

**How Small and Midsize Businesses Can  
Turn the Internet into a Private Network  
for Competitive Advantage**

# HURWITZ REPORT

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## How Small and Midsize Businesses Can Turn the Internet into a Private Network for Competitive Advantage

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Recently, a number of changes and new technologies have emerged that make it possible for small to midsize businesses to cost-effectively connect multiple remote networks.

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Small and midsize businesses are being left behind in the move to "second generation" e-Business.

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A competitive second-generation e-Business is built on the premise that the business model, partners, and geographic locations it encompasses will change continually and thus needs an adaptable, virtual network infrastructure to support it.

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Using the Internet as the foundation for your wide area network can theoretically be less expensive and more flexible than traditional solutions. However, the associated costs and complexity of using VPN solutions has been prohibitive.

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OpenReach has created a new type of VPN service that easily and effectively leverages the power of the Internet for private connectivity without the complexity, cost, or time associated with setting up traditional VPNs.

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Within a few short years almost all companies will use solutions such as OpenReach TrueSpan™ Services to connect remote offices, partners, and employees into a single Logical network that enables users to work as if they were located in the same place.

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# Executive Summary

To gain competitive advantage, you must transition your company from fragmented entities with multiple, self-contained locations and limited partners into a business that provides the customer with a seamless and totally integrated service experience — even though you may have many external partners, providers, or remote business units.

Until recently, connecting different networks, and building wide area networks, remained the province of only the largest companies with enough technical skill and financial resources. Why? Because until now, most organizations that wanted to link remote offices muddled through with limited bandwidth, high prices, difficult technical requirements, or used simple email to share files. So how can you link remote offices, employees, and partners, and provide access to corporate applications, data, and IT resources as if they were all located in one building?

Recently, a number of changes and new technologies have emerged that make it possible for small to midsize businesses to cost-effectively connect multiple remote networks. Broadband access to the Internet has proliferated (offering cheaper and faster access), security technologies have standardized, and new technologies known as virtual private networks (VPNs) have emerged to secure network-to-network connectivity.

This white paper explores the new connectivity requirements dictated by e-Business and highlights how Internet-based VPNs can solve these connectivity needs. In addition, it highlights how one company, OpenReach, is providing a new web-based service for small and midsize businesses that automatically connects remote offices, separate partners, and telecommuting employees under one roof, allowing them to interact as if they were in the same building, on the same network.

## Using the Public Internet as Your Private Wide Area Network

Okay, so you're connected. You've got email, you can surf the Web, and you may even have a corporate web site that allows you to sell products over the Web. But can you easily connect remote offices, partners, or employees into your existing corporate network? Can you provide them secure access to your business-critical applications and share files and resources easily between offices? Can you add a new partner to your corporate extranet in under an hour? Is your business really ready for the "e"-conomy?

If you're like most small and midsize businesses, the answer so far has been "no." Unless you're a Fortune 500 company with an army of IT and networking staff, connecting multiple corporate locations with anything other than simple email has typically been beyond reach. The private and virtual private network (VPN) services available from Telecom companies are too expensive. Building your own VPN with firewalls, enhanced routers, or VPN products demands too much IT networking knowledge to be feasible. With these constraints, small and midsize businesses are being left behind in the move to "second generation" e-Business. And this problem will become increasingly critical as more companies use networking to better serve their customers, partner more closely with suppliers, hire geographically distributed workers, and open remote locations.

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This white paper explores the evolving requirements for becoming a second-generation e-Business and why office-to-office, company-to-partner, and company-to-remote employee connectivity will be a key competitive requirement for success. It highlights the benefits of setting up VPNs over the Internet, and then explores the typical barriers to success and why it has been so hard to simply connect remote offices into a single, unified network. In addition, it highlights how one company, OpenReach, is addressing these issues by supplying a new web-based service for small and midsize businesses that connects remote offices, separate partners, and telecommuting employees under one roof, allowing them to interact as if they were in the same building, on the same network.

