

## WHITE PAPER

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### Building Networks for Business

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#### IDC OPINION

Business executives at enterprises are confronted today with increased global competition and rapidly changing customer needs and wishes. In Europe, trade regulations are being relaxed and competition from low-cost regions is heating up. Worldwide, technology is available allowing enterprises to compete on a larger scale and at a lower cost than ever before. In such an environment it is crucial for enterprises to operate as efficiently as possible and to be able to quickly adapt to changes in the marketplace.

At the same time, IT directors and IT managers are confronted with an increase in the number and nature of applications used and a corresponding increase in bandwidth consumption. IDC believes that a well-managed and up-to-date network can help enterprises to tackle both business and IT challenges. This business network should enable mobility, security, and application availability, while running at a high efficiency rate and a low operational cost. In addition it should be future proof and ready for converged applications such as voice over IP (VoIP). As a result, enterprises can concentrate on running the business rather than on running the network.

This white paper, written by IDC and commissioned by D-Link, discusses how medium-sized enterprises and enterprise branch offices use networking technology for their enterprise communications infrastructure to deliver improved operational efficiency and increased competitiveness at reduced costs.

#### TODAY'S BUSINESS CHALLENGE

Business has become more global in nature and employees have become more mobile. At the same time, enterprises have put a greater emphasis on their core competence and started to source a number of non-core activities through partners. Because of the build-out of this global, mobile, distributed network of sites, employees, customers, and partners, the role of IT and communications has become increasingly important. In today's global economy the ability to distribute knowledge swiftly and intelligently is critical.

Although enterprises are getting more global and employees are getting more mobile, most of the IT budget remains focused on delivering services to the desktop. In reality, an increasing number of employees may be away from their desk for more than one-third of their working day. The result is that finance is paying for equipment that is not being used effectively. The way to reduce costs and increase productivity is to make sure that IT investments — even if budgets are tight — are being directed where they will have the most effect: supporting the increasingly distributed and mobile business environment.

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## Competitive Challenges

Increasing competitiveness is a key issue for business executives, enabling them to be more profitable and gain market share. Below is a summing up of the most important competitive challenges for enterprises today. Both balancing and managing these challenges is key.

- ☒ In a market where the economy is weak and prices are under pressure, it becomes increasingly difficult to grow revenues. In order to increase revenue, enterprises need to grow the average spend per customer — for instance, by launching new products — find new customers, or implement new business models.
- ☒ In today's competitive marketplace, it is very difficult to increase prices to maintain profitability. Instead, a company has to learn how to do business at a lower cost.
- ☒ Maintaining customer loyalty and satisfaction is of the utmost importance. Enterprises cannot afford to lose business and customers to a competitor because they are not satisfied.
- ☒ Today's economic uncertainty makes it difficult to do business the easy way. In a challenging economy, the best-run companies tend to survive longer and compete better.
- ☒ Doing more with less has become a mantra for many large organizations and many smaller and midmarket enterprises are now implementing programs that aim to achieve the same.
- ☒ Even in the public sector, efficiency and accountability play an important role. Government organizations, educational institutes, healthcare organizations — all have to deal with the realities of increasing competition and public scrutiny.

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## Operational Challenges

The above competitive challenges make it clear that operational excellence is a prerequisite for supporting competitiveness at a higher efficiency rate and a lower cost. As a result, IT managers are being forced to deal with the following:

- ☒ A limited budget. The challenge is to buy the best product or service at the lowest cost or price.
- ☒ Limited IT resources and expertise. The challenge is to get the most out of the infrastructure at the lowest cost.
- ☒ Dealing with increased regulatory requirements, such as data privacy rules, which can be an additional cost imposed upon the business.
- ☒ Security issues. In an environment where there is less budget and staff to deal with this, security has to be built in the infrastructure at a low cost.
- ☒ Limited bandwidth. In an environment where applications are getting larger and multimedia traffic is increasing, bandwidth can become a scarce resource.

- ☒ Keeping things simple. When you do not have the manpower to streamline operations, management and ease of use become paramount.
- ☒ Keeping technology investment up-to-date. Even if your IT infrastructure is the best solution for the lowest price, technology is changing rapidly. How do you keep up with the latest improvements at a reasonable cost?
- ☒ At the same time, IT needs to be used as a competitive weapon, rather than purely a defensive measure.

