



BUSINESS ETHERNET:
THE BUSINESS
CONNECTIVITY
OF CHOICE

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SYNOPSIS

This whitepaper describes the advantages of Business Ethernet (Ethernet over copper) as compared to T1, Bonded T1 and fractional DS3 (T3) services. It also discusses growth in the availability and popularity of this technology and key vertical markets, including case study examples.

TECHNOLOGY OVERVIEW

Originally developed in 1976 by Xerox at their Palo Alto Research Center (PARC), Ethernet is a well-established technology for distributing data around local networks. The term “ether” is used because Ethernet standards can operate over a variety of paths, including coaxial cable, Cat 5, fiber optics and radio waves.

Ethernet Internet connectivity over copper, commonly known as Business Ethernet, applies Ethernet standards to connect a single site to the Internet via the same twisted pair copper facilities used for DSL and T1 services. A device is placed on the customer premises to aggregate copper pairs in order to transmit and receive information. For example, five copper pairs may be aggregated to deliver a highly reliable full-duplex 10 Mbps connection. Back on the carrier network, another device interfaces with the device on the customer premises and routes traffic securely to the Internet. Voice traffic, if present, is routed separately.

Ethernet is a highly flexible protocol that utilizes packet-switching, meaning that data is transmitted in small blocks, called packets, and bandwidth can be dynamically allocated to maximize efficiency. This is significantly different from the more rigid standard of time-division multiplexing used by T-carrier services (T1, T3, etc.), in which data is transmitted in a fixed order and pre-allocated to sub-channels of a circuit. Because packet-switching moves data across networks more efficiently, Business Ethernet is significantly less expensive to deliver.

The core advantages of Business Ethernet are affordability, ease of install, reliability, and scalability. These advantages are detailed below in a comparison between T-carrier and Business Ethernet services.

COMPARISON TO T1, BONDED T1, AND DS3 (T3) CONNECTIVITY

T-carrier systems have been the dominant business networking connectivity in the U.S. for decades. The most popular T-carrier circuit options are T1 and T3, also known as DS1 and DS3. Like Business Ethernet, these solutions deliver business-class full-duplex connectivity with high reliability. A T1 can deliver up to 1.544 Mbps, while a T3 offers up to 44.736 Mbps. Fractional options are also available, and T1s can be bonded together for circuits of 3.0 Mbps or more.

T-carrier has only one significant advantage over Business Ethernet – a larger availability footprint. A T1 or T3 circuit can be implemented any distance from the local loop (telephone company central office), while Business Ethernet can travel only 9-

11,000 feet. However, Business Ethernet is already available in many metropolitan areas and its footprint will continue to expand rapidly as more network infrastructure is deployed. (See page 4 for additional information about Business Ethernet availability and popularity.)

Where it is available, Business Ethernet is unquestionably a better choice for symmetrical business-class bandwidth up to 20x20 Mbps:

- » **More affordable.** A 3 Mbps Business Ethernet circuit costs about the same as a 1.5 Mbps T1. On a cost per megabit basis, all Business Ethernet speeds are significantly more affordable than a T1 or T3. As described in the Technology Overview section, this is primarily because of the flexibility and efficiency of Ethernet packet-switching protocols.
- » **Comparable or easier installation.** In the past, T-carrier services were a necessary choice for legacy networks that were unable to support Business Ethernet. This is rarely a problem today. Business Ethernet is as easy to implement as a T1 and far easier than a T3, which can take many months and typically requires costly infrastructure improvements.
- » **Equally secure and reliable.** There is no difference in the security capabilities of Business Ethernet and T-carrier services, and both come with standard 99.99% SLA-guaranteed uptime.
- » **Scalability.** Business Ethernet is highly scalable with speeds including 3x3, 5x5, 10x10, 15x15, and 20x20 Mbps. Equipment does not need to be changed at the customer premises to increase bandwidth. It's simply a matter of aggregating additional copper pairs and adjusting the carrier network equipment. Two 1.5 Mbps T1s can be bonded to produce a 3.0 Mbps circuit, but this requires additional equipment and is more costly. In addition, Business Ethernet uses loop bonding technology, whereas T1 bonding uses link bonding technology. With link bonding, a problem in any one of the lines can dramatically impact the whole connection. This is not the case with loop bonding. Also, loop bonding requires less overhead than link bonding, which means more bandwidth is available for applications and less is consumed delivering the data connection.

Good Shepherd Services, a large non-profit organization serving the youth of New York City, is an excellent example of the advantages of Business Ethernet over T-carrier services. With over 900 employees and 51 locations, Good Shepherd requires bandwidth for Internet access, email, youth programs, VPN between sites, and access to New York's automated child welfare information system. The organization began saving tens of thousands of dollars annually when they cancelled T3 connections at both of their datacenters and restructured their network around a single 10x10 Mbps Business Ethernet connection at their Manhattan datacenter. Their installation process with the T3s took almost a year and required major infrastructure development. The Business Ethernet was installed in about a month with minimal expense. They also enjoy exceptional reliability and effortless management.