## Building a Second-Generation e-Business

Today, obtaining competitive advantage requires that businesses transition from fragmented entities with multiple self-contained locations and limited partners into businesses that provide the customer a seamless and totally integrated service experience, although it may involve many external partners, providers, or remote business units. To achieve this level of cohesion, all employees, locations, and partners must be working in concert to meet the customers'

needs. It is essential that all elements of the service delivery process can securely access the same applications, network, and data resources, whether inside the company or at a partner, and regardless of location — be it the main office, a branch office, or at a telecommuter's home. Providing an integrated, adaptable, and real-time customer experience (or being a “second-generation e-Business”) means that all your corporate locations, partners, suppliers, and employees must be linked on the same network, not just by email or web sites, and have appropriate levels of access.

The second-generation e-Business is one that leverages networking to create a virtual corporation composed of a highly dynamic collection of employees, groups, corporate locations, partners, suppliers, and customers based on ever-changing business requirements. To survive in today's economy, businesses must be able to move quickly and immediately adapt to the environment as it changes around them. A competitive second-generation e-Business is built on the premise that the business model, partners, and geographic locations it encompasses will change continually and thus it needs an adaptable, logical network infrastructure to support it.

A typical second-generation e-Business isn't necessarily a giant web retailer like Amazon.com or an evolving “click-and-mortar” business like Wal-Mart. Instead, a second-generation e-Business is more likely a small-to-midsize company built on the premise that time-to-market, ability to adapt, and serving customer needs are paramount. Second-generation e-Businesses are adaptable, efficient, and timely.

Second-Generation e-Business Attributes	Impact	Benefit
<b>Adaptability</b>	Changing business models and partners Adaptable corporate infrastructures	Ability to maximize profit through new business opportunities Ability to take advantage of new business models or partnerships by removing technical limitations or infrastructure constraints
<b>Efficiency</b>	Use of public infrastructure Use of technology standards	Less infrastructure investment required, frees money for strategic investments in the core competency areas of the business Reduces complexity and customization, enables flexibility
<b>Timeliness</b>	Ability to create extranets and relationships instantly, without time-consuming hardware or software setup	Capture new revenues more quickly and reduce IT staffing requirements

One of the keys to delivering adaptability, efficiency, and timeliness is the ability to easily integrate all corporate locations, partners, and suppliers into the minute-by-minute stream of business activities. The only real way to provide true integration is to have safe, secure, and consistent connectivity among all these components. You can't be a second-generation e-Business if the San Francisco office can't interact in real-time with the inventory or schedule information from the server on the Boston office's network, or if your PR firm can't access the appropriate marketing files and materials on your local area network due to security concerns or level of difficulty. The next big step in the e-Business/Internet evolution is the ability to securely and easily connect offices seamlessly across the Internet, building a dynamic wide area network (or WAN).