## **BUILDING NETWORKS FOR BUSINESS**

Although networks cannot solve the above competitive challenges, networks can be used to address the highlighted operational challenges and as a result make it less challenging for an enterprise to compete. Networks are at the heart of the IT and business infrastructure. In today's business environment, networks help both people and applications to communicate. They should be designed to make data and voice communications instantaneous and easy. For example, consider the effects of a network failure on email. Every enterprise has an email server that depends on a network for connectivity. If a network switch or router fails, email and business stop. Customers are affected, employee productivity slows, and revenue dries up.

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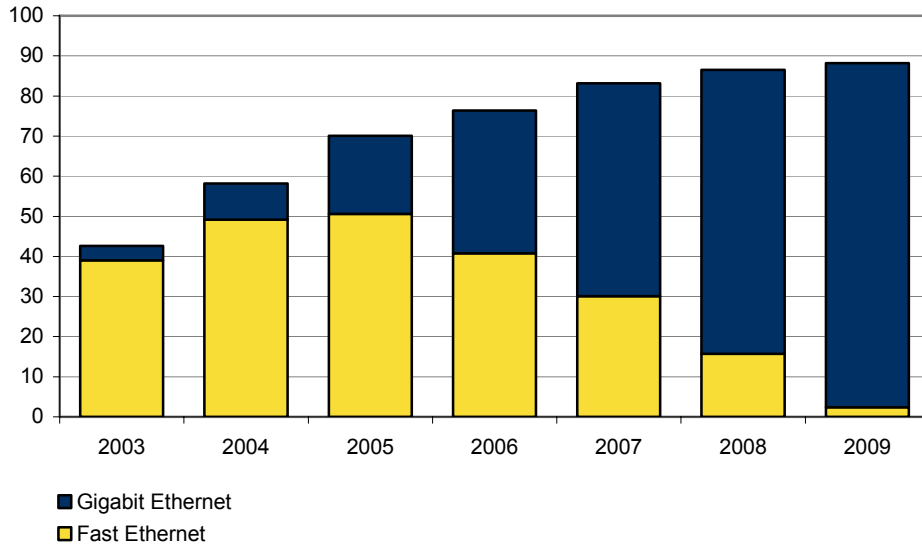
### **Network Bottlenecks and Characteristics**

Because networks tend to grow with your company, your current network might not be optimized for competitiveness and operational excellence. If the network fails, the business suffers. Here are some of the most common bottlenecks and their immediate solutions.

- ☒ **Limited performance for new applications.** The way enterprises deploy networks is changing and the performance requirements put on networks are becoming more demanding. IP telephony and other collaborative applications are driving more traffic through the network. File size continues to grow and we are witnessing the convergence of voice, video, and data. Consequently the network does not deliver the performance that is needed. Although upgrades take place every year, we are entering a significant migratory phase within which customers are upgrading to Gigabit Ethernet connectivity from fast Ethernet connectivity. The declining prices of this new technology have everything to do with this shift. The average selling price (ASP) for a Gigabit Ethernet port in Europe has fallen from €344 in 2003 to €134 in 2005. Already today, enterprises are using 10-Gigabit Ethernet technology for aggregating extremely high volumes of traffic. Figures 1 and 2 show the expected uptake of Gigabit Ethernet and the corresponding drop in average price.

**FIGURE 1**

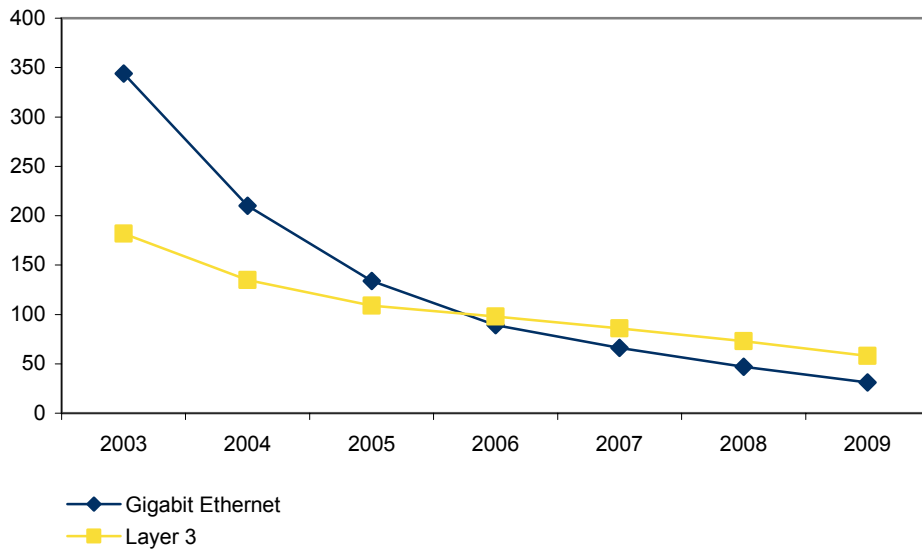
Gigabit Ethernet Gaining Ground in Europe — LAN Switch Port Shipments (M)