KEY VERTICAL MARKETS

Today almost every type of business is experiencing growing bandwidth requirements due to increases in overall Internet use and multimedia applications. Business Ethernet is an ideal choice for any business with high-demand access needs, including centralized databases, point-of-sale, large file transfers, server/application hosting, remote workers, and VPN links between offices.

The fastest growing markets for Business Ethernet are data-centric industries, including the following:

- » **Financial Services.** Investment firms, banks, insurance companies, and other financial service businesses need to be able to upload and download financial records quickly and with maximum security. They also frequently maintain branch offices and need bandwidth to support large and complex internal networks.
- » **Healthcare Services.** Hospitals, medical offices, and healthcare-related businesses constantly send and receive health records and other large files. They also demand high levels of security due to HIPAA requirements.
- » **Retail.** Both point-of-sale and e-commerce retailers demand extensive and highly reliable bandwidth. NY-based retailer Glamourmom, LLC uses a 5x5 Mbps Business Ethernet connection to support a retail website, backend processing for their New Jersey warehouse and portals for their wholesalers and affiliates – as well as VoIP between offices, email hosting, and nightly offsite backups. Because of local loop charges in their area, they are enjoying more than three times the bandwidth of a 1.5 Mbps T1 for about half the price. They also appreciate the ease of scalability and plan to upgrade to a 10x10 Mbps connection within the next year as their business grows.
- » **Media & Communications.** The design, advertising, public relations, marketing, and publishing industries have always needed to upload and download large data files, but these files are now growing exponentially. For example, the Bellevue, Washington based company Retail Entertainment Design (R.E.D.) develops video media experiences for leading retailers including Fred Meyer, Hollywood Video, and Hot Topic. They rely on a 10x10 Mbps Business Ethernet connection to deliver massive video files, including high-definition footage, across their network to over 12,000 retail stores nationwide, while uploading new content at the same time.

AVAILABILITY AND POPULARITY

Ethernet connectivity is quickly becoming the primary business networking connectivity of choice. It is available in dozens of metropolitan areas and more are being added all the time. Current markets include Atlanta, Austin, Baltimore, Boston, Chicago, Cleveland, Columbus, Dallas, Denver, Detroit, Fort Lauderdale, Fort Worth, Harrisburg, Houston, Las Vegas, Los Angeles, Memphis, Miami, Minneapolis, Nashville, New Jersey, New York City, Oakland, Orlando, Philadelphia, Phoenix, Pittsburgh, Portland, Sacramento, St. Louis, Salt Lake City, San Antonio, San Diego, San Francisco, San Jose, Seattle/Tacoma, Tampa, Tempe, and Washington DC.

Demand for Business Ethernet is expected to grow by as much as 40% in 2009¹. Analysts predict continued growth in the industry from \$2.4 billion this year to nearly \$7.8 billion by 2014². This growth is accelerating in the current economic downturn precisely because of the benefits Business Ethernet provides. Businesses of all sizes need affordable, reliable, flexible and scalable bandwidth to stay competitive.

“2009 has become the year of Ethernet,” says Keith Altman, General Manager of Bridgevine Business. His company is a leading e-commerce solution provider offering a wide array of services, including Internet, voice and data, through a variety of partners, including Speakeasy. “Even in a down economy, a lot of businesses are still looking for more bandwidth,” Altman reports. Instead of adding bandwidth to support more employees or more offices, many businesses are using additional bandwidth to support cost-efficiency programs and drive new business. For example, one Bridgevine Business client is cutting their travel budget by introducing video conferencing. Others are exploring new online revenue streams and managing their own email campaigns.

There is no reason to believe that companies will turn away from Business Ethernet when the economy recovers. As leading analysts Frost & Sullivan explain, “companies who are in need of network connections will be unlikely to use the old and expensive circuit-based technology again.”³ Ethernet will continue to be “a very attractive service” and migration will continue as the availability footprint grows.

¹ Shree, Roopa. Ethernet Hits the Business User's Spot. 2009. Frost & Sullivan. 14 May 2009. <<http://www.frost.com>>.

² Mahoney, Doug. Carrier Ethernet Showing Double-Digit Growth Despite Economy. 2009. Fierce Telecom. 14 May 2009. <<http://www.fiercetelecom.com>>.

³ Shree, Roopa. Ethernet Hits the Business User's Spot. 2009. Frost & Sullivan. 14 May 2009. <<http://www.frost.com>>.