## Traditional Solutions to Building Wide Area Networks

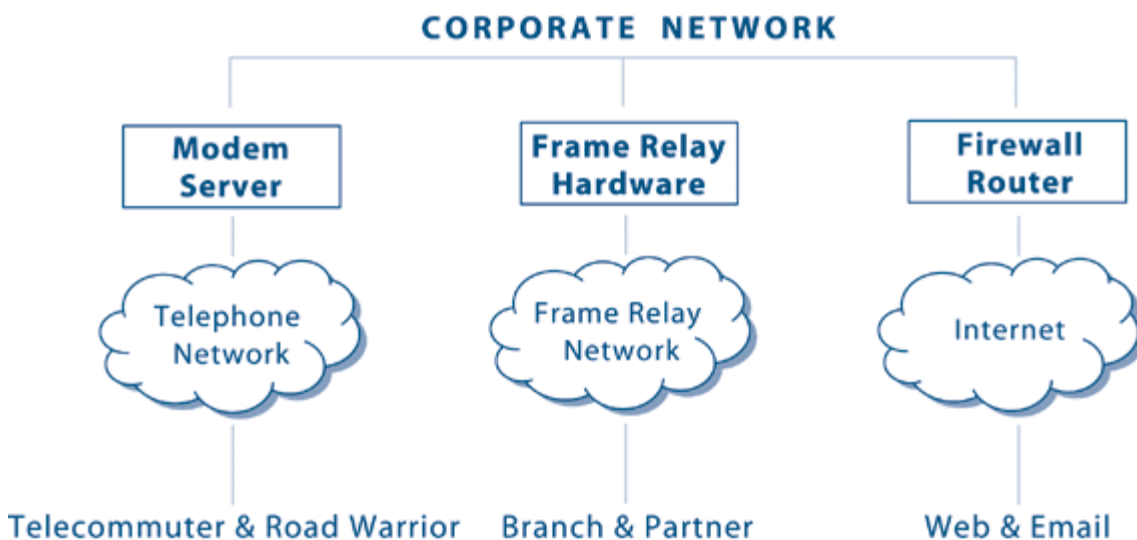
You cannot become a second-generation e-Business with multiple business locations acting as islands of isolation without any real connectivity (other than email and telephones, perhaps). To meet increasingly important needs for adaptability, efficiency, and timeliness, companies must create a logical business network that enables users to share network resources and access company applications, regardless of where they are geographically located (or, in the case of extranets, regardless of whether or not the users are employees). Unfortunately, until recently, building wide area networks remained the province of only the largest corporations or companies with enough technical skill and financial resources. Most organizations that want to link remote offices muddle through with limited bandwidth, high prices, and difficult technical requirements. Organizations have used a range of approaches to build wide area networks to connect remote offices, partners, or employees. These "traditional" approaches to connectivity include:

- ▶ **Point-to-point leased lines.** Point-to-point leased lines were among the first solutions used to connect multiple remote locations and networks. This approach to wide area networking offers guaranteed performance, but is inflexible and very costly. Point-to-point leased lines are just that — point-to-point, physical networks requiring the engineering of separate links between sites that need to communicate with each other. Point-to-point leased lines can take from 30 to 60 days to install and typically are billed at a flat rate based on the distance covered.
- ▶ **Packet switched networks.** The next evolution in building wide area networks came from using packet switching to reduce cost and increase flexibility. Frame relay packet switching runs at higher speeds with lower overhead than earlier X.25 packet switching alternatives, and is designed to enable organizations to build "virtual" connections called permanent virtual circuits (PVCs) between offices. This approach lowers access circuit costs by allowing

multiple PVCs at a location to share a single access circuit to the frame relay network, and increases flexibility by reducing the time required to add or change a connection. But these solutions are based on a network service provider's proprietary (or private) network. Proprietary networks are typically owned and operated by one or more companies. Such networks are limited to connecting locations within reach of the service area for the particular network provider, or through managed network-to-network links that the provider has established to other provider networks. Frame relay networks require the engineering of access circuits for each site, and PVCs between sites. Like point-to-point solutions, the initial installation of frame relay still takes a long time, additional access circuits can usually be installed in two-to-three weeks, PVCs in days, and the service is typically billed at a flat rate based on the bandwidth allocated.

- ▶ **Dedicated virtual private network (VPN).** A more-recently introduced service alternative offered by some network service providers is the dedicated VPN. This routed service eliminates the complexity and cost associated with the engineering of the connections between locations, but requires the service provider to manage security as the routed network is shared with other customers. These solutions are tied to the service provider's proprietary network and therefore have geographic reach limitations similar to frame relay solutions.

Figure 1 below shows a typical wide area network solution, including a modem server for road warriors, frame relay for connecting offices, and a firewall/router for Internet access.



Source: OpenReach, Inc.