Source: IDC, 2005

**FIGURE 2**

Rapid Price Declines in New Network Technology — Average Price per Port (€)

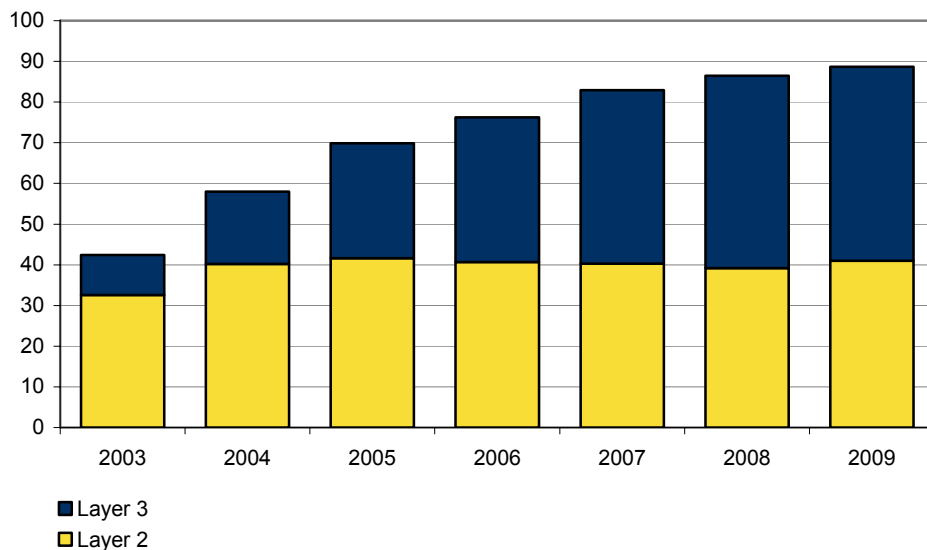


Source: IDC, 2005

- ☒ **Limited support for users.** Even when containment of costs is paramount, there will be the need to support more users on the network when business is growing. The network will need more density to support more users but with the performance to make sure users get the bandwidth they require. This calls for the usage of LAN switching technology and form factors that are small in size but can be easily expanded with more ports that can be added as business grows.
  
- ☒ **Lack of intelligence in the network.** Many customers are starting to reduce their overall networking expenditures by converging their voice and data networks into a single network. In such a situation, it is crucial that the network has the intelligence to prioritize applications. LAN switches with the intelligence to do this are generally labeled as Layer-3 switches. Demand for latency-sensitive applications such as voice and video, along with improvements in the tools to measure quality of service metrics on the network and price declines, will help drive adoption of Layer 3 functionality. In addition to application prioritization, Layer 3 functionality provides better filtering, increased security, improved bandwidth allocation and improved network trouble shooting capabilities. The ability to manage networks intelligently is also improved through Layer-3 switching. Figure 3 provides evidence of the increasing popularity of this technology in Europe.

**FIGURE 3**

Growth in Network Intelligence in Europe — LAN Switch Port Shipments (M)



Source: IDC, 2005

- ☒ **Unreliable network performance.** New IT applications such as high performance computing, server clustering, SANs, disaster recovery, streaming media, and multisite collaboration, have their impact and influence on the network. In situations where these applications apply, one should consider migrating to a high availability network. LAN switch infrastructures that support server farms and clusters require higher levels of performance and resiliency than a typical Layer 2 wiring closet switch.

