection in the event of a network failure.

It's also worth noting that system developers like Sycamore Networks have had equipment for more than a year that crams two gigabit Ethernet channels into a 2.5 Gbps wavelength. Bear in mind even this device wastes 500 Mb of bandwidth, the equivalent of over 300 DS-1 circuits! But Sycamore had to develop its own type of silicon to achieve this feat. The off-the-shelf chips now being offered by Agere and PMC make it easier for other system vendors to catch up.

Summary: Ethernet Over SONET (EoS)

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Key: An Ethernet-over-SONET (EoS) architecture that combines Ethernet economics, packet switching flexibility and SONET resilience offers a compelling cost-of-ownership strategy for carriers. *An important benefit of this architecture is that is its extendable beyond the metro area to include any wide area geography.*

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In all cases, the economic benefits of Ethernet play out in lower cost and complexity for both carriers and customers. Unlike today's hard-wired TDM circuit interfaces, an Ethernet interface can be remotely provisioned to adjust bandwidth or change service parameters. Customers no longer need to schedule truck rolls or circuit provisioning upgrades because the inherent flexibility of Ethernet supports connections that scale from 64 Kbps to 10 Gbps. Now that's flexible!

Paul is a Product Manager, Business Marketing, Optical Data Networks, SBC. He also teaches at Chicago's DePaul University and can be contacted at paul.a.bedell@msg.ameritech.com.

This article is the final excerpt in an exclusive UPDATE series from his new book, "Gigabit Ethernet For Metro Area Networks", which was published by McGraw-Hill in December, 2002. It is available at Amazon.com; Borders; Barnes and Nobles and other major bookstores and Internet outlets.

Table 1: SONET Virtual Concatenation Bandwidth Utilization Versus Waste

Service	Bit rate	Bandwidth Utilization Without VC	Bandwidth Utilization With VC
Ethernet	10 Mbps	STS-1 (20%)	VT1.5-7v (89%)
Fast Ethernet	100 Mbps	STS-3c (67%)	STS-1-2v (100%)
Gigabit Ethernet	1 Gbps	STS-48c (42%)	STS-3c-7v (95%)
Low-speed ATM	25 Mbps	STS-1 (50%)	VT1.5-16v (98%)
Fibre Channel	200 Mbps	STS-12c (33%)	STS-1-4v (100%)
Fibre Channel	1 Gbps	STS-48c (42%)	STS-3c-7v (95%)

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SBC Assists NASA After Columbia Incident

Immediately after the crash of the Space Shuttle Columbia, SBC's Federal Solutions Group teamed with NASA to assist the agency with response and special investigative needs. SBC worked with NASA to assess the special needs of an independent investigative team being set up just outside the Johnson Space Center campus. In ongoing discussions with NASA engineers, SBC Federal Solutions recommended a GigaMAN product capable of handling the large imagery and data files anticipated in the investigation of the shuttle disaster. The recommendation was accepted. Normally, a GigaMAN installation takes 30 days or more but a combination of hard work and luck allowed SBC to do the work in 30 hours! This happened for three reasons: 1. SBC & NASA Teamwork 2. We had fiber optic cable available in the ground and all that was needed to make it work was some splicing 3. We had additional fiber optic cable available and electronics equipment in stock.

SBC Yahoo!

If you have DSL Internet access at home and have not yet switched to SBC Yahoo! – now's the time. Migration software is available via compact disc. Further info is available at sbc.yahoo.com/dsl startup....Sales of SBC Home Networking have taken off like a rocket – up from less than 500 a week when the product debuted a few months ago to more than 1,000 a day over the last few weeks. Several crucial innovations are responsible for the surge in Home Networking, which allows customers to connect multiple computers: One is the incredible price: when SBC Home Networking debuted, a wireless gateway cost $599, a wired one $399. Today, the prices are $199 and $149 respectively – plus SBC Yahoo! customers get a $99 rebate.

SBC Wins State Of Michigan Contracts

The State of Michigan has selected SBC as its Telecom partner for the next 6 Years. The contract consolidates the voice, data and video network needs of the State of Michigan agencies and is part of the "LinkMichigan" initiative to improve Michigan's telecommunications infrastructure and make available consistent, statewide, high-speed telecom services.

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New SBC Marketing Partnerships

1. SBC Yahoo! DSL went on sale at over 100 **Best Buy** stores just a few months ago and is already the top-selling DSL Internet access product sold by the chain.
2. SBC & Cingular have signed an agreement to sell each other's products and SBC expects to have a presence in dozens of **Cingular Stores** by mid-year.
3. A partnership with **DELL** is making it easier for customers to get SBC Yahoo! DSL when they buy a new computer. DELL is selling DSL-ready PCs that come with a network interface card pre-installed.
4. SBC is featured in **TurboTax**, one of the nation's most popular tax preparation programs, with 6.5 Million CDs now in customers' hands. The software invites customers to sign-up for Internet access from SBC Yahoo! Dial today and SBC Yahoo! DSL in the future.
5. We're expanding the reach of SBC's eChannel through an **Online Affiliate Network** where approved web partners can sign up to sell SBC Yahoo! DSL, SBC Long Distance and other services.

SBC Consultant/Vendor Sales Group

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