**Figure 1. Typical wide area network**

## Alternatives to Wide Area Networks

Although not directly related to the proprietary networks identified in this paper, companies have attempted to use a few other “band-aid”-type solutions to link offices:

- ▶ **Remote access.** Although not necessarily a way to link multiple networks, remote access provides a way to link specific client PCs (such as laptops or remote employees) into a company’s network. Remote access solutions include access via office modems with separate phone lines, requiring authentication systems, or access via the Internet, when VPN-type functionality is needed to secure the connection.
- ▶ **Email.** Email can also be used to link remote locations via the Internet, but this solution is extremely limited. Users can only email files or text messages, and there must be someone at the other location available to respond. Email solutions are not practical as LAN-to-LAN or extranet solutions, because they provide only offline connectivity and are susceptible to security problems, such as the “Love Bug” virus that spread to hundreds of thousands of computers in May 2000 and caused tens of millions of dollars in damage.
- ▶ **Web sites.** Corporate web sites and intranet sites can be used to share information over the Internet, but these solutions do not typically provide security (such as encryption) nor do they provide ways to share network resources across different corporate locations. Web sites are really only useful for the one-way dissemination of information and are not an appropriate solution for truly linking different networks. Rather than simply extending your LAN environment and your access to files and network resources to wherever you happen to be, web sites provide a predetermined set of information and capabilities that typically do not include access to internal corporate data, files, or resources.
- ▶ **Nothing.** Last, but not least, one of the most prevalent solutions to linking offices, partners, and employees is to simply do nothing. Many small and midsize businesses do not even try to link their east and west coast offices, or create an extranet with their PR company to share marketing files because it has been too difficult, too costly, or too time-consuming to implement. In most of these cases, companies continue to resort to the time-tested but ineffective “network” solutions of “sneaker net,” such as fax, FedEx, and snail mail.

However, these types of solutions simply will not provide the timeliness, flexibility, or integration that e-Business requirements dictate. Going forward, even small companies will find that having the ability to easily build secure and dynamic network connections between offices or partners will be critical for long-term success.

## The Internet Is the Answer

The foundation of a true second-generation e-Business is its ability to connect (and not simply communicate!) with multiple, geographically distributed locations (whether they're partners, suppliers, employees, or other) in a seamless way without extensive or costly technical investments. Hurwitz Group believes that successful businesses will convert their local area

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networks (LANs) into logical *business* networks (LBNs) that combine geographically dispersed networks under one roof, into one logical network. The result will be a network in which employees have access to all the company information and applications as if they were all in the same building. Whether working from a branch location, at home, or on the road, employees' experiences should be exactly as if they were at the company's headquarters.

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 Businesses have tried a variety of means to create unified corporate networks to link disparate locations and partners. However, given a number of factors, including cost, ubiquity, and flexibility, Hurwitz Group believes it now makes enormous sense to use the Internet to link remote locations and partners.

Why the Internet? Originally used as a means for communication for higher education and government, the Internet has exploded over the past 10 years as a common tool for communications (typically via email) within and between businesses worldwide. The Internet is arguably the most cost-effective and efficient means for communication between individuals and systems available today. It allows for connectivity worldwide, has minimum barriers to entry (compared to other private connectivity/network solutions such as frame relay), and has excess available bandwidth. As John Patrick, VP of Internet Technology at IBM said in the October 1999 issue of InfoWorld, "We are going to be awash in bandwidth. Competition between telephone service providers, cable companies, and wireless firms will ensure that high-speed access is plentiful." The Internet is not owned by any one particular corporation or individual, but is a conglomerate of fiber backbones across multiple service providers worldwide. This translates into built-in redundancy that ensures availability and reliability for the most critical communications.

Theoretically, Internet-based connectivity solutions:

### Are less expensive.

- ▶ No leased line charges or long distance charges are involved.
- ▶ Increasing availability of cost-efficient DSL and cable-modem services makes high-speed Internet access affordable and effective. For example, a standard DSL line might be completely adequate for many small offices and cost \$50-\$200/month, while a fractional T1 might cost \$500/month.

