Supercharging Productivity: An Essential Guide for Gigabit Ethernet and Hyper-Threading Technology

By Carol Hildebrand

Although most managers think technology is a competitive advantage for large companies, nowhere is it more important than for the small to medium business. And more than ever, these businesses depend on technology to power their economic engine. Leveraged wisely, technology can help companies work smarter and be more productive, driving down costs at the same time. Indeed, technology can assist small and medium businesses (SMBs) by providing them the necessary productivity to push their businesses beyond their limits.

How important is the desktop when conducting day-to-day business? Answer — very important as a substantial amount of business data can now be found on the desktop. Being able to quickly create and share that data should be a top priority for businesses of any size. And a key success factor in utilizing and sharing information lies in a business’s decision to invest in new desktops that leverage innovative technologies for efficient and enhanced processing of information and applications. Although SMBs constantly juggle the tradeoff between cutting-edge technology and budget constraints, the investment can pay off in terms of productivity gains.

According to “The Corporate Refresh Cycle Grinds into Motion,” a 2003 report from IDC, the tough economy has forced some companies to cut costs by delaying desktop and notebook upgrades. The result: lost productivity. “An institution can stretch the replacement cycle only so far and then it starts to cost itself money, in both hard dollars and opportunity costs,” states the report.2 Not only that, but many small to midsize businesses struggle with IT resources. Many cannot afford a large full-time IT staff and depend on the services of one or two IT professionals for the full gamut of services. As a result, SMBs generally cannot afford — either in terms of budget or manpower — to implement technologies that don’t easily work within the framework of their existing infrastructure.

All this is playing out in a business climate characterized by even heavier demands on desktop performance. Users are increasingly running multiple applications simultaneously, while demanding network bandwidth for shared applications and rich-media content. Based on recent usage trends, desktop and network performance will certainly face increasing demands. According to the IDC report, “If your organization hasn’t upgraded its client since before the Millennium, now is the time to get started. From now on, older clients will create more and more of a drag on competitiveness and profits.”2

Gigabit Ethernet in Conjunction with Hyper-Threading Technology: An Answer for the SMB Market

Dell desktops and workstations coupled with both Intel® PRO Gigabit Ethernet3 and Intel® Pentium® 4 Processors with Hyper-Threading Technology1 provide a solution to small and midsize businesses looking for a performance boost. By combining Intel PRO Gigabit Ethernet and Pentium 4 processors with Hyper-Threading Technology — which now come standard on many Dell™ OptiPlex™ business desktops and Dell Precision™ workstations — IT managers at businesses may be able to realize outstanding performance improvements at minimal investment.
“Dell is bringing Gigabit Ethernet to the industry mainstream by taking a relevant technology, providing it with a stable platform and offering great value through our direct model. That’s important to our customers when you think about how networks are going to be used in the future.”

Frank Muehleman, Senior Vice President and General Manager, Americas Small and Medium Business Division, Dell Inc.

Indeed, 2003 is turning out to be a watershed year for Gigabit Ethernet desktop connections. Prices on the technology have declined, and the technology has matured as companies such as Dell have incorporated Intel’s PRO Gigabit Ethernet into many of its standard desktop profiles. Not to mention, Dell also offers Gigabit-enabled PowerConnect switches to complete the connection from the desktop to the server. In the past few months, Gigabit Ethernet to the desktop has moved beyond specialized and high-tech companies to ordinary businesses and applications — a clear sign that the market is maturing. For example, as of 2003 year-to-date (August 2003), Dell has sold over 40% of its desktops in the U.S. with Intel PRO Gigabit Network Connections to small and medium-sized businesses.

According to “Supercharging the Desktop,” a special report from Network World, the Dell’Oro Group estimates that the number of Gigabit Ethernet network connections over copper ports installed on network switches will have jumped from 2 million last year to 5 million this year, and will jump again to about 20 million in 2005.6 This is a significant number considering desktop connections account for the majority of Gigabit Ethernet over copper ports.