- ☒ **Limited management capability.** When the network fails to deliver the right message at the right time, customers and employees cannot communicate, so productivity suffers and revenue stops flowing. This is the moment to implement managed switches. By minimizing downtime and network performance degradation, managed switches allow businesses to operate more efficiently, cut costs, and prevent revenue loss. Management software that resides in managed switches provides early warning systems for possible network strains and is a tool for network administrators to improve network performance and network efficiency.

In addition to the above, networks must also be transparently accessed by all applications. Important generic network characteristics of an up-to-date network are:

- ☒ **Anytime, anywhere access.** Improving application availability and employee productivity are important points, but this has to go hand in hand with the ability to ensure that employees get the appropriate information at the right time and that unauthorized access is prevented. Naturally, many IT managers want to keep control over network access in this way.
- ☒ **Improved network reliability.** Most employees rely on the corporate LAN to access applications, share information, and communicate with their colleagues and others. Any downtime or poor network performance impairs their work and makes them and the company, less effective. Keeping users connected and productive is paramount.
- ☒ **Power over Ethernet (PoE) capability.** It is not just PCs and servers that are attached to networks today. Increasingly VoIP phones, wireless access points, and IP cameras are being deployed. Power over ethernet (PoE) technology supplies power to devices attached to Ethernet LANs through the wiring that is already being used for data transmission. The benefits of doing this include more flexibility and efficiency in network design, lower cost in installations, easier moves, adds, and changes, and enabling centralized power management. For example, sometimes the best location for a wireless access point is in a place where there is no power outlet close by. Similarly, effective security measurements require flexibility in the placement of IP cameras. Also, VoIP phone installations can benefit from power backup solutions that are already attached to the PoE-enabled switch.
- ☒ **Simplified provisioning and lower management.** Enterprises can save money and time by automating the configuration management process and eliminating the need to configure each individual switch, one at a time, in a scheduled manner. Further, by reducing the amount of time network administrators spend on common, labor-intensive administration tasks, the automated features of network management free up network professionals to work on strategic business initiatives that drive revenue.

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## Security

Enterprises rely heavily on the network and the ability to seamlessly move information across it. On the one hand, networks have to remain open and accessible for partners because of this. On the other hand, it is unfortunately also the network that presents the most threats through both targeted and non-targeted attacks. For these reasons, enterprises have kept investing in security technology despite the very low economic growth. IDC surveys show that security remains the number 1 reason to upgrade network equipment. The following considerations remain important in this respect:

- ☒ The increasing reliance on the Internet as the computing platform makes enterprises vulnerable to attacks through the net.
- ☒ The need to protect transactions and credit card payments. With ecommerce rapidly growing, transactions and payments need to be secure.
- ☒ The increasing adoption of data-intensive applications, not only within the enterprise boundaries, but also to automate processes with partners and suppliers, makes companies more vulnerable to attacks that can have severe consequences for partners and customers.
- ☒ The emergence of mobile solutions to increase efficiency should at the same time be coupled with security implementations that allow for secure mobility.
- ☒ The need to protect sensitive data and respect data privacy/regulation. Local and European governments put rules and regulations in place that make companies accountable for privacy breaches. However, if compliance leads to the deployment of IT solutions that at the same time allow an organization to enhance productivity, reduce costs, and enable the delivery of new products or services, then compliance is not seen only as a burden.

In order to maintain the benefits of instant communications with employees, partners, and customers, and also to minimize security risks, the network has to make sure that devices and users are "clean" and authenticated, access is restricted only to those resources that the user is authorized to see, traffic coming from an authenticated device is authorized, policies are enforced network-wide, and unauthorized users and viruses are prevented from damaging the network. Of course, network performance should not be affected while securing the network.

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## Availability

The more efficient the network is the more productive you are. You lose competitive advantage if you are too slow. A network needs to touch all the employees to make applications available across the business but it also needs to be up and running 100% of the time. By their nature, networks are commonly distributed across sites, PCs, and servers and can depend on other devices as well. Availability thus becomes an even more critical and complex issue on networks. A network that is built for business should therefore have high availability systems that typically include redundant hardware (e.g., power supplies) and intelligent software (e.g., load balancing and failover functionality). In addition, proactive network management software will alert you to network problems that might occur in the near future and will provide you with the tools to prevent them. Also, network resilience, which is the

capability of the network to continue to function in the case of unexpected problems, is an important characteristic of a high availability network. For instance, the capability to intelligently reroute network traffic, avoiding unresponsive network segments, is a key feature here.