### Provide better performance.

- ▶ Increasingly fast Internet backbones and additional fiberoptic lines provide enormous bandwidth potential and superb performance potential. For example, UUNET now provides service level agreements (SLAs) stating it guarantees an average latency of no more than 85ms roundtrip in North America.
- ▶ Widespread deployment of broadband connections such as cable modems and DSL connections enables fast Internet access for remote workers, small businesses, and extranet partners.

### Are more flexible.

- ▶ The ubiquitous public Internet infrastructure enables almost anyone to access a local Internet gateway rather than provisioning leased lines or paying long-distance costs. In many cases it's very difficult, or impossible, to connect locations outside of a traditional private network. Now, with growing deployment of extranets, companies are finding themselves increasingly faced with this challenge of connecting locations outside of the service area of their traditional network provider or connecting partners that use a different service provider.
- ▶ No monopolies means increased choices and reduced rates.

But you can't simply use a web browser or email to create Internet-based logical networks. Instead, since the Internet is an open, public network, companies must use specialized software or hardware to create the private and secure communication links (or tunnels) among locations to ensure privacy.

## The Internet and VPNs — A Perfect Combination

With the advent and ubiquity of the Internet, VPNs have emerged as a way to build a private communications network over a shared public infrastructure. VPNs provide secure private connections over the Internet by enabling authentication of individuals and locations, delivering secure and private “tunnels” between individuals or locations, and encrypting the data being sent. VPNs typically include a number of capabilities that make it feasible (if not easy) to send private data over the Internet in a secure way:

- ▶ **Firewall.** Protects the edge of the corporate network, between the WAN and LAN. The most effective firewalls are configured to permit or deny any specified type of traffic, and keep a log of any unauthorized attempts to enter the network.
- ▶ **Authentication.** Ensures that those connecting to the corporate network are authorized to do so. The strongest means for authentication, such as digital certificates, will verify the identity of both users and systems and identify both ends of the connection to each other.
- ▶ **Tunneling.** Protects the integrity and security of the original data packet by placing it inside another packet for transmission (encapsulation).
- ▶ **Encryption.** Scrambles data with a random code called a key. A key is assigned to a string of data until that key is changed. The length of the key and frequency of key changes determines how secure the data is. Longer keys contain more information to decipher, while frequent changes ensure that one key deciphers only a limited set of information. Therefore, if that key were to be cracked, only the information scrambled with that key would be vulnerable.
- ▶ **Routing.** Essential component to networking in general. Necessary to ensure that data gets from specified Point A to specified Point B.

A secure Internet-based communication and commerce solution should include the strongest of each the above VPN components, to ensure that communication within your network, and with other networks, is protected from intrusions or breach of security. Today, most VPNs are IP-based (Internet protocol — the most common networking protocol) and designed to work over the Internet. They typically fall into two categories:

- ▶ **Hardware-based VPNs.** A number of VPN solutions are based on proprietary hardware platforms that claim to provide high price/performance ratios and potentially increased security through specialized functions. Network equipment manufacturers are building some VPN capabilities into routers and other networking equipment.

- ▶ **Software-based VPNs.** Software-based VPNs have emerged as another alternative to private networks or hardware-based VPNs. As vendors evolve their firewall solutions, they've typically added VPN-type functionality such as tunneling and encryption.

## Difficult, Scary, and Expensive

Using the Internet as the foundation for your wide area network can theoretically be less expensive and more flexible than traditional solutions. However, the associated costs and complexity of using VPN solutions has been prohibitive. Even with VPN technologies, most companies have been reluctant to link remote locations over the Internet because it has been difficult, scary, and expensive.