Most often what justifies the upgrade for these users is not a single killer application. Rather, it’s the promise of enhanced system performance to meet users’ intense multitasking needs as applications become more bandwidth-intensive and users more sophisticated. “Desktop applications used to consist of some e-mail, Web browsing, and Microsoft™ or Lotus™ applications; however, users are now doing real-time virus scanning while real-time network applications are being pushed to the desktop,” notes Indraj Gill, Director of Marketing, OptiPlex Desktops, Dell Inc.

Businesses are also leveraging the network to perform such bandwidth-intensive tasks as application and operating system upgrades, as well as hard-disk backups. Meanwhile, applications and files are getting larger, with more graphics and multimedia content. “Put all that together, and the time it takes to get from the desktop through the network to the server gets longer,” says Gill. “So Gigabit Ethernet to the desktop in conjunction with the Intel® Pentium® 4 processor with Hyper-Threading Technology can enable users to increase their productivity by getting data faster and doing more simultaneously.”

The Need for Speed

How much faster? With Intel® PRO Gigabit Ethernet Network Connections, Dell desktops and workstations can receive throughput between 500 and 800 megabits per second, the same as or faster than hard disk transfer rates, and data gets to end users 5 to 8 times faster than with traditional Fast Ethernet (100 megabits per second) connections.7 The Intel Pentium 4 processor with Hyper-Threading Technology further enhances a desktop’s ability to get the full use out of a Gigabit Ethernet link. What is Hyper-Threading Technology? Hyper-Threading Technology is an enhancement to the Intel NetBurst™ microarchitecture that allows two threads or instruction streams to run independently and in parallel on a single Intel® Pentium® 4 processor.
processor. The processor allocates its execution resources—including cache memories, execution units and buses—between the two logical processors (See Figure 1).

“Intel® PRO Gigabit Network Connections and Intel® Pentium® 4 Processors with Hyper-Threading Technology complement one another to maximize desktop network application performance.”

John Zanot, Director of LAN Access Division Marketing at Intel.

Recent benchmark test results help support this claim. VeriTest™, an independent technology testing lab, reported testing results from the combination of Gigabit Ethernet and Hyper-Threading technologies in April 2003 after being commissioned to do so by Intel. In one test, VeriTest tested the technologies on desktops with simultaneous tasks such as downloading files from a network shared drive while converting a PowerPoint presentation to a portable document format (PDF). VeriTest compared a desktop with the Intel® PRO/1000 MT Desktop Adapter and an Intel® 2.8GHz Pentium® 4 processor with Hyper-Threading Technology® with a similarly-equipped desktop with the same processor (but no Hyper-Threading capability) and Fast Ethernet (100 Mbps). The results of this test scenario showed that the desktop using both Gigabit Ethernet and Hyper-Threading Technology achieved a performance increase versus the same desktop equipped with Fast Ethernet and no Hyper-Threading. Even more impressive, the desktop equipped with the Pentium 4 2.8GHz processor and Hyper-Threading Technology and a Intel PRO/1000 MT Desktop Adapter converted the PowerPoint presentation to an Adobe PDF format almost 4.90 times faster than a Intel® Pentium® III desktop with Fast Ethernet and no Hyper-Threading, which is a typical configuration for a PC purchased several years ago. However, when today’s desktop with Hyper-Threading Technology was coupled with a Fast Ethernet connection at 100 Mbps, the performance improvement was only 2.99 times faster than the Pentium III desktop. The complete results of VeriTest’s networking multi-tasking testing are reproduced from its report in Figure 2.