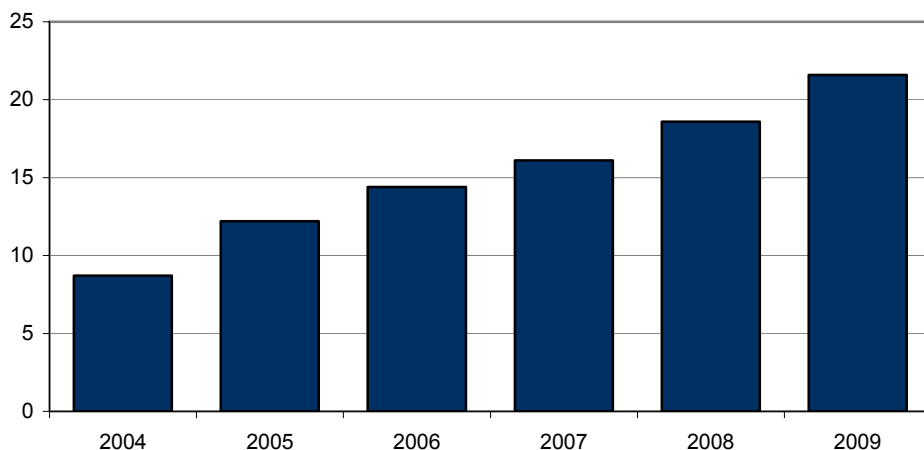
## Mobility

Global competition has forced enterprises to be increasingly spread out. Many companies also enjoy a growing mobile workforce, such as executives traveling around the world, salespeople operating in the field, and telecommuters working from home. The lines between home and workplace, occupation and recreation, time zones and international borders are fading. In addition, a company's partners and customers are subject to the same trend. Business executives most likely do not realize that in such a distributed environment the concept of improving operational excellence and application availability changes dramatically.

One of the areas where mobility solutions are increasingly being deployed is in the office and in warehouse and factory environments. Figure 4 provides IDC's prediction of wireless LAN-enabled client sales such as laptops and PDAs in the enterprise in Europe.

**FIGURE 4**

European Businesses Move to Wireless LAN — WLAN Clients Shipments (M)



Source: IDC, 2005

The benefits of deploying wireless LAN technology revolve around employee productivity gains for always-connected users, enhanced user experience, rapid deployment of new networks, and increased business flexibility. There are, however, challenges associated with the use of this technology. Budgets are limited and the skills to deploy wireless LANs effectively and securely are often not available. An important characteristic of a business-ready wireless LAN solution therefore is the availability of simple to use and automated installation and maintenance tools. Time consuming tasks such as installation, configuration, channel selection, device discovery, and power adjustments can be automated that way.

## SELECTING NETWORKS FOR BUSINESS

Enterprises want to be focused on the business rather than on technology. When looking for networking solutions they should therefore look for suppliers that can help support their limited IT operations and abate their lack of resources in time, money, and trained personnel, leaving them to focus on their core activities. The first decision you need to make in a selection process is to whether to build and run the network yourself or whether to outsource it. Also you need to think about the return of your investment and the total cost of ownership. Many solutions on the market are expensive and require extensive integration and deployment. These solutions work well for large enterprises with large IT organizations and the necessary resources, but they are not generally appropriate for other enterprises. Feature selection and analysis should center on the business requirements and resource limitations of the IT staff. Match your needs with products that are easy to use and deploy to lower your network TCO.

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### Do it Yourself (DIY)

If you have the IT resources and expertise it can be cost effective to implement and select a network yourself, of course with the help of a local partner that understands your business needs. To achieve maximum benefits you need to select technology that is easy to use, and provides immediate and clear benefits. The following vendor and product selection criteria are important in this process and are invariably mentioned by all customers that IDC talks to:

- ☒ Quality — This remains selection criteria number 1 for the vast majority of customers. The product needs to do what it says it will do on the box, no compromises. For businesses with a large IT staff, the availability of many features and functionalities will define quality. If limited IT staff are available, however, one should look for enterprise quality coupled with ease of use and manageability rather than just feature function. This has the associated benefits of lower deployment costs.
- ☒ Reliability — Also consistently mentioned in the top 3 selection criteria. Especially important in network technology that connects employees, partners, and customers.
- ☒ Cost — Another one of the top 3 and perhaps the ultimate decision maker. For when quality and reliability are comparable, it is through comparing the cost — and there are several ways of doing this, as explained in the section on ROI and TCO — that a final decision is reached. Look for a product that will meet your business and technical requirements at the lowest cost.
- ☒ Service — This goes hand in hand with quality, reliability, and cost. A quality product for a good price but with prohibitively expensive annual service and warranty cost should be identified in the cost comparisons.
- ☒ Product portfolio — Vendors with a comprehensive portfolio can deliver choice and compatibility. With networks becoming more like systems and less dependant on single products, a wide selection of LAN switches, routers, wireless LAN, security, voice, etc., is important.

- ☒ Industry standards — It is important to preserve your investments in network technology and to use industry standard products. For instance, the usage of Ethernet across the company simplifies management and maintenance and training. Previous investments in Ethernet can be preserved when migrating to Gigabit and 10-Gigabit.
- ☒ Geographic proximity — One of the things that is consistently mentioned by IT managers and directors is the value they place on working with a supplier or supplier partner that is close to them. This means close in terms of geographic proximity, but it implies also closeness in terms of understanding culture and local business issues.
- ☒ Features and functions — Focus on the key features and functions that you need, not the ones you are never going to use. Analyze the level of automation and manual time that is necessary to deploy, operate, and maintain the product.
- ☒ Ease of use, implementation, and management. Businesses have a need to deploy services faster while lowering the cost of delivery of these services. Test drive the solution prior to purchase to confirm that the architecture and support needs do not overtax your users and IT staff.

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## **Outsourcing**

If you do not have the resources and expertise you might want to opt for managed services or outsourcing of the network. The benefits of this approach are the following:

- ☒ Predictable operational expenditures instead of capital expenditures
- ☒ No need to maintain expensive IT resources or expertise
- ☒ The ability to lower administrative and maintenance costs

There are many middle roads available between a DIY or fully outsourced solution. For instance, remote network management, managed services, or hosted networks and applications are some of the available flavors. It all depends on balancing technology and business decisions.

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## **ROI and TCO**

In addition to quality and reliability, cost is also in the top 3 buying decision criteria. As mentioned above, if quality and reliability are comparable, it is through comparing costs that decisions will be made. It is important to look at two key cost metrics when evaluating network products and solutions:

- ☒ Total cost of ownership (TCO)
- ☒ Return on investment (ROI)

What are these two metrics and when are they appropriate? TCO calculates the total capital and operating costs to deploy a technology within a given timeframe. ROI is a comparison of incremental benefits versus incremental costs. TCO is appropriate for comparing options of equal benefit and low differentiation. It can be used to manage a total cost picture. ROI is appropriate for choosing among investment alternatives. It can be used to manage and maximize overall incremental benefits.

For instance, when a wireless LAN solution is installed, a comparison can be made between different vendors on the basis of how much it will cost to buy, operate, and maintain the wireless LAN network. However, before this TCO analysis is done, one should analyze the incremental business benefit of the wireless LAN installation. For instance, employee productivity might rise, which can be measured as a benefit. The cost of the wireless LAN investment can then be offset against the gains in business productivity.

## **CONCLUSION**

Networking and Internet have changed the way we do business. As a result global competition is forcing companies to do more with less. Networking technology can improve your operational excellence and hence your competitiveness. Improving your network is not just about technology but also about maximizing employee productivity, increasing application availability, improving business continuity, and reducing costs. Your business partners expect you to operate efficiently, react more quickly, and anticipate customer demand better. Today you can get the technology capabilities that large enterprises have — your customers know you can. Gigabit Ethernet, Layer-3 switching, wireless LAN, and network security solutions and technologies can help you compete better and more efficiently. Executives should consider both the technical and staffing costs associated with running a network. Hiring the right experts and affording their services requires time and resources that many enterprises may not have. These challenges underscore the need for a product with an intuitive GUI that is easy to use and cost-effective. Buying a product that is difficult to use and requires extensive training fails to provide the value that enterprises need and can actually increase the cost of network ownership.

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