Building a wide area network over the Internet has been difficult because most robust solutions have required esoteric networking and security technologies. Merely deciding what type of VPN and what levels of security or encryption are required are enough to confuse most IT personnel and almost all non-IT personnel. Beyond the complex purchase decision, the installation and ongoing maintenance of such systems can be time-consuming, especially if the number of remote locations changes frequently. In addition, many companies have found that rolling out traditional VPN-type products requires significant logistical planning to make sure that the right hardware and software is available at all the remote locations. Initial configuration of these remote sites is often time consuming enough, without factoring in the effort required to get a remote site back on line if a location fails (especially if no skilled IT resources are available at the remote site).

Internet-based wide area networks have been scary to many organizations because of the increasing number of Internet security threats, such as hackers and corporate espionage. There has been no end of news over Internet security breaches or Internet attacks, and there's no reason to think that such events will abate any time soon. However, this doesn't mean that businesses can't use the Internet safely for e-Business or intracompany communication. On the contrary, with the right software and policies, it is becoming increasingly easy to use the Internet for secure communication. Corporate security policies should be implemented from end-to-end, from the point at which the information transfer originates, to the point at which it terminates, and within the origination and termination points as well. Use of VPNs can provide excellent security levels if they support the right standards and are configured properly.

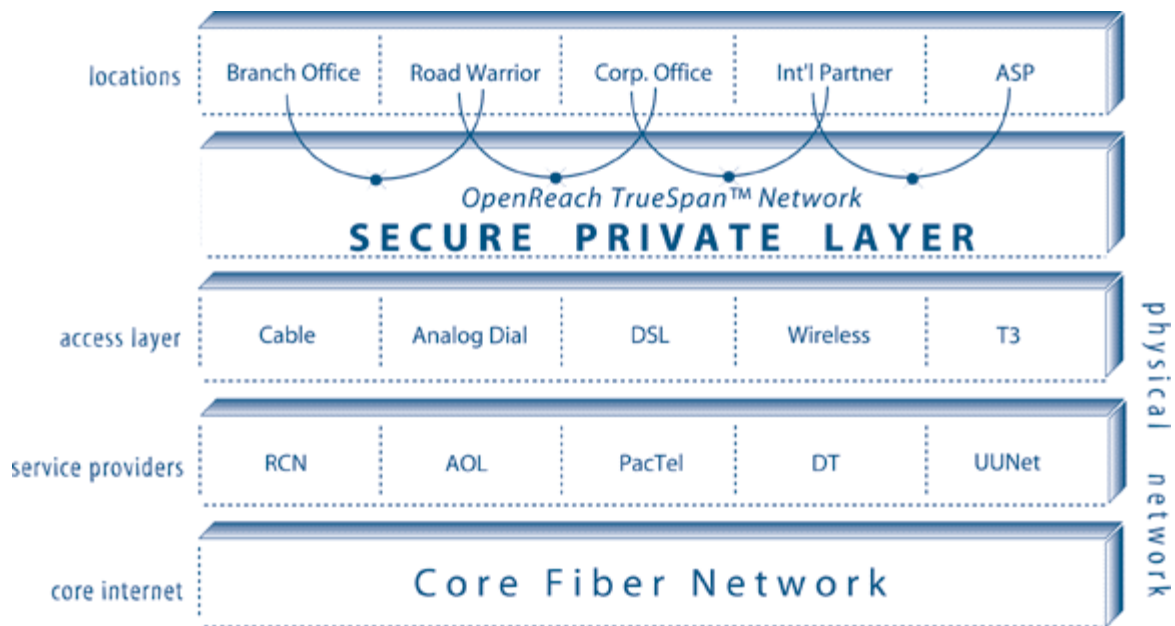
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As wonderful as VPNs and Internet-based connectivity sound, such solutions have continued to remain prohibitively expensive. Even prepackaged VPN solutions have required expensive networking personnel to configure (enterprise level firewall/VPN solutions can take up to a week to configure), install, and manage. In addition, the installation often requires support at the remote locations, dictating either extensive travel requirements for home office personnel or the hiring and training of remote IT support staff. In addition, many VPN solutions have required the purchase of specialized and proprietary hardware, and even software-only VPNs have remained expensive and require available hardware. Although VPNs can save considerable amounts of money over frame relay or leased line networks, too often the savings are erased by associated IT support costs or by the requirement for hiring a full-time IT professional to set it up and keep it running.