Gigabit Ethernet and Hyper-Threading Technologies should also boost network performance, helping to enable IT managers at small to midsize businesses to maximize their resources. As more and more tasks—such as updating software, troubleshooting hardware, and performing virus scans—take place on the corporate network, IT managers need to be able to do these jobs with minimal impact to user performance. Desktops with an Intel® PRO Gigabit Ethernet Network Connection and a Pentium 4 processor with Hyper-Threading Technology can also help boost servers to top performance across the network by minimizing the amount of processing time for simultaneous tasks. Combine these servers with affordable Gigabit network switches from Dell, and you can help ensure powerful networking speeds.

**Counting the Cost**

For small to midsize businesses, price is always a determining factor when it comes to technology implementations. With Gigabit Ethernet’s interoperability with existing 10/100 technology, businesses can implement this technology at minimal investment and in a staged approach over time.

With the Intel® PRO Gigabit Network Connection now available on most of Dell’s OptiPlex business desktops and Dell Precision workstations, implementation can simply be a part of scheduled desktop upgrades. In fact, a full range of Dell products, from switches and servers to storage solutions, support Gigabit Ethernet. Furthermore, many businesses can deploy Gigabit Ethernet to the desktop on a building’s existing Category-5 copper cable, simplifying the implementation process. And Category-5 cable is used by more than 85% of current network installations, according to past surveys by Sage Research. Being able to leverage the same cable for 10 megabit, 100 megabit and up to one gigabit per second connections allows businesses to make a gradual transition while preserving communications for legacy systems. Most important, Gigabit Ethernet’s benefits are built to last, providing businesses with plenty of headroom to expand and build on existing technology (See Figure 3).

Why are SMBs well positioned to leverage new technologies? Answer — because SMBs tend to have the visibility and
flexibility to determine what IT products need to be upgraded, the improvements to performance and productivity they’ll realize, and what it will cost. In the end, providing headroom for future growth and supplying employees with the technology tools to boost productivity will impact the bottom line. Any technology that can assist small to midsize business in maximizing their productivity while leveraging existing budgets and infrastructure is sure to be a winner.

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The Top Five Things an SMB Should Know About Gigabit Ethernet

MAJOR ADVANTAGE FOR MINIMAL COST.

Gigabit Ethernet technology when implemented across a network and desktop can boost performance as much as eight times that of Fast Ethernet. It can transform the rate of network data flow, supercharge desktop productivity and help reduce bottlenecks; and it can do so at minimal investment. For example, Intel PRO Gigabit Network Connections are standard on a range of competitively-priced Dell IT products.

DEPLOY EVERYWHERE WITH MINIMAL DISRUPTION

Gigabit Ethernet allows you to migrate to the next generation of networking with standard Category-5 Cabling. For a small business network, Gigabit over copper offers the ideal solution. It’s simple and cost-effective to deploy, making use of your existing cabling without any re-wiring. You can improve performance while balancing your budget.

INCREASED PERFORMANCE FROM SERVER TO DESKTOP

The desktop is the premier business tool for small to midsize businesses today. Workers depend on it to create and share information and collaborate with workers on a daily basis. So it makes sense to boost the performance of both the desktop and the network that supports it.

AN INVESTMENT FOR TODAY AND TOMORROW

Interoperability testing means that you can deploy Gigabit Ethernet anywhere on your network with complete confidence. The auto negotiation feature means that your network components — desktop, switches, and servers — will automatically adjust their transmission speeds when components are upgraded to Gigabit. This makes your transition to a faster network and a more productive office possible in a staged approach. Your investment in your existing structure is maximized — not rendered obsolete.

EASY TO INSTALL AND MANAGE

Gigabit Ethernet is not only backwards compatible with 10/100 Ethernet, but it’s easy to install on an incremental basis. For example, it can be deployed as a business upgrades its systems and by adding an all-Gigabit switch to complete the connection from the desktop to the server. Also, Intel’s PROSet Utility can provide fast and easy driver maintenance.

For more information on Gigabit Ethernet, check out "Gigabit to the Desktop: All Systems Go!", an informational Web cast at www.dell.com/gigabitwebinar or call 1-888-809-3355.