## The OpenReach Solution

Based on a number of factors, the Internet is clearly the best backbone for connecting and internetworking multiple locations, partners, and employees. It's ubiquitous, (available almost everywhere — small towns, large cities, around the world), there's a huge amount of capacity; and it's increasingly cost-effective, with fast, new access methods such as DSL and cable modems. However, the installation and maintenance of the VPN functionality required to make the Internet secure has been too complex and/or required too much financial investment in hardware, software, or time.

OpenReach, Inc. has created a new type of VPN service that easily and effectively leverages the power of the Internet for private connectivity without the complexity, cost, or time associated with setting up traditional VPNs. Rather than requiring specialized hardware or software, OpenReach's TrueSpan™ Software self-configures on any standard (x-86-based) PC to quickly create a true wide area network. Configuration requires pointing-and-clicking or adding members to a partner list. This makes it feasible and safe for small to midsize businesses to build a true e-Business network.



Source: OpenReach, Inc.

**Figure 2. The OpenReach TrueSpan Logical Network Layer**

OpenReach's TrueSpan™ Services are like an extension cord for your office computer network, connecting separate offices and making them appear as one (see Figure 2). PCs, servers, and printers "see" each other as if they were all local — under the same roof. Employees at their PCs interact with each other as if they were in the same building. TrueSpan connects your remote locations through the Internet, making it cheaper, simpler, and more flexible than traditional methods (leased lines, long distance dial, or frame relay). In fact, TrueSpan Services work over any Internet access technology (cable, DSL, cable modem, T1, etc.) and with any Internet service provider. OpenReach provides built-in security because everything is encrypted, tunneled, authenticated, and firewalled using the strongest standards available.

TrueSpan's capabilities are implemented as software running on a generic PC in the local area network (LAN). One dedicated PC connects your entire LAN to another office; no changes are required to existing PCs, servers, firewalls, or networking equipment. You can connect PCs, Macs, UNIX systems — anything that communicates via TCP/IP. OpenReach provides a graphical interface to set up, manage, and monitor connections between offices, and its 24x7 hardened Network Operations Center alerts you if something goes wrong with your connection to another office.

Setting up your OpenReach TrueSpan Network is simple: Visit the OpenReach web site, answer several questions, and then download the software to a floppy disk. Pop the disk in an available PC, and reboot. The PC comes up as a VPN router, connects to the OpenReach Network, and downloads any additionally needed configuration or set-up parameters. Repeat this procedure at each location and you can then use the graphical configuration at the OpenReach web site to connect and disconnect secure communication pipelines between your offices. Figure 3 shows the OpenReach TrueSpan Network connecting multiple branch offices, customers, and telecommuters over different access technologies and service providers. Hurwitz Group sees OpenReach's TrueSpan Network changing virtual *private* networks into the logical *business* networks that enable broad and dynamic e-Business partnerships, because appropriate network resources and applications can be easily and quickly shared with remote locations and business partners.

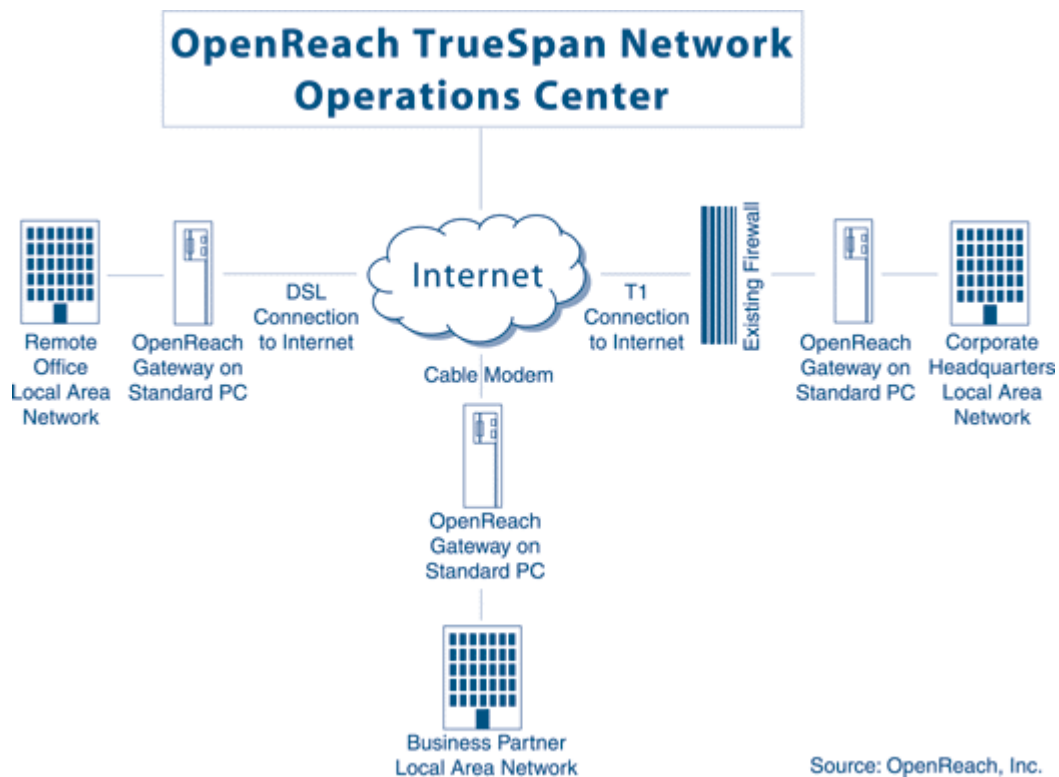


Figure 3. OpenReach TrueSpan Network

## Conclusion

With the increasingly fast pace of business, it's no longer acceptable (or even practical) for small and midsize businesses to operate dispersed locations as islands of isolation. In fact, all types of businesses, even ones with a limited number of locations, will find themselves required to build extranets or provide secure network connectivity to partners, suppliers, customers, or remote employees. Unfortunately, traditional private networks, and even newer, Internet-based VPNs have been too costly, complex, and time-consuming to meet the demands of the small and midsize business market.

OpenReach is one company addressing these issues by supplying a new web-based service for small and midsize businesses that connects remote offices, separate partners, and telecommuting employees under one roof, allowing them to interact as if they were in the same building, on the same network. OpenReach's TrueSpan Service provides "point-and-click" logical private networks with no specialized hardware requirements (other than a standard PC) and a graphical interface to quickly configure an industrial-strength multi-location business network. By lowering the cost and complexity barriers to safely connect multiple networks, OpenReach is creating the logical network infrastructure that will enable small and midsize businesses to become second-generation e-Businesses.

Just as all companies currently use email and web browsers to communicate over the Internet today, within a few short years almost all companies will use solutions such as OpenReach TrueSpan Services to connect remote offices, partners, and employees into a single logical network that enables users to work as if they were located in the same place. Hurwitz Group advises organizations to begin evaluating their options for wide area connectivity and start planning their own logical business network today.

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# Experience. Insight. Action.

Hurwitz Group, Inc. is a research and consulting firm providing strategic guidance with e-Business initiatives and is recognized for its real-world experience and pragmatic approach. Clients include Fortune 2000 organizations as well as business-to-business software and services vendors. Hurwitz Group strategists leverage the company's research to provide market development and positioning strategies, enterprise technology strategies, and custom